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Title: Tablet-Supported Self-Assessment in a Class for Students with Intellectual Disability

Year: 2023

Version: Accepted version (Final draft)

Tablet-supported self-assessment in a class for students with intellectual disability

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Tablet-supported self-assessment in a class for students with intellectual disability

Abstract:

Self-assessment has been shown to have positive effects on students' self-regulated learning strategies and academic achievement. However, self-assessment and self-assessment instruction are under-researched areas among students with intellectual disability. This data-driven qualitative study aimed at examining the self-assessment expressions students with intellectual disability documented in their learning diaries and how the teacher and teaching assistants used video recordings to facilitate students' self-assessments in one Finnish special needs education class. The naturally occurring research data consisted of both students' tablet-based learning diaries (N=6) and video recordings of students' self-assessment situations (N=17). The results show that students' self-assessment expressions varied from short and vague expressions to argumentative and reflective assessments. The use of video recordings served various functions, such as directing and instructing students, demonstrating assessment and providing feedback. The outcomes of this study demonstrate how the self-assessment practices of students with intellectual disabilities can be facilitated by using video.

Introduction

Self-assessment has been shown to enhance students' motivation as well as to strengthen their feelings of ownership of learning (Paris and Paris, 2001; Wiliam, 2017). In addition, the practice has been found to have positive effects on students' learning strategies and self-efficacy (Brown and Harris, 2013; Panadero et al., 2017) as well as on their academic performance (Andrade 2010, 2019; Brown and Harris, 2013; McMillan and Hearn, 2008). However, learning self-assessment does not necessarily occur without support, but especially academically low-performing students have been found to benefit more than high-performing students do from the instruction of self-assessment (Brown and Harris, 2013). Despite this potential, the means for supporting the self-assessment of low-performing students are under-researched (Panadero et al., 2015), and the formative assessment of students with intellectual disability is overall an unexamined field (Anderson and Östlund, 2017). More attention is especially needed on what the appropriate goals are for self-assessment according to age and ability and how self-assessment skills should be taught (Brown, Gavin and Harris, 2014). This study addresses this research gap by examining self-assessment practices in one special education class in Finland for students with intellectual disability, where video-based methods have been used to support students' self-assessment. The purpose is to study how to best scaffold effective formative self-assessment and then develop pedagogical practices based on this knowledge (see also Andrade, 2019). In addition, the study meets the need for examining video-supported self-assessment, which is rarely utilised when teaching students with intellectual disability regardless of the positive results about their use in earlier research (Aykut, 2020).

Definition of self-assessment

Both in research and practice, there is a lack of conceptual consistency about the meaning of self-assessment (Andrade, 2019; Dunn and Mulvenon, 2009; Panadero et al., 2015). As a result, critical concerns have also been presented about the validity of self-assessment research (Dunn and Mulvenon, 2009; McMillan et al., 2013). The simplest way to accomplish self-assessment is to ask children to assess themselves without any aids (Panadero, Jonsson and Botella, 2017). However, many researchers have defined more strictly that self-assessment requires students to assess their learning process or outcome against pre-established criteria and to revise or improve their performance on the basis of this assessment (Andrade and Valtcheva, 2009; McMillan and Hearn, 2008; Panadero and Alonso-Tapia, 2013). In addition to conceptual diversity, the self-assessment practices are also variable. Panadero et al. (2016) found over 20 categories of self-assessment practices, which varied in terms of student and teacher involvement, use of assessment criteria, purpose of the self-assessment and available instructional support. Furthermore, Andrade (2019) presented a taxonomy of self-assessment that contained examples of how to self-assess one's competence, processes or products, regardless of whether they included separate assessment criteria or whether the purpose of the assessment was summative or formative.

Self-assessment research is mainly based on two different theoretical approaches: self-assessment is considered as a self-regulatory process carried out by students or as an instructional process used and guided by the teacher (Panadero and Alonso-Tapio, 2013). As an instructional process, self-assessment is part of formative assessment (Andrade and Valtcheva, 2009; Andrade, 2010; Black and Wiliam, 1998, 2009; Cauley and McMillan, 2010), and it is implemented alongside drafts of work. In this case, its primary purpose is to enhance learning, in contrast to self-evaluation, which involves students in grading their outcome (Andrade and

Valtcheva, 2009; Andrade, 2010). The theoretical approaches could also, however, be integrated, whereupon self-assessment can be seen as an instructional strategy, the goal of which is to learn to assess one's work in order to improve self-regulation (Panadero and Alonso-Tapio, 2013). In addition, self-assessment has many commonalities with the theories of self-regulation, because formative self-assessment is an integral part of self-regulated learning (Andrade, 2010, 2019).

In this study, we approach self-assessment as an instructional process and adopt a broad definition of self-assessment, according to which self-assessment occurs when students' expressions about their work or ability contain some sort of quality characteristics (see Brown and Harris, 2013; also Andrade, 2019). In this case, many kinds of self-assessment targets are possible, and students can evaluate their understanding, interests, effort, strategies, improvement and need for assistance (Paris and Paris, 2001). Furthermore, teachers' consciousness of the purpose of self-assessment is significant, that is, of how the students' self-assessment generates feedback that promotes their learning (Andrade, 2019).

