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# Peer feedback in teacher professional development

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# Chapter 2

## Implementation Models of Teacher Peer Feedback: A Systematic Review

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## Abstract

Although the effects of teacher professional development (TPD) programmes involving peer feedback have been previously examined, peer feedback has been implemented differently in these programmes. Consequently, it is necessary to provide an overview of how peer feedback is implemented in TPD programmes, and which factors determine teacher-learning effects. Based on a systematic literature search, 29 articles were selected and reviewed. Four implementation models of teacher peer feedback are distinguished (i.e., lesson study-based peer feedback, research-initiated peer feedback, supervisor-guided peer feedback, and self-regulated peer feedback). Meanwhile, we identified five factors that influence teacher learning through peer feedback (i.e., characteristics of participants, training and supervision, schedule and duration, support and tools, and characteristics of feedback). These findings lead to suggestions on how to further improve the implementation of peer feedback in TPD programmes for teachers.

## 2.1 Introduction

Peer feedback is a commonly implemented element in many teacher professional development (TPD) programmes, and its effect on teacher learning has been examined in previous studies (Chien, 2017; Iacono, Pierri, & Taranto, 2019; Jin et al., 2019; Ma, Xin, & Du, 2018; Sanetti et al., 2014). These studies not only indicate the positive effects of teacher peer feedback but they also show different practices and various factors that influence teacher learning through these peer-feedback activities. These practices and influential factors have led to many different descriptions of peer feedback, without giving much information about how it has been included in the programmes. Therefore, to improve the future implementation of peer feedback in TPD programmes, a more generalised understanding of these different practices is needed. In this study, the literature on teacher feedback will be reviewed to build implementation models (i.e., the structure and procedure of peer-feedback activities, which consists of different aspects of the practice of peer feedback, such as the contexts, components, phases, and participants) and to identify those factors that may affect teacher learning through these programmes.

## 2.2 Peer feedback in TPD programmes

In the current study, we use the term 'teacher peer feedback' to cover all teacher-learning activities that include peer feedback as the main component. To do so, we further defined teacher peer feedback according to Hattie and Timperley (2007), who defined feedback as "information provided by an agent (e.g., teacher, peer, book, parent, self, and experience) regarding aspects of one's performance or understanding" (p. 81). In this definition, two main elements can be identified: the agent and the aspects of performance on which the feedback is provided. In teacher peer feedback, the feedback agent is a teacher who provides feedback to peers based on not only teaching performance and understanding but also their teaching plans and practical issues (Ma, Xin, & Du 2018; Zan & Donegan-Ritter, 2014).

Teacher peer feedback is a common component in many TPD programmes and it has been found to support teachers' improvement of teaching. For example, Ma, Xin, and Du (2018) examined the learning outcomes of an online personalised learning programme involving peer feedback based on both teaching plans and teaching videos. Based on the analysis of peer feedback conversations, revised lesson plans, and teaching videos, the authors found that peer feedback improved the teachers' programme participation, teaching design skills, and in-practice teaching abilities.

Iacono, Pierri, and Taranto (2019) embedded written peer feedback on a teaching plan in a blended course for mathematics teachers, and found that feedback on their teaching plan enabled the teachers to improve their instructional design skills. Briere et al. (2015) investigated the effects of a within-school consultation intervention, where veteran teachers provided performance feedback to new teachers. The authors found that new teachers increased their rate of specific praise. In summary, the results of these studies show that peer feedback can be an effective and crucial element in TPD programmes.

Teacher peer feedback is generally implemented differently according to the specific programmes that it is embedded in. Within these programmes, different factors are found to affect teacher learning through peer feedback. For example, Chien (2017) conducted a study based on a programme called 'teaching demonstration' where a group of in-service English teachers observe each other's teaching and provide feedback to each other under the supervision of a professor in education. Based on this programme, Chien (2017) found six factors that affect teacher peer feedback, as follows: handbooks for observations, the supervisor's expertise, the observed teachers' expertise, the observers' discussions, location, and training workshops. Jin et al. (2019) studied a teacher-learning programme that involves peer feedback in the form of 'novice–expert interaction', where expert teachers (with more teaching experience) reviewed novice teachers' teaching videos and provided constructive feedback. Given that their study was conducted in a Chinese vocational education context, Jin et al. (2019) argued that the main influential factors were Asian culture, vocational education context, and the experience gap between expert and novice teachers. Sanetti et al. (2014) used performance feedback from a special-education teacher to help three eighth-grade teachers to promote their students' self-monitored learning. They also discussed the influence of time scheduling, duration of the peer feedback-based programme and contextual features on teachers' learning through peer feedback. In addition, Jao (2013) studied the experiences of elementary mathematics teachers in a peer-coaching programme, where peer feedback was implemented by an iterative learning cycle that included a pre-conference meeting, in-class observation, and a post-observation conference meeting. An observation template and peer interview protocol were used in the observation phase and the post-observation conference, respectively. Jao (2013) found that the main factors affecting the teachers' learning outcomes were the environment where the conferences were held, the schedule, the participant's initial fear, and the use of a protocol/template. Although this diversity

in the implementation and influential factors of peer feedback provide a valuable insight into peer feedback within certain contexts, a comprehensive understanding of how peer feedback is implemented in TPD programmes is still lacking. Nevertheless, this comprehensive understanding is necessary because it can provide an analytical framework for future research and it can provide reference for the future TPD programmes involving peer feedback.

