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Making peer feedback work: the contribution of technology-mediated dialogic peer feedback to feedback uptake and literacy

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ABSTRACT

In recent years, academic and practitioner attention to improving attainment as a result of feedback, as well as satisfaction with it, has led to a conceptualisation of feedback that considers learners' active role in making feedback processes effective. This has led to interest in 'feedback literacy' or what learners need for productive feedback use. Engagement in peer feedback practices is believed to enhance some aspects of feedback literacy, namely, the ability to make evaluative judgements about work quality. However, based on evidence from a qualitative study with 14 undergraduates at a South Korean university, this paper argues that technology-mediated peer feedback practices can also support learners in navigating processes involved in feedback uptake. Results indicate that online feedback dialogues helped learners better understand and co-develop actionable feedback points and process some of the socio-affective and relational aspects of feedback engagement. The technology could also mediate multiple, recursive task-oriented discussions over space and time in emergent collaborative learning spaces. The results provide evidence for a new understanding of technology-mediated dialogic peer feedback as an online community practice and have implications for practitioners working in online and blended conditions.

KEYWORDS

Technology-mediated dialogic peer feedback; collaborative learning; feedback engagement; online learning community

Introduction

In recent years, the importance of feedback for attainment (Hattie 2009), consistent learner dissatisfaction (Carless and Winstone 2020; Office for Students 2020), and reports of maladaptive engagement (Crisp 2007; Evans 2013), have led to increasing interest in feedback engagement and use or 'feedback uptake' (Carless and Boud 2018) in higher education contexts. This has evolved into a strand of scholarship that views feedback not only as the production and transmission of a compelling message but as a student-centred, dialogic and agentic process (Price, Handley, and Millar 2011; Carless 2020). This process requires feedback information to be used productively by the receiver and that feedback providers and receivers share responsibility for making the processes effective (Nash and Winstone 2017). This line of enquiry has evolved to consider how to nurture 'feedback literacy', which has been defined as the dispositions, capacities and understandings required by learners to process and utilise feedback information effectively (Carless and Boud 2018).

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Of the various activities believed to support the cognitive and evaluative aspects of feedback uptake and literacy, involving learners in collaborative learning activities (Malecka, Boud, and Carless 2020), such as working with criteria and exemplars and giving and receiving feedback, is considered to be especially powerful.

The role of feedback dialogues in understanding peer feedback

Recent research has begun to demonstrate the importance of the co-construction or negotiation of meaning process, and shows that providing opportunities for learners to discuss feedback in in-person settings enables them to question teacher feedback (Hill and West 2020) and to clarify the meaning of peer feedback (Zhu and Carless 2018; Reddy et al. 2020; Schillings et al. 2020). This presumably leads to better uptake of peer feedback by providing opportunities for improved understanding of feedback information and lowering the significant feedback uptake 'barrier' of not understanding feedback received (Winstone et al. 2017b).

However, while feedback dialogues are considered useful and desirable for learners (Vattøy, Gamlem, and Rogne 2020; Armengol-Asparó, Mercader, and Ion 2020), in practice settings the provision of such dialogues has met with challenges, such as finding time in class and difficulty scheduling peer feedback meetings outside of class (Zhu and Carless 2018). Learners have also indicated the desire for teacher adjudication of peer disagreements, which is considered too resource-intensive (Zhu and Carless 2018; Schillings et al. 2020). Similarly, working in an online environment, Filius et al. (2018) report that students did not take advantage of opportunities for ongoing peer dialogues after receiving feedback in an online Moodle-based forum because they found the environment to be too asynchronous, inconvenient and public. Overall, these problems: finding time and space for peer feedback in class, resourcing teacher adjudication of peer feedback, and facilitating a rich interactive dialogic peer feedback experience in online settings, appear yet to have found solutions in the empirical literature and represent ongoing issues for educators, especially as even before COVID-19 much feedback took place in online settings (Padgett, Moffitt, and Grieve 2021).

Repositioning the aim of dialogic peer feedback

Although many empirical studies of peer feedback have employed transmission-like peer feedback designs (e.g. Nicol, Thomson, and Breslin 2014; Gaynor 2020; Zhan 2020), several recent studies position peer feedback as a socio-constructivist dialogic process and define it as involving collaborative meaning-making and evaluative judgement regarding the quality of work (e.g. Filius et al. 2018; Zhu and Carless 2018; Carless 2020).

Aligning with this socio-constructivist perspective, in this paper I propose a repositioning of the assumed purpose of peer feedback, to complement emerging discussions of how teachers can deploy curriculum-based activities to support feedback uptake and literacy (Malecka, Boud, and Carless 2020), but also to leverage the potential benefits of working in online and blended environments. From this perspective, if mediated by technology to help overcome some of the barriers to practical deployment, in addition to the other aims, the peer feedback process can become an evolving online community practice. Such online communities can offer learners support as they navigate the cognitive, evaluative and socio-affective processes (Winstone et al. 2017a) involved in peer feedback uptake and feedback literacy development. In this way, beyond offering assistance with written outputs, such practices help individuals to directly or indirectly 'co-regulate' (Panadero, Andrade, and Brookhart 2018; Wood 2021) their 'zones of proximal development' (Vygotsky 1978) related to the processes involved in 'appreciating feedback', making and refining 'evaluative judgements' and 'managing affect' productively (Carless and Boud 2018) while making comparisons between individuals' own understanding and that of others (Nicol 2020).

Research gaps and aims

The role of dialogue in peer feedback has received surprisingly little attention in the literature (Ajjawi and Boud 2017; Zhu and Carless 2018). Technology has frequently been considered a potential solution for managing feedback practices that may facilitate feedback uptake and literacy (Carless and Boud 2018; Molloy, Boud, and Henderson 2019; Carless and Winstone 2020). However, there also appears to be an absence of empirical studies of technology-mediated dialogic peer feedback that have successfully navigated some of the issues discussed.

Given this gap, there appears to be scope for studies investigating the use of ongoing technology-mediated peer feedback to solve some of the reported issues enacting genuinely dialogic and collaborative peer feedback designs. There appear to be few studies that consider both the opportunities and challenges of conducting dialogic peer feedback in settings in which there are few opportunities for in-person meetings to negotiate peer feedback meaning (i.e. digital settings). This is of particular relevance to current higher education settings, as even before the institutional response to the COVID-19 crisis, most contexts could be described as 'blended' (Broadbent et al. 2020).

