

ASCILITE 2023

People, Partnerships and Pedagogies

Dialogic feedback in online teaching: implications for teacher education

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Effective feedback requires a dynamic two-way process in which both teachers and students engage actively in dialogue. Online teaching has been widely adopted in education since COVID-19 pandemic; yet limited studies have explored the implications for dialogic feedback. This paper presents a study that seeks to identify challenges that teachers face when facilitating dialogic feedback in online teaching and explore how different feedback modes may enhance or hinder dialogic feedback. Based on findings of interviews with 16 in-service and pre-service teachers from the UK and Australia, we suggest that teacher education needs to highlight the development of student feedback literacy, the relational aspect of feedback, and pedagogical strategies to creative use of learning technologies for feedback.

Keywords: dialogic feedback, online teaching, teacher education, feedback modes, challenges

Introduction

Feedback plays an important role in scaffolding learning. At a cognitive level, feedback helps students reflect on their current progress and identify strategies to work towards desired goals (Butler & Winne, 1995). At an affective level, feedback can encourage positive motivation and self-esteem among learners in addition to continuous dialogue with teachers and peers (Nicol & McFarlane-Dick, 2006). On this account, effective feedback relies not only on how feedback is given, but also how it is received and used by students (Carless & Boud, 2018; Hattie & Timperley, 2007); how teachers support students to develop the ability to read, interpret and use written feedback (Carless & Boud, 2018; Sutton, 2012); and how teachers create spaces for dialogue to happen (Winstone, 2021). These conditions require key elements including: a) active learners who value feedback and use it productively, b) educators who can effectively incorporate the feedback process into course design, and c) an institutional culture that ensures consistency and quality of feedback (Henderson et al., 2019).

Existing studies that explore effective feedback processes tend to focus on higher education settings with little discussion on implications of effective feedback for teacher education. Moreover, while online teaching has been a new norm in all sectors since the COVID-19 lockdowns, approaches to facilitating feedback in online teaching is still under explored. In light of this, we interrogated a set of interview data collected from 16 secondary in-service and pre-service teachers who were invited to reflect on their online teaching practice while schools faced disruptions by the pandemic. Specifically, we investigated how teachers provided students with dialogic feedback as they transitioned from in-person to online teaching during the pandemic. The investigation was guided by two questions:

1. What are the challenges for teachers to facilitate dialogic feedback in online teaching?
2. How might different modes of feedback enhance or hinder dialogic feedback?

Our investigation focused on understanding how teachers provided feedback to their students, how they used technologies for this purpose, and how students responded to their feedback. This allowed us to understand how technology can positively or negatively impact feedback provision, which will in turn help us identify needs for teacher education.

Background

Dialogic feedback

Dialogic feedback is defined by Carless et al. (2011) as “an interactive exchange in which interpretations are shared, meanings negotiated and expectations clarified” (p. 397). It is considered more sustainable than one-way feedback, which tends to focus on the timeliness of feedback and fails to recognise the fact that how students

interpret and use feedback is equally if not more important to effective feedback. The dialogic aspect of feedback is prominent in the definition of feedback proposed by Yang and Carless (2013) who describe feedback as “all dialogue to support learning in both formal and informal situations” (p. 286). Dialogic feedback is a two-way process in which students and teachers negotiate meaning, set expectations and monitor student progress and goals (Dawson et al., 2018), helping provide students with opportunities to self-reflect and diagnose their strengths and weaknesses (Sutton, 2009). This process can help students shape and strengthen their arguments and their understanding of topics, support deeper learning (Ryan et al., 2017) and give them the tools they need to feed forward feedback (Sutton, 2009); that is, using previous feedback to inform one’s next steps (Chong, 2021).

One of the main benefits of providing students with dialogic feedback is that it empowers them to take an active part in their own learning rather than being passive recipients of feedback (Carless & Winstone, 2020). One-directional feedback, in which the teacher gives students comments on their work with no expectation or mechanism for action from the students, does little to foster learning (Pitt & Winstone, 2020). This one-directional approach to feedback is often initiated by the teacher and provided at the end of the learning sequence (Dawson et al., 2018). It is found to be a dominant type of feedback used in education (Carless & Winstone, 2020). The one-way model of feedback overlooks the sense-making process undertaken by the recipients, thus resulting in a common challenge among students who found their received feedback difficult to understand and act on (Er et al., 2020). To overcome these issues, teachers should engage students in dialogue through the provision of feedback (Sutton, 2009).