In this literature review, we aim to generalise the previous practices of teacher peer feedback into implementation models and we hope to identify any factors that may affect the teacher-learning effects. Consequently, two research questions are formulated:

- How is peer feedback implemented in TPD programmes?
- Which factors affect the effect of teacher peer feedback in the context of TPD?

## 2.3 Method

### *2.3.1 Search terms and databases*

To guide our research procedure, we followed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) standards (Moher et al., 2009). Figure 2.1 shows the process of the research method of the current review study. The Web of Science portal was used to search the articles, and all of the databases on the portal were included (i.e., Web of Science Core Collection, Current Contents Connect, KCI-Korean Journal Database, MEDLINE, Russian Science Citation Index, and SciELO Citation Index). We set the following pre-conditions before the search: the language of the search results is English and the time span is from 2000 to 2020. For the search terms, we used ‘peer feedback’ and all its synonyms (i.e., ‘peer assessment’, ‘peer review’, ‘performance feedback’, ‘peer evaluation’, ‘peer coaching’, and ‘peer observation’), combined with ‘teaching’, ‘teacher’, ‘mentor’, and ‘educator’, respectively. The search process yielded 3873 results in total. After removing the replicates, 2638 unique records remained.

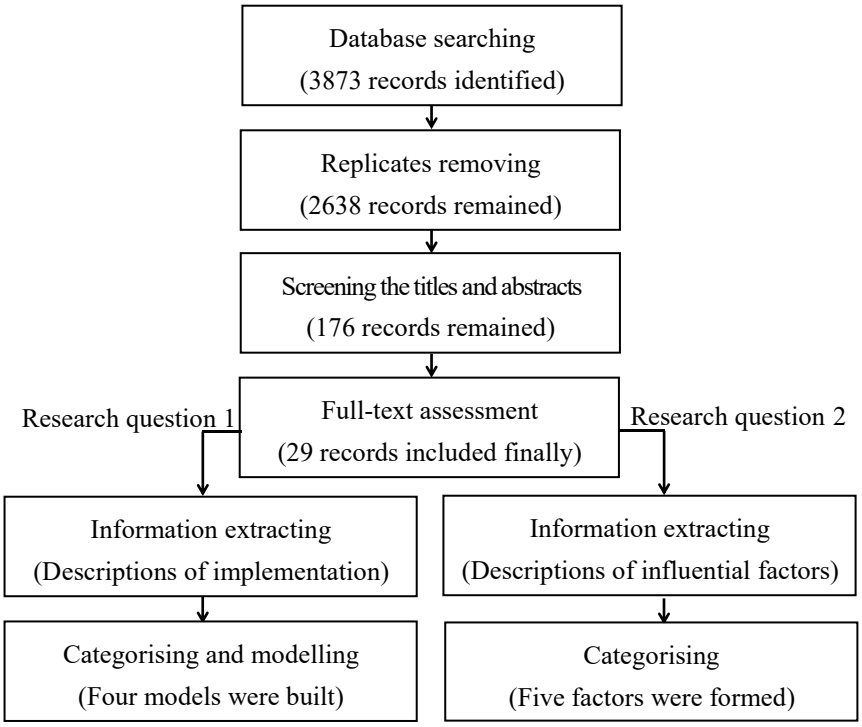


Figure 2.1 The general process of the research method

### *2.3.2 Screening titles and abstracts*

The titles and abstracts of the identified articles were screened according to the following criteria: 1) the included articles should be empirical studies involving teacher peer feedback, 2) the included teacher peer-feedback activities should be developmental in nature (i.e., the peer feedback should be used to improve teachers' teaching practice), 3) the feedback provider and receiver in the research should both be in-service teachers (note that 'teacher' was perceived broadly in the current study, which includes people whose full-time job involves interacting with students and supporting the growth of students in a school, such as special educators, paraprofessionals, mentors/tutors in vocational schools and teachers in all different school subjects), 4) teachers should work in primary or secondary schools because teachers in higher education usually spend a large amount of time researching rather than interacting with students.

The screening process was carried out by the first author by reading the titles and

abstracts of the 2638 articles that we identified earlier. After the screening process, 176 articles were selected.

### 2.3.3 Full-text assessment

Given that the title and abstract may not provide enough information for screening, another round of selection was conducted based on the assessment of the full text. When assessing the full text, we set additional inclusion criteria based on our two research questions. The first research question focuses on the implementation of peer feedback, which includes articles that provide information on how teacher peer feedback was implemented in the method or context sections; thus, we checked the details of the context and method section of these articles. The second research question focuses on factors that influence the teacher-learning effects, thus we checked the results and discussion section of these articles to ensure that they provided information on the influential factors. Finally, a total of 29 articles remained.

