Instructional feedback to support self-regulated writing in primary school

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Feedback that enhances self-regulated learning when writing seems to rarely be provided in classrooms to beginner writers, although acting autonomously as a writer is crucial for the pupils' further literacy development. Effective instructional feedback should be built on dialogues where the teacher supports the pupil(s) in monitoring the text, discussing qualities and weaknesses, and enhancing reflection upon what to do next. Thus, feedback interactions that emphasize pupils' agency over their own learning processes are valued, more knowledge is needed about how to facilitate such instructional feedback interactions for elementary pupils. Therefore, the current study asks: *How do teachers facilitate feedback that promotes self-regulated learning when second graders (7-year-olds) are writing in classrooms?* The data consist of a thematic analysis of transcriptions from video recordings ($n = 540$ min) of four teachers' classrooms. The results show that designing instructional feedback interactions that promote self-regulated learning when second graders write are possible when teachers let go of their control, letting the pupils take agency by adopting assessment criteria, monitoring their texts, and expressing self-generated feedback, as well as applying help-seeking strategies while confirmed by their high expecting teachers.

KEYWORDS

agency, feedback interactions, feedback uptake, teachers' support, strategies, high expectation

Introduction and aim

Feedback in early writing instruction has primarily been providing information about right and wrong at the surface level of the pupils' texts, or at the pupils' ability and effort (Fiskerstrand & Gamlem, in process; Graham, 2018a). Further, several researchers have pointed out the lack of sufficient writing instructions in the first years of schooling (Gerde et al., 2012; Håland et al., 2018; Graham, 2019), as today too many finishes elementary- and secondary school without adequate writing skills (Cutler and Graham, 2008). For young writers, writing makes an important foundation for further progression in education, work-life, and personal development, as well as acting autonomously and using tools effectively (OECD, 2000; Gerde et al., 2012; Graham, 2019). To be able to support pupils' progression, feedback becomes a significant part of the learning process(es) (Black and William, 1998; Smith and Lipnevich, 2018; Andrade et al., 2021). Therefore, feedback in early writing instructions is crucial to study thoroughly (Schuldt, 2019).

Instructional feedback (Smith and Lipnevich, 2018) is powerful to enhance pupils' understanding, learning, and reflection in a classroom (Black and William, 1998; Hattie and Timperley, 2007; Shute, 2008; Mandouit and Hattie, 2023). Further, the feedback needs to be understood by the pupil, and provide concrete information about how to improve

the performance, or in the general domain of the performance (Hattie and Timperley, 2007; Smith and Lipnevich, 2018). Instructional feedback must also build on pupils' internal feedback to strengthen and stimulate self-regulating learning (Butler and Winne, 1995; Brandmo et al., 2020; Nicol, 2021). In addition, feedback connected to pupils' self-efficacy is also found to be of value, since it is becoming central in the pupils' learning process (Smith et al., 2016; Zimmerman et al., 2017; Lipnevich and Panadero, 2021). Moreover, the pupils must reflect upon the feedback (Butler and Winne, 1995; Graham, 2018b) and be given opportunities to improve by using the provided feedback (Brookhart, 2018).

In recent feedback research, the pupils' perspective and uptake of the feedback have been greatly emphasized, highlighting affective effects and the pupils' emotions (Gamlem and Smith, 2013; Carless and Boud, 2018; Gamlem and Vattøy, 2023; Mandouit and Hattie, 2023). The pupils' emotional reaction is stated as utterly important as the feedback provided in second grade primarily is oral (Chen et al., 2011), and research focusing on the quality of teachers' oral feedback for beginner writers is limited (Schuldt, 2019).

Feedback that strengthens the learner's self-regulated learning, is stated to have the greatest impact on the learners' development (Hattie and Timperley, 2007). At the self-regulation level, the pupils get support in taking agency over the learning process, mastering and monitoring both the quality and the effectiveness of the work, as well as being willing to invest in the improvement (Hattie and Timperley, 2007), in addition to emotional support (Mandouit and Hattie, 2023). However, recent studies have shown that instructional feedback aiming to enhance the pupil's self-regulated learning is hard to find in elementary school (Brooks et al., 2019). Therefore, in the current study, we are interested in investigating how teachers facilitate and use feedback at self-regulating level in their teaching when pupils are working with writing assignments.

The features of the feedback provided in the early years of schooling are fundamental for the pupils' beliefs about their development (Dweck and Master, 2009), as well as their understanding and use of feedback (Gamlem and Vattøy, 2023). Pupils who experience feedback that stimulate their drive to grow will seek new challenges and regulate their learning process (Dweck and Master, 2009). This perspective is important in many aspects of school, although especially crucial regarding the young pupils' development as autonomy writers (OECD, 2000), taking agency over their writing and their ability to engage in, monitor, and react in their future writing (Graham, 2018a,b).

Theoretical framework

Instructional feedback

Instructional feedback concerns: "Any information about a performance that a learner can use to improve that performance or grow in the general domain of the performance" (Smith and Lipnevich, 2018, p. 593). The information might be provided by a teacher, a peer, or even the pupil himself (Smith and Lipnevich, 2018). To be useful, the feedback should also contain information about both the quality of the performance, the quality of the desired goals related to the performance, and measurement to compare the two (Ramaprasad, 1983). These points were modified and formulated by

Hattie and Timperley (2007) as "feed-up," "feed-back" and "feed-forward."