Research context and ethics

The study context was an elective credit-bearing advanced academic writing course at a prestigious South Korean university that students can take at any time during the four years of their studies if they meet the language requirement. A self-selected (convenience) sample of 14 undergraduates (six males, eight females) of South Korean origin and mixed year grades chose the course from a selection of other advanced elective classes (prose, presentation, culture etc). Half of the sample were in their first year, and half were from 2nd, 3rd and 4th years, taking mixed majors (humanities, social sciences and sciences), and of advanced to near-native language ability (the equivalent of IELTS 7.5+ or more). Participants chose pseudonyms for data reporting and provided written and verbal consent to participate in the study after permission from a UK university ethics board was granted. Throughout the study, I endeavoured to remain fully 'reflective' (Cohen, Manion, and Morrison 2018) regarding my positionality and its impact on the robustness of the ethics, data collection and analysis process (Trowler 2016).

Practices for facilitating receptivity to feedback

The course, which was face-to-face with blended and online elements for teacher and peer feedback, started with an attempt to provide a supportive classroom environment and ethos to scaffold feedback receptivity based on a synthesis of understandings from the literature (Wood 2021). I tried to ensure that learners understood the relationship between learning objectives and how assessment and feedback (including peer feedback) were aligned to facilitate learning (Parker and Winstone 2016; Winstone, Hepper, and Nash 2019; Ryan et al. 2020). To attempt to stimulate engagement with feedback, participants were then introduced to the concepts of 'growth mindset' (Forsythe and Johnson 2017), the zone of proximal development (Vygotsky 1978), and the idea that feedback can be 'dialogic' (Carless 2015). Participants were then asked to consider how these ideas might relate to learning from peer and teacher feedback. They were then set a short reflective writing task to consider how the concepts might relate to their own experiences and those they may have during the course (see Figure 1). Reflections were also discussed in class.

Scaffolding the dialogic peer feedback practices

After an elicited discussion of what constitutes academic excellence, participants were introduced to essay marking criteria and encouraged to notice the gaps between their current

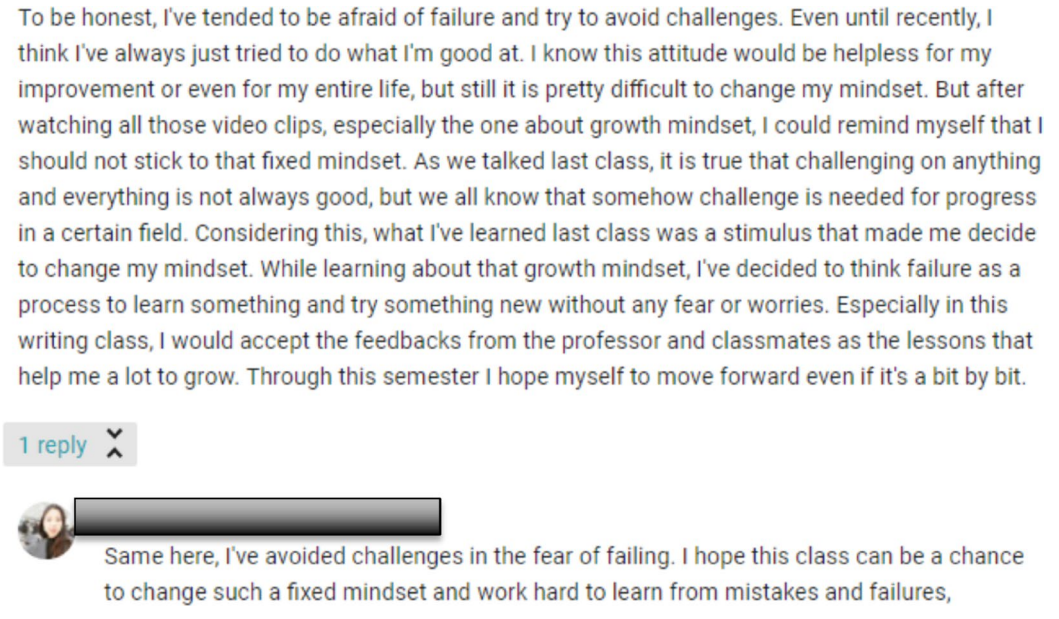


Figure 1. Example of a student response to a reflective task.

understanding and the actual requirements. As a form of peer feedback training, groups of students were then invited to apply the criteria to examples of work at different attainment levels and comment on their strengths and weaknesses using the Google Drive comment fuction. The teacher then shared feedback comments and grades in each area of the criteria for comparison so that potentially tacit aspects of the marking process could be explicated. Students were then exposed to existing peer feedback examples, and features of effective peer feedback were highlighted and discussed. By the end of the session, all students were expected to be able to use Google Drive to deliver comments, reply to comments, and tag the teacher with questions to ensure fluency with the platform.

Google Docs was considered better suited for the study than standard forums (Moodle/Blackboard) because it can mediate comments and replies that are 'anchored' to a highlighted excerpt of the text (see Figure 5). The platform also allows multiple reviewers to offer textual feedback without the author relinquishing the ability to modify their work in response to real-time comments, which can mediate a dynamic review and response process. In previous research, Google Docs was found to support bi-directional feedback exchanges with teachers (Chong 2019) and peers (Alharbi 2020). It was also found to meet the criteria for the technology acceptance model (TAM) (Andrew 2019; Rejón-Guardia, Polo-Peña, and Maraver-Tarifa 2020), which predicts intentions to use technology based on perceived usefulness and convenience. Google Classroom was selected as the class virtual learning environment because of its simplicity, automatic notifications (if switched on), cross-platform mobile applications and smooth integration with Google Docs and Drive, all of which were considered to align with the TAM.

Students were given the task of writing a 1,200-word research essay on a critical discursive question of their choice (co-developed with the teacher). They then had three weeks to produce the first draft for peer review and were encouraged to elicit the feedback they wanted by leaving a request comment on their work, for a group of three or more reviewers to respond to (randomly assigned). There was also flexibility for learners to solicit additional feedback from other students if desired (see Figure 2). Learners then had two weekends (8 days) to complete peer review discussions and respond by producing a new draft for formative teacher feedback. Students

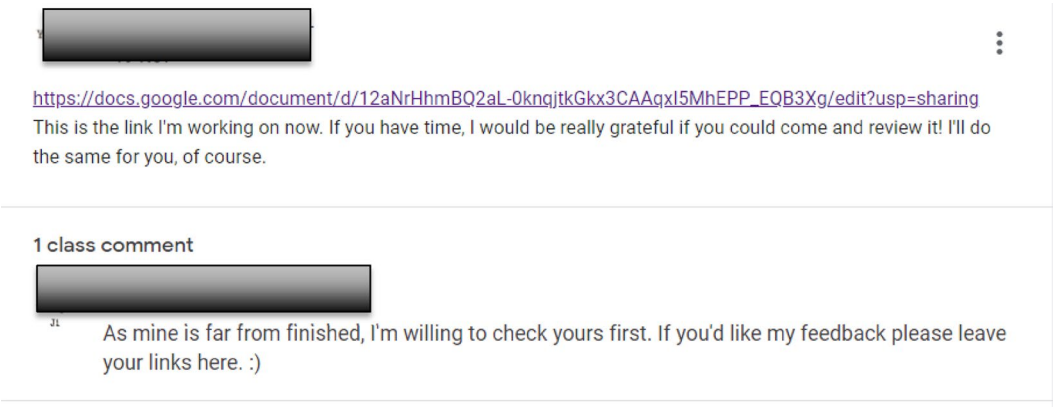


Figure 2. Additional feedback request to the community on Google Drive.

then had a week to utilise teacher feedback (with opportunities for questions via google drive), and after summative feedback, they were asked to reflect on what they had learned from the process in writing.

