Peer feedback with support of digital technology in visual art education

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Abstract

This licentiate thesis focuses on the development of the idea process in art education using digital peer feedback. In the school subject visual art, the visual idea process, e.g., when students sketch their ideas, is an important phase in a project. When an idea takes form, there is the possibility for considering the idea in a new way, for others to study and discuss it, and most importantly, for generating new ideas. By digitally sharing their visual idea process and providing feedback, students can become more aware of their own and others' creative processes.

Peer feedback in this thesis leans on two theories. The first is self-regulated learning, meaning that students formulate goals and identify needs (both their own and others') when learning. In the feedback activity, the student is responsible for their own idea and for the visual feedback given to other students. They also receive valuable input when providing feedback. The second feedback theory is social constructivism and the zone of proximal development, i.e., the difference between what students accomplish in learning with the help of others and what students accomplish by themselves. In this study it is shown (by focusing on the social aspects of peer feedback) that when students help others, they develop their own products far more than they might have done if working individually.

On two occasions, I observed and investigated how students (an eighth-grade and sixth-grade class) developed and digitally shared visual ideas supported by digital peer feedback. Thematic analysis was used on data gathered on both occasions (i.e. in both iterations of the study) to identify different types of feedback provided by students. In the first iteration, the feedback was in written form, and through analysis, five themes were created that described different types of peer feedback. In the second iteration, feedback was provided using various visual techniques, and through the analysis, four themes were formed. In each iteration of the study, four categories were created to describe the degree of change between the first and final sketches.

The results suggest that using digital tools and peer feedback activities in visual art could help improve students' abilities to develop ideas. The methodological contribution of this research is its new use of peer

feedback using visual feedback. With this form of feedback, students stayed within one medium, using a sign system to communicate visual solutions on the sketches of other students. At the same time, they received practical tips and direct advice that they could immediately apply to their sketches.

Sammanfattning

Den här licentiatuppsatsen fokuserar på att utveckla idéprocessen i bildundervisning med hjälp av digital kamratfeedback. I skolämnet bild är den visuella idéprocessen, till exempel när elever skissar sina idéer, en viktig fas i ett projekt. När en idé får en form blir det möjligt att betrakta den, för andra att studera och granska, och kanske viktigast av allt, att generera nya idéer. Genom att digitalt dela med sig av sin visuella idéprocess och ge feedback kan elever bli mer medvetna om sina egna och andras kreativa processer.

Kamratfeedback, peer feedback, i uppsatsen lutar sig mot två teorier. Den ena är själv-reglerat lärande, vilket innebär att formulera mål och identifiera behov i lärandet. I feedbackaktiviteten är eleven ansvarig för den egna idén och för den feedback som ges till andra elever. Eleverna får också värdefull input när de ger feedback. Den andra teorin är socialkonstruktivism och den proximala utvecklingszonen, dvs. skillnaden mellan vad elever åstadkommer i lärandet med hjälp av andra och vad elever åstadkommer på egen hand. Den här studien (som fokuserar på de sociala aspekterna av kamratfeedback) visar att när elever hjälper andra utvecklar de sin idé mycket mer än vad de skulle ha gjort om de hade arbetat individuellt.

I två omgångar undersöktes hur elever i åttonde och sjätte klass utvecklar och digitalt delar visuella idéer med stöd av digital kamratfeedback. Inspiration från tematisk analys användes i båda omgångarna för att identifiera olika typer av feedback från eleverna. I den första användes skriftlig feedback, och genom analysen skapades fem teman som beskrev olika typer av elevernas feedback. I den andra omgången gav eleverna varandra feedback i form av olika visuella tekniker, och i analysarbetet skapades fyra teman. I båda omgångarna bedömdes graden av förändring mellan den första och den sista skissen. Fyra kategorier skapades i varje omgång.

Resultaten tyder på att det skulle kunna vara fördelaktigt för elevernas förmåga att utveckla idéer med hjälp av digitala teknologier och kamratfeedback-aktiviteter i bild. Den digitala delningen underlättade för eleverna att dela och granska varandras idéarbeten och feedback. Det metodologiska bidraget från denna licentiatuppsats är att kamratfeedback

har använts på ett nytt sätt, visuell feedback. Genom att stanna kvar i ämnets visuella språk och kommunicera feedback visuellt återanvändes föremål och former i den ursprungliga skissen.

Till mina allra käraste kinderägg - Rita, Otte och Georg

”Den mätta dagen, den är aldrig störst.
Den bästa dagen är en dag av törst.

Nog finns det mål och mening i vår färd -
men det är vägen, som är mödan värd.

Det bästa målet är en nattlång rast,
där elden tänds och brödet bryts i hast.

På ställen, där man sover blott en gång,
blir sömnen trygg och drömmen full av sång.

Bryt upp, bryt upp! Den nya dagen gryr.
Oändligt är vårt stora äventyr.”

- Karin Boye

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Stockhom, September 2023
Eva-Lena Forslind

List of included papers

Forslind, E. L., Hrastinski, S., & Forsler, I. (2023). Digital peer feedback on visual ideas: a study of eighth-grade students in visual art. *Interactive Learning Environments*, 1-18.

Forslind, E. L., Hrastinski, S., & Forsler, I. (submitted). Visual Peer Feedback using a digital space: A study of sixth-grade students in the visual arts classroom.