Conditions for high quality self-assessment

It has been reported that there are problems in the validity and reliability of student self-assessment, thus self-assessments should not be used in justifications of grading (Brown and Harris, 2013; Brown and Harris, 2014). The efficiency of self-assessment has been found to depend on students' internal factors, such as metacognition skills, which enable students to monitor and evaluate their learning against criteria (Paris and Paris, 2001). As students get older and develop academically, they seem to be less optimistic and more accurate in their self-assessments (Brown and Harris, 2013). In addition, various external factors, such as instructional strategies, are of great importance to successful self-assessment (Paris and Paris, 2001). The instructional strategies promoting students' self-assessment include enhancing awareness of the

value of self-assessment in students, practising self-assessment frequently for a significantly long period, cueing students when self-assessment is appropriate, and taking students' individual differences into consideration (Goodrich, 1996). Teachers can also provide opportunities to use self-assessment data (Brown and Harris, 2013; Ross, 2006) as well as utilise modifications for different grade levels (Mcmillan and Hearn, 2006). In addition, it is crucial to ensure psychological safety in the implementation of self-assessment (Brown and Harris, 2013; Ross, 2006; Yan et al., 2019).

One of the most important requirements for using self-assessment successfully seems to be a clear framework for the assessment. The assessment target, meaning the task or performance to be assessed, should be specific and attention should be paid to both the process and the outcome of learning, and the criteria for assessment should be visible (Andrade, 2019; Goodrich, 1996; Ross, 2006). Access to clear criteria can be met by using checklists or rubrics (Andrade, 2019; Andrade and Valtcheva, 2009; Brown and Harris, 2014; Goodrich, 1997; Panadero and Alonso-Tapia, 2013; Panadero and Jonsson, 2020), or by writing them in children's language and defining them collaboratively with students (Ross, 2006). Students can also be taught how to apply the criteria, and feedback on accuracy and rewards from peers and adults may also be helpful (Brown et al., 2015).

Self-assessment is recommended to be started from simple techniques before moving to complex ones (i.e. rubrics), which include holistic, intuitive assessments about effort, satisfaction or work quality (Brown and Harris, 2014). One simple technique is for teachers to ask questions or provide choices that encourage self-assessment while providing feedback (Cauley and McMillan, 2010). Students should also receive sufficient time for revising their performance (Andrade and Valtcheva, 2009).

In general, the self-assessment process involves the following three steps: articulation of expectations and criteria, monitoring and self-assessment, and revision (Andrade and Valtcheva, 2009; Cauley and McMillan, 2010; McMillan and Hearn, 2008). Brown and Harris (2013) grouped self-assessment interventions into three major groups: self-ratings, self-estimations of performance, and criteria- or rubric-based assessments. They concluded that self-assessments can be global or task specific. Rubrics and self-rating were also contained in Panadero and Alonso-Tapio's (2013) list of self-assessment interventions, but they also mentioned assessment without criteria and using scripts.

As for the efficacy of self-assessment practices, there are contradictory results. Brown and Harris (2013) found positive effects on learning and self-regulation in interventions which demanded more mental engagement than simple self-marking or self-rating. Yan, Chiu and Ko (2020) demonstrated that learning diaries were beneficial self-assessment tools for students and improved their academic achievement and sense of self-efficacy. However, Panadero, Jonsson and Botella (2017) found in their review that various self-assessment interventions had similar effects on students' self-regulated learning.

Use of video-based methods in teaching self-assessment for students with intellectual disability

Research is relatively scarce on self-assessment practices of students with intellectual disability, and low-performing students have been supposed to lack the necessary metacognitive skills for accurate self-assessment (Panadero, Brown and Strijibos, 2016). However, Rolheiser (1996) presented a growth scheme (cited in Mcmillan and Hearn, 2008) that describes how to implement self-assessment also for students struggling with learning. At the beginning level, teachers give assessment criteria to students and examples of how to apply them, provide

feedback and determine the next learning goals and strategies. At the intermediate level, students select the criteria from a menu, teachers describe how to apply the criteria, feedback is provided by both students and teachers, and then students can also select learning goals and strategies from a menu. At the full level, students generate the criteria, teachers model how to apply the criteria, teachers engage students in justifying their feedback, and students construct goals and strategies (Rolheiser, 1996).

Anderson and Östlund (2017) observed that teachers and school assistants of students with intellectual disability experienced that asking reflective questions is the basis of formative assessment. In addition, using formative assessment templates and video recordings from lessons were considered to help students and professionals in assessment. Especially video recordings provided students an opportunity to see and assess their performance with a teacher and to focus on specific parts of a video to highlight the strengths and improvement needs (Anderson and Östlund, 2017). Additionally, in Ocoughling et al. (2013), self-assessment using video impacted positively on the performance and motivation of students without special needs. In Aykut (2020), students with intellectual disability evaluated their own behaviour according to specific criteria, and self-evaluation while watching video feedback was effective for improving participants' performance in a targeted behaviour.