In its function, instructional feedback is "prospective, rather than retrospective" (Smith and Lipnevich, 2018, p. 33), as feedback is meant to move the pupils forward (Hattie and Timperley, 2007; Wiliam, 2010; Mandouit and Hattie, 2023). Brookhart (2018) saw this factor in light of the teachers' provision of opportunities to use the feedback. Here, she aligns with Kluger and DeNisi (1996) who claim that the most important feature of feedback, is that the recipient does use it, as well as it is understandable and reflected upon. This is an approach that is highly stated in recent research studies as well (Lui and Andrade, 2022; Van der Kleij, 2022). Brookhart (2018) also emphasized that supporting the pupils' use of feedback is an effective way of equalizing the teaching, as the most high-achieving pupils will use the information anyway, but giving a chance to follow up for everyone can ensure better learning for the whole class. Additionally, the benefits of providing instructional feedback are not limited to the individual level, but to the whole class, as the pupils know what is expected, and their teachers will monitor their work and provide relevant support (Oakes et al., 2018). Further, effective instructional feedback builds on challenging, yet clear goals that are communicated to, and accepted by the pupils (Sadler, 1989). Additionally, Hattie and Timperley (2007) highlighted that goals also help focus the pupils' attention, as well as to direct the feedback. In addition, how to succeed becomes clearer for the pupil when goals or assessment criteria are explained or communicated (Black and William, 1998, 2009; Gamlem and Smith, 2013).

Pupils' notion of emotional support in feedback interactions can be hard to understand. Mandouit and Hattie (2023) found that when providing feedback, it should include emotional support as positive comments that strengthen the pupils' motivation to respond to the feedback. Another important, yet complex factor is praise. Hattie and Timperley (2007) pointed out that pupils enjoy being praised, although they appreciate being praised more for what they have done, than for who they are. In the same manner, Dweck and Master (2009) highlighted differences between pupils who are praised for their ability, in contrast to their effort. Pupils who are praised for their effort and get to see that their effort raised their performance, will build confidence, and seek more challenging tasks. On the other hand, the ones praised for their ability are more likely to give up, reasoning that lack of ability will stop them.

Instructional feedback can also fail in its intention of improving learning and understanding (Black and William, 1998, 2009; Hattie and Timperley, 2007). Askew and Lodge (2000) referred to the concept of "killer feedback" (p. 6) when the feedback blocks learning instead of promoting it. Similarly, there is a risk of reducing the pupil's motivation when attention is set to errors and the pupils experience lacking the ability to solve them. On the other hand, pupils who find relevant strategies are more likely to maintain their self-motivation when facing errors (Zimmerman et al., 2017).

Feedback about self-regulated learning

In their meta-analysis of feedback research, Hattie and Timperley (2007) discriminated four feedback levels (task level, process level, self-regulating level, and self-level) and attributed each level specific descriptions and evaluations. All four levels have the potential for effective feedback, although they emphasized that the most effective are the ones directed specifically to the learners' self-regulated

learning. These feedback levels should further be seen as tightly connected to a classroom climate where the pupils were encouraged to peer- and self-assess, in addition to learning from mistakes (Hattie and Timperley, 2007). Additionally, recent studies have pointed to the affective effects of the feedback at the self-regulated level, highlighting that the teachers must consider the emotional effects of the feedback as an important part of the pupils' uptake (Smith et al., 2016; Gamlem and Vattøy, 2023; Mandouit and Hattie, 2023).

When a pupil is writing, the external feedback provided by a teacher will always be in addition to the pupil's self-generated feedback (Butler and Winne, 1995). The self-generated feedback builds on previous knowledge, beliefs, domain-specific knowledge, strategy knowledge, and motivation beliefs, in addition to goals that the pupil has according to the task, enacted strategies, and the product so far (Butler and Winne, 1995; Zimmerman et al., 2017). The provided feedback from an external source will verify, add on, or might also create a conflict with the pupil's internal feedback. Where the teacher provides dialogues regarding the pupils' performance, its qualities and/ or weaknesses, the provided information might enhance the pupils' reflection concerning information that expands their understanding of the task, performance, and goals – as well as trigger clarifying questions, or even discussions concerning alternative further paths (Butler and Winne, 1995; Smith et al., 2016). Then the pupils are positioned as active participants rather than passive feedback receivers (Askew and Lodge, 2000). In these interactions, the teachers must help the pupils verbalize their inner feedback to enable further connections to the external (Nicol, 2021). Additionally, the external instructional feedback will in such cases support the pupils' development as self-regulated learners (Butler and Winne, 1995; Panadero and Lipnevich, 2022). The instructional feedback is also stated as helpful to ensure effective strategies as the teachers monitor and supervise the pupils' task approach, as well as to support the pupils' behavior and motivation (Oakes et al., 2018).

The feedback that stimulates self-regulated learning supports the pupils' agency over the learning process, as well as builds confidence as competent learners (Clark, 2012). The feedback is concerned with engagement, strategies, effort, and certainty, as well as the pupils' ability to monitor and self-assess (Hattie and Timperley, 2007). In addition, the feedback promotes effective learning strategies that imply both cognitive skills to self-assess one own's ability, in addition to management (Clark, 2012). It has also been stated that volitional strategies (Black and William, 2009) should be considered, as the pupils need to be willing to involve in and use the feedback, although going back, interpreting the feedback, and revising the performance, costs (Hattie and Timperley, 2007; Black and William, 2009). In the active learning process, a self-regulated pupil is aware of one's own strengths and weaknesses and is purposefully pursuing goals and strategies to enhance competence (Zimmerman, 2000).

Feedback at the self-regulated level contains information about both the task level and the process level enabling the pupils to see the task and its goals in relation to what is already known and what more is needed. Hattie and Timperley (2007) explained it like this:

> Learning can be enhanced to the degree that students share the challenging goals of learning, adopt self-assessment and evaluation strategies, and develop error detection procedures and heightened self-efficacy to tackle more challenging tasks leading

to mastery and understanding of lessons (Hattie and Timperley, 2007, p. 103)

The connection between internalizing the goals and relevant strategies, in addition to evolving procedures to detect errors growing into mastering new challenges, are thus emphasized. In this way, feedback at the self-regulation level stimulates the pupils' deeper learning as the processes are transferable into new tasks and contexts (Hattie and Timperley, 2007; Panadero et al., 2017; Brandmo et al., 2020; Mandouit and Hattie, 2023). Although having the capacity to provide the pupils with multiple comments while giving feedback, Zimmerman (2000) highlighted that the teachers' most important task is to use the feedback interactions to stimulate the pupils' ability to self-regulate.