### 2.3.4 Analysis of included literature

To answer the first research question ("How is peer feedback implemented in TPD programmes?"), we aimed to build implementation models based on existing practices of peer feedback. Thus, we first extracted all of the descriptions of the implementation procedures from the included articles. These descriptions were then labelled based on the characteristics (e.g., particular implementation steps, roles of participants, support and tools, and programme context) of the implementation of the peer feedback in the studies. These labels were further categorised into seven characteristics based on their similarity. Finally, we identified the dominant characteristics and divided the included teacher peer-feedback activities into four different models.

With regard to the second research question ("Which factors affect the effect of teacher peer feedback in the context of TPD?"), the result and discussion sections of the included articles were reviewed. In total, 72 factors were labelled throughout the 29 reviewed articles, which were then divided into eight types of factors, which are: 'characteristics of participants', 'training and supervision', 'schedule and duration', 'support and tools', 'characteristics of feedback', 'organisational management and leadership', 'relationship between participants', and 'group size'. In our results section, only the first five are elaborated because these are the most commonly recognised factors (i.e., shared by more than one-third of the reviewed articles, or 10

articles) that affect teachers' learning through peer feedback.

## 2.4 Results

### *2.4.1 Implementation models*

Before presenting the four models of peer feedback, we will present the seven implementation characteristics that underlie these models, namely: 'work cycle', 'initial instruction', 'fixed role', 'support and tools', 'learning objectives', 'process supervisor', and 'programme context'.

**Work cycle** means that peer feedback is implemented through an iterative procedure, requiring that participants go through the cycle at least twice, and every new cycle is based on the results of the last round of activity.

**Initial instruction** refers to a workshop-style instruction at the beginning of the programme, which provides participants with the basic principles and requirements of how peer feedback is conducted. However, constant supervision during the process is not labelled as initial instruction.

A **fixed role** indicates that participants are pre-assigned either as coach (feedback provider) or coachee (feedback receiver) by programme staff, and their roles do not switch during the programme.

**Support and tools** refer to three types of support used during the process of peer feedback, as follows: 1) digital environment or platform of the programme, 2) presentation tools supporting the presentation of teaching performance of the observed teachers (e.g. PowerPoint, video and audio equipment, and teaching plan form), and 3) feedback provision tools, which are used to support the observing teachers to provide feedback (e.g., checklists, observation schemes, bugs in ear equipment, and conversation prompts).

Four types of **learning objectives** of these TPD programmes are distinguished, as follows: 1) 'self-decided', which is the individualised learning objectives that participants can decide themselves based on what they want to improve through the peer feedback; 2) 'pre-set general', which is a general and same learning objective pre-set by the programme organiser for all the participants (e.g. improve teachers' teaching expertise); 3) 'pre-set specific', which is a specific and same leaning objective that is pre-set by the programme organiser for all participants (e.g. increase the amount of inquiry in the classroom); and 4) 'learning objectives', which are based on diagnosis where participants set their personalised learning objectives based on an analysis of their teaching experience.

The **process supervisor** is a facilitator of peer feedback meetings, who is in charge of facilitating the communication, pairing peer dyads, provides a guideline for observation focus or provides initial instruction to participants. The process supervisor is usually a researcher or staff member of the TPD programme. In Chien (2017), expert teachers and professors were invited to supervise the process.

**Programme context** is the context where teacher peer feedback is being conducted, which can be divided into three types: 1) peer feedback as a detached teacher-learning activity with a specific focus on peer feedback, 2) peer feedback as an embedded component in a comprehensive TPD programme where other learning activities (e.g. workshops on pedagogy) are also involved, and 3) peer feedback initiated by researchers with a specific focus on examining the change in teaching behaviour (e.g. increasing teachers' specific praise).

Table 2.1 lists the seven implementation characteristics in regards to the 29 reviewed articles. The presence of the characteristics in each article is labelled as *. Based on the seven characteristics in the practices of peer feedback, the 29 studies were clustered into four implementation models.

Table 2.1 The implementation characteristics of all peer-feedback activities in reviewed studies

| Implementation model | Author | Work cycle | Initial instruction | Fixed role | Support and tools | | | Learning objectives | Process supervisor | Programme context |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Environment | Presentation | Feedback provision | | | |
| Lesson study-based peer feedback | Artigliere & Baecher (2016) | * | * | * | | | | self-decided | researcher | detached |
| | Butler & Yeum (2016) | * | | | * | * | | pre-set general | no | detached |
| | Brix, Grainger, & Hill (2014) | * | | | | | | self-decided | no | detached |
| | Jao (2013) | * | | | | | * | self-decided | no | detached |
| | Pearce *et al.* (2019) | * | | * | | | | pre-set specific | programme staff | embedded |
| | Thurlings *et al.* (2012a) | * | * | | * | * | * | self-decided | programme staff/no[a] | detached |
| | Zwart *et al.* (2009) | * | * | | | | | pre-set specific | programme staff | detached |
| Research-initiated peer feedback | Briere *et al.* (2015) | | * | * | | * | * | pre-set specific | researcher | research-based |
| | Brock & Carter (2016) | | * | * | | | | pre-set specific | researcher | research-based |
| | Ottley *et al.* (2017) | | * | * | | | * | pre-set specific | researcher | research-based |
| | Sanetti *et al.* (2014) | | * | * | | | * | pre-set specific | researcher | research-based |
| | Walker, Douglas, & Brewer (2020) | | * | * | | | * | pre-set specific | researcher | research-based |