Methodology and data collection

Based on calls to research by Handley, Price, and Millar (2011) and Winstone et al. (2017a) to attempt to 'counter the invisibility of learners' engagement' (Winstone et al. 2017a, p34), and in an attempt to understand the lived experience of participants, I sought to use methods that could help explore the role of technology-mediated dialogic peer feedback practices in uptake processes (Winstone et al. 2017a; Wood 2021) and feedback literacy development. Accordingly, a qualitative case study was planned utilising surveys and semi-structured interviews, framed by the following research question: *What were the perceived effects of technology-mediated dialogic peer feedback practices on feedback engagement and uptake?*

Working from interpretive assumptions, I chose a 'progressive focusing' process to facilitate a more exploratory approach to answering the research question (Sinkovics and Alfoldi 2012). Such a process allows the initial stages of a data collection process to inform and help focus questions for subsequent steps through a deeper understanding of the participant experience. Qualitative surveys were chosen for their ability to illuminate what participants judged to be most significant in their experience of dialogic peer feedback while also accessing their preferred terminology and language (Braun et al. 2020). This enabled deeper exploration of significant emergent themes in the interviews than would otherwise have been possible.

Methods and data analysis

After the full essay cycle had taken place and students had received summative feedback from the teacher (at week 12 of 16), data from qualitative surveys ($N = 14$) were printed, and aspects related to the peer review experience were highlighted using a close reading analysis. These data were then used to help focus semi-structured interviews ($N = 13$) conducted over the subsequent two-week period. Through this process, planned questions were amended, omitted and added.

Questions were designed to be open, exploratory and to avoid leading answers. They were aimed at gathering information about how students understood academic standards and the feedback landscape, made evaluative judgements, self-assessed clarified and regulated goals,

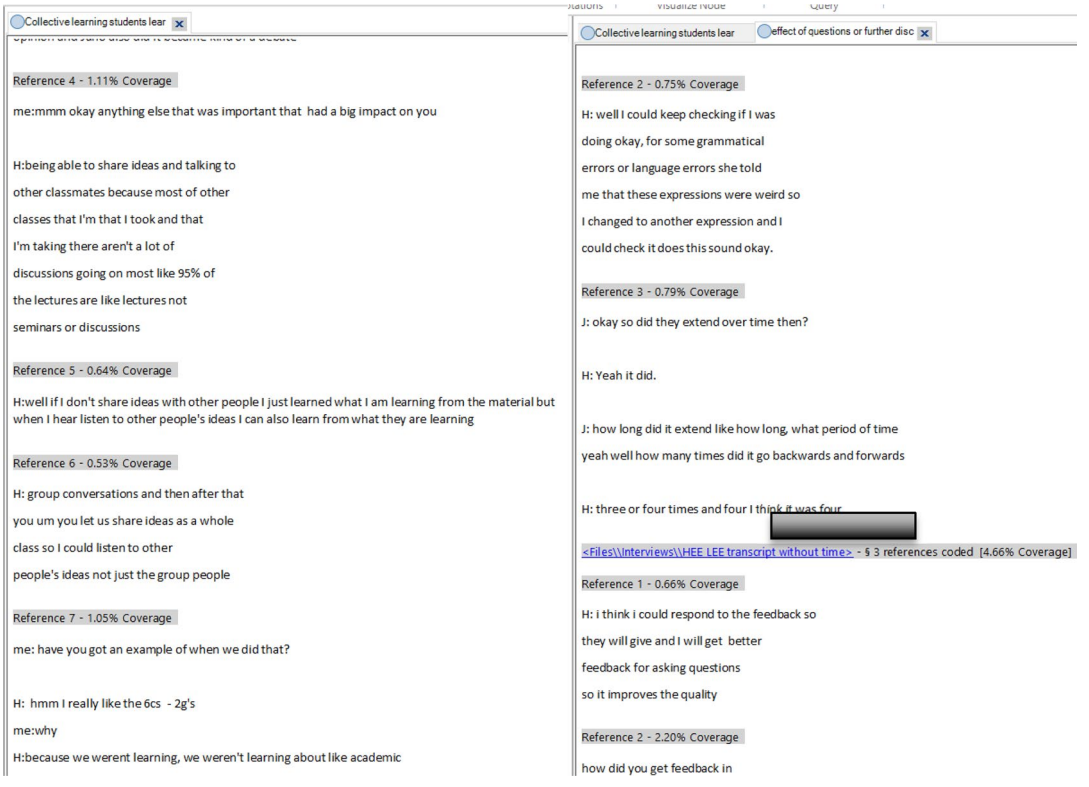


Figure 3. Example of codes 'collective learning' and 'effect of dialogue'.

and about affective aspects of their feedback uptake or rejection processes (Winstone et al. 2017a; Wood 2021). Permission to use data/screenshots and anonymous excerpts of students writing, and feedback reflections from Google Drive and Classroom, was also obtained for exemplification, methodological triangulation (Twining et al. 2017) and an in-depth understanding of participants' experiences from a naturalistic perspective.

An inductive thematic data analysis process following Braun and Clarke (2006) was chosen to facilitate understanding of the phenomena from the participants' perspective and avoid potential bias from pre-ordinate themes (Thomas 2006; Zhu and Carless 2018). In the data analysis process, I first transcribed the data and became familiar with it, reading it several times. I then transcribed and analysed the interview, then survey, data in sequence, coming up with many codes in each. Codes were then compared and reviewed and refined into key themes in several iterations. Figure 3 shows some of the 20 codes attributed to 'collective learning', alongside some of the 29 excerpts coded to the 'effect of further questions or dialogues' that contributed to the overarching theme, 'Technology-mediated dialogues made feedback useful and facilitated the co-creation of actionable feedback'. Consistent themes emerged independently in both the interview and written accounts before being merged (see Figure 4). Drive and reflection data were also used for verification and providing context.