Self-regulated pupils have also self-efficacy beliefs to reach the desired goals. Feedback provided can preclude or strengthen pupils' self-efficacy beliefs, and thus increase or decrease effort (Zimmerman et al., 2017). Similarly, feedback interactions where the teachers seek to control rather than pursuing pupils' reflection reduces the pupils' agency, self-efficacy, and self-regulation (Black and William, 2009; Zimmerman et al., 2017). Further, Rubie-Davies et al. (2010) highlighted teachers' expectations as a crucial factor for developing self-efficacy showing the link between high-expectation teachers facilitating pupils' higher outcomes.

In the context of writing and instructional feedback at a self-regulating level, Graham (2018a) emphasized the self-regulating category's potential to build more writing confidence for the writer himself, by providing the pupils with techniques and language to develop their writing. While supporting the pupils' self-generated feedback by pointing at concrete ways to monitor progress, the feedback can also promote autonomy in the writing process (Graham, 2018a). The pupil's self-monitoring is especially crucial when it comes to feedback because when the writer is engaged in reviewing the text, there is an opening for internal and external feedback to meet (Butler and Winne, 1995; Graham, 2018b).

Although feedback at a self-regulating level is fruitful, research shows that it is difficult for teachers to facilitate such interactions. In their mapping of usage of the four feedback levels in an Australian 7th grade, less than 1 percent of the feedback was found to promote self-regulation (Brooks et al., 2019).

Instructional feedback in early writing instruction

Learning to write adequately is seen as an essential skill, on which further development in school and education, as well as occupational and personal possibilities, relies on (Cutler and Graham, 2008; Gerde et al., 2012; Graham, 2019). Second-grade pupils (age 7 years) are vulnerable writers, who receive most of their feedback orally (Chen et al., 2011). The teachers who provide feedback to these pupils are in general relatively close to the pupils (Smith and Lipnevich, 2018), and by spending a large amount of time in class with the same teachers, the pupils' relationship with their teachers is crucial for the pupils' uptake of the feedback (Chen et al., 2011). Young pupils have particular needs for concrete information about what to do next to improve (Tunstall and Gipps, 1996), as they are likely to get overwhelmed if the information load is too heavy (Smith and Lipnevich, 2018). In addition, the teachers must model effective strategies (National Research Council, 1999), e.g., drawing on their knowledge of oral language (Shanahan, 2006). Providing feedback that

strengthens the young writers' agency and understanding of writing is also pivotal in terms of preventing literacy problems, as these problems are more effectively met in the early year of schooling (Graham et al., 2015a).

While teaching writing, elementary teachers report that limited time makes oral feedback interactions at the meaning level difficult (Clarke, 2000; Håland et al., 2018). In addition, Van Der Kleij and Adie (2020) also found that pupils in second grade seldom understand the oral feedback as the teacher intended. Although the feedback interactions identified in their study were dialogic to some extent, the teachers tend to ask too many questions in these dialogues, making the pupils perceive the feedback as ineffective.

Graham et al. (2015b) saw in their meta-analysis that classroom-based formative feedback where primary-level pupils get feedback from their teachers during the writing process, either concerning the texts or their progress, had a significantly positive impact on the pupils' text quality. In addition, they found that adults are the most effective feedback providers regarding pupils' text quality, compared with peers, self-assessment, and computer assessment (Graham et al., 2015b).

In the recent years, early writing instruction has undergone a digital change where the pupils are spending more of their time using apps and writing on tablets (Tärning, 2018). Many of the apps provide the pupils with feedback as they write, but as Tärning (2018) showed, this feedback has limited value as the apps are only able to confirm the pupil whether the performance was right or wrong, lacking a pedagogical approach to support the pupils' reflection upon their performance.

Building on previous research, and seeking to expand the field of knowledge, the current study's research question is set to: *How do teachers facilitate feedback that promotes self-regulated learning when second graders (7-year-olds) are writing in classrooms?* By using thematic analysis (Braun and Clarke, 2006), we have analyzed transcripts of observations of 14 teachers' feedback patterns in writing lessons in second grade (4320 min in total).

Methodology

Research design and recruitment

The qualitative study is based on video recordings from second-grade classrooms (pupils 7 years old). Video analyses are chosen to thoroughly describe the participants' actions and gain rich contextual data (Schultz, 2006; Klette et al., 2017). The study is a part of the DigiHand research project (Gamlem et al., 2020) where early writing instruction is studied in classroom conditions where a mixture of tablets and pencils are used. The classes and their teachers were recruited through invitation letters in addition to an open call in an article about the project in the media.

Context

Video recordings were collected from 14 classrooms (2nd grade, 4320 min of recording) during the autumn of 2019. Two cameras were used in the classrooms. One on a rack in the front focusing on the whole class, and one handheld by the researcher zooming in, and following the teacher. In addition, the teachers wore a collar-clip microphone to ensure good sound quality. In every classroom, the whole school day was recorded except for lunch, physical education, and breaks, since this study was analyzing instructional feedback interactions while the pupils were writing. The teachers were told to plan and conduct a typical school day for their pupils. In Norwegian second-grade classrooms, pupils have four or five lessons (à 45 min.) a day and usually have the same teacher all day. In the collected video recordings, we see that the pupils most often wrote in one or two of these lessons. The pupils in these classrooms are using both tablets and pen/paper while writing.

Ethics

Consent from all participants (teachers and pupils) was collected before video recording, in addition to information about the study and its aims. Ethical considerations were followed by informing the participants about their free will to participate, and their right to confidentiality. In addition, they were also informed about their right to withdraw from the study at any time without any consequence other than the destruction of their data. Information about the study was provided to all informants, and due to the pupils' young age, their parents/caregivers had to give consent for participation. The Norwegian Centre for Research Data has confirmed the study.