Forslind, E. L., Hrastinski, S., Forsler, I., & Häggström, S. (submitted) Digital kamratåterkoppling på visuella idéer i bild.

Contents

1. Introduction

The image on the cover was created in a study in which sixth-grade students gave visual feedback on each other's sketches of ideas in a composition task, "Self-Portrait via Objects," in art class, with a photograph as the final product. The original sketch consisted of a drawing of only the skateboard with the left foot, with a wish list in the form of a text line: "Skateboard, DC, Starwars, Football and Basketball". The students' original sketches were copied and distributed to two other students in the class, who were asked to suggest ways to improve the image by visually interacting with a printed copy of the sketch. They used a variety of visual techniques to give each other feedback: cutting and pasting, drawing, adding shadows and colors, and using tools like scissors, pens, paints, and blunter artistic tools. Although the feedback was mostly visual, some parts were textual. Subsequently all the sketches and feedback were photographed, transferred, and shared on the digital tool using a mobile phone. In addition to providing feedback on two other student sketches, there was time for the students to study each student's sketch and feedback projected on the teacher's computer screen. The entire group's work was made available in digital format, giving students the opportunity to see other students' sketches as well as all of the student feedback that provided alternative forms of expression. When work is collected and visualized digitally, it becomes easier to access than in the physical classroom, where not everyone is as comfortable moving around for various reasons (Cornelius & Herrenkohl, 2004).

This licentiate thesis is about digital peer feedback on visual ideas in the visual arts, specifically how visual ideas can be developed and shared with others using digital feedback among students, how such activities can be structured, and how ideation skills can be practiced. The visual idea process is about giving shape to an idea, telling, and communicating a

sequence as clearly as possible and explaining the overall purpose of what one wants to achieve (Eisner, 2008). This process allows one to try out different visual expressions in order to convey a desired result, whether it is developing a design for a logo, or conveying a story or scene in an animation. The visualized idea furthers the process of creating the image, which gets a function when there is a plan, like having a map to follow. In the latest Swedish curriculum (Swedish National Agency for Education, Lgr 22), the visual idea process has been given greater importance than in previous curricula and is mentioned in the subject's purpose and in a little more detail in the commentary on the curriculum's purpose:

> Developing ideas refers to the actual development and idea process, regardless of where the ideas come from. Students can get their own ideas, for example by observing [...] images [...] in the environment. The development of ideas can also be based on a given task where a problem, a need, a material or a technique can be the starting point. (Swedish National Agency for Education, commentary material for the syllabus in visual art, p. 7, my translation)

Time and instruction in the visual idea process is often limited, which can make this a stressful activity for many students. Some find it difficult to come up with a single idea while others come up with several ideas at the same time. Once an idea is on paper, some want to protect it from the eyes of others and have problems showing their sketches, both to the teacher and to others in the class or group. Continuing to work on something that has not quite found its shape from the beginning often results in use of the same style, even if that style or idea is counteracted with lots of support and advice (Eisner, 2002). Addressing this problem requires clear and structured teaching of how to develop ideas with the help of others in the same situation.

When I conducted the two iterations of my research (at two schools one year apart), the participating schools were using digital tools with communication pathways focused on teacher-to-student, teacher-to-teacher, and teacher-to-a group of students. In both iterations, a digital space like the classroom was needed, with a place for each student to

collect their work, both visual and textual. This digital space also needed to offer an overview and transparency to facilitate sharing and the ability to study what everyone in the group has achieved. The opportunity to observe the work of others, and how compositions and visual forms are created, can to some extent offset the sense of risk-taking and disclosure in sharing one's work with others. Observation provides an opportunity to visually compare one's own sketch with those of others and mimic shapes and expressions, giving a direct orientation on how one wants to formulate one's own sketch. The possibility of digital feedback among students also facilitates the anonymization of the students as well as providing an opportunity to practice expressing opinions and to influence, but above all, it activates students in their learning and increases awareness of the task and the diversity of ways to solve it (Latifi & Noroozi; 2021; Liu & Carless, 2006).

My interest is partly in how the visual idea process can be developed with the help of feedback among students, and partly how digital media can aid students in this learning. To be useful in this context, the inherent properties of the digital tool must offer opportunities for sharing in the form of a common space where each student can store and share their work next to the work of others.

In this design-based research study, two iterations were planned and conducted in two different primary schools. Design-based research is characterized by the design of the research activity, often conducting multiple experiments/iterations (Brown, 1992) to improve and redesign the activity in real-world settings (Barab & Squire, 2004). The overall study was performed place in close collaboration between researcher and teachers in accordance with Wang and Hannafin (2005) who point out the importance of the active involvement of the researcher in learning procedures, implementation and analysis. On these two occasions, the consequences of digital media on students' abilities to develop their skills in the idea process were studied and researched with the same teacher.

Paper I (research performed in 2020) is about the first iteration of the study (how eighth grade students developed their visual idea process

based on text-based digital feedback) and has been published with the title “Digital peer feedback on visual ideas: a study of eighth-grade students in visual art”.

Paper II (research performed in 2022) describes the second iteration (how sixth grade students gave each other visual feedback and shared it digitally, and how the feedback and sharing shaped and influenced their visual idea processes) and has been submitted with working title “Visual Peer Feedback in a Digital Space: A study of sixth grade students in a visual arts classroom”.