Results and discussion

Qualitative analysis revealed the perceived importance and benefits of peer feedback dialogue for feedback engagement and uptake. There were over 100 references to dialogism in the

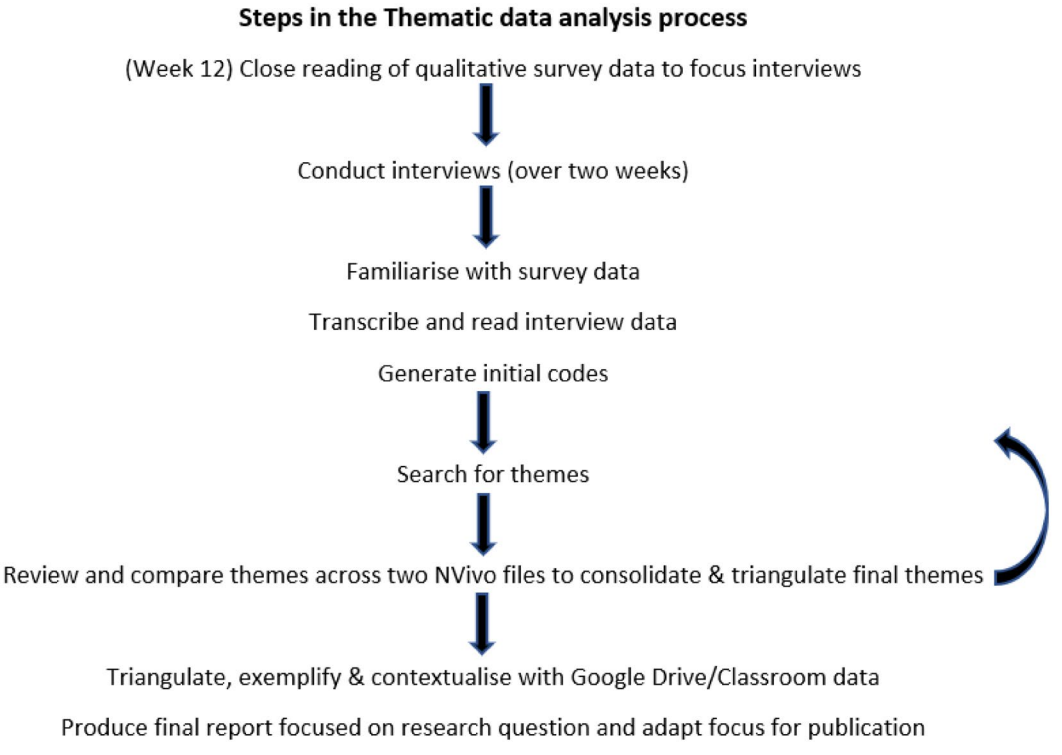


Figure 4. Illustrated thematic data analysis process.

written data, and all interviewees raised the topic contributing to 121 excerpts coded to the theme of dialogism in peer review (221 emergent codes in total). The following three overarching themes emerged, showing that technology-mediated dialogues:

Theme 1: made feedback useful and facilitated the co-creation of actionable feedback
Theme 2: lowered socio-affective barriers and supported feedback literacy
Theme 3: helped overcome barriers of time and space to dialogic collaborative learning
Each theme is also divided into subthemes that contribute to the overarching theme.

Theme 1: Facilitating useful actionable feedback

Theme 1.1: Making feedback usable

One of the most prominent themes revealed how the peer feedback process without clarification and discussion opportunities was often perceived as useless and, in many cases, futile:

> [Without dialogue], there will be no result of the feedback. Feedback is useless if no one gets what it means (Jenny interview).

> When feedback is written on paper, and you don't even get the opportunity to ask the evaluator why they thought this way…we end up not understanding the feedback at all. And ultimately, we just ignore it…The absence of dialogue just results in failure to give good feedback and to receive it. (Grace interview)

Participants explained that it was the ability to question, refute and discuss feedback information that allowed them to clarify and utilise it:

> For many feedback points [from peers], there are many that are hard to understand, many that need clearing of the point, and many that can be arguable. Dialogic feedback through Google Docs helped resolve this issue. I could understand better what others commented about my writing (survey 3)

> Having a discussion and having time to clarify it can make that feedback useful (Jenny interview)

Data from this theme suggests that the 'discussion' of peer feedback involves eliciting additional information and clarifying the meaning of feedback, but also questioning feedback. This evidences an emergent agentic role for feedback receivers within the peer feedback uptake process.

Dialogue also reportedly helped with audience perspective-taking:

> But through this dialogue, I understand why that person thought that way more because we have the dialogue. So, I can understand how it looks from outsiders' and the readers' perspective (Grace interview)

> Peers always point out what is not clear enough for them, so during the dialogical process, it helps me to understand what that is, and since there are multiple peer reviews, it gave me multiple perspectives. (Kylie interview)

These examples suggest that the dialogic process helped the participants understand that their work can be interpreted from different perspectives. Being aware of this helped them improve their work for the general reader through a reflective process involving comparisons between their own and others' perspectives.

Part of the contribution of such dialogues was also the opportunity to ask the peer to explain why they thought a revision should be made, and this was considered the most important aspect of the course by several participants:

> I could question the feedback, and why the peer thought I should revise that part of the essay. This aspect of the activities was the most helpful for me. (Survey 9)

These accounts illustrate the perceived value of dialogues about peer feedback and the relationship with participants' ability to understand it or receive additional information about how the feedback can be understood. This further clarification appears to help avoid the situation in which feedback information was ignored and, thus, had the reported effect of improving peer feedback engagement and uptake. The process is also exemplified in Google Drive data (Figure 5):