Seeing feedback as a dialogic process helps teachers interact with students and helps form supportive learning communities, especially in online environments where other opportunities for interaction with teachers are more limited (Swan, 2002). Dialogic feedback depends on openness, empathy and sensitivity from teachers in their building of supportive and interactive learning environments (Carless, 2013). The interactions that dialogic feedback facilitate between students and teachers are key in promoting social presence within online environments (Linton, 2016), which has direct impact on community building. It is therefore essential to consider the ability of teachers to facilitate dialogic feedback and required resources as part of teacher training.

Technology-enabled feedback

In the context of online teaching, teachers’ proficiency with technological tools can help them facilitate dialogic feedback, thereby creating a ‘sense of presence’ that encourages student participation and investment in their learning (Foster et al., 2021; Li et al. 2020). Furthermore, the ability to integrate technologies into teaching creatively is crucial in promoting effective dialogic feedback between teachers and students (Carless & Winstone, 2020; Swan, 2002). However, it is not uncommon to see the lack of ability to use technologies meaningfully for educational purposes among teachers (Chen, 2008; Koehler et al., 2013). Spiteri and Chang Rundgren (2020) thus emphasise the need to develop skills in managing information, communicating using technologies, creating digital content, being mindful of safety in digital environments, and solving problems related to the use of technology. Similarly, Linton (2016) argues that teachers need to acquire competencies required to support students and meet their needs in online learning environments, in addition to possessing technical knowledge. These competencies include using technology skills to form communities, create opportunities for rich interactions and accommodating different learning needs, among others. Mishra and Koehler (2006) specifically addressed this problem by proposing the Technological, Pedagogical and Content (TPACK) model, which recognises the interplay between pedagogy, technology and content in integrating technologies in the classroom and how teachers need to design their use of technology by integrating all three aspects. As we reflect on how teachers use technology to facilitate dialogic feedback in online teaching, it is important to consider teachers’ TPACK competency rather than simply focus on technical applications.

Methodology

Participants

This study used a qualitative methodology to elicit secondary education pre-service and in-service teachers’ experiences and challenges in trying to facilitate dialogic feedback in online teaching during the 2020 COVID-19 lockdowns when schools globally faced disruptions. We conducted a case study utilising a convenient sampling strategy to benefit from the researchers’ networks, particularly teacher education programmes and connections with local schools. In total, 16 participants from Scotland, UK and Victoria, Australia joined the study, including six in-service teachers recruited from both regions and 10 pre-service teachers recruited from two universities. The teaching experience for our in-service teachers ranged from two to 28 years, with an

average experience of 12 years, adding to the variety of the sample chosen. A breakdown of participants (pseudonyms used) can be seen in Table 1.

Table 1: Participant information (teaching experience of in-service teacher indicated in brackets)

	Pre-service teachers (n = 10)	In-service teachers (n = 6)
Scotland	Sylvia, Eileen, Mary, Joseph, Lily, Sharon, and Olivia	Mark (25 years) Charles (10 years) Robert (4 years) Lucy (28 years)
Australia	Oscar, Michael, and Violet	Helena (2 years) Andy (5 years)

Data collection

Data was collected from the participants through semi-structured interviews and focus groups. As part of a wider project that sought to understand how teachers build and maintain a supportive learning community through technology-assisted feedback practice, the interview and focus group questions focus on various aspects of their experiences teaching online during the COVID-19 lockdowns, the support they received, and how they used feedback to engage with the students and form learning communities despite the limitations of virtual teaching. One-hour individual interviews were conducted with in-service teachers due to their often-busy schedules, and 1.5-hour focus groups were used for pre-service teachers as focus groups allow participants to support each other in expressing shared experiences (Chen, 2008), and support from peers might help them talk about difficult experiences they had during their placement. The full list of questions used for the interviews and focus groups can be found at <https://bit.ly/3DiY3bc>.

We received ethics approval from both of the two universities (where the pre-service teachers were recruited) collaborating on the study before undertaking this research (ID 93368 & ID 27534). Participants were provided with information sheets detailing the data that would be collected from them and how it would be stored and processed. Their consent was received prior to the interviews and focus groups.