Video modelling means students watch a video of someone performing a desired behaviour that is then to be imitated, while video prompting is where the target skill is divided into smaller steps that are then performed after viewing. Both approaches seem to be effective teaching practices for individuals with intellectual disability (Gilson et al., 2017; Park et al., 2018; Spivey and Mechling, 2016; Lo et al., 2014). There are results from comparative studies that video prompting is more effective than video modelling (Mechling et al., 2014; Park et al.,

2018). No significant differences were found, however, when comparing point-of-view videos and scene-view video-modelling (Spencer et al., 2015) or using the peer- or self-modelling (Ozkan, 2013). Video materials with adaptations (picture/word captions and interactive search; Evmenova et al., 2011; Evmenova et al., 2017; Shepley et al., 2017) and using visual schedules with embedded video modelling (Shepley et al., 2018) may be beneficial for students with intellectual disability. These students can be taught to use videos for self-instruction (Cannella-Malone et al., 2013; Shepley et al., 2017) and the use of video-based self-instructional materials may allow teachers to reallocate their time to other tasks (Shepley et al., 2018). Furthermore, a promising result for teacher workloads is that using video materials produced in environments that differed from the learning environment were useful (Mechling et al., 2014).

Regardless of these positive results, use of video modelling is not a frequently used method for teaching students with intellectual disability. Over half of the teachers in a survey by Knights et al. (2019) did not use video modelling, and only 12.4.% used it weekly or daily. Earlier research mainly focuses on the effectiveness of video modelling and prompting, whereas video-based self-assessment studies are rare, as is research on self-assessment by students with intellectual disability. This study seeks to address this gap by researching tablet-supported self-assessment. These portable smart devices have been found to be efficient for teaching various functional skills to students with intellectual disability and they can increase the self-prompting and independence of students (see Goo et al., 2019). However, there is little guidance on how to use these devices (Goo et al., 2019). Therefore, this study contributes an analysis of one possible method for using devices to support self-assessment.

The research questions were as follows:

1. What kinds of self-assessment expressions do students with intellectual disability document in their tablet-based learning diaries?

2. How do the teacher and teaching assistants use the video recordings of learning and teaching situations to facilitate students' self-assessment?

Methods

Study Context

The compulsory education of students with intellectual disability in Finland lasts 11 years instead of the usual nine years (Basic Education Act, 1998). When receiving special support, students have individual learning objectives for subjects defined in the Finnish national core curriculum. If individualised subject-based objectives are not possible for a student to achieve, the objectives can be based on five activity areas: cognitive skills, language and communication, daily living skills, motor skills and social skills (National Core Curriculum for Basic Education/NCCB, 2014). The activity area curriculum is intended for students with severe intellectual disability (Ministry of Education and Culture, 2012) or students with other disabilities or serious illnesses (NCCB, 2014).

The Basic Education Act (1998) states that the function of assessment is to improve students' abilities in self-assessment, in addition to offering guidance and encouraging learning. The NCCB (2014) states that teachers should give feedback, which helps students to understand what they should learn, what they have learned and how they can promote their learning. The NCCB also states that in lower classes, students' self-assessment abilities are improved by helping them to recognise their strengths and become aware of learning objectives. In contrast, in upper classes, students should be guided to observe their learning and recognise the factors that

influence it. The objective of self-assessment is to make students aware of their improvement and understand how they can enhance their learning. However, teachers have strong autonomy in classroom practices. Self-assessment practices are therefore not strongly regulated, particularly in the teaching of students who need extensive support.

Participants and classroom environment

The participants were six (three boys and three girls) 13–17-year-old students with extensive support needs and mild or moderate intellectual disability (F70/F71), a special education teacher with five years of teaching experience and two teaching assistants with over 15 years of experience. Three of the students had a curriculum with individualised subject-based objectives. They could read and write sentences, perform addition tasks in the 0–20 range and use both complete and compound sentences and varying verbal phrases when communicating. Three students had a curriculum based on activity areas, and they needed intensive adult support in their classwork. These students could identify a few familiar written words, count small quantities and communicate with individual spoken words or simple, two-to-four-word sentences. All students could move independently. Participants were recruited from one full-time special education class that had eight students with intellectual disability and was located in a municipal primary school. The grouping routines in the classroom were flexible and versatile, with teaching performed in the whole group, a small group, pairwise or one to one. The three teaching assistants worked with the students independently but under the guidance of the teacher.

Written informed consent from the teacher, the teaching assistants and the parents was received. The students gave their verbal assent for the study through Easy Finnish and picture communication. The Development Unit of Growth and Learning in the city that was the subject of the research approved the study and its ethical implications (decision of the

Service Director, 23 April 2019). The data protection ombudsman of the University of X was consulted when conducting the data protection impact assessment required by the General Data Protection Regulation.

The students had several years of experience with using tablets in school. For the previous two and a half years, the class had a 1:1 tablet system, and every student had a tablet that was provided by the school. Students were allowed to take the tablets home and show recordings of the school day to their parents. The learning diary method and self-assessment practices had been a target for development in the class during the previous two semesters. Students had a few learning diaries in their personal iPads, one general learning diary and some subject-based diaries. The students kept these learning diaries with the Apple iPad application *Book Creator* (bookcreator.com), which is a tool for creating digital books that enables the user to easily combine text, images, audio recordings and videos.