Table 2.1 (Continued)

| Implementation model | Author | Work cycle | Initial instruction | Fixed role | Support and tools | | | Learning objectives | Process supervisor | Programme context |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Environment | Presentation | Feedback provision | | | |
| Supervisor-guided peer feedback | Chien (2017) | | * | | | | * | pre-set general | expert teacher or professors | detached |
| | Edwards & Steed (2020) | | | * | | | * | pre-set general | programme staff | embedded |
| | Herbert & Bragg (2020) | | * | | | | * | pre-set specific | researcher | embedded |
| | Nami, Marandi, & Sotoudehnama (2016) | | | | * | * | | self-decided | researcher | embedded |
| | Rivera-McCutchen & Panero (2014) | | | * | | | * | self-decided | programme staff | detached |
| | Thurlings *et al.* (2012b) | | | | | * | * | self-decided | programme staff | detached |
| | Thijs & van den Berg (2002) | | * | | | | * | pre-set specific | researcher | embedded |
| | Visone (2019) | | | | | | * | pre-set specific | programme staff | detached |
| | Zwart *et al.* (2008) | | * | | | | | pre-set specific | researcher | embedded |

Table 2.1 (Continued)

| Implementation model | Author | Work cycle | Initial instruction | Fixed role | Support and tools | | | Learning objectives | Process supervisor | Programme context |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Environment | Presentation | Feedback provision | | | |
| Self-regulated peer feedback | Charteris & Smardon (2016) | | | | | * | | pre-set general | no | embedded |
| | Fallon & Kurtz (2019) | | | * | | | * | pre-set specific | no | detached |
| | Iacono, Pierri, & Taranto (2019) | | | | * | | * | pre-set specific | no | embedded |
| | Karagiorgi (2012) | | | | | | * | pre-set general | no | detached |
| | Ma, Xin, & Du (2018) | | | */-[b] | * | | * | based on diagnosis | no | embedded |
| | Sato & Haegele (2018) | | | | * | | | pre-set general | no | embedded |
| | Zan & Donegan-Ritter (2014) | | | | | | * | pre-set specific | no | embedded |
| | Zhang, Liu, & Wang (2017) | | | | * | | | pre-set specific | no | embedded |

Note: [a] indicates there are more than one group of participants, and some groups have a programme staff as process supervisor but some groups do not.

[b] indicates there are more than one group of participants, and some groups have a fixed role of participants but some groups do not.

### *Lesson study-based peer feedback*

Lesson study is a well-known TPD activity that centres on the collaborative study of live classroom lessons. The distinguishing feature of a lesson study is the iterative cycle of collaborative lesson design, lesson presentation, and reflection (Lewis, Perry, & Murata, 2006). In the current study, we named the teacher peer-feedback activities with an iterative work cycle as 'lesson study-based peer feedback'. Studies that used the term 'lesson study' without this iterative work cycle are not categorised into this type. For example, Nami, Marandi, and Sotoudehnama (2016) defined their programme as 'lesson study' but they only conducted the peer feedback procedure once, without a refined learning objective and a new round of observation. Figure 2.2 portrays the work cycle in the lesson study-based peer feedback model. The lesson study-based peer feedback usually starts with an introductory meeting, in which the participating teachers get to know each other and set their learning objectives with the help of their peers. In some cases, the learning objectives are pre-set by the programme organiser (i.e., Pearce et al., 2019; Zwart et al., 2009). During the introductory meeting, the researcher or process supervisor could also do the instruction; although only three of the included articles describe an initial instruction. After the learning objectives are set, the teachers plan the lesson together or alone. Presentation is the step where the teachers present their work, which could be live classroom teaching (Jao, 2013) or teaching video (Thurlings et al., 2012a). During the presentation and feedback provision phases, most of the lesson study-based peer feedback does not require fixed roles from participants: a team of teachers usually works reciprocally and takes turns playing the roles of feedback receiver and provider. Finally, after receiving feedback, the teachers adapt their learning objectives according to the feedback received from their peers.