Data analysis

The interviews were transcribed verbatim and NVivo was used to code the data. An inductive approach was taken to code the transcripts based on emerging themes from the data (Swain, 2018). This paper is part of a wider research project, and so only the codes directly related to feedback are presented here (Table 2). The full project coding scheme can be accessed at: <https://bit.ly/3h2bVyO>. Three major themes were identified related to facilitating feedback in online teaching: a) the feedback the teachers received as a result of their practice, b) the purpose of the feedback they gave to their students, and c) the media through which they provided their students with feedback. The first series of codes, feedback for teachers, focused on how students responded positively or negatively to the feedback and teaching practices that were enacted as part of the virtual teaching during the COVID-19 lockdowns. The second group of codes, purpose of feedback, related to the purpose of the feedback the participants gave to the students. Finally, mode of feedback includes a set of codes that capture the different media teachers used to provide feedback to students: written, verbal, or multimedia.

Table 2: Coding scheme

<i>Codes</i>	<i>Definitions</i>
Feedback for teachers	Positive feedback Feedback that reflects positively on teacher performance, teacher choices, teaching practices, or other related matters.
	Negative feedback Feedback that reflects negatively on teacher performance, teacher choices, teaching practises, or other related matters, e.g. complaints or criticisms
	No feedback No feedback was received or solicited in response to an interaction or teaching practice.

Purpose of feedback	Encouragement	Motivational feedback that is only meant to encourage students regardless of their performance
	Engagement	Feedback whose purpose is to elicit engagement with students. This kind of feedback is not task-dependent but to check on how students are doing.
	Learning and revision	Feedback whose purpose is to help students monitor their progress in relation to set goals (e.g., learning outcomes or personal goals about entering the university) or standards.
Mode of feedback	Written feedback	Feedback given through written means.
	Verbal feedback	Feedback given verbally, either in person or through synchronous sessions.
	Multimedia feedback	Using audio, video, or other multimedia to deliver feedback.

Results and discussion

In response to the two research questions, we present the challenges that the participants faced when facilitating dialogic feedback as part of online teaching and the extent to which different modes of feedback enabled or hindered dialogic feedback. We also presented comparisons between in-service teachers and pre-service teachers based on the frequency of codes applied to capture comments made by them regarding specific topics.

Challenges with dialogic feedback

Many of our participants were acutely aware of the importance of feedback in the learning process. They stressed the importance of feedback as dialogue drawing on face-to-face teaching experience where teachers would walk around the classroom to provide feedback to students one-on-one during class time. The participants also emphasised the active role that students needed to play in the feedback process, including asking for feedback and acting on it – also known as key characteristics of feedback literacy (Carless & Boud, 2018). However, dialogic feedback is a two-way street, and our interview data shows that both the teachers and their students contributed to the challenge of engaging in dialogic feedback in online teaching.

Student-related challenges

A common issue faced by the teachers when facilitating dialogic feedback in online teaching was the lack of responses from students regarding received feedback. Several participants traced the problem back to the lack of digital literacy skills and unequal access to technological resources among students. For example, Eileen noted that a large percentage of her students struggled to log into the learning platform, and Olivia cited that her students did not access the class material or hand in their assignments due to problems with access to Wi-Fi.

Another common issue was an attitude of indifference toward feedback among students. The participants indicated that some students were unaware of the feedback that they had received and some did not see a need to respond or act on it. Andy, for example, mentioned that the real challenge to providing students with feedback was “whether they actually check it”.

Both issues mentioned above contributed to poor feedback literacy observed among the students according to the feedback, which was noted to have posed a significant challenge to dialogic feedback. As also commented by Mark that students would need a lot more training on feedback literacy, since they needed to be supported in learning how to access the feedback on the platform and what to do with the feedback once they accessed it.

Teacher-related challenges

The struggle to create online environments conducive to the development of student feedback literacy was a main factor of the challenge that teachers faced in facilitating dialogic feedback. Setting up effective conditions for students to appreciate and use feedback is essential in helping develop student feedback literacy (Carless & Winstone, 2020). These conditions include emphasising formative feedback, providing opportunities to apply feedback, and using e-portfolios, for example. Teachers, however, often lack proficiency and experience in designing conditions for this to happen (Chong, 2021) as was the case with our participants.