Students or staff members took photos or videos of students at work or of their learning outcomes. Sometimes, the teacher instructed the students on what to document, but the students had the freedom to document whatever they wanted to in their learning. Students could also do voice recordings or write about their learning, and these tools were also used by the adults when they gave feedback to the students. The self-assessment was usually carried out as a verbal conversation between an adult and a student, and students were sometimes instructed to document their self-assessment. In the latter case, students wrote or voice recorded their self-generated self-assessment responses in learning diaries. There were also a set of emojis (smiling, neutral and concerned faces as well as pictures that indicated needing adult support or working independently) stored on the iPads, and students often added these symbols to the pages of their learning diary when they assessed the feelings the exercise had evoked.

Data

The data of this study were naturally occurring, meaning the self-assessment situations or documents were not specifically designed for this study but took place as part of normal school days, without outside intervention in the classroom. The first author collected the data. The first research question was answered on the basis of students' learning diaries written during one academic year and collected at the end of the semester. The diaries of the six students contained 218 self-assessment expressions, varying between 22 and 64 expressions per student. According to the teacher, all the self-assessments were not contained in the diaries because the students also performed some undocumented self-assessments.

The data for the second research question contained 17 video recordings of self-assessment situations over a three-week period for three students with individualised subject-based curricula. Despite the presence of the cameras, the study did not cause any changes for the students' schooling or the self-assessment episodes planned by the teacher. In this phase, the students with an activity areas curriculum were not available due to personal reasons. The duration of the video recordings varied from 0.29 minutes to 10.12 minutes (m = 3.30 minutes; total amount = 59.42 minutes). The videotaped self-assessment situations involved one to three students and a special education teacher (13 situations) or students and a teaching assistant (four situations). The situations were held at the end of the lesson, but the subjects varied (see Table 1).

Table 1. Information of recorded self-assessment situations where videos were used as a support

subject	N of situations	N of students in each situation	themes
crafts	1	2	drilling
sports	3	1	football
physics	2	1	air
Finnish language	2	1, 3	spelling, writing
math	2	3	money counting,

English	2	1, 2	vocabulary, conversation
home economics	1	1	cooking

Analysis

The data were analysed through data-driven content analysis (see Hsieh and Shannon, 2009). In practice, the analysis was conducted as presented in Mayring (2000). In analysing the first research question, the first author extracted the students' written or recorded self-assessment expressions and arranged them in Microsoft Excel. After becoming acquainted with the material, all authors categorised the students' expressions into different sub-categories (see Table 1). The formulation and naming of the categories and sub-categories contained several phases, during which the categories were reformulated collaboratively until achieving a consensus among all researchers. The final categorisation was based on the following dimensions, which seemed to differentiate self-assessment expressions: the target of the self-assessment, the form and particularity of the assessment and how assessments were justified.

Originally, the second research question focused on examining how adults support students' self-assessment in general. The first author transcribed both verbal and nonverbal interactions in the video-recorded self-assessments. The transcription contained 8450 words. After reading the data, we found that the adults' use of video recordings played a crucial role in facilitating the students' self-assessment. Therefore, we decided to concentrate on how the adults used videos to facilitate students' self-assessment in the lessons. Then, the situations containing the use of video (3587 words) were separated from the original transcription. The categorisation of this data was based on the functions that the video served in self-assessment situations. In addition, the focus was on detailing the sequential organisation of recurring video-use patterns.

The first author had the main responsibility for analysis; however, all authors formed and reviewed the data-based analysis categories over several data sessions until achieving a consensus.

Results

Types of students' self-assessment expressions

The first research question focused on the self-assessment expressions that students with intellectual disability had documented in their tablet-based learning diaries. Students' self-assessment expressions documented in the learning diaries were divided into assessments of the learning result, assessments of the learning process and assessments of learning content (Table 2). Claiming understanding was the most common way of assessing one's learning results. It contained expressions where students described generally what they had learned (e.g. 'I learned to weigh items'), practised (e.g. 'I practised English in a restaurant') or been able to do (e.g. 'I can read'). These expressions did not thus show the actual learning result but concentrated on describing the content of the previous lesson. Contrary to this, when demonstrating understanding, students also showed evidence of their learning by giving specific examples of the content of their knowledge or skills (e.g. 'I learned that the brown hare is a big hare'; 'I learned that Christianity is the biggest religion').

In the assessment of the learning process, the most common way of carrying out self-assessment were general assessments where students briefly and relatively vaguely described, by means of adjectives or adverbs, how the lesson or exercise had gone (e.g. 'The dancing lesson went very well'). Especially the word *well* was used very frequently, and almost two-thirds of the general assessments stated that something went quite well, well or very well. However, in the

argumentative expressions, students also justified and specified why something went well (e.g. 'I was careful and had neat handwriting'). The most multifaceted ways of assessing one's learning process were the reflective self-assessments. They contained analysis of a past activity or performance with its various elements and influencing factors, as a process (e.g. 'I succeeded quite well, but in the beginning it was like I didn't know what I had to do but then we got instructions, so I started to do it and it really was easy') as well as setting goals for one's learning in the future (e.g. 'In the future, I have to remember to be careful if there is one or two letters' [when spelling the word]).