Regarding ethics, we are aware that the video recordings of classrooms might affect the participants. In addition, pupils at this age might be especially vulnerable Sparrman (2002). In the current study, the researchers used the cameras' zooming function rather than following the teacher step by step, to avoid the researcher moving around more than needed.

Sample, pre-analysis and selection

To answer the research question, a pre-analysis of the data was conducted to study feedback interactions from 14 schools; 14 classrooms where teachers were providing instructional feedback, in addition to sequences where teachers and pupils discussed texts. A sequence is defined here as a feedback interaction loop where the teacher and one or more pupil(s) exchange information about one text aiming to improve the text as well as the pupils' learning and understanding. These sequences were further sampled and transcribed verbatim. An interpretation of the sequences was conducted building on Hattie and Timperley's (2007) four feedback levels (task, process, self-regulating and self), and then a selection for further analysis was made of the classrooms where feedback at a self-regulated level was observed. When mapping usage of the four feedback levels, less than 3 percent of the feedback was found to promote self-regulation. These feedback interactions were found in four of the classrooms. Thus, only four classrooms were selected for deeper analysis.

The teachers in these four schools (classrooms) are female, they are the head-teacher in the observed class, and their teaching experience is on average 15 years. The schools are provided with fictive names in the study. The writing task in the class is mapped, in addition to assessment criteria for writing assignment (see Table 1).

TABLE 1 Data overview.

School name	Writing task	Assessment criteria	Feedback context(s)	Feedback sequences
Ashwood	Factual texts about the Space	Both content and punctuation	Whole class and individual	19
Birchwood	Factual texts about spiders	Both content and punctuation	Individual	13
Cedarwood	Free writing inspired by Noah's Ark	Punctuation only	Whole class and individual	23
Dogwood	Factual texts about the light	Both content and punctuation	Whole class	6
Total				61

Analysis of feedback interactions to promote self-regulation

All the transcriptions were uploaded to the qualitative data software NVivo12 and further analyzed (61 sequences in 540 min in total). All the feedback sequences in the four classrooms were included. For the four selected classrooms, the instructional feedback as teacher-pupil interactions were analyzed in addition to the pupils' uptake of feedback.

For the analysis, we developed deductive categories building on Zimmerman et al.'s (2017) cyclic model for self-regulated learning: (1) Setting goals, (2) Monitoring, and (3) Reflection. The first category includes the set of goals when providing instructional feedback. While Zimmerman et al. (2017) focus on the pupils' internal goalsetting, we include goals that the teacher sets as well, as Sadler (1989) promotes. The second category reflects in which manner the pupils' texts are being monitored in the feedback sequences, and whether it is the teacher or the pupil who controls this process. Zimmerman et al. (2017) highlight the pupils' ability to self-monitor within this category. The last category contains information about to which extent the pupils take or are given room to reflect in the feedback sequences. Zimmerman et al. (2017) also include the pupils' ability to make judgments and to react to these judgments about their performance. In Zimmerman et al.'s (2017) cyclic model, the third phase is followed by the first once again, where the pupils' set goals for their behavior and thinking for further pursuing the goals.

To enable analysis of the verbal interactions and the physical actions taking place in the feedback interactions, we have used Sinclair and Coulthard's (2002) initiative, response, follow-up (IRF)-framework in each of the three categories. The discourse analysis is effective to reveal the patterns of discourse between the teacher and pupils, especially to see if and how the teachers are inviting the pupils' contributions, as well as evaluating them in the conversations. In addition, the pupils' uptake becomes visible by looking at the pupils' verbal replays and physical reactions to the teachers' initiative, replay, or follow-up.

Reliability is ensured as the coding was made by both authors. Using an interpretative approach (Hatch, 2002) each author analyzed themes that referred to instructional feedback on the self-regulation level. Thematic analysis (Braun and Clarke, 2006) was conducted by both authors as we read and reread the data, developing the coding process. In each step of the analysis, we worked separately and then together to strengthen the reliability of the coding process. The process was inspired by the hermeneutic approach, which seeks to understand the whole while at the same time reconsidering that whole (Gadamer et al., 2004/1975).

Results

Setting goals and assessment criteria

In all four classrooms, the teachers introduced learning goals to the pupils and used them actively in their feedback. Learning goals like capital letters, full stops, and space between words were common goals in all the classrooms. Three of the teachers had also included specific goals containing the content. In the Ashwood classroom, they had the most extensive goals where the pupils were to write factual texts about Space, and the assessment criteria stated that the texts must contain at least two things about the earth, two things about the sun, two things about the moon and some about the planets. The teacher used the learning goals and the assessment criteria as a checklist both when they were in a whole class setting and one pupil was presenting his/her text, and when the teacher walked around in the classroom visiting the pupils at their desks.

At Birchwood, the pupils were writing factual texts about spiders, and their goal was to write three "I know sentences" about spiders, in addition to an explanation of why spiders make webs. In her feedback, the teacher stressed assessment criteria as punctuation, in addition to right spelling. She also used content-related assessment criteria to check for the pupils' factual understanding.

The teacher at Cedarwood let the pupils decide whether to write "I see-sentences" from a picture of Noah's Ark or to make up their story. They had no additional assessment criteria other than punctuation. When talking to the pupils, the teacher highlighted the punctuation, in addition to spelling. She did also get a lot of orthography questions from the pupils. In three sequences, the pupils asked the teacher to write difficult words on the blackboard, indicating that the class had internalized this way of teacher support as a relevant help-seeking strategy. The teacher confirmed the use of this strategy when a pupil asked how to write "a man called Noah." She helped him to spell out "a man called," and then she said: "And now you see his name on the blackboard." The pupil responded verbally with another question. "Noah, where?," and the teacher followed up: "In the headline. Do you see it?" The pupil nodded and read "Noah" (Cedarwood, sequence 8).