As indicated by the participants, many of the lesson delivery methods were limited to posting worksheets and other tasks in online platforms, which invited little interactions from students. The result was described by Mark as “sending lessons out into a black hole” and Michael as sending it “out into the ether”. The lack of opportunities for students to interact with the teacher made it difficult to track the impact of feedback. As noted by Sylvia, Andy and Lucy, they had no way of knowing whether students had seen the feedback they provided. Mary further pointed out that the minimal interaction with students made it difficult to identify students who needed help thus losing opportunities to adjust teaching content accordingly.

By contrast, Robert was one of the few teachers who were able to facilitate interactions with students by heavily integrating multimedia into his learning design, thereby facilitating dialogic feedback. For example, he utilised voice notes to personalise the feedback for students and used breakout rooms to foster synchronous dialogue with students about their learning. He reported that using these technologies helped his students “feel valued”, and that it helped with overall engagement in his class (Swan, 2005). Unlike Robert, however, many of our participants were not able to elicit responses from students toward their provided feedback. The notable one-way feedback left the teachers with uncertainty regarding whether the feedback was helpful to students or not. It is also clear that the use of technology by many teachers was ineffective in developing an environment for dialogic feedback. This shows a need for teacher training in technological-pedagogical knowledge according to TPACK (Mishra & Koehler, 2006).

In addition to the way teachers embed technologies into learning design, the purpose of feedback was found to play a role in the facilitation of dialogic feedback. Three main purposes of feedback were identified: encouragement, engagement, and learning and revision (Table 3). Feedback for encouragement seeks to keep students motivated for learning, and is usually focused on self-level (Hattie & Timperley, 2007), such as praising students. This type of feedback appears to have less direct or observable impact on learning (Brooks et al., 2019), because it includes no information about the task and arguably diverts attention from it (Alqassab et al., 2018). The feedback was provided with no expectations of any particular action taken by students, thus may be considered as unidirectional by nature.

Table 3: Coded frequency of feedback purpose, percentage based on the total mentions of different feedback modes by groups of participants (pre-service vs. in-service)

	Pre-service teachers (n = 10)	In-service teachers (n = 6)
Encouragement	14 (40%)	8 (20%)
Engagement	3 (9%)	5 (12%)
Learning and revision	18 (51%)	27 (68%)
Total	35 (100%)	40 (100%)

On the contrary, feedback for engagement was provided with the intention to get students to respond in some fashion. While learner engagement can be seen as multifaceted, comprising learners’ cognitive, affective, and behavioural interaction with others and with learning materials (Martin & Borup, 2022), our participants predominantly used this kind of feedback in an attempt to encourage behavioural interactions such as submitting assignments. Unfortunately, this type of feedback elicited little responses from the students according to the participants, perhaps because it also contained very little or no specific information for improvement.

Feedback for learning and revision, on the other hand, focused on providing information about the strengths and weakness of student performance and ways to improve it. This type of feedback is usually intended to help students monitor their progress and goals (Dawson et al., 2018) and inform their next steps (Chong, 2021). It can facilitate dialogue between students and teachers as meanings of feedback are interpreted, negotiated, and further clarified. It can also facilitate internal dialogue as students reflect on their own learning. This type of feedback was noted to be the dominant purpose of feedback among both pre-service and in-service teachers.

Interestingly, we noted extensive adoption of encouragement feedback among pre-service teachers compared to in-service teachers (Table 3). Several pre-service teachers indicated that this was because they felt uncomfortable giving critical feedback to students they had never met before. For example, Mary, Eileen or Violet, reported that they did not have the “authority” to correct them. Eileen further confessed that she often left students with one-sentence comments, such as ‘Good job,’ ‘Thank you,’ and, ‘Remember to engage in next

week’s task”. The lack of professional confidence and opportunities to build relationships with students arguably drove pre-service teachers to place more emphasis on feedback that elicited limited interactions, which may be seen as a potential barrier to dialogic feedback.

Modes of feedback

Our interviews show that feedback was most commonly delivered in the written mode, followed by verbal. Multimedia feedback was the least common mode, and notably not utilised by pre-service teachers at all (Table 4). The written feedback was mostly delivered through comment boxes embedded in the learning platforms. It was found to be less effective in promoting dialogue and interactions, whereas verbal and multimodal modes were more effective in facilitating synchronous interactions and asynchronous communication respectively.