Paper III will describe the methodology used in both iterations and will provide a practical description of a pictorial composition assignment and step-by-step instructions for feedback training and the use of digital peer feedback on visual ideas, both written and visual. This more practical publication will be a chapter in an anthology for student-teachers in Leisure Education focusing on Art.

1.2 Aim and research questions

This thesis aims to investigate peer feedback in a digital space, focusing on the design and testing of methods that allow students to develop and share their visual idea processes. More specifically, this thesis addresses the following questions:

1. What types of feedback were provided by the students?
2. How did the students use peer feedback in their final visual ideas?
3. How did the students perceive the visual idea and peer feedback process?

To further explore how peer feedback may function, the method in the first iteration, in which students gave written feedback, was redesigned for the second iteration, in which students presented their feedback visually. Because written and visual feedback are communicated differently and may cause different changes in students’ sketches, there was a need for a fourth, more comparative question based on the results

of the two iterations that specifically compared the difference between written and visual peer feedback:

4. What were the differences between written and visual feedback?

1.3 Structure of the thesis

The licentiate thesis consists of seven chapters. The first chapter is this Introduction to the thesis, which presents the area and aim of the thesis. The second chapter, Subject background, presents an overview of previous research in the field that the thesis deals with and the next chapter, Theoretical background, presents the central concepts of the thesis. In the fourth chapter, Method, I present the sub-studies' selection, research methods and how the material in each sub-study has been analyzed. The papers are then presented in the subsequent two chapters, Summary of papers and Results and discussion, where the results are also problematized. The seventh and last chapter, Limitations, further research and concluding discussion, presents the studies' limitations and contributions, and suggests areas for future research and concludes this thesis with a summary of the work.

2. Subject background

2.1 Visual arts education

In Sweden, the visual arts subject is taught in grades one through nine of primary school and is a consistent area that covers all stages in the production of narrative, informative images, and image analysis, including links to, or from, the student's own visual culture, from basic knowledge criteria to more advanced ones. By linking the students' own experiences in their visual culture to, for example, an art image, the understanding of the meaning of the image in the analytical work increases. In such discussions, students not only practice their subject-specific language when explaining what they see and understand, but also sharpen their practical visual skills by observing the work of others, and seeing how compositions and visual forms are created (Häikiö Karlsson, 2021). The Swedish core content for grades 7-9 mentions several areas to be included in the teaching, including two- and three-dimensional work such as digital creation, moving images and techniques such as color and pictorial composition (Swedish National Agency for Education, Lgr 22). In art, students need the opportunity to discover and present different visual problem solutions in a reflective and critical way (Stavridi, 2015).

The visual arts subject has undergone a change in many parts of the world, from being focused on developing skills such as drawing and sketching to a subject focused on visual culture and communication (Duncum 2001; Häikiö, 2021; Marner & Örtegren, 2013; Åsen, 2006) and on developing the abilities to collaborate, to be creative, and to think critically (Stavridi, 2015; Yefimenko et al., 2021). The subject has changed its name and focus several times, moving from individual teaching to today's whole-class teaching (Åsen, 2006). This shift from an art subject to a visual culture and communication subject has happened in much of

the world (Duncum, 2001). In Sweden, this subject was called drawing in the 1870s when it was introduced as a separate subject, a name that persisted until the 1980s curriculum when the name was changed to visual art.[1] The focus shifted from technical depiction to aesthetic education and then to drawing as a means of expression in the early 1960s. With the change of name to visual arts, the curriculum focused on a broader view of visual communication (Marner & Örtegren, 2013), and the visual arts subject is currently described as "an important means of communication alongside reading, speaking and writing" (Åsén, 2006, p. 117).

2.2 Visual culture, communication, and visual ideas

The subject visual art is now about visual culture and communication. Visual culture is a collective term for art and media; the stated purpose of the subject visual art mentions film, photography, design, art, architecture and environments (Swedish National Agency for Education, 2015). Paul Duncum (2015) referred to Wilson who likened visual culture to a rhizome: "like the continuously growing root system of a mushroom, the roots of visual culture spread out and into everyday life" (Wilson as cited by Duncum, 2000, p. 31). Unlike art, visual culture does not belong to an institution, but is culturally broader and, with the help of a widespread technology, often emerges in ordinary society in reflection on visual experiences and how we see and interpret what we see. Mirzoeff (1999) defined visual culture as "visual events in which information, meaning or pleasure is sought by the consumer in an interface with visual technology [which is] any form of apparatus designed either to be looked at or to enhance natural vision, from oil paint to television and the Internet" (p. 3).