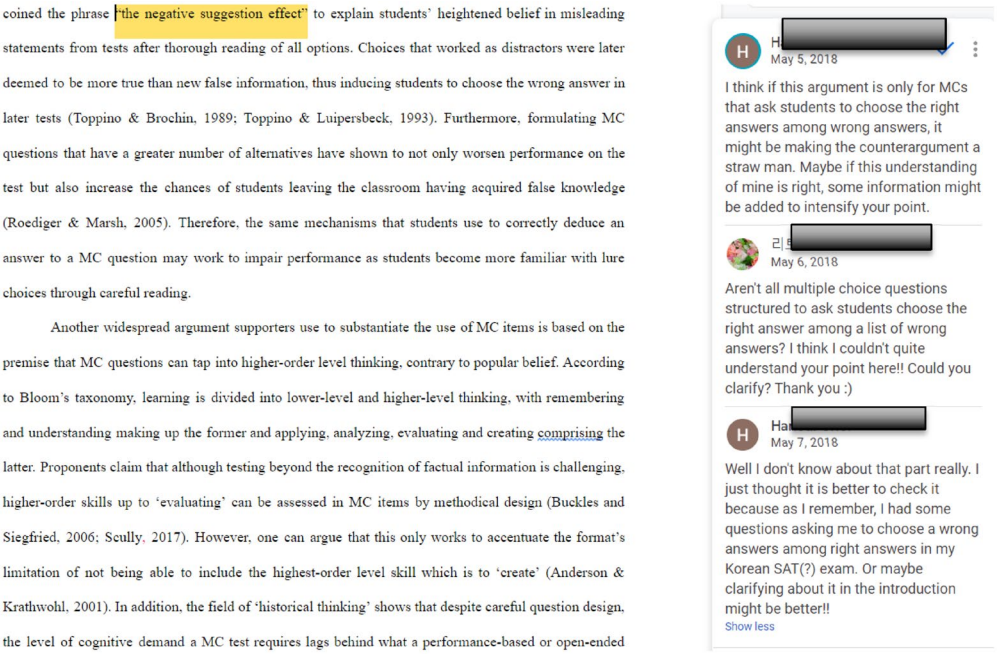
Theme 1.2: Collaborative learning and developing a learning community

Participants described not only negotiating or repairing the meaning of peer feedback through questions, but also expanding on feedback points and developing them iteratively through peer discussion within groups. This process helped participants to co-develop a more actionable and higher quality feedback point or generate a 'better and more specific way to revise' (Survey 5):

> I think I could respond to the feedback, so they will give, and I will get better feedback for asking questions, so it improves the quality. (Kevin, interview)

> Also, I can ask and refute the feedback…Through this process, I can reflect and develop the feedback and eventually improve my writing. (Survey 7)

Collaborative development of a feedback point was reported as a recursive process involving several cycles of up to four exchanges (Haeley interview). Engaging in this process reportedly helped participants regulate the achievement of goals set as a result of feedback by checking back with the group:


coined the phrase "the negative suggestion effect" to explain students' heightened belief in misleading statements from tests after thorough reading of all options. Choices that worked as distractors were later deemed to be more true than new false information, thus inducing students to choose the wrong answer in later tests (Toppino & Brochin, 1989; Toppino & Luipersbeck, 1993). Furthermore, formulating MC questions that have a greater number of alternatives have shown to not only worsen performance on the test but also increase the chances of students leaving the classroom having acquired false knowledge (Roediger & Marsh, 2005). Therefore, the same mechanisms that students use to correctly deduce an answer to a MC question may work to impair performance as students become more familiar with lure choices through careful reading.

Another widespread argument supporters use to substantiate the use of MC items is based on the premise that MC questions can tap into higher-order level thinking, contrary to popular belief. According to Bloom's taxonomy, learning is divided into lower-level and higher-level thinking, with remembering and understanding making up the former and applying, analyzing, evaluating and creating comprising the latter. Proponents claim that although testing beyond the recognition of factual information is challenging, higher-order skills up to 'evaluating' can be assessed in MC items by methodical design (Buckles and Siegfried, 2006; Scully, 2017). However, one can argue that this only works to accentuate the format's limitation of not being able to include the highest-order level skill which is to 'create' (Anderson & Krathwohl, 2001). In addition, the field of 'historical thinking' shows that despite careful question design, the level of cognitive demand a MC test requires lags behind what a performance-based or open-ended

Figure 5. An example of a dialogue spanning three days.

> Usually, if it [peer review] was in paper form, it would be a one-way thing, and it would finish, but here I could do a follow-up question or ask them for feedback on my answer "oh, is it okay now?" and they would say "oh, I think it's much better". (Judy interview)

In addition, these discussions also expanded into collaborative group learning that involved multiple perspectives:

> Google drive was awesome, if you do paper feedbacks, you get feedback, and that's it, but if you do it on Google drive, one feedback is like multiple feedbacks because you can talk to each other and one person says, "you should fix this to this", and I suggest another thing, and when that person replies again it's like another feedback I get. (Kylie interview)

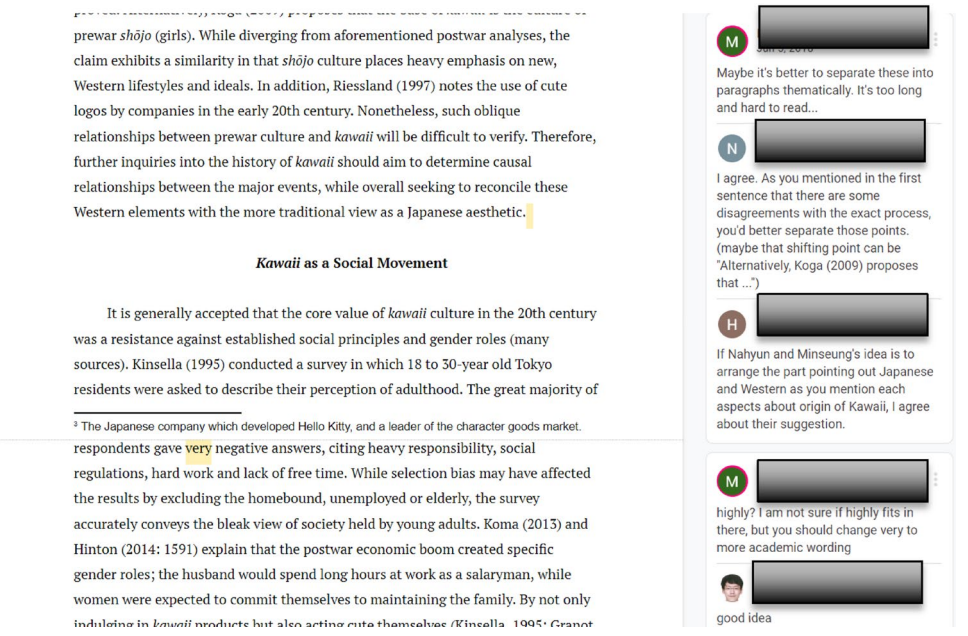
These excerpts provide evidence that groups of learners co-constructed actionable feedback through multiple exchanges and a knowledge synthesis process. Figure 6 exemplifies the group discussion process through Google Drive comment dialogues.

Theme 1.3 understanding standards and making evaluative judgements

Because the technology could mediate simultaneous feedback by groups of feedback givers on the same essay, there was also evidence of group co-regulation of feedback points:

> My peers asked me a lot of questions about my comments, so I really replied, and I think that actually, some comments helped them change their way. When I put a comment, there is another comment from the writer of that essay, and the other feedback giver also agrees about that point, then the original writer changes the point, I think that was the most common process. (Holly interview)

> For Kylie's essay, Juno was also reviewing hers, so the three of us could talk about common mistakes we were finding in her essay. There were agreements on some parts, and disagreements on some parts, so it was interesting to find that some people didn't think the same as me (Haeley interview)



[3] The Japanese company which developed Hello Kitty, and a leader of the character goods market.