Table 4: Code frequency of feedback mode, percentage based on the total mentions of different feedback modes by groups of participants (pre-service vs. in-service)

	Pre-service teachers (n = 10)	In-service teachers (n = 6)
Written	18 (60%)	19 (40%)
Verbal	12 (40%)	19 (40%)
Multimedia	0 (0%)	10 (20%)
Total	30 (100%)	48 (100%)

Written feedback: use of comment boxes

One of the most common ways in which teachers provided their students with learning and revision feedback was through the use of comment boxes. These boxes were provided as a feature of the learning platform and allowed teachers to leave general comments on specific assignments. Mark, Joseph, Sylvia, Lucy, Eileen and Olivia all specifically mentioned using comment boxes to leave feedback to students. However, they received very little response from the students. One potential issue is that written comments in online environments often lack depth (Henderson & Phillips, 2014), offering little guidance for revision or learning (Ryan et al., 2016), and are often unidirectional in that there are often no effective mechanisms for the students to reply to these messages and ask for clarification or further direction (Malecka et al., 2020).

Written comments on submitted work (aka comment boxes) are often the only form of feedback students recognise (Carless & Boud, 2018), but these can lead to passive student reactions that often do not include using the feedback in any meaningful way. When teachers merely ‘provide information’, they are not setting up conditions for dialogue (Molloy et al., 2020), which might explain why our participants reported that their use of comment boxes elicited little response from the students, as there was little to no expectation that students should respond to this feedback and no mechanism to check if students used it to improve their work.

An additional challenge mentioned by our participants was conveying meaning or personality when writing their feedback through comment boxes. Violet, for example, noted “when it’s just written, it can sometimes come across as a lot harsher than it is, and especially being online”, and Mary expressed uncertainty on whether her feedback might be received negatively by students because of the lack of verbal and nonverbal cues. Both verbal and non-verbal cues are important in creating a sense of immediacy, as a sense of psychological distance creates a barrier to establishing a trusting atmosphere (Swan & Shih, 2005). Trust is one of the most important prerequisites for students to develop the confidence and motivation to ask for feedback (Carless & Boud, 2018), since feedback processes are enhanced by relational support from teachers that involved empathy and trust (Carless & Winstone, 2020). Our participants, both in-service and pre-service, ascribed most of their struggles in establishing dialogue with students in online teaching due to a distance that is both physical and psychological.

Verbal feedback: synchronous interactions

Verbal feedback was used by in-service and pre-service teachers mostly to emulate the conditions of in-person classrooms and therefore create a sense of community and closeness with the students. The two main ways in which this was accomplished by our participants was by providing verbal feedback to the whole class, or using more innovative technologies such as breakout rooms to give verbal feedback to smaller groups of students and therefore ensuring that it was more personalised and focused.

Providing generic feedback during class periods that were held via video conference was reported with mixed success, as teachers mentioned students were often not willing to turn on their cameras or microphones to engage with the teachers' feedback or ask questions about the materials. In response to this, some of the teachers such as Charles and Violet made use of the chat function in the videoconference interface to offer them a space to ask their questions without having to 'speak up', and Robert gave students individual time slots for feedback so those who were uncomfortable asking questions in front of the whole class could have their needs addressed.

Video conferencing platforms were also used for giving more focused feedback and interaction with students in addition to providing entire groups with generic feedback, to good results. Robert, for example, used video conferencing to schedule one-to-one conversations with students to provide them with individual feedback, noting that students responded well to this kind of personalisation because it made them feel valued, as discussed earlier. This personalised approach was noted to be a key factor of his success in facilitating dialogic feedback. By contrast, Sylvia did not adopt a personalised approach to feedback and struggled with student attendance in the scheduled open live sessions for any students to drop in if they wanted feedback on their work or had questions about the course material.

Another way in which teachers attempted to recreate in-person feedback practices in online environments was through the use of breakout rooms. Mark and Helena found that students were more likely to participate, ask questions and request feedback in the smaller groups afforded by breakout rooms, as the smaller number of students in breakout rooms allows for more active learning and collaboration to happen (Chandler, 2016; Naik & Govindu, 2022). In his own words, the combined use of these tools was helpful "because the pupils were able to really dig in deep to the subject in terms of what they were doing, and then like actually be able to verbalise what they'd learnt". This kind of active collaboration among small groups of students through breakout rooms can help create more meaningful learning (Pinilla & Reher, 2021), as also reported by the participants.