Visual culture is more about constructing ideas and expressing one's creativity and image-making than art, which is linked to the 'new' name of the subject, visual art. Communication comes from Latin and means to share, to make common, and is about conveying and telling something. According to general communication theories, there must be rules and signs for a communication to occur and be understood

[1] The Swedish word for the subject is *Bild*, which directly translates as picture or image. Teaching in the subject includes visual culture and communication, two- and three-dimensional imaging, form and design, digital creation, and image analysis.

by the parties involved (Cherry, 1956). If the parties involved or the recipient do not understand the message, the communication has not occurred and the information is lost (Dainton & Zelley, 2022). According to the Swedish National Agency for Education's latest curriculum from 2022, the visual arts subject should, among other things, aim to "[...] that students develop their creativity and their interest in creating and communicating visually" (Swedish National Agency for Education Lgr 22). When you want to share something with someone, it may be easiest to explain it verbally or to write down what is on your mind. Regardless of the communication channel you use – voice, text, or visual media – you need to have an idea of what you want to say and how you want to say it. "Yet, for the visual to be properly reconceptualized as part of a general theory of communications it must be understood in terms of how it operates as one sign system among others" (Duncum, 2004, p. 256). In the idea process, ideas take shape, and ideas can be expressed in different modalities, verbally in drafts texts or some other kind of verbal expression, similar to the way that words can demonstrate one's train of thought in how a math problem has been solved. In a visual idea process, the idea is materialized in, for example, sketches or three-dimensional prototypes, where various visual expressions such as lines, compositions and shapes are used to communicate (or to attempt to communicate) the idea (Han et al., 2021; Lubart, 1994; Runco & Smith, 1992; Watts et al., 2017; Eisner, 2008). Visually communicated idea creation has been given more space in Lgr 22, which hopefully means that it will be more practiced in teaching (Scott et al., 2004).

2.3 Digital media and technology

The Swedish primary school curriculum states that all students should have the opportunity to develop skills in using digital technologies and to develop digital competence in their education (Lgr 22). What do these ideas mean in practice?

According to the Swedish National Agency for Education's text "Understanding digitalization at primary school level", the goal is combining subject knowledge with digital competence: "Having digital competence in school means ... being able to solve problems and turn

ideas into action" (2022, p. 11). The Agency for Education describes the key concepts of digital tools and media as follows:

- Digital technology can be anything from cameras, computers, learning tablets to various programs on a computer.
- Digital media are web services or social media.
- Digital technology and media should be used for everything including acquiring knowledge, information seeking, image processing, and communication.

Since 2006, when the European Union defined digital literacy as one of eight key competences for lifelong learning, education policy documents have focused on increasing the use of digital technology and media and information literacy (MIL) skills in schools (Godhe, 2019). The specific choices of digital tools or media are partly up to the competence of the teaching staff and tool availability (Forsler, 2020). Like other technology used in teaching, digital tools should be used as a natural part of a teaching plan with a clear purpose and area of use. In education, digital technologies should be used together with other technologies, materials, and techniques (Swedish National Agency for Education, 2018).

In this study, the tool Padlet was used as the primary digital technology because it provided the opportunity to collect and share all work, visual images, photos and text, in a group (see Figure 1). In Padlet, students can post content from tablets or their own phone. In addition, the digital space gave students the opportunity to interact on more equal terms than the physical space, and it also easily offered an overview of everyone's work and feedback.

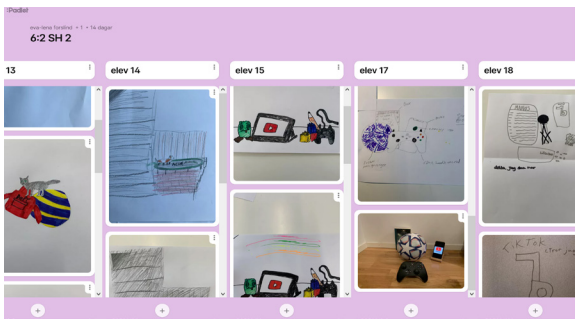

Figure 1. Screenshot of Padlet in Iteration II.

3. Theoretical background

3.1 Constructivism and social constructivism

Early constructivism, or cognitive constructivism, is linked to the mid-last-century work of child psychologist Jean Piaget (Säljö, 2015; Kalina & Powell, 2009; De Lisi & Golbeck, 1999). From a constructivist perspective, knowledge is actively constructed by a learner rather than passively acquired. Learning is seen as individual, varying according to individuals' different levels of experience and prior knowledge (Noroozi et al., 2018; De Lisi & Golbeck, 1999). Feedback from a constructivist perspective can be that someone who knows more, such as a teacher, helps someone who knows less, such as a student (Evans, 2013).

The social form of constructivism also sees knowledge as constructed, but as a social phenomenon (Vygotsky, 1978), with meaning and understanding emerging in the encounter and interaction between a teacher and students, and among students. In a learning exchange that takes place in interaction, it can just as well be the teacher who learns from the students as students who learn from the teacher (Dysthe, 1996, 2003). I use social constructivism as the theoretical background as it is an important part of my overall research about how learning takes place and the use of formative assessment, such as peer feedback, where dialogues between students take place.

The stage in which an ability is in its infancy, but developing, is called the zone of proximal development. This zone involves both what someone achieves with someone else and what they achieve on their own (Vygotsky, 1978; Webb, 1989). Vygotsky (1978) states that the zone of proximal development is when "[...] learning awakens a variety of internal development processes that are able to operate only when the child is

interacting with people in his environment and in co-operation with his peers" (p. 90). The zone of proximal development develops and changes over time and depending on where a person is in their education. With the help of others, it is possible for a person to reach further and gain greater understanding than they would on their own. In my research work, this idea of the zone of proximal development is used to investigate how formative assessment can be used in the form of peer feedback to influence the development of (and increase the chance of improving) the idea process of a student. Getting an extra pair of eyes on one's work and being able to make suggestions for improvements to other people's ideas enables interaction, and through this interaction one can become a little better than one would have been were one alone in the process.