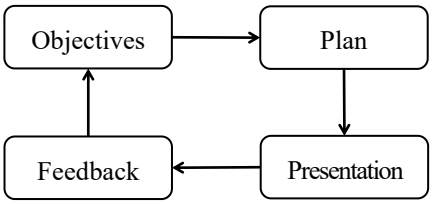


Figure 2.2 The lesson study-based peer feedback model

### *Research-initiated peer feedback*

The second type of teacher peer feedback is distinguished based on its programme context, where peer feedback is conducted as part of a research project instead of being part of a TPD programme. These research-initiated programmes are included in the current review because peer feedback in these programmes is used to improve the teachers' teaching behaviour or strategies, and the effects of feedback is subsequently examined. The research-initiated peer feedback model can be considered as the most structured peer feedback type compared to the other three models (see Figure 2.3) because all implementation characteristics (e.g., initial instruction, the fixed role of participants, and pre-set specific learning objectives) are set by researchers who launched the programme. The learning objectives in this type of peer feedback are very specific (depending on the research aim) and they are usually focused on teaching behaviour. For example, some of the objectives are to increase the teacher's specific praise (Briere et al., 2015) and improve the teacher's use of strategies to promote their students' interaction with their disabled peers in the classroom (Brock & Carter, 2016). Researchers or university experts often take the role of process supervisors. They first introduce the learning objectives to teachers and they then conduct an initial instruction in which the process supervisor matches the coach (usually a more experienced teacher) and coachee (usually novice teachers), clarifies the learning objectives and guides coaches on how to provide feedback. Compared to the lesson study-based peer feedback model, the feedback provided in the research-initiated peer feedback model is usually very specific, decontextualised and performance-based to stimulate particular behaviour, and it does not aim to refine the learning objectives. Support and tools are frequently used to provide performance feedback, such as 'bug in ear' equipment (Ottley et al., 2017), a training protocol with different prompts (Sanetti et al., 2014) and an Excel graphing template to present the teachers' performance (Briere et al., 2015). Another unique element of this type of peer feedback programme is the frequent use of probes, which are used to monitor the teachers' leaning of the targeted behaviour.

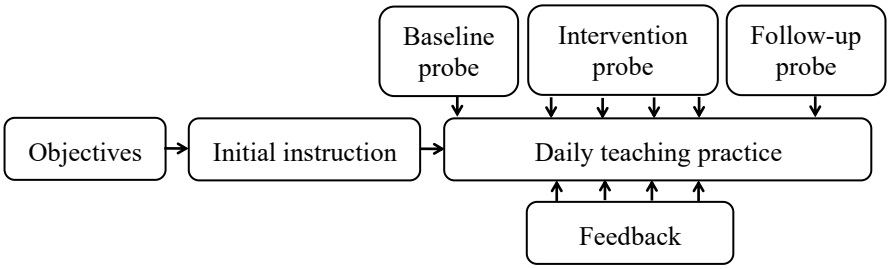


Figure 2.3 The research-initiated peer feedback model

### *Supervisor-guided peer feedback*

Figure 2.4 indicates the model of 'supervisor-guided peer feedback'. A typical characteristic of this model is the involvement of a process supervisor, who can also be called a 'process director' or 'process instructor'. This supervisor is actively involved in almost all phases of the process of teacher peer feedback. Supervisor-guided peer feedback usually starts with instruction provided by a supervisor. During the instruction, the supervisor will help the participants to become acquainted with the peer feedback procedure. Meanwhile, the participating teachers decide together with the supervisor which teaching aspects they want to develop. In some cases, learning objectives are self-determined, but in most cases the supervisor sets the learning objectives beforehand. In the phase of presentation and feedback provision, the process supervisors can help with making schedules (Visone, 2019), group the coach and coachees (Edwards & Steed, 2020), and explain the tools that can be used during peer feedback (Chien, 2017). In most situations, process supervisors attend the feedback provision meetings as a facilitator, instead of a feedback provider. As a facilitator, they help to guide the conversations among teachers and refocus the team on the main issues when necessary (e.g., Herbert & Bragg, 2020).

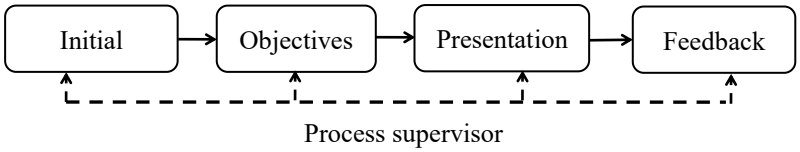


Figure 2.4 The supervisor-guided peer feedback model

### *Self-regulated peer feedback*

Self-regulated peer feedback can be perceived as the most open model for implementing teacher peer feedback. No process supervisors are involved and requirements on how to provide feedback to each other are less pre-structured when compared to the other models. As reported in some programmes, such as in Karagiorgi (2012), peer feedback was arranged at convenient times according to the teachers' schedule. The teachers can choose their peers by themselves, and they can decide whether to use some support and tools during observation and feedback provision. This means teachers are regulating the entire process of peer feedback. Only three steps are included in this model (i.e., objectives, presentation, and feedback; see Figure 2.5), and there is a variety in the practices of each phase. The learning objectives in the self-regulated peer feedback model could be both general (e.g., establish the school as a learning community; Karagiorgi, 2012) and specific (e.g., improve the teacher's skill in designing student-cantered ICT-integrated lessons; Zhang, Liu, & Wang, 2017), and personalised objectives based on diagnosis are also included. During the presentation phase, the teaching performance can be presented in various ways, not only teaching videos or live classroom visits but also in teaching plans (Ma, Xin, & Du, 2018) and verbal descriptions of issues in teaching practice (Zan & Donegan-Ritter, 2014). In a self-regulated peer feedback programme, peer feedback often has a broad definition; for example, Zan and Donegan-Ritter (2014) defined feedback as 'a reciprocal sharing of information and support between peers'. Thus, feedback is also provided in different forms, such as face-to-face dialogical feedback (Fallon & Kurtz, 2019) and short written comments online (Sato & Haegele, 2018). Another characteristic of the self-regulated peer feedback model is the use of online learning platforms, which provide more flexibility for participants on when and how to access peers' teaching presentation and feedback. An online teacher-learning programme is applied in four out of the eight studies categorised as self-regulated peer feedback (Iacono, Pierri, & Taranto, 2019; Ma, Xin, & Du, 2018; Sato & Haegele, 2018; Zhang, Liu, & Wang, 2017).