However, while verbal feedback received better response from students than written feedback and allowed for better conditions of dialogue around feedback, its main limitation is its impermanence. Students cannot go back to review said feedback if they are struggling with their learning further down the line, thus making it difficult for students to build upon previous feedback to improve their learning (Malecka et al., 2020). Teachers noted that the learning platforms allowed all feedback to be stored indefinitely so students can always access it, which is one of the main affordances of technology for feedback (Carless & Winstone, 2020; Malecka et al., 2020). Written feedback is more permanent and traceable, but as discussed in the previous section, teachers worried about its impersonal nature and students rarely responded to it, so it did little to foster learning or engagement. The third mode of feedback identified in our sample, multimedia feedback, seems to solve both problems.

Multimedia feedback: asynchronous communication

Research shows that multimedia feedback can be better at fostering dialogic feedback (Henderson & Phillips, 2014; Ryan et al., 2017), as it helps reduce the psychological distance between teachers and students, encouraging the creation of supportive online communities and creating conditions for dialogical feedback to occur (Swan, 2002). Our participants mentioned that, in contrast to the low levels of engagement teachers got from using written feedback through comment boxes, using a varied array of multimedia technologies allowed teachers to create better conditions for dialogic feedback.

Andy, for example, used Zoom's screen sharing and screen annotating capabilities to give students feedback in real time on their coding exercises. He reported that students were very satisfied with this form of giving feedback and even began sharing their screens unprompted, taking an active role in their learning. As also noted in the literature, screencasting allows students to receive more detailed feedback that is individualised and helps them feel more connected to the teachers (Henderson & Phillips, 2014; Ryan et al., 2016).

Another way of giving feedback to students online that avoids issues with written feedback being perceived as 'impersonal' is the use of audiovisual recordings. Research has found that audio feedback allows for more detailed feedback, which is easier to understand and more individualised (Ryan et al., 2016). Both Charles and Robert used voice notes in addition to written feedback on student assignments, and they both remarked that students seemed to find this feedback more impactful. Robert observed that students were very grateful for this kind of feedback and tended to act on it more often (Carless & Boud, 2018), and multimedia feedback in general is considered "deeper" and "more authentic" (Chong, 2019). There is also evidence that using different modes of feedback can help enhance its effectiveness (Henderson et al., 2019).

Many of the teachers used the technological tools they had at their disposal, and sometimes even combinations of tools, to provide feedback to their students in ways that encouraged them to participate, take ownership of the

feedback and ask follow-up questions for clarification. Both in-service and pre-service teachers reflected on the purposes of feedback and the pedagogical challenges of making the move to online teaching, expressing a desire to use technologies to create learning communities and engage in dialogue with the students to support their learning processes.

However, it is important to note that none of the pre-service teachers in our sample reported having used multimedia feedback during their placements. We do not have enough data to determine why this might be the case, but we can venture two inferences. First, lack of multimedia usage might be related to the lack of confidence that pre-service teachers expressed in their feedback-giving capabilities. As reported by some of the pre-service teachers in our study, they often felt as though they did not have the authority to provide students with comprehensive feedback due to the lack of opportunity to build relationships with the students. This may be one reason why pre-service teachers were more reticent to experiment with multimedia feedback. Second, teacher placements for pre-service teachers tended to last a few weeks, so it is plausible that there was not enough time for them to react to the needs in field while upskilling in the same ways as the in-service teachers did, especially regarding the pedagogical aspects of online teaching.

Overall, few teachers harnessed the possibilities of multimedia feedback, even though research shows that it has some of the best effects in engaging students and helping their learning, especially when compared to written forms of feedback (Ryan et al., 2017, 2019). Only a couple of the participants used audio notes to provide feedback, and none of them used video clips to provide feedback that also included non-verbal cues. This can be attributed to teachers' lack of experience with teaching online, as many of them did not know about the possibilities of using technology to provide feedback and instead used video conferencing software to try to replicate the same type of feedback they would give in face-to-face settings. While pre-service teachers had more experience with using technologies in general and mentioned having studied the subject content during their training, our study showed that they had less experience with the specific application of pedagogical principles to the use of technologies. This lack of experience and ability to integrate technologies into teaching has been well-documented, and frameworks such as TPACK, which emphasises the interplay between technological, pedagogical, and content knowledge to enable the effective use of learning technologies in the classroom (Koehler & Mishra, 2009), may be utilised to address this need in teacher training.