The assessments of learning content meant assessing the exercise, task or lesson in which students had participated. When assessing the difficulty of the exercise, students usually simply mentioned it to be easy or difficult. However, there were also some utterances where the difficulty of the lesson was more rigorously described (e.g. 'The most difficult thing was that I really didn't understand English'). The last type included assessments of a lesson content's pleasantness. In these students assessed their feelings about the exercise (e.g. 'I like newspaper'). All of these expressions were positive, and mostly exercises were said to be 'nice'.

Although the purpose of the study was not to analyse the self-assessment skills of individual students, some observations can be made. Students with an individualised curriculum used all the presented ways of self-assessment, whereas the students with an activity area curriculum used only claims of understanding and general assessments of the learning process or they assessed the difficulty or pleasantness of the learning content. One of the students typically used the *it was nice*-type of self-assessment, but the ways of self-assessment expressions varied for every student. As seen in Table 2, the most multifaceted ways of self-assessment

(demonstrations of understanding, argumentative and reflective assessments) were in the

minority.

Table 2. Types of self-assessment expressions in the learning diaries

Types of self-assessments	Example	% of expressions (N = X)
A. Assessment of learning result		
Claims of understanding	*I learned counting*	37.6%
Demonstrations of understanding	*I learned that Finland has four neighbour countries*	6.0%
B. Assessment of learning process		
General assessments	*did well*	17.4%
Argumentative assessments	*I got everything correct, 29/29 points*	6.0%
Reflective assessments	*I can read the clock, but I have to remember to focus and read the clock carefully*	9.2%
C. Assessment of learning contents		
Assessments of exercise difficulty	*difficult exercise*	16.5%

| Assessments of exercise pleasantness | *it was nice* | 7.3% |

Using video recordings to support students' self-assessment

The second research question focused on how the teacher and teaching assistants used the video recordings of learning and teaching situations to facilitate students' self-assessment. It was answered by using the collected video data of the assessment situations. The video recordings saved in students' learning diaries on their iPads contained short recordings of students' performances in lessons and, in some cases, additional teacher instruction. From examining the collected video data, we found that adults used the video recordings in four different ways in self-assessment situations: directing students to use video as a basis for their self-assessment, demonstrating feedback with video, using video recordings to check students' knowledge, or instructing students to compare different performances in separate videos. With little variation, the structure of situations was that, first, participants discussed what the student had learned, and then the adult led the self-assessment through asking questions. In video-usage methods, the significance of the assessor role varied for both the teacher and the student.

Teacher directs student to use video as a basis for their self-assessment

The first way in which teachers used video recordings in the self-assessment situations was to direct students to utilise them as a basis for reminiscing and self-assessing their performance. This is done by attracting attention, requests, or reflective questions. As a response,

students report their learning by narrating what they were learning and assessing their learning by using adjectives or reflective self-assessments.

In Extract 1 (table 3) below from a Finnish language lesson, Jenna has been writing an essay about her school and the teacher has recorded a short video of Jenna writing by pencil in her notebook. The teacher and Jenna are watching this video on Jenna's iPad.

Table 3. Extract 1

Line	Speaker	Turn
1	Teacher	*OK, Jenna, what are you practising here?* *(The teacher picks up the iPad to show it to the student. The iPad is showing a video of her writing.)*
2	Jenna	*I'm writing, sentences.*
3	Teacher	*OK, or you're really writing a story? What are you writing about?*
4	Jenna	*My school*
5	Teacher	*OK*
6	Jenna	*A story*
7	Teacher	*What do you think is going well for you here?*
8		*(Jenna taps the screen to indicate writing)*
9	Jenna	*Well, I'm concentrating and I'm writing neatly.*
10	Teacher	*OK, how do you know that you are writing neatly?*
11	Jenna	*Because my handwriting is neat.*
12	Teacher	*OK, and it stays on those right lines.* *(Teacher points with a finger at the notebook visible in the video)*
13	Jenna	*And I stay on the line, I don't fall off the line.*
14	Teacher	*OK*
15		*(pause, teacher moves to the end of the video)*
16		*Now let's watch the end.*
17	Jenna	*About what?*
18	Teacher	*Where you need an adult's help here at the end?*
19		*(Jenna's voice can be heard on the video: 'It always starts with a big letter', on the video Jenna keeps talking it's difficult to make out)*
20	Jenna	*That's how I have to always put a big letter at the beginning.* *(points at the screen)*
21	Teacher	*OK*
22	Jenna	*Then I get it that OK, you can do it like that.*

Note. The translation of the original data extracts from Finnish to English represented an idiomatic translation so that the turns would evocate the same shades of meaning despite the differences between languages.