3.2 Self-regulated learning

Theories behind self-regulated learning are often cited in terms of Vygotsky's ideas about the language and signs we use for communicating and controlling our thinking and behavior (Vygotsky, 1986; Fox & Riconscente, 2008) and the aforementioned Piaget's theories of intellect and emotion, where self-regulation takes shape when we learn to control our actions, intentions, and feelings (Säljö, 2000). Self-regulated learning refers to students activating, enhancing, and sustaining their learning (Zimmerman, 1986), and to gaining an awareness of how to learn (Higgins et al., 2016), what they need from others to accomplish different tasks (Fox & Riconscente, 2008), and what motivates them to accomplish a task. Emphasis is placed on formulating goals and identifying learning needs (Butler & Winne, 1995; Järvelä et al., 2011). The purpose of structured self-regulated learning is providing students with strategies to choose from in learning, such as developing critical thinking (Abrami et al., 2008). In structured self-regulated learning, a teacher initially teaches and supports what are called 'meta-cognitive methods' – that is, methods to plan, monitor and evaluate their learning. Students first experiment with support and gradually take more responsibility for their own learning. Often, collaboration between students can be an asset, and they can use different types of working groups to support each other

in becoming more independent in their learning (Higgins et al., 2016). Students who are familiar with self-regulated learning are more confident in their own abilities and capacities to learn and do not need as much help from others (Perry et al., 2008). Self-regulated learning in one subject tends to spill over to other subjects and can develop into a more generalized study technique (Perry et al., 2008).

Specifically, in this study, self-regulated learning manifests itself in each of the two iterations in that each student is responsible for their own sketch and the feedback each student provides. In feedback from others, each student receives written or visual suggestions about how the work can be improved or formulated in other ways. In this interaction, students become aware of different ways of expressing themselves and access a variety of ways to accomplish the task (Bartholomew et al., 2019; Lee et al., 2021; Liu & Carless, 2006). The possibility to study more idea sketches than the two assigned provides an even larger selection for visual comparison and for relating to. Reflection and metacognition are seen as integral parts of learning, enriching and extending students' understanding. Reflecting on one's learning and thinking about one's process when learning enriches and expands understanding. Burman and Lundberg Bouquelon (2022) describe aesthetic experience and reflection in processes of aesthetic learning as follows:

> One element that is usually included in the process through which the experience is refined into experience is reflection. Based on the experience, reflection makes it possible to put oneself and one's own thoughts, ideas, and previous experiences in relation to those of others. (Burman & Lundberg Bouquelon, 2022, p. 8, my translation)

3.3 Assessment

Assessment in a subject is based on many elements, some of which are up to the teacher to select for use in a task. Assessment can be seen as a source of insight and help (Shepard, 2000) for both the teacher and

the students, but it is a tricky process, challenging the assessor to look and think carefully and to sharpen their senses. A teacher's assessment work is an ongoing internal process, a growing library of demonstrated abilities, and something the teacher reflects on as teaching proceeds.

Assessment comprises summative and formative aspects. These two aspects can be thought of as two sides of the same coin, and if used consciously, they facilitate and clarify teaching and can increase learning for both teachers and students. Summative assessment is the type of assessment one often thinks of in the context of teaching, the more traditional type of assessment (= grades) and is generally seen as the dominant part of grading. This type of assessment happens at the end of a given assignment – when the teacher grades and assesses the final result and everything that the teacher has collected based on the objectives of the task and the steps that the teaching has covered.

In contrast, formative assessment can be seen as most aspects of teaching that happen before an assignment is completed and submitted. In addition to the presentation of the subject area and information about the task and objectives, formative assessment includes the teacher's advice or assistance to clarify and adapt the task to the students, indicating objectives and skills that need to be demonstrated in relation to the criteria of the task. Formative assessment is about making students active in their learning and aware of objectives and learning outcomes (Järvelä et al., 2011). Different methods of formative assessment are suitable for different occasions, and a teacher can pick and choose what is most relevant. Students can access tools for deeper reflection using structured formative assessment.

Sometimes self-assessment can be used to allow students to familiarize themselves with the knowledge criteria of the task and gain a deeper understanding by putting these criteria into practice. Boud (1995) defines self-assessment as "the involvement of students in identifying standards and/or criteria to apply to their work and making judgements about the extent to which they have met these criteria and standards" (p. 4). Self-assessment can be developed by having students reflect on their own

work through directed questions, comments, or the like (Boud, Cohen & Sampson, 1999). Self-assessment work can be carried out independently or collaboratively, with task objectives and criteria approached through discussion.

Assessment can also be performed by a classmate, in which case it is called peer assessment (Ketonen et al., 2020). In peer assessment, not only do the objectives of the task and knowledge criteria become more precise and more relevant, but the student also gets information about how someone else solved the task and came up with alternative solutions, which gives a broader palette to relate to.

3.4 Feedback and peer feedback

In educational contexts, feedback is considered a central part of forward-looking information (Kluger & DeNisi, 1996) for improving one's knowledge and skills (e.g., Shute, 2008; Tunstall & Gipps, 1996). At its best, feedback can resemble a communicative process in which there is a dialogue between teacher and learner about performance, knowledge requirements, and goals (Liu & Carless, 2006). The discussion may include details in the form of praise, corrections, and tips for improving learning, and can be given individually or to a whole group simultaneously. Teacher-student feedback is intended to make students think about their work in relation to what is to be achieved in the learning process and the objectives of the task in the subject in question.