The goals that the class at Dogwood was working toward were to write three sentences about the light and to include a headline, in addition to punctuation. While writing, the teacher introduced what she called a "text check" where the pupils were encouraged to check each sentence in their texts for capital letters, full stops, and space between the words. When the pupils were showing their text to the class, most of them had corrected themselves and there was little left for the teacher to correct. Thus, the pupils seemed to use the

assessment criteria which were introduced as text checks. Instead, the teacher emphasized the content and the relevance between the headline and the text. She also explained the relevance of the learning goal and assessment criteria, like: "Great. I think you have answered the task! You have written three sentences, and you have a headline. That is really important so that our readers know what the text is about. You have also checked your spelling. Very good!" (Dogwood, sequence 2).

In another sequence at Dogwood, the presenting pupil assessed his text when presenting for the class, using the learning goal and assessment criteria:

> Teacher: Would you stand up and tell us what you have done?
> Pupil: [reads his text]
> Teacher: Yes, good!
> Pupil: I forgot full stops
> (…)
> Teacher: You know what, since you said you forgot the full stops, I am sure you will remember it next time. So, it doesn't matter! This is how we learn! And you saw it yourself!
> (Dogwood, sequence 4)

Here, the teacher supported the pupil's comment by pointing at his development as a writer, as well as praising the pupil for seeing the fault by himself.

Monitoring

In monitoring the text as a part of the feedback, the teachers showed different patterns. At Birchwood, the teacher was consequent in pointing at what the pupil had mastered in the text, in her openings, like: "What is good here, is that you have remembered the capital letters at the beginning and full stops at the end." The pupil gave a verbal response like "mmm," and the teacher added the directive: "Now, we are going to listen to your text" (Birchwood, sequence 1). In these interactions, the teacher got to show the pupils the qualities in their texts, by modeling quality using the pupils' written assignments.

At Ashwood, the four first sequences in this classroom took place in a whole class setting. Here, the teacher used the assessment criteria monitoring one and one text and discussed the texts together with the pupils in the class:

> Teacher: [uses "Siri" [AI] on the tablet to read the pupil's text aloud]
> Pupil in the class: He has written a lot about the moon!
> Teacher: Yes, he has written a lot about the moon. And we know what the task's demand was, right? You are required to write two sentences about the earth, the sun, the moon, and the planets. He has written about the earth, that there are billions of people, but has he written more about the earth?
> Pupil in the class: No!
> (…)
> Pupil in the class: He can also write more about Jupiter!
> Teacher: Aha, he might want to write something about Jupiter as well! In addition, you can look at

your long sentences and consider some commas. Then the text will be easier to read. Another point is the capitals. Remember that it is very important to have capitals after every full stop. -Now you have some tips about what to improve in your text. Thank you so much for sharing!

(Ashwood, sequence, 2)

In these sequences the whole class was engaged in the feedback, monitoring the presenting pupil's text, while the teacher led the discussion. A common pattern from these four sequences is that the focus tends to point at what is missing, rather than qualities in the texts. This becomes particularly clear in sequence 1, where the teacher asks the class: "Does [name of the presenting pupil] fulfill the goals?" And the class replied: "No!." The presenting pupils did not participate by commenting in either of the four sequences, which also shows that the feedback was generated from the peers and the teacher, but the text's author remained silent. At the end of the sequence, the teacher summed up by adding additional information about missing elements in the pupil's text.

When walking around in the classroom, the Ashwood read the pupils' texts and built on her monitoring while providing feedback, but her approach directed the pupil's attention more toward the errors, like this example indicates: "[the teacher reads the pupil's text and makes corrections in the text] We must talk about full stops. Can you fill in full stops here? Do you know what that is?" The pupil reacted to the teacher's directive by adding a full stop, and the teacher followed up with an accepting "yes," and then pointed at another sentence that lacked full stop (Ashwood, sequence 7).

In the Dogwood classroom, the setting was similar, but here the class was listening as the teacher controlled most of the commenting, in dialogue with the presenting pupil.

> Teacher: [reads from the whiteboard] Look here! Very good! Can you tell me about your text?
> Pupil: I have written about light
> Teacher: Will you read for us?
> Pupil: [reads]
> Teacher: Great! You have written a factual text about light. You have accomplished our goal, as you have three sentences. You do also have capital letters, space, and full stops. That makes the text easy to read for us. That is very good! You have also made something at the bottom. What is that?
> Pupil: It is a girl with a flashlight
> Teacher: Yes, a flashlight. Why did you include a flashlight?
> Pupil: Because it lights
> Teacher: Because it lights, and that is our topic. Was that the reason?
> Pupil: Mmm
> Teacher: I must say, you all have been very clever with your headlines this time! That shows… Not all of you remembered the headline last time, but this time, you all got it! That means that you have improved your factual text skills.

(Dogwood, sequence 1)

In this sequence, the teacher monitored the pupils' text and compared it with the learning goal and assessment criteria, as she explained why the achieved goals were important. The presenting pupil also got a chance to present the text for the class explaining his choices.

At Birchwood, the teacher monitored the pupils' texts in her feedback as she reminded the pupils about the assessment criteria. In the sequence below, the teacher first pointed at a quality in the pupil's text referring to the goals. Then when she pointed at another goal, the pupil revealed that he was not yet ready to apply the goal by himself:

Teacher: Let me see. Very good, you have remembered the capitals, right? One more thing you must remember, what is that?
Pupil: Full stops
Teacher: Yes, full stops. You can put one at the end of your sentence.
Pupil: I don't remember where the end is
Teacher: Try to read it
Pupil: [reads]
Teacher: Yes
Pupil: [adds the full stop]
Teacher: Have you used your headset while you were writing?
Pupil: No
Teacher: You must always use your headset when you write, right?
Pupil: But I do not need it. I am only adding some full stops.
(Birchwood, sequence 11)

First, the pupil revealed his lack of understanding by saying that he did not remember where the sentence ended. And with his reply, the teacher got to provide him with the strategy of reading his text and listening to find where the end was. Further, when the pupil added a full stop at the right place, he showed that listening to his text made him hear where the end was, as well as mastering the provided strategy.