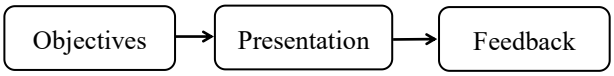


Figure 2.5 The self-regulated peer feedback model

### 2.4.2 Factors that influence teachers' learning effects

As a response to our second research question ("Which factors affect the effect of teacher peer feedback in the context of TPD?"), the result and discussion section of the included articles were reviewed, and eight influential factors were extracted in total. These factors are 'characteristics of participants', 'training and supervision', 'schedule and duration', 'support and tools', 'characteristics of feedback', 'organisational management and leadership', 'relationship between participants', and 'group size'. However, we only elaborate the first five in this section because the other three factors were discussed relatively less in the included articles (i.e., less than one-third of the articles).

#### *Characteristics of participants*

The participant's characteristics were the most frequently mentioned as being relevant to the teachers' learning results. Three aspects were indicated by previous researchers. The first aspect is the teaching experience of peer-feedback actors. In an online programme, Ma, Xin, and Du (2018) compared the effect of two groups of participants, where one group receives feedback from three expert teachers (with longer teaching experience than the participants) and the other group receives feedback from peer teachers (with equal teaching experience as the participants). These authors found that the peer coaching-based learning approach had a larger effect on teachers' willingness to participate in professional learning and lesson design skills than the expert coaching-based learning approach. They concluded that similarity in the teachers' experience may make it easier for the participants to express and accept comments. Related to teaching experience, the teachers' knowledge (e.g., technological knowledge, pedagogical knowledge, and content knowledge) is also considered necessary for participating teachers to make the best use of peer feedback to promote their professional development (Zhang, Liu, & Wang, 2017).

The second aspect of participants' characteristics pertains to the competencies of peer-feedback actors. Different kinds of competencies of participating teachers are required to be able to conduct a successful peer feedback-based programme. For example, dialogic competence is identified by Butler and Yeum (2016) as one of the most important abilities of the participants because it allows them to realise their own biases during observation, create dialogic space and engage in mutual meaning-making. The abilities of observation and diagnosis are also stressed by

Walker, Douglas, and Brewer (2020) to indicate that the participants need to be able to determine whether their peers need to improve performance in particular aspects and whether they should offer feedback based on their observations.

The third factor associated with participants' characteristics is their willingness to participate in the peer-feedback activities and their motivation for professional development. For example, Pearce et al. (2019) found that the success of peer coaching is interconnected with the teachers' willingness to share critical reflections about their daily practice during the post-observation conferences. Jao (2013) also argued that the teacher's overwhelming desire to improve their teaching can help them to overcome their initial fear of having an observer in the classroom and reinforce their belief in the effect of peer feedback.

### *Training and supervision*

The participants' training and supervision are another important factor that is related to the teachers' learning effects. Initial instruction on the basic peer interaction principles, abilities of observation, and effective communication skills is recommended in many of the reviewed studies (e.g., Brock & Carter, 2016; Nami, Marandi, & Sotoudehnama, 2016; Zhang, Liu, & Wang, 2017). This is vital because the participants need to be able to take the role of a reviewer who should ensure that their feedback is in line with the expectations of the programme organiser and those of the observed teachers (Iacono, Pierri, & Taranto, 2019). Moreover, Walker, Douglas, and Brewer (2020) argue that with prior training on peer interaction, the teachers may encounter less uncomfortable situations in providing feedback to their peers and experience fewer troubles in building relationships with each other.

In addition to formal workshop-style training at the beginning of a programme, continuous supervision during the whole process of peer interaction is also stressed in many studies. For example, Thurlings et al. (2012a) compared the effects of a peer feedback-based TPD programme, which consists of one virtual group and three face-to-face groups. Their findings show that the virtual group was less effective than were the face-to-face groups. The authors attributed the effectiveness of face-to-face groups to the process supervisor (only the face-to-face groups were equipped with a process supervisor). The authors recommend that process supervisors should actively steer the peer feedback process by asking guiding questions, reflecting explicitly on the coaching behaviour of the participants, and contributing when peer feedback tends to become less effective. The importance of process supervision was also recognised by the participants in Chien's (2017)

programme. The participants mentioned that the hostess (process supervisor) helped them to focus on the main topic, ask guiding questions, provide supplementary materials, and summarise the discussions, which resulted in better learning outcomes.