Peer feedback is an activity in which students reflect and critically analyze other students' work (Misiejuk & Wasson, 2021; Topping, 2009). Unstructured (natural) peer feedback is a direct and informal dialogue, often with one's bench neighbor or others around the same table where and when a task or project is presented (DiPardo & Freedman, 1988). This type of feedback arises quickly and as a natural process of approaching and understanding the specific area or problem. Natural peer feedback can be about exchanging thoughts and ideas, and it can also be questions about the task. It may be wonderful for those who share

the process, but it often does not extend to include all students at all tables in the whole group.

Structured peer feedback, on the other hand, is designed by the teacher and is more or less prescribed in terms of what the feedback should contain, who should give feedback to whom, what the feedback should look like, and what form the feedback should take (i.e., oral, written, visual, etc.). Unlike peer assessment, peer feedback is not based on knowledge requirements but rather on detailed information about alternative pathways to the goal. Using the task objectives and selected assessment criteria, students are asked to identify strengths in the work of other students and make suggestions for improvement (Falchikov, 2001; Van Der Berg et al., 2006). The structured activity of peer feedback enables students to take a more active role in their learning (Liu & Carless, 2006), becoming both a trigger and a compass showing the way forward, and can also be a tool for the student to regulate their learning (Butler & Winne, 1995) through the internal and external feedback they receive. Peer feedback can aid self-assessment because one's peers have started with the same knowledge base.

Another critical aspect of engaging in peer feedback is that learning moves from being a private, individual dialogue between a teacher and a student to a broader context involving other students in the same situation. Teaching can be further clarified by seeing the problem-solving processes of others, and be more effectual for the student's learning if the individual student is forced to formulate in the specified area.

3.5 Related research

This section reviews the current knowledge in the field, and highlights what is lacking in research about visual arts and visual peer feedback provided and shared digitally.

Peer feedback can be based on two theories reviewed in the previous section: self-regulated learning, which means that students formulate

goals and identify needs when learning (Butler & Winne, 1995; Järvelä et al., 2011), and social constructivism and the zone of proximal development, which refers to the difference between what students accomplish when learning on their own and what they accomplish with the help of others (Vygotsky, 1978). From these perspectives, both giving and receiving feedback provide students with alternative ways to develop and visualize ideas that they would not have access to if they were working alone (e.g., Hattie & Timperley, 2007; Latifi et al., 2016; Noroozi et al., 2016). Peer feedback can be provided in digital spaces (Huisman et al., 2018) as well as on-site (Liu & Carless, 2006). One of the advantages of using digital peer feedback is that it makes the activity easier to overview. When students are given the opportunity to study and provide feedback on the work of others, they are also given the opportunity to self-evaluate their own work and to imagine alternative ways of expressing ideas (Bartholomew et al., 2019; Lee et al., 2021).

Peer feedback (also called peer assessment) is when students reflect on and critique the work or performance of other students (Misiejuk & Wasson, 2021; Noroozi et al., 2018; Topping, 2009). In this process, students provide feedback to another student using the specific criteria and standards of the given task. A common approach is to identify strengths but also make suggestions for improvement (Falchikov, 2001; Latifi et al., 2020; Van Den Berg et al., 2006). In order to provide useful feedback, it is essential for one to be trained beforehand to know how to communicate feedback to others (Huisman et al., 2018). How well students understand and participate in feedback processes is referred to as feedback literacy. In a study of secondary school students, Ketonen et al. (2020) found that students' feedback literacy was developed through participation in formative peer assessment.

Peer feedback is dependent on the knowledge level of the students, and students are often unaware of how to use peer feedback to improve. This is likely due to the facts that most students lack strategies for how to handle the feedback they receive (Jönsson, 2013), that there are different views of what constitutes quality work (Anker-Hansen & Andrée, 2019), and that some feedback might simply not be useful (Jönsson, 2013).

In a study of student writing, beneficial feedback provided students with information about their current and expected knowledge levels (Noroozi & Hatami, 2018). That said, it has been suggested that high-achieving students might be less receptive to feedback. A comparative study of peer feedback and tutoring in engineering programs found peer feedback had significant effects for low and average-achieving students, but only small effects for high-achieving students (Hamer et al., 2014). Similarly, research on student teachers showed significant effects of peer feedback for low and middle performers, but small effects for high performing students (Li & Ga, 2016).

Digital peer feedback in visual art education

In the visual arts, various digital technologies may provide ways of sharing visual ideas and providing peer feedback (Ersöz & Şad, 2018; Lee et al., 2021; Lin et al., 2016). Digital technologies may also serve as repositories, providing a space for collecting and exhibiting works (Beattie, 1994; Lindström, 2007). In Beattie's (1994) study, the 'mini-portfolio' was not limited to the final product, but included the idea and related processes such as sketches, feedback revisions and notes. This vital part of the work process can be documented by using digital technologies.