In Extract 1, the student constantly watches the video of her own performance while answering the teacher's questions. At the beginning of the extract the teacher taps the video to

start it and picks up the iPad while showing it to Jenna. After this, he asks two open questions about the content of the most recent exercise: the first question relates to what Jenna is practising in the video (line 1) and the second question refers to what Jenna is writing about (line 3). After receiving the immediate answers from Jenna and correcting the first answer (writing a story instead of a sentence) the teacher asks a reflective question: 'What do you think is going well for you here?' (line 7). The adverb *here* refers to the scene in the video, and as a response, Jenna points to the video with her finger and immediately responds that she is concentrating and writing neatly. The teacher confirms the answer through minimal feedback 'OK' but tries to get Jenna to refine her answer and to recognise the characteristic features of neat handwriting by asking how Jenna knows she is writing neatly. Jenna responds, however, by repeating her earlier answer and only changes the verb 'I am writing' to the noun 'my handwriting'. The teacher accepts the answer by means of an acknowledgement token 'OK' but completes it by describing how the letters 'stay on those right lines'. Again, the use of the pronoun *those* refers to the record of the writing situation visible to the student. After that, the student repeats the teacher's message, 'and I stay on the right line' and shows that she understands the point by saying the same thing in his own words.

Finally, the teacher focuses the student's attention on the assessment by forwarding to the end of the video where the student corrects a mistake in using the uppercase letter and asks where she needed adult help. The video shows Jenna's speech, and she responds in the same way as in the video that she needs to remember to put the capital letters in the sentence. At the end, Jenna identifies her own learning from the video by saying that 'I get it, you can do it like that'.

This extract demonstrated how the teacher repeatedly relied on the video when prompting the student to look back and assess the past learning situation. The strategy seemed to be

efficient, since the student was also constantly looking for advice from the video about her own performance to answer the assessment questions given by the teacher. Jenna's answers contained claims of understanding as well as general and argumentative assessments.

Teacher demonstrates giving feedback to students with video recordings

The second context in which teachers use video recordings in the self-assessment situations is to give specific feedback on students' assessment. In this case, a teacher uses video as a tool for demonstration by pointing out sections which need improvement, or which are strengths of the student. Through the modelling, the video recordings enable teachers to improve students' self-assessment skills.

Extract 2 (table 4) is from a physical education class, where one of the learning goals has been to move the football under control so that student can look up from the ball and the ball stays close to the foot all the time. The teacher and the student have been watching the video of Alisa dribbling and discussing what the learning objective was.

Table 4. Extract 2

Line	Speaker	Turn
23	Teacher	*What... Do you remember what is important in moving the ball?*
		(Teacher points with his finger to Alisa´s dribbling in the video)
24	Alisa	*Look at the ball and*
		(Alisa waves her hand)
25	Teacher	*Yes, sometimes up?*
26	Alisa	*Yes*
27	Teacher	*Ok*
		(Teacher plays the video and points at Alisa's head)
28		*Let's see here if you look up sometimes*
29	Alisa	*No*
30	Teacher	*Yes*
		(teacher points with his finger all the time to Alisa's head in the video)
31		*you just look at the ball quite a lot, OK, but you were*
		(teacher follows the ball with a finger while continuing to talk)
32		*when Otso taught you that it was important that the ball stays under control. Do*
33		*you keep it under control?*
34	Alisa	*Yes*
35	Teacher	*OK, it doesn't get far away from that foot. The ball stays there all the time.*

In this situation, the student can see herself on the video and the video also concretises the feedback given by the teacher. The teacher directs the student's attention precisely to the right point by pointing to it on the video with a finger. At the beginning of the extract, the teacher tests the student's knowledge of the lesson and clarifies his question by pointing a finger at the student dribbling a football in the video. The student answers the question and replaces part of the answer with a wave of her hands, the meaning of which the teacher interprets verbally by giving a possible understanding: 'Yes, sometimes up?' After receiving an affirmative answer from the student, the teacher points at the head of the student moving the ball and directly asks a self-assessment question whether the student is looking up. The video makes the student's development target unequivocally explicit and so the student immediately gives a negative answer. In line 31, the teacher also clarifies the learning objective by pointing at the video and saying that the student looked at the ball while moving.

After demonstrating corrective feedback by means of the video recording, the teacher highlights a positive feature in the student's performance. He asks the student another self-assessment question concerning if the ball was under control while she was moving, and again, the student is able to produce an immediate positive answer on the basis of the video. The teacher confirms the answer and also verifies it by pointing to the ball in the video and verbalising the performance seen on the video: 'OK, it doesn't get far away from that foot'. This kind of demonstration of feedback and leading the students themselves to notice the reasons for a certain kind of feedback from the video is easy to implement during lessons that require physical

performance. It concretises the feedback and helps students to self-assess their activity when they do not need to focus on their performance at the same time.

> *Teacher uses video recordings to check students' knowledge*

The third way teachers use video recordings in self-assessment situations is to check students' knowledge. A teacher can point out sections in videos and ask questions from students or after watching video with students, ask students if they understood what happened or what will happen next.

In Extract 3 (table 5), the students have attended a physics class where they have conducted an experiment where a piece of paper is placed in a glass, the glass is placed upside down in a water container and it has been found that the paper does not get wet because the air remains in the glass. After the lesson, the teacher and Mika discuss the lesson in a separate space. Mika's iPad has a video of the experiment.