Another interesting feature in this sequence is the pupil's refusal of using headphones. He showed no understanding of using the speech synthesis while checking his text for punctuation, although he just got help using it for that purpose. The pupil ended up rejecting the feedback, proclaiming that it was useless for his purpose.

Reflecting

In the reflecting category, the main pattern in our material shows that the teachers were directing the pupils about what to do, leaving little co-thinking or reflection about their own work to the pupils. One typical example of this pattern is sequence 7 from Ashwood:

Teacher: [reads the pupil's text and makes corrections in the text] "And the Moon". "The Moon is round." Then we must talk about the full stop. Can you fill in full stops? Do you know what that is?
Pupil Mmm
Teacher: Yes, there. "The sun is a big star". Then you need a full stop. Now we can write something about the earth. What do you know about the earth?
Pupil: [unclear]

Teacher: Yes, that is a good sentence. Write that! Start with capital and remember space. Do you want me to write it on a post-it note for you?
Pupil: Yes
Teacher: [writes the sentence on a post-it note]
(Ashwood, sequence 7)

In her opening move, the teacher pointed directly at weaknesses in the pupil's text by giving feedback on mistakes, as well as directing the pupil to correct them by adding full stops. Further, in her next move, she directed the pupil to write a new sentence, building on the pupil's proposal. Additionally, she asked the pupil if he wanted her to write the sentence, which he confirmed.

In interactions where the pupils made the initiative move, and got the teachers' attention, several examples show that the pupils were seeking confirmation of their work, proclaiming to be "finished." In both Ashwood and Birchwood, we see examples of this. However, the two teachers from these schools showed different patterns in their responses. At Ashwood, the teacher started to read the pupil's text and gave feedback concerning mistakes.

Pupil: I am finished
Teacher: You have finished. Let me see [reads the text]. "Real warm", that we write in one word [corrects the text]. "Been here", I think you mean. You make some mistakes while you write, but we can't take it all. You have written a lot, and that is very good. You have full stops and capitals. Many nice sentences. Are there more corrections to be done? Jupiter spins, do you hear that?
Pupil: [corrects to "spins"]
Teacher: And we say "the fastest"
Pupil: [corrects to "the fastest"]
Teacher: This is more correct
(Ashwood, sequence 8)

The teacher at Ashwood also corrected some faults herself in the text, while she pointed at others, indirectly directing the pupil to make the corrections. The Birchwood teacher, in contrast, showed a different pattern, as she was activating the pupils, pointing the responsibility for finalizing the texts back at the pupils, when facing the same "I am finished"-statement:

Pupil: I am finished
Teacher: Have you listened to your text?
Pupil: Yes, but he reads it wrongly
Teacher: Well, if he reads it wrongly, then maybe you have written something wrong.
Pupil: Yes, but where I have written "*ei*", then he reads "*ein*"
Teacher: Ok. Let's listen
(Birchwood, sequence 9)

In this sequence from Birchwood the pupil got to experience taking responsibility for correcting his text, as well as to be provided with a relevant strategy. In addition, the teacher kept standing by his side, observing, and offering to cooperate in his process.

In feedback sequences where the pupils get to make their own reflections on what to do next, the typical pattern is that the pupils make their suggestions rather than following the teachers' proposals.

An example of this, is from Cedarwood, when a pupil asked for help with his further writing, although he already had a suggestion in mind:

> Teacher: What was it that you were wondering about?
> Pupil: What to write
> Teacher: [reads] "I see a man who is called Noah". Ok, let's look at the picture
> Pupil: Where is Noah?
> Teacher: Hm, maybe inside the boat
> Pupil: But he was there!
> Teacher: Yes, he was in the other picture. Maybe you can write that he had many animals on his boat?
> Pupil: I will write: "I see two twin pandas"
> Teacher: Yes, you can write that!
> Pupil: How do I write that?
> Teacher: Look at "I see" as you wrote it there. You know how to write it
>
> (Cedarwood, sequence 10)

Despite the pupils' question, and the teachers' answer, the teacher here let go of her control and gave the pupil autonomy and authority to decide his next move. In the same manner, the teacher showed confidence in the pupil. She expressed her positive expectations for him to be able to write what he suggested. Interestingly, the pupil responded by asking how to spell it. The teacher then provided the pupil with the strategy of looking back into his text where he previously had written the sentence.

Similarly, there are examples where the pupils took agency, overseeing the teacher's questions. In the sequence below, we see an example where the pupil and the teacher seem to have separate agendas:

> Pupil: Can you help me?
> Teacher: Of course! [reads aloud] "I see", can you help me read what you have written?
> Pupil: [reads] "I see a girl panda and a boy panda"
> Teacher: That is good! Are you finished with this sentence?
> Pupil: What do you mean?
> Teacher: Well, you could end this sentence, and then you can – What do we usually end our sentences with?
> Pupil: I see a lion!
> Teacher: Yeah, do you want to write that?
> Pupil: Could you write "lion" on the blackboard?
> Teacher: [spells] "l i o n ", of course, I can!
>
> (Cedarwood, sequence 20)

The teacher drew her attention to a mistake, missing a full stop. The pupil was answering the teacher's question with a new question and thus kept on track with his agenda explaining what he wants to write. The teacher then dropped the punctuation comment and supported the pupil in his new idea for what to write further.

Discussion

Self-regulating learning when setting goals or assessment criteria

Our results provide evidence of the value of setting learning goals or introducing assessment criteria to promote self-regulated learning while pupils are writing. All four teachers integrate information about goals and assessment criteria in their feedback, and the results indicate that the learning goals are both understood, yet challenging for the pupils, as Sadler (1989) emphasizes.