Figure 6. Co-constructed feedback among three reviewers and recipient.

Asked how peers resolved disagreements, Haeley answered:

> Well, if someone didn't agree with me, I think I found some sources to back up my opinion, and Juno also did; it became a kind of debate (Haeley interview)

These accounts provide evidence that learners could learn collaboratively through the experience of sharing a peer feedback space and engaging in uptake-oriented discussions. They also provide further evidence of the cyclical and iterative nature of learning through collaborative group technology-mediated peer feedback (see subtheme 1.2).

In the interview, students were also asked how they understood 'good academic standards'. Half of the participants ($N=7$) responded by talking about the importance of giving and receiving peer review. The following comment typifies this theme:

> Giving feedback also helps me, because I learn a lot about good writing itself when I'm giving feedback… if I see other people's writing, then it's much more clear to me what can be done better, compared to looking at my own writing, so looking at other people's writing and then finding out how it can be improved and what they're missing, or doing good. I can also apply that knowledge to my writing later. (Kylie interview)

This theme illustrates the importance of providing feedback for developing critical skills for students to apply to their own work. However, in the overarching theme, most of the participants focused their reports (about how they understood standards, made judgements about quality, and set and regulated goals) on the learning contribution of receiving peer feedback and discussing how it could be actioned within emergent online community groups.

Implications of theme 1

To support learning, feedback information needs to be acted upon to close the gap between current and target performance (Sadler 1998). Before this can happen, it needs to be understood and potential barriers to its use mitigated (Winstone et al. 2017b). All of the participant accounts

(both written and oral) were highly positive about the contribution of technology-mediated peer feedback dialogues to their ability to engage with and use feedback. Participants suggested that this enhanced feedback engagement and uptake in several important ways.

First, participant accounts illustrated that in many cases of peer feedback without discussion, feedback is underdeveloped or challenging to understand, and as a result is often ignored. This study shows that, even after peer feedback training, participants felt that the peer comments often still needed to be discussed, refuted, tested or validated (Zhu and Carless 2018) by other peers. This process required individuals to adopt an active and agentic approach to challenging, questioning and building on feedback received if it was unclear, undeveloped or unconvincing. This also led to recursive, ongoing, peer group dialogues that resulted in collaboratively generated actionable feedback that was perceived to be higher quality due to the process. Participants explained that regular technology-mediated interaction with peers during the writing process helped them consider the audience perspective; this allowed them to reflect on and improve the comprehensibility of their writing.

One important implication of this finding is that it helps evidence and align understanding of engagement with peer feedback with the socio-constructivist and process-oriented dialogic definitions of teacher-student feedback practices. From this perspective, feedback providers and receivers are considered to be equally responsible for agentic co-construction of the meaning they derive from peer feedback processes (Nash and Winstone 2017). Such evidence of peer feedback as a socially constructed process has been mostly absent from the literature, which has also somewhat neglected the agentic role of peer feedback receivers. This is perhaps due to the understanding that students are often distrustful of feedback from less authoritative sources, and receiving feedback is often viewed as the more passive of the two roles (van Heerden and Bharuthram 2021).

In this study, participant accounts also suggested that receiving feedback was more helpful if it was accompanied by opportunities for online discussion and co-development with a group of peers (Armengol-Asparó, Mercader, and Ion 2020), and that group discussions for resolving disagreements evolved into collaborative, distributed, co-regulative opportunities or 'debates'. While in similar studies learners indicated desiring teacher intervention in such cases (see Zhu and Carless 2018; Schillings et al. 2020), in this study, learners reported being able to settle such issues within their peer groups by employing external resources (Wood 2021). This suggests learners were demonstrating enhanced 'authorial agency' (Nieminen et al. 2021).

The evidence also illustrates that the peer discussion process can go well beyond 'negotiation of meaning' (Zhu and Carless 2018; Reddy et al. 2020). The data show that the role of the peer shifted from 'advisor' on the construction of a written product to 'collaborator' in the cooperative development of the understanding of standards and the refinement of critical and evaluative capabilities through group co-regulation processes in online communities that emerged through multiple interactions, as proposed by Wood (2021). While the benefits of giving peer feedback are often considered to be greater than receiving it in the literature (McConlogue 2015; Ion, Sánchez Martí, and Agud Morell 2019; Carless 2020), evidence from this study suggests that when engaging in technology-mediated dialogues with peers about what feedback means and how it can be enacted, the benefits of receiving peer feedback are potentially more significant.

Theme 2: Technology-mediated dialogues lowered relational and socio-affective barriers

Dialogue encouraged the 'appreciation of feedback'

Participants indicated that they often felt uncomfortable or fearful about giving feedback, particularly to older peers. One participant noted this in a piece of reflective writing in which she described a cultural aversion to feedback that appeared to be common:

> In Korea, having "red marks" all over your paper means a bad thing. It usually implies that there is something very 'wrong' with the paper, and many may consider this as criticism rather than helpful suggestions. (Judy reflection)

As a result of this cultural perspective on the meaning of feedback, students are often reluctant to give in-depth peer feedback. However, participants also explained that the dialogic nature of the environment helped them to overcome this discomfort or 'fear' by expanding their understanding of the purpose and nature of feedback as an act of benevolent collaboration:

> The ways we use to give and get feedback [technology] make me feel easy and comfortable about the feedback. Before entering this class, I was afraid of advising someone, especially older and higher-grade peers. I felt that advising someone needs perfect certainty. I thought advice is not giving my idea, but giving the answer, pointing out the wrong point. (Survey 7)

Participants explained that this also helped with some of the relational and affective difficulties of giving peer feedback because they felt more willing to provide tentative comments that could be co-developed into an actionable point through a peer group process. According to survey respondent 3, the two-way conversation helped build relationships, which then supported participants' interpretation of the provision of peer feedback comments as an act of support rather than criticism. The process of peer feedback uptake was also aided by the conversational and more indirect nature of their discussions:

> When there was something that I didn't know, I could always put questions about it, and since it is a conversation, I could give my feedback as a question. (Survey 3)

> Also, I can give feedback more freely because I know that I can develop my idea effectively talking with people about the feedback. I threw away the fear about giving right and perfect feedback. I feel free about giving any idea and feelings. (Survey 7)

In an interview, Jane also pointed out that even something the feedback provider was uncertain about could be a helpful starting point in the group peer feedback process:

> I think it [dialogism] made people more free about giving feedback, people can give feedback that is not perfect, and the small idea of someone can be fed back with others advising. (Jane interview)

These examples illustrate that incorporating technology-mediated dialogues within the peer feedback process also encouraged participants to offer feedback they might otherwise have felt uncomfortable providing. The discussions thus helped participants to navigate some of the relational complexities inherent in the peer feedback process.