Lee et al. (2021) carried out a study in a visual arts class on the impact of a proposed method of peer feedback compared to a general feedback method, on the performance and learning of students in creative thinking. One group participated in a progressive peer feedback method, while the other (control) group used a conventional feedback method.. Students in the progressive peer feedback group became aware of their learning process by observing and assessing the drawings of others: studying the skills of others and being challenged made students keener observers and more reflective of their own knowledge. Using Dweck's (2006) mindset theory, Bacon (2016) found that developing the ability of students to make useful feedback comments promoted their growth mindset and increased their trust in their peers' ability to help. Her students became more proficient in providing useful feedback comments to their peers,

which resulted in higher achievement in her art class.
Another study on feedback in the field of visual arts was an investigation with ten students and a visual arts teacher, and the question was whether Facebook could be used as a platform for sharing work and providing formative peer feedback (Ersöz & Şad, 2018). The results showed that the peer assessment made the students look at their work from different perspectives and become more aware of their own strengths and weaknesses. The features of Facebook facilitated the sharing of work and comments, but also had negative aspects, such as the lack of structure and the fact that the open space also allowed the participation of strangers (Ersöz & Şad, 2018). The use of digital technologies to facilitate formative peer assessment in visual arts education has also previously been discussed by Lin et al. (2006) in a study about how fifth-grade students provided peer assessment using web-based portfolios. The portfolio system helped teachers announce assignments, overview students' work, make suggestions and assess the final works. It provided a space for the students to exchange opinions and suggestions both with the teacher and with other students in the group, while at the same time providing a place for the sharing and containment of their work (Lin et al., 2006).

There has not been much research conducted at the intersection of the fields of peer feedback and digital feedback, or in peer feedback in the visual arts. This study contributes knowledge about the use of visual peer feedback supported by a digital space.

4. Method

This section describes how the two iterations of the study were conducted, the methods and the participants, ethical considerations, and the empirical materials analyzed.

Table 1. The research methods and research questions of the studies.

Texts	Methods for collecting data	Methods of analysis	Participants	Research question
Text-based peer feedback on visual ideas (published article)	Sketches Written feedback Open-ended survey	Thematic analysis	Year 8	1. What types of peer feedback were provided by the students? 2. How did the students use peer feedback in their final visual ideas? 3. How did the students perceive the visual idea and peer feedback process?
Visual feedback on visual ideas (manuscript submitted)	Sketches Written feedback Open-ended survey	Thematic analysis	Year 6	1. What types of visual feedback were provided by the students? 2. To what extent did the students use the visual peer feedback in their final sketch? 3. How did the students perceive the visual idea and peer feedback process?
Description of the task in the two iterations (book chapter)	Description of the studies, but the task takes precedence.	Written as a research communication deliverable. This chapter summarizes and reflects on the two studies.	Years 6, 8	

A design-based research study (Barab & Squire, 2004; Wang & Hannafin, 2005) was set up consisting of two iterations that built upon each other in real classroom activities where the researcher and teacher collaborated closely in a feedback activity. The teacher changed school of operation during the study and began at a new school, therefore, the students were not the same. Because the students were from two different schools, the task could be reused with a new student cohort. In the first iteration, text-based peer feedback on sketches of students in eighth grade was used. In the second iteration, the task and subject were the same, but the peer feedback was provided visually. The research methods and research questions of the studies are summarized in table 1.

4.1 The assignment

The assignment focused on two of the core content areas of the subject visual art in the Swedish curriculum (Swedish National Agency for Education Lgr22), namely composition and image analysis.

The name of the project was Self-portrait via objects: the teacher presented the area of the assignment, and the students were asked to produce a pictorial composition in which they were to represent themselves by objects and show how these objects describe what the students like to do in their spare time. This task involves communication and composition with objects as pictorial elements placed in the picture's foreground, middle ground, and background. Image sections, angles, and light and color create different expressions. The task included various media from sketch techniques to digital photography.

Students studied and analyzed each other's images to provide feedback using the image analysis training they received in the teacher-designed task. The task is based on still life, and the selected objects were placed in a composition according to taste. Still life is the arrangement of objects (anything from cups and vases to skulls) used in painting and drawing to represent the shapes of objects and the spaces between the shapes.

The students got the assignment on paper with the following instructions (my translation):

> 1. PLAN and RESEARCH: You should plan your picture with pen and paper, sketch and write down thoughts about what should be included in the image and how the picture should be composed. This is done during class time.
>
> 2. REFLECT: Give feedback to two other students' ideas during class time. Receive input from two other students. Manage the feedback and refine your idea.
>
> 3. PHOTOGRAPHY: Do it at home. Set up your still life with your sketch in hand and take a picture with your mobile phone camera. If you plan to edit the image on your phone, do so.

4.2 First iteration

For the first iteration we (the teacher and myself) chose the feedback model of Berger's Two Stars and a Wish (Berger, 2012; Leahy & Wiliam, 2015). According to this method, student feedback should include two positive aspects (the stars) and one critical aspect (the wish) to improve or clarify the work (Berger, 2012; Leahy & Wiliam, 2015). We chose to change it to one star and a wish based on findings that praise and rewards are less useful as feedback (Hattie & Timperley, 2007; Misiejuk et al., 2021; Noroozi et al., 2016). The teacher started the feedback training activity lesson by showing anonymous images of recent student work in which she gave feedback on those images and encouraged the students to do likewise. According to the teacher the students were shy about this task and did not dare reflect in a whole group – only a few were confident enough to talk in front of others, and the teacher ended up doing most of the talking. Still, through this process, the students got examples of different types of feedback comments. The students were asked to reflect about whether these would be appropriate comments to give to someone's work. Next, the teacher showed examples of sentence starters like "I like

how you..., It was incredible how you..., I did not understand..., I think it would be clearer if..." Then the teacher handed out different colored sticky notes (pink for wishes and yellow for stars). The students, now divided in pairs with support of the sentence starters (Latifi et al., 2019), provided feedback on another example of a recent student work, by giving a star sticky note and a wish sticky note. When the students were finished, they put their sticky notes on a door, wishes on one and stars on the other (Figure 2). The teacher wrote examples of the students' feedback on the board and led a whole-class discussion about the relative quality of the comments.