Conclusion

This study focused on understanding the challenges that teachers face when facilitating dialogic feedback in online teaching (RQ1) and how feedback modes might enhance or hinder dialogic feedback (RQ2). In terms of challenges, we noted student feedback literacy to be a key factor of dialogic feedback. For students to benefit from feedback for learning, they need to appreciate it and take appropriate actions accordingly including seeking further feedback and acting on feedback (Carless & Boud, 2018). However, feedback literacy in the context of online learning encompasses digital skills required for students to navigate resources. Similarly, to create an online learning environment that support the development of feedback literacy among students, teachers need to be able to utilise technologies to support pedagogical purposes, in our case, dialogic feedback. Thus, preparations for student teachers to teach online may build on frameworks such as TPACK (Mishra and Koehler, 2006), which integrates technology with content and pedagogical knowledge. Specifically, when it comes to facilitating dialogic feedback in online environments, the design aspect should consider the capability to utilise technology in ways that may encourage learner engagement with and uptake of feedback. In other words, teacher training should not only focus on how to use educational technologies in a technical sense, but on the pedagogical strategies that teachers can use to foster dialogue through the creative use of learning technologies.

In terms of modes of feedback, verbal and multimedia feedback were found to be particularly effective in facilitating dialogic feedback. They allow teachers to personalise feedback and reduce the 'psychological distance' with students. This strengthens the relational aspect of feedback and thus increased student engagement with feedback. Nevertheless, written mode was still the dominant mode adopted by the teachers using written boxes available on learning platforms.

Comparing in-service and pre-service teachers, we found pre-service teachers to place more emphasis on providing feedback for the purpose of encouragement and having the least engagement with multimedia feedback. As confessed by the pre-service teachers, the former was mainly due to the lack of confidence in themselves as teachers and little opportunity to build relationships with students due the short period of placement. This points to the importance of feedback being a relational process in which empathy and trust play key roles in sustainable dialogue between teachers and students (Carless & Winstone, 2020; Yang & Carless,

2013). Teacher education providers thus need to consider the above-mentioned challenges that pre-service teachers face and work closely with schools to better facilitate mentorship and opportunities for pre-service teachers to build relationships with students.

As for the observation of little adoption of multimedia feedback among pre-service teachers, our speculation is that the lack of confidence in themselves as trainee teachers coupled with the limited time available for school placement might have refrained them from exploring teaching innovations through the use of technologies, as innovations do not always meet with acceptance by students. While this requires further validation in future research, teacher education may focus on enhancing pre-service teachers' sense of agency, in particular, the capability to formulate professional goals and actions drawing on past experiences and the cultural, structural and material resources teachers have at their disposal (Priestley et al., 2015). For example, it could be beneficial for pre-service teachers to involve in a community of practice in which the participants have shared value and professional goals that may encourage collaborative and collective actions to reach these goals (Albion & Tondeur, 2018).

Overall, the study highlights the importance of considering pedagogical affordances and constraints when adopting technologies to facilitate dialogic feedback in online teaching and the need to pay attention to the relational aspect of feedback processes in teacher education. One of the main limitations of this study was its limited scope, as the sample size was relatively small. Future research could broaden the scope of research into dialogic feedback in online teaching by using larger sample sizes and in different contexts. Future research could also focus on students' perceptions of different feedback practices during their time with online learning. Another limitation of the study is the lack of comparison between teaching experiences during and post the pandemic. Future studies may build on the findings of the study and explore how teacher training and experiential learning may help pre-service teachers develop digital feedback literacy and confidence they need to create supportive learning communities and foster dialogue with their students around learning.

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Hibert, A., Phillips, M., Gašević, D., Pantic, N., MacLean, J. & Tsai, Y. S. (2023). Dialogic feedback in online teaching: implications for teacher education. In T. Cochrane, V. Narayan, C. Brown, K. MacCallum, E. Bone, C. Deneen, R. Vanderburg, & B. Hurren (Eds.), *People, partnerships and pedagogies*. Proceedings ASCILITE 2023. Christchurch (pp. 137 - 147). <https://doi.org/10.14742/apubs.2023.651>

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