At Dogwood the teacher promotes self-regulating learning by using goals to make their own "text check." In using the task's goals to check their texts, the teacher also helps the pupils express their self-generated feedback according to the task (Butler and Winne, 1995; Zimmerman et al., 2017), and to engage in self-assessment and evaluating strategies (Hattie and Timperley, 2007). To be able to check their text, the pupils must also adopt the learning goals (Hattie and Timperley, 2007). A particularly effective example of how the pupils have adopted the assessment criteria is the pupil at Dogwood who corrects himself after reading his text aloud. By commenting on his lack of full stops, the pupil expresses his self-generated feedback (Smith et al., 2016; Nicol, 2021), and a meeting occurs between internal and external feedback that promotes self-regulating learning (Butler and Winne, 1995; Panadero and Lipnevich, 2022). This pupil thus has an active role in providing feedback (Askew and Lodge, 2000). In the follow-up, the teacher builds on the pupil's comment by highlighting the pupil's self-assessment effort, as well as pointing at the pupil's development which stimulates the pupil's further challenge-seeking and orienting toward learning goals (Dweck and Master, 2009; Zimmerman et al., 2017). This provides evidence that second-grade pupils surely can take agencies in providing feedback. The pupils are showing adaptation to the provided learning goals and use of self-assessment strategies when the teacher opens for autonomy rather than controlling the pupils learning (Black and William, 2009; Zimmerman et al., 2017).

This study also reveals a challenge when promoting self-regulating learning through feedback interactions by using learning goals, as the information load might get heavy for the pupils (Askew and Lodge, 2000; Smith and Lipnevich, 2018). The sequence from Ashwood shows the fine balance between using clear and challenging goals in feedback dialogues to stimulate the pupils' learning, and how to avoid killer feedback where the feedback blocks learning rather than promoting it (Askew and Lodge, 2000).

Monitoring for self-regulated learning

This study shows that monitoring the pupils' texts is a useful tool while providing feedback to stimulate second-grade pupils' self-regulated learning. The teacher at Birchwood used a pattern of integrating the learning goals in the activity to point at qualities in the pupils' texts, while using facilitating strategies such as language modeling (National Research Council, 1999) by using phrases like "what is good here is…." On one side, this promotes self-regulated learning as the teacher compares the learning goals and the pupil's text in these sequences, which is of great importance for the pupil's understanding of the goals (Sadler, 1989; Hattie and Timperley, 2007). In addition, she gives emotional support by pointing at concrete qualities that are crucial to building self-efficacy, confidence, and motivation for further work (Gamlem and Vattøy, 2023; Mandouit and Hattie, 2023). On the other side, this teacher does not invite the pupils to express their inner feedback (Butler and Winne, 1995; Smith et al., 2016; Nicol, 2021), nor to discuss the qualities of their own work (Hattie and Timperley, 2007; Clark, 2012). In addition, the pupils are being placed in a passive recipient role (Askew and Lodge, 2000).

At Ashwood, when the teacher is facilitating feedback in a whole class setting, monitoring the pupils' text is done in cooperation with the teacher and the pupils in the class. Facilitating feedback in such settings might give the advantage of stimulating self-assessment as the pupils are active in commenting on the texts in regard to the task, goals, and assessment criteria, which can give support to the pupils' expressions of self-generated feedback (Butler and Winne, 1995; Nicol, 2021). Providing this type of feedback in a whole class setting is also tightly related to the way Hattie and Timperley (2007) connect feedback to self-regulating learning with a classroom climate that encourages peer- and self-assessment.

Nevertheless, the troubleshooting perspective in feedback from both the teacher and the peers, highlighting what is missing, also becomes a limitation. While receiving feedback, the burden of comments coming from peers, might get tough for the presenting pupil (Smith and Lipnevich, 2018), and potentially block the learning (Askew and Lodge, 2000), and self-efficacy beliefs (Gamlem and Vattøy, 2023). Thus, the emotional aspects of the feedback seem to be forgotten (Gamlem and Vattøy, 2023; Mandouit and Hattie, 2023). Further, the presenting pupil seems not to be invited to comment regarding what was useful or how she plans her work. This positions the pupil as a passive recipient (Askew and Lodge, 2000), leaving her understanding of the achievement and performance silent, as well as missing the opportunity of stating the value of listening to self-generated feedback (Butler and Winne, 1995; Smith et al., 2016; Nicol, 2021). This is a crucial point, particularly as Van Der Kleij and Adie (2020) have shown that pupils seldom understand the feedback as the teacher intended, in addition to the awareness of the pupils' age and vulnerability (Chen et al., 2011).

At Dogwood, feedback interactions in the whole class setting align with the practice at Ashwood, but in contrast, there is a dialogue between the presenting pupil and the teacher, activating the author [pupil] in the feedback interactions. This teacher also uses text evidence in the feedback to praise the pupil's development, supporting the pupil emotionally (Gamlem and Vattøy, 2023; Mandouit and Hattie, 2023), as well as building confidence for seeking greater challenges and pursuing further learning (Dweck and Master, 2009; Zimmerman et al., 2017). Thus, this teacher is promoting feedback interactions that might enhance the pupils' self-efficacy beliefs.

Our study also shows that introducing strategies can serve as a point of departure for self-regulating learning for pupils in second grade. The pupil at Birchwood who reveals that he does not understand where to place full stops, is an example of this. As the teacher becomes aware of the pupils' lack of understanding, she gives feedback showing the pupil a learning strategy – to use AI [speech synthesis] on the tablet to listen to his text. And due to his listening, the pupil manages to place the full stop at the right place. Gaining access to this error-detecting strategy, might strengthen the pupil's self-regulated learning and enable him to master larger challenges in the future (Hattie and Timperley, 2007; Zimmerman et al., 2017), and to support the pupil's ability to monitor his writing process (Graham, 2018b), as well as to stimulate self-generated feedback (Butler and Winne, 1995; Nicol, 2021). While the pupil uses speech synthesis and listens together with the teacher, the pupil does also get to build confidence in self-assessment, as well as agency in the writing process (Butler and Winne, 1995; OECD, 2000; Graham, 2018a,b). In addition, they learn to draw upon their oral language – through the use of language

modeling, which Shanahan (2006) and the National Research Council (1999) state is an important learning strategy for young pupils.