### *Schedule and duration*

The schedule and duration factor refers to how the time arrangement may influence teachers' learning through peer feedback. The results from the reviewed articles in the current study reveal that the first concern about time is the participant's schedule. Brix, Grainger, and Hill (2014), for example, argue that the teacher's busy schedule may block them from participating in peer-feedback activities, which may reduce their learning effect. Therefore, the authors recommend allocating release time for the peer feedback process and to reallocate the responsibilities for participants who have administrative tasks to keep them attending a long-term peer-feedback activity. Furthermore, Sanetti et al. (2014) examined the effect of performance feedback on improving the teacher's adherence to an intervention on students' preparedness, engagement, and homework completion. They regarded scheduling difficulties as a more likely reason for an unstable treatment adherence than skill or knowledge deficits.

The second consideration in regards to time is the duration of the peer feedback programme. In their discussion of an in-service teacher education course, Nami, Marandi, and Sotoudehnama (2016) suggested that the limited time of the entire programme may have reduced the effect of peer feedback. The authors state that better results might have been obtained if the teachers had an opportunity to engage in the programme for a longer period. A positive example comes from Pearce et al. (2019) who studied a two-year peer-coaching programme. They argue that a long-time span maximised the benefits of the peer-feedback activities in their study because it allowed the participants to build relationships and solve problems with peers gradually along the way. In addition to the whole programme, the duration of specific phases of peer-feedback activities is also important. For example, Edwards and Steed (2020) found that many participating teachers expected a longer duration of observation before providing feedback to peers because they need more time to formulate their feedback based on their observation.

### *Support and tools*

As indicated in Table 2.1, the effects of support and tools can be distinguished in

three aspects. The first aspect entails environment support (mostly, online portals), which is used in many of the included programmes to facilitate and monitor the peer feedback process. The merits of online environment support are identified in these studies, such as providing teachers with flexibility in when they access peers' presentation and feedback (Butler & Yeum, 2016), creating a safe space for exchanging feedback (Butler & Yeum, 2016), and allowing the process director to manage and monitor the learning process of each teacher (Iacono, Pierri, & Taranto, 2019). However, the weaknesses and disadvantages of these environmental supports have also been found. For example, a safe anonymous environment is likely to block teachers from obtaining the personal and contextual information that they need to create meaningful dialogues and critical friendships (Butler & Yeum, 2016). This argument is in line with Thurlings et al.'s (2012a) results, who found that teachers in face-to-face groups provided more effective feedback than teachers in a virtual group.

In the second aspect, during the presentation phase, tools such as video and audio devices, PowerPoint, and lesson design forms are commonly used to support observed teachers' presentation (Butler & Yeum, 2016; Charteris & Smardon, 2016; Nami, Marandi, & Sotoudehnama, 2016). These facilities are used to present important evidence on how observed teachers perform in their classroom. This makes it possible for observing teachers to base their feedback on observations grounded in their peers' practice, and thus improve the quality of their peer feedback (Zan & Donegan-Ritter, 2014). Furthermore, the use of presentation tools can also support the presenting teachers' self-reflection.

In the third aspect, with regards to supporting feedback provision, guidelines, discussion logs, conversation prompts and observation forms are considered to be helpful tools for promoting teachers' communication during the post-observation meeting. For example, in a peer-coaching programme for primary mathematics teachers, Jao (2013) provided a conversation guideline consisting of a series of questions for observing teachers to provide high-quality feedback to their peers. She suggested that the use of this guideline can help the participants to focus more on their peers' teaching practice and make the teachers acquainted with the peer feedback process. Sato and Haegele (2018) used another tool, called 'bulletin board discussion logs', to increase social interactions among teachers. This tool provides participants with opportunities to post short comments on a course webpage at any time. The positive effect of this tool was acknowledged by most of their participants.

### *Characteristics of feedback*

Characteristics of feedback refer to how teachers provide feedback to each other and what elements are included in feedback conversations. Concerning the way in which feedback is provided, many well-recognised characteristics were identified; for example, effective feedback is goal-directed, specific, constructive, corrective, and balanced between positive and negative comments (Edwards & Steed, 2020; Sato & Haegele, 2018; Thurlings et al., 2012a). Moreover, the optimal balance between being critical and polite is also regarded an important feature of effective feedback according to Butler and Yeum (2016). This means that feedback should be formulated in a polite and friendly way so that all participants can accept it, and also in a way that the participants can clearly understand what is expected of them to improve their teaching practice. In addition, the elements included in a peer feedback dialogue also affect teacher learning from peer feedback. For example, guiding questions, solution-focused questions, continuous questioning, summarising, and acknowledging were found to be helpful during the teacher peer feedback, while evocative questions, hinting, judging, finishing sentences, and providing own examples are considered to be ineffective (Thurlings et al., 2012b).

## 2.5 Discussion and conclusion

The current review study has resulted in four implementation models of TPD programmes (i.e., lesson study-based peer feedback, research-initiated peer feedback, supervisor-guided peer feedback, and self-regulated peer feedback) and five factors that influence teacher learning (i.e., characteristics of participants, training and supervision, schedule and duration, support and tools, and characteristics of feedback). Based on the findings, three viewpoints will be discussed in this section.