Theme 2.2 dialogic peer feedback from a peer community as affective support

Participants also reported that the ongoing peer feedback relationships/communities they formed functioned as an emotional support mechanism that provided motivation and encouragement for the challenge of engaging with feedback. These aspects are also illustrated in the language choices participants used to describe their experience of membership of a peer feedback community:

> It made me more motivated to actually fix it, so I know that everyone's engaged and people are putting their time and effort in doing my feedback… it would be a sin to not use it… I think it's just like a motivator; it's like a synergy effect. (Judy interview)

> I'm not doing this work alone, and there is someone who is so looking forward to my improving… I think it was support and feedback that makes me really motivated to work hard and improve. (Jenny interview)

> I feel I'm an important person, so everyone is helping me to be a better writer, that emotion itself helped me a lot in writing (Kevin interview)

These excerpts suggest that the emotional impact of membership of a supportive digital peer feedback community can be quite powerful.

Implications of theme 2

In this theme, participants explained their pre-existing discomfort with providing (and receiving) peer feedback, explaining that in the Korean cultural context, feedback is often seen as a form of criticism that can potentially damage relationships and social standing (Han and Xu 2021; Zhan 2020). This issue may have been exacerbated by the participants' differing ages, which in Confucian cultures often has implications for what is deemed appropriate behaviour from 'junior' group members to 'seniors'. It has similarly been noted in the literature that factors such as culture can negatively influence students' reactions to feedback (Evans 2013; Ryan and Henderson 2018).

However, participants explained that experiencing feedback as a technology-mediated dialogue over time helped them process and mitigate their aversion to engaging in the peer feedback process. Viewing peer feedback as something that could be 'conversational', negotiated and co-constructed helped individuals navigate the lack of confidence they reported regarding the accuracy of their feedback suggestions. As a result, participants reported feeling more confident providing feedback comments that were not fully formed, certain or clearly expressed. This finding appears to be both novel and significant in exemplifying how peer learning within online environments can be effectively mediated.

The shift from simple comment provision to engaging in discussions around peer feedback helped participants perceive the intention of peer-generated comments as benevolent and supportive, which, in turn, helped ease some of the relational frictions (Carless and Winstone 2020) inherent in the activity. The experience of dialogism also seemed to enable participants to modify their understanding of the meaning and function of peer feedback (Winstone et al. 2017b), and suggests an improved 'appreciation of feedback' (Carless and Boud 2018) or an enhanced understanding of how assessment and feedback combine with course content to facilitate learning (Wood 2021).

Participants also reported that experiencing peer group support strongly motivated and affectively supported their process of feedback uptake. They explained that understanding the effort involved in producing peer feedback, they felt obliged to use information received from peers. Demonstrating benevolence and care can encourage student uptake of teacher feedback (Leighton and Bustos Gómez 2018) and intentions to engage in future feedback (Telio, Ajjawi, and Regehr 2015). However, evidence of the positive influence of supportive peer relationships on motivation and willingness to engage with and use peer-generated feedback information appears to be an original and potentially significant finding. This suggests that ongoing multi-directional technology-mediated feedback practices support the affective and relational dimensions of feedback literacy (Carless and Boud 2018), in addition to cognitive and evaluative aspects. While some studies suggest that anonymous peer feedback may be more objective (Panadero and Alqassab 2019), this study indicates that, similarly to van Heerden and Bharuthram's (2021) findings, when strong reciprocal and mutually supportive relationships are formed among peers, the gains are potentially more significant.

Theme 3: Technology acceptance and opening new learning space

The convenience of the platform stimulated engagement

Participants reported that the usability and convenience of the Google Drive compared to other online peer feedback methods they had used (i.e. the local Moodle system) positively impacted engagement. The language choices of the participants are again revealing:

> The technology that we use during the class was really important for facilitating engagement of the feedback process… because it's way easier, and way faster, way more approachable than not having it, especially Google Drive. (Kylie interview)

> Google Drive and Classroom are absolutely superior than ETL [local Moodle system], intranet, or other ways of handing in and distributing material. Regardless of how helpful feedback are, if the instrument is inconvenient for sharing feedback instantly and multilaterally, positive effects of feedback would be tremendously diminished (Survey 9)

This suggests that the technology selected to host dialogic feedback practices (and potentially the way it is deployed) can also significantly impact learner behaviour, depending on how effectively it can facilitate engagement in the peer group feedback processes and how learners perceive it.

Anchoring comments to the text facilitated engagement

Another affordance of the technology that appeared to have a positive impact was the ability of the platform to 'anchor' a feedback discussion to a particular point in the text:

> For other classes, sometimes I'm asked to make comments on other students work, but it's not on the work itself; there's a file I can click to see it, but I have to make comments on the bottom of the posting, so it's not as effective as Google Drive. (Kylie interview)

> The point that I like is that comments are positioned were feedback took place, so I could easily find where to improve (Survey 2)

These excerpts suggest that providing or receiving comments directly on an extract of writing facilitates engagement in the provision and consumption of comments, perhaps due to the ease of use and convenience of the system for the task at hand.

Overcoming time and space issues for learning from peer feedback discussions

It also appears that the affordances of the mobile application (combined with South Korean mobile internet penetration) also facilitated mobile learning during commuting or transition time. In his interview, Minseung pointed out that because his commute took two hours a day and because feedback dialogues were mediated by Google Docs, he could spend additional time thinking, and thus getting 'a deeper understanding of what feedback means, or what I should do'. Survey responses also confirmed this:

> I think the best thing is that you can access the class materials on mobile (Reading things on subway is extremely convenient). (Survey 6)

It also appears that discussions that take place over time may also have had a positive impact on peer feedback quality:

> Using Drive for peer feedback gives peers and me enough time to think about each other's works. I think it helps us to give higher quality feedback, making us more motivated. (Survey 4)

Juno pointed out that Google Drive also facilitated long conversations in comparison to the use of paper or some other technologies, which opens a different kind of 'space' for feedback:

> The essay was like, eight pages, but the comments on the sides were like ten, twenty pages, so I don't think we could have done that much and that extensively if you were just doing it on paper or during class or just talking about it face-to-face. (Juno interview)

The extent of the ongoing exchanges was also reflected in the Google Drive data. For example, there were 99 feedback comments on one draft of Juno's essay, as exemplified in Figure 7. Such long dialogues would have been challenging (or impossible) to mediate using other technologies or face-to-face, as Juno's interview comment suggests. It also seems that such affordances directly enabled the kinds of extended group dialogues described in theme 1.