Regarding the feedback that the speech synthesis at the tablets provides, there is an important notion as the digital device only offers limited feedback regarding right and wrong (Tärning, 2018). As we see in the results, the pupils need the teacher to support them in detecting and solving errors when listening to their texts. The current study extends the existing research at this point, by pointing at the teacher's role in designing effective instructional feedback for young learners, as second graders (7 years old). Not only is the teacher important as an establisher of the feedback interaction (Smith and Lipnevich, 2018; Gamlem and Vattøy, 2023), but the teachers' support while the second graders are expressing, interpreting, and solving their monitoring is also of great importance.

Nevertheless, the pupil in sequence 11 at Birchwood rejects his teacher's direction of using speech synthesis, which might indicate that he does not understand that this could be a strategy for learning or seeing the point in using this tool in his self-assessment. This example serves as a reminder of the importance of understanding assessment criteria, for adopting the learning goals, and having knowledge about relevant strategies when promoting self-assessment and self-regulation learning (Hattie and Timperley, 2007).

Self-regulating learning when reflecting

This study demonstrates that pupils in second grade can reflect upon what to do next in their texts, as a part of developing as self-regulated learners. The teacher at Ashwood uses the introduced assessment criteria to provide feedback when monitoring the pupils' text. As mentioned above, this seems to catch her in a troubleshooting mode – as her emphasis is focused on mistakes and correctness. Similarly, the same practice tends to result in a pattern where the teacher gives directives rather than asking open questions. As shown in Ashwood sequence 7, the teacher gives directives while both correcting and looking forward, making little room for the pupil to contribute. As Zimmerman et al. (2017) highlight, the pupil should be able to reflect upon the feedback, as well as to make judgments to promote self-regulated learning. In addition, there is no intersection in this sequence, where the pupil's self-generated feedback can meet the external (Butler and Winne, 1995; Nicol, 2021).

In the same sequence, another interesting notion raises as the teacher asks, "Do you want me to write it on a post-it note for you?" From one perspective, the teacher introduces a useful scaffold for the pupil, providing a relevant strategy at the task level (Oakes et al., 2018). However, the strategy does not promote further reflection for the pupil (Hattie and Timperley, 2007). In addition, the teacher also reveals that she does not expect the pupil to be able to write the sentence by himself. In contrast, the teacher at Cedarwood (sequence 10) expresses that she expects that the pupil will manage to write "I see two pandas," although the pupil immediately asks for help. As teachers' expectations predict outcome (Rubie-Davies et al., 2010), the two teachers' different questions lead the pupils in different directions, one into higher achievement and one into lower. To promote self-regulated learning, self-efficacy in believing that you can reach the desired goals is also required (Zimmerman et al., 2017), which the Ashwood teacher risks taking away from the pupil in this sequence.

In sequences 10 and 20 at Cedarwood, the pupils take the initiative by seeking help to decide what more to write. In the teacher's response, she shows in both sequences that she chooses to let the pupils lead the dialogues, rather than directing the pupils in a certain direction. These two sequences show that the pupils have internalized help-seeking as a relevant strategy when feeling short of alone. This is an important part of self-regulating learning as seeking help from others shows agency and to pursuit learning goals (Hattie and Timperley, 2007; Dweck and Master, 2009; Zimmerman et al., 2017). In addition, the teacher lets the pupil's initiatives set the feedback interaction which further supports the pupil's agency over their learning process(es) (Hattie and Timperley, 2007; Clark, 2012), as well as supporting the pupils emotionally by providing positive feedback (Smith et al., 2016; Gamlem and Vattøy, 2023; Mandouit and Hattie, 2023).

Conclusion

This study's main finding is that teachers can design instructional feedback interactions that promote self-regulating learning when second-grade pupils are writing, regardless of being proven difficult (Brooks et al., 2019). The interactions can be designed by using concrete, yet challenging learning goals and assessment criteria, the pupils can adopt to the goals by checking their texts for concrete qualities, supported by the teachers' conformations and praise for their effort in doing so. Further, when teachers are monitoring pupils' text, the feedback can promote self-regulating learning by encouraging the pupils to express their self-generated feedback or by involving the pupils in the assessment process. In addition, self-regulated learning is stimulated while giving the pupils access to effective learning strategies like using tools to self-assess and detecting errors, although still with guidance from their teacher. Last, the study shows that the feedback interactions between teacher-pupil can promote self-regulated learning by stimulating the pupils' reflection and by acknowledging help-seeking strategies, and supporting the pupils emotionally by confirming their reflections, showing high expectations. Generally, these feedback interactions seem to take place when the teachers loosen up their need for controlling the situation, letting the pupils take agency.

Limitations

This study has a sample from 14 classes, but by studying instructional feedback interactions at the level of self-regulating learning, the sample only ended up with four classes. This is both a finding – few classrooms have this type of interaction, and a limitation

as only these types of interactions are analyzed. The data is limited to retroactive post-facto analysis as the feedback sequences are analyzed as they emerged naturally. Our narrow scope provides valuable information about what is said and done in these four classrooms, but it lacks information from a representative sample to generalize. For further research, we suggest longitudinal studies and larger samples focusing on capturing feedback patterns and ways of adapting instructional feedback to promote self-regulating learning in elementary classrooms.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Author contributions

PF collected the data, composed the original draft, conducted the analysis and coding, as well as developing the conceptualizing of the study. SG collected the data, conducted analysis and coding, reviewing and editing, as well as developing the conceptualizing of the study. All authors contributed to the article and approved the submitted version.

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The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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