The first contribution of the current study is that we categorised the previous literature on teacher peer feedback into four implementation models. This finding responds to the need to integrate different teacher-learning activities with peer feedback, as mentioned in the available studies. For example, Brix, Grainger, and Hill (2014) argued that some of these terms are synonyms, and they related their study on peer review of teaching to the similar activities, such as peer review of teaching, peer evaluation and peer coaching. Therefore, the four implementation models provide a strong framework for future practitioners and researchers to locate the peer feedback-based teacher-learning activities that they conducted. It also

provides information about the seven characteristics that are involved in implementing different types of peer feedback. Moreover, all four models have a positive effect on TPD, although different models may have their unique contribution to particular aspects of teachers' learning. For example, teachers reported that they gained academic support, technical support, emotional support and reflective support from peers in a programme with self-regulated peer feedback (Zhang, Liu, & Wang, 2017), and new teachers' rate of specific praise was found to increase after receiving performance feedback from veteran teachers in a research-initiated peer feedback programme (Briere et al., 2015). The unique benefits of different peer feedback models may be caused by the different combination of the seven characteristics underlying these models. Consequently, future research should focus more on the seven characteristics and their correlation with teacher-learning outcomes to enrich the understanding of the function of the four models.

The second result in the current study is that it yielded five influential factors in peer feedback. This shows that a diversity of factors are associated with the effectiveness of peer-feedback activities in TPD programmes, and this diversity makes it difficult for programme staff to design optimal peer-feedback activities. In a previous study, it was found that the complex learning tasks in teacher-learning programmes may block activity designers from predetermining what resources the participants will need (De Hei et al., 2016). Therefore, we argue that participants, programme organisers and process supervisors should work together to explore the most effective and adaptive ways to implement peer feedback during the programme. In other words, peer feedback should be conducted in an adaptive and adjustable way. This requirement for TPD programmes was also proposed by other researchers. For example, Denton and Heiney-Smith (2020) have emphasised the importance of matching mentors and mentees, developing a proper way of communication, and adjusting mentors' expectation of mentees in a TPD programme. According to the five factors found in this study, the adjustability and adaptiveness can be achieved with an accurate match of participants, the training and supervision of the participants, and providing adequate time to develop a strong relationship between participants (Edwards & Steed, 2020; Nami, Marandi, & Sotoudehnama, 2016; Pearce et al., 2019).

Third, the specific model type 'research-initiated peer feedback' should be discussed because of its unique programme context. In the strict sense, this model cannot be regarded as 'peer feedback in TPD' because this type of peer feedback is

mainly based on research that involves a well-structured activity setting and a small number of participants. However, the studies that are characterised as 'research-initiated peer feedback' all met our inclusion criteria and do contribute to the knowledge of how teachers may improve their teaching behaviour based on peer feedback. Thus, we categorised the research-initiated peer feedback as a unique model, and this model emphasises the value of frequent and stimulating feedback in teachers' learning of specific teaching behaviour. We argue that research-initiated peer feedback model is particularly promising and may be implemented in TPD programmes that target specific teaching behaviours, strategies, and methods as their main learning objectives.

### *2.5.1 Implications*

Considering the multiple types of implementation models and the widely proven positive effects of these different models in the available research, it is clear that different models have unique characteristics and contributions. This also means that it is essential to choose the most suitable model when implementing teacher peer feedback, rather than identifying the perfect ones in general. To choose the most suitable model, we suggest that organisers of TPD programmes should conduct a precise analysis of learning objectives, participants' competences and experience. For instance, if the target learning objective is very specific or behaviour focused, then the research-initiated peer feedback model may be more appropriate; while if the participants are relatively experienced and possess a certain extent of self-regulation and communication skills, then the lesson study-based peer feedback and self-regulated peer feedback approach may be the most suitable choice. Supervisor-guided peer feedback would be a better choice for novice teachers with less experience in participating in learning programmes.

We recommend that programme organisers should consider the five types of factors. In general, some tips related to the five types of factors are: 1) matching teachers with respect to their competencies, teaching experience and learning motivation; 2) providing enough instruction for participants before and throughout the peer feedback process; 3) schedule the programme according to the participants' convenience and arrange relatively long-term programmes to provide adequate time for the participants to develop their relationship and feedback skills; 4) analyse the merits and shortcomings of support and tools, and then select them according to the goal of the programme; and 5) formulate feedback in an acceptable, but critical, way. In addition, these influential factors should be adjusted and monitored continuously

to optimise the practice of peer feedback-based TPD programmes. This requires teacher educators and programme organisers to frequently scrutinise, interview or survey participants with regards to their learning needs, changing expertise, attitude, motivations, and expectations, to adequately adapt peer feedback to the participants.

### *2.5.2 Concluding remark*

This article provides a systematic review of 29 studies on peer-feedback activities among teachers. Four types of implementation models are categorised, and five types of factors are found. The huge diversity in these implementation models and influential factors not only provide an overall view of how peer feedback is implemented in TPD programmes but also contributes to future research and practice by exploring guidelines to optimise the implementation of peer-feedback activities.