Table 5. Extract 3

Line	Speaker	Turn
36	Teacher	*OK, so what are you practicing in the lesson?*
37		*(pause, Mika looks at the iPad screen)*
38	Mika	*If the paper fills up with water.*
39	Teacher	*Yes, or let's look at it from the video*
		(Teacher makes Mika's tablet and starts playing a video and both start watching)
40		*if the paper fills up with water or if*
		(Teacher points with a finger at the iPad screen)
41	Mika	*If the mug fills up with water*
42	Teacher	*Yes, if you put it under water*
43		*(pause, they watch the video for a moment, Teacher stops the video)*
44		*Do you remember what happened in that test*
45		*(pause)*
46		*If the mug filled up with water?*
47	Mika	*It didn't.*
48	Teacher	*Yes, great, so you remember really well. Can you say why it didn't fill up?*
49	Mika	*Because there's water, that is, air, in the mug.*
50	Teacher	*You can say it.*

In the beginning, the teacher asks what was practised in the lesson. The student responds in a way that the teacher seems to receive as incorrect. The teacher puts the video on and they watch it together. In line 40, he repeats the student's answer ('paper'), and asks the student an alternate question by leaving out the correct word ('mug') from the question, while pointing to the mug on the video. So here the teacher uses the video as a hint for the correct expression. As a response, the student self-corrects his earlier answer and the teacher both accepts and extends it. Next, the teacher stops the video and tests the student's understanding of the experiment: 'Do you remember what happened in that test (…) if the mug filled up with water?' The student produces a correct answer to the question and can also explain the phenomenon at the teacher's request. Thus, the purpose of watching the video was to help the student demonstrate his understanding based on the hints provided by the video. This kind of activity, where the teacher makes the student's learning concrete by checking the student's knowledge, may help students in the self-assessment process.

Teacher instructs students to compare different performances in separate videos

The fourth way in which teachers use video recordings in the self-assessment situations is to instruct students to compare two different video sections from the same situation. In these cases, the teacher either shows two different performances by the same student or the model performance and the student's performance. The purpose of the comparisons is to help students notice their needs for improvement as well as their strengths.

In Extract 4 (table 6), the class has attended a football lesson, where one of the objectives has been to practise dribbling a football. After the lesson, one student (Jenna) and the teacher are sitting on a bench and watching videos about the lessons on the teacher's iPad. They have been assessing Jenna's performance and discussing that Jenna's strength in dribbling has been keeping

the ball under control. There is a video of both the trainee teacher's model performance and the student's own performance in dribbling.

Table 6. Extract 4

Line	Speaker	Turn
51	Teacher	*OK, let's have a look at this, when your teacher Otso shows what's different*
52		*between you.* *(teacher taps another video on)*
53	Jenna	*Well, it's that I sometimes had the ball between my feet and it was under control.*
54	Teacher	*Well, OK, but look at how Otso is he walking or is he running?* *(teacher follows Otso with a finger)*
55	Jenna	*He's running.*
56	Teacher	*OK, well let's look at then when you, you do* *(Teacher changes the video)*
57		*what's different between you and Otso?*
58	Jenna	*That I'm walking and Otso's running.*
59	Teacher	*Yeah, you got the ball nicely under control* *(Teacher points with a finger)*
60		*but in the future you could run.*
61	Jenna	*OK*

Before this extract, the teacher and Jenna have been watching a video about Jenna dribbling a football. At the beginning of the extract, the teacher changes the video and shows Jenna how the trainee teacher, Otso, is demonstrating a model performance. The teacher asks Jenna to compare what the difference was between Jenna's dribbling and the trainee teacher's, but Jenna answers in by mentioning what had been noted as her strength based on the previous video. Next, the teacher asks Jenna to assess the trainee teacher's performance and gives her a simple assessment task through an alternate question: 'Is (the teacher) walking or running?' When Jenna answers that the teacher is running, the teacher changes back to the video of Jenna's performance and asks the same question as at the beginning of extract about what the difference is between the performances. Jenna now notices the difference and can assess the performances:

the teacher is running and Jenna is walking. In the end, the teacher uses the comparison as a starting point for giving feedback about Jenna's strengths and weaknesses in dribbling a football.

Discussion

The purpose of this study was to examine what kinds of self-assessment expressions students documented in their learning diaries and how video recordings were used to support students' self-assessments. The results showed that self-assessment, as an instructional process, can also be used successfully with students with intellectual disability. The self-assessment expressions documented by students in the learning diaries were diverse, but they did contain some quality characteristics about their work or their ability, meaning they met the criteria for self-assessment as defined by Brown and Harris (2013) and Andrade (2019). They were divided into assessments of the learning result, assessments of the learning process and assessments of learning content. Although a majority (78.8%) of the documented self-assessment expressions were vague or general, 22.2% of the expressions represented demonstrative, argumentative or reflective assessments, which conveyed deeper self-reflection and were thus representative of high-quality self-assessment. The students' expressions seemed to be mainly positive, which is also typical for younger children (Brown and Harris, 2013), and this can hinder them from recognising their need for skill development and practice. There is a further concern that the general, adjective-based assessments of the learning process or pleasantness (e.g. 'went well') do not represent accurate self-assessment, which supposedly have positive effects on learning (Brown and Harris, 2013).