Google Drive also reportedly solved some of the temporal and spatial issues students had experienced when working collaboratively with others in the past. In his interview, Juno also pointed out that when working in groups, students usually have 'very few meetings close to

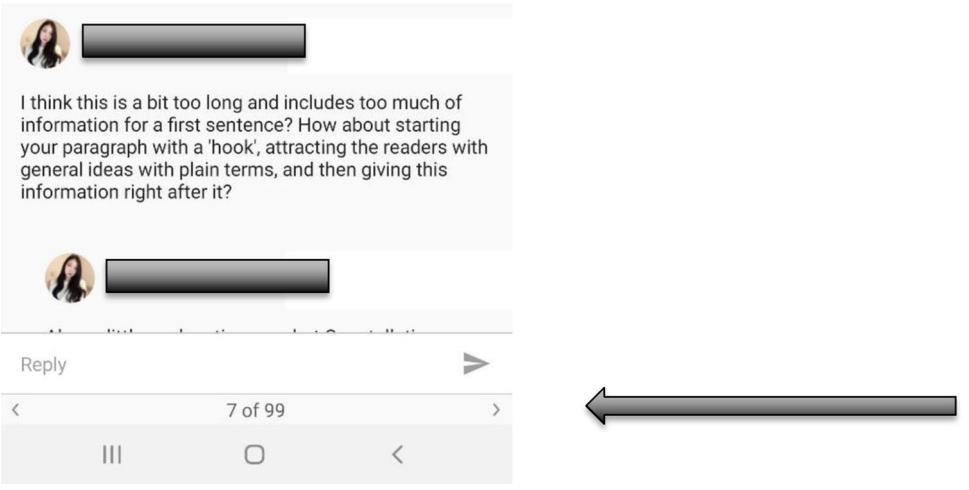


Figure 7. Data from Google Drive (mobile) illustrating 99 comments on one essay draft.

the deadline' but that Google Drive did not have the limitation of time and space and so 'was able to facilitate [peer review] conversation at all times, I think that helped a lot'.

This ability to overcome limitations of time and space may have been due to the notifications that the system can generate that integrate with mobile apps and mobile systems:

> Google Classroom was successful! I love how it sends notifications on my phone (Grace reflection)

Implications of theme three

These accounts suggest that using Google Drive/Docs/Classroom encouraged engagement in dialogic peer feedback processes because it was perceived as practical, quick and convenient compared to other platforms participants had used. In addition to its capacity as a unified environment for providing and receiving feedback, participants reported that the platform's ability to facilitate extended discussions of highlighted excerpts of a text over time encouraged agentic engagement in a high-quality peer feedback process. These affordances also mediated peer feedback communication during transition times, such as commutes or between lessons, creating additional 'spaces' (Wegerif 2013) for collaborative learning from peer feedback, aided by email and app notification reminders. Overall, the data also appear to provide evidence for ecological (Chong 2021) and sociomaterial (Gravett 2020) perspectives of learner agency, as it appears that environmental, technological and social factors played a significant role in supporting feedback uptake and literacy.

The findings appear to evidence how limitations reported in an in-person study of peer feedback (Zhu and Carless 2018), in which finding time for peer feedback meetings was a reported issue, and a study of electronic peer feedback (Filius et al. 2018) in which the electronic platform failed to mediate ongoing dialogue, can be overcome. Evidence from the present study suggests that perceived ease of use, utility, and the platform's affordances for facilitating dialogic feedback should be considered when designing technology-mediated peer feedback practices (Rejón-Guardia, Polo-Peña, and Maraver-Tarifa 2020; Winstone et al. 2020). Indeed, if lacking such affordances, it seems unlikely that peer feedback practices can evolve past the one-way transmission of comments without the time and space to discuss them face-to-face. However, such 'transmission' of feedback comments places feedback within the cognitivist or 'old paradigm' of feedback (Carless 2015). This has been a justified criticism of technology-mediated feedback in related literature

(Mahoney, Macfarlane, and Ajjawi 2019; Pitt and Winstone 2020), as it positions feedback receivers as passive recipients rather than agentic partners in the feedback uptake process.

Limitations and future work

As a small-scale study with homogenous participants and a self-selected convenience sample, there are limits to claims about generalisability that can be made about certain aspects of the thematic analysis. The study was also based on perceptual data that may be prone to bias, novelty or researcher effects, and unfortunately, it was not possible to consider the impact of the practice on learner outcomes due to the study's scope. To expand on these findings, future work may consider the use of such practices in different contexts, from both teacher and learner perspectives, alternative technologies (zoom, peer screencasts or social networking services), cohort or mixed methods studies to determine the impact on attainment, as well as sustainable and transferable feedback literacy skills through the exploration of the long-term effects of such practices. Given the apparent influence of the learning environment and social and cultural interaction on feedback engagement in the data, there also appears to be scope to explore ecological, sociomaterial and socio-cultural approaches to better understanding and facilitating feedback uptake and literacy and agency in the peer feedback process in digital and blended settings.

Implications and conclusions

This paper has attempted to instantiate technology-mediated peer feedback practices to help mitigate some of the issues reported with dialogic feedback practices in the field and address a literature gap regarding the relationship between technology-mediated dialogic peer feedback, feedback uptake and literacy. It has also attempted to help close the gap between discussions of the need for agency of the feedback receiver in the general and peer feedback literature, in which the agentic role of feedback receivers and the benefits of peer review to feedback receivers have been underexplored.

The analysis provides evidence that technology-mediated dialogic peer feedback practices deployed in the ways suggested can help learners negotiate the cognitive, evaluative and affective processes involved in feedback uptake and literacy development. These practices can help reduce relational frictions in peer feedback activities, improve 'appreciation of feedback', and motivate learners to engage with peer feedback in discursive online feedback communities. The practices also provide expansive digital 'spaces' for co-regulation and collaborative learning from peer feedback in a manner that was perceived as useful, convenient and efficient, leading to perceptions of enhanced peer feedback uptake.

The evidence also supports the repositioning of the assumed role of peer feedback in digital settings as a community practice that supports learner agency. The data evidence and help refine aspects of the dialogic, technology-mediated model of feedback uptake and literacy proposed by Wood (2021) and provide further insight into the how the feedback uptake and feedback literacy development process can be scaffolded through peer feedback. Accordingly, the study has implications for both theory and practice in the discussion of feedback uptake, feedback literacy and teacher feedback literacy (Carless and Winstone 2020) in the blended and online learning environments becoming ever more ubiquitous in higher education contexts.

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