This study confirms the positive results of earlier studies, where video recordings have been used as support for self-assessment (Anderson and Östlund, 2017; Aukyt, 2020; Ocoughling

et al., 2013). Four different ways of supporting self-assessment with video recordings were identified: directing students to use video as a basis for their self-assessment, demonstrating feedback with video, using video recording to check (and correct) students' knowledge or instructing students to compare different performances in separate videos. The use of videos made it possible to concretise the situations through pointing, demonstrative pronouns (e.g. *those*, *this*) and visual reminders, as a result of which students were able to express the strengths and weaknesses of their performance, as well as perform teacher-initiated self-corrections. However, part of the situations consisted mainly of teacher-directed instruction and contained only minimal responses from the students. In these episodes it was challenging to assess students' understanding or how they benefited from the use of video later in their self-assessment sessions. However, in the majority of the episodes students' responses showed that they were able to observe their performance.

The results of this study provide examples of how the conditions for high-quality self-assessment can be met with the support of tablets, including active involvement of teacher and students, concreteness, immediateness and cognitive engagement (Brown and Harris, 2013). Many researchers have emphasised the importance of clear criteria or rubrics for assessing performance (Andrade, 2019; Goodrich, 1997; Brown and Harris, 2014; Ross 2006; Panadero and Jonsson, 2013, 2020). In this study, however, rubrics were not used, but the videos may have been a substitute for making the objectives concrete. Sometimes the criteria were presented very clearly, as when the objective was verbalised and pointed out on the model video, and sometimes they remained unclear. On the other hand, for students with intellectual disability who may lack, for example, reading skills, the criteria should be stated in a simple way. As Brown and Harris (2013) have stated, self-assessment should be started from simple and concrete techniques such

as assessing a single, concrete criterion for performance in the video, as is presented in this study.

This study had some limitations. The research data consisted of the practices of only one classroom, which weakened the transferability of the results, and the findings need further validation with larger samples. In addition, only verbal expressions of self-assessment were analysed, with the result that the students' cognitive processes remain unclear. Students may have challenges in their verbal self-expression, thus we cannot judge their self-assessment skills only by looking at their expressions. The strength of the study was that the data were naturally occurring, and so it presents one authentic implementation of self-assessment in a classroom for students with intellectual disability. However, the reader should consider that the results of this study are descriptive in nature and that, for example, the effectiveness of the practice was not assessed. Although the assessment of social validity is usually related to intervention studies, it can also be discussed in natural settings according to the three criteria established by Wolf (1978; see also Turan and Meadan, 2011). Self-assessment as a learning and instructional goal is important, as it has positive outcomes on students' learning and is required in the Finnish national curriculum (NCCB, 2014). School workers accepted the procedures for supporting students' self-assessment because they were developed and used naturally in the school. The third level of social validity, outcomes of the self-assessment practices in the classroom, were not measured in this study, although positive outcomes have been presented in other studies. Further research could focus on the use of other support methods in self-assessment situations as well as compare self-assessment practices with and without video support.

This study presents several implications for practice. First, it can be said that students with intellectual disability also have skills for comprehensive self-assessment if there is support

for it. Although the categories of documented self-assessment expressions were not in order of precedence, they can be used as a tool for thinking when deciding how to support students for more comprehensive self-assessment. These categories can be introduced to the students as well when instructing them on self-assessment. At the same time, the use of assessment vocabulary (e.g. adjectives) could also be enhanced to make self-assessment expressions verbally richer or more accurate. Finally, the four ways of using the video in the support of self-assessment presented in this study can be used in practice. In particular, the strategy where students compare videos of their own performance and model performance, and the teacher points out what to assess may be an example of a good self-assessment practice. It meets many recommendations (e.g. clear criteria) of researchers, and its use could be more frequently encouraged. One possible and time-efficient way of making these model videos is to record a teacher's instructions and share them on students' devices, which is also beneficial for revising as well as for communication with parents. One-to-one computing can also be highly recommended for students with intellectual disability as a means to reap all the benefits mentioned in this study.

Conclusion

The results of this study confirm that supporting self-assessment is a part of formative assessment (Black and Wiliam, 1998, 2009; Andrade and Valtcheva, 2009; Andrade 2010; Cauley and Mcmillan, 2010) and that the two cannot be separated in practice. The results showed that a teacher's feedback, questions and prompts can be strategies for facilitating students' self-assessment. The use of the video recordings in this study differs from the video modelling that has been previously demonstrated to be effective (Gilson et al., 2017), because the use of video was not directly intended to learn new skills. However, the practices presented in this study help students with extensive support needs in their self-assessment by enabling them to see their

performance on the video recordings, retrieve documented earlier assessments and use that knowledge in their future learning. At its best, self-assessment provides students with insights into their own knowledge and skills, enhancing their learning motivation (Wiliam, 2017) as well as their results (Andrade 2010, 2019; Brown and Harris, 2013; Mcmillan and Hearn, 2008).

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