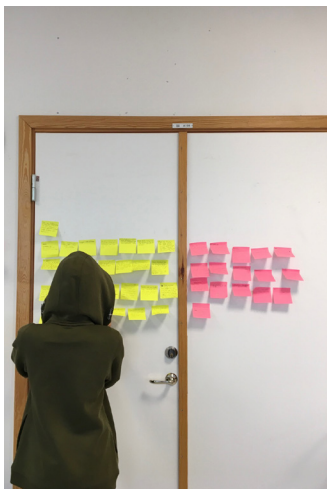

Figure 2. From the feedback training in Iteration I, with sticky notes divided into wishes and stars on the door.

The first phase in the assignment (and the first object for peer feedback) was for students to start drawing their ideas with pen on paper. Then they uploaded a photo of their sketch (taken with mobile phones) to the digital technology Padlet. In Padlet, students were anonymous to each other, receiving a number instead of their name. The teacher assigned two visual ideas to each student to give feedback on. Then the students got time to study all the contributions. In the second phase, the students provided written feedback on the assigned sketches, which were uploaded to the Padlet under the original sketch. Now the students got time to study all the feedback and reflect upon feedback they had received personally. The third phase was to sketch the second and final sketch, take a photo of it, and upload it to Padlet.

4.3 Second iteration

As in the first iteration, the teacher started the assignment with an overall presentation. This time, the assignment was presented with three objects representing the teacher: a tomato, a toy mouse, and a piece of Lego. The teacher explained why those objects had been chosen: the tomato to represent being a vegetarian, the toy mouse to represent/remind her of her son (it used to be a beloved toy of his), and the piece of Lego representing playing with her son. The objects were then put together in a variety of compositions, clarifying the concepts of foreground, midground and background for the students. In this iteration, the students were in the end meant to provide visual peer feedback, though the feedback activity training was held practically and verbally, with the teacher inviting the students to give verbal suggestions about how to place the objects differently. This assignment itself followed the same procedure as it did in the first iteration, starting with sketching the first sketch with pen on paper, uploading a photo, and ending with a second sketch. The difference was in the modality of the feedback: in this iteration. the teacher made hard copies of the original sketches and assigned two copies to each student to provide visual feedback on.

There was one small difference in digital use in the iterations, which is that in the first iteration the students used their own mobile phones to take pictures of their sketches, provide feedback to peers, upload pictures and feedback to Padlet, and to study the others' sketches and feedback. In the second iteration, the sketches were photographed and uploaded by myself and the teacher, and the digital sharing went through the teacher's computer to the big screen for all at the same time.

4.4 Participants and selection

In the first iteration, the students were in their eighth school year (14 to 15 years old) and they were divided into three groups of about 17 students each. In the second iteration, the students were in their sixth school year (about 12 years old) and divided into three groups, each consisting of 18

students. Both iterations took place during the pandemic, which caused some student absences in one or both lessons. The absences affected the peer feedback activity in that more students than usual were absent for the first lesson, which meant they had less time to provide feedback and so fewer students got feedback than might have been expected.

4.5 Data collection

The empirical material for my research was collected between autumn 2020 and spring 2022, in two different primary schools in Stockholm in two quite similar areas – newly built middle-class areas with both owner-occupied and rented accommodation. The empirical material includes the first and second sketch, the provided feedback (either in written or visual form), and two surveys. The written peer feedback was exported from Padlet to an Excel file and anonymized. The visual peer feedback was exported from Padlet to a PDF file.

4.6 Survey

- The surveys contained open-ended questions and were completed by 52 students in the first iteration (three students did not want to participate and two were absent in one of two lessons) and 36 students in the second (nine students did not provide consent). The survey in the first iteration had the following questions (my translation):

- What kind of changes were made in your second draft after receiving feedback on the first draft?
- How did you experience getting feedback from others on your work?
- How did you experience giving feedback to others?
- How did you experience looking at the visual ideas of other students?

In the second iteration's survey the questions were changed slightly to fit the visual feedback activity:

- How did you feel about others drawing/cutting your picture (getting feedback from others)?
- How did you feel about drawing/cutting someone else's picture (giving feedback to others)?
- What changes did you make in your second sketch based on the feedback you received on your first sketch?

The answers from both surveys were digitized from the paper sheets to an Excel file and anonymized.

4.7 Ethical consideration

This research involved young students, and for their protection, the study was guided by the ethical guidelines for research in Good Research Practice (Vetenskapsrådet, 2017). There are risks in letting students assess the work of others. As young people may not be accustomed giving feedback, the risk of abusive behavior and so forth has to be taken into account. To avoid upsetting students and to address this issue, students were provided with examples of feedback comments to reflect on in advance. Students' identities were anonymized, and they did not know to whom they were giving feedback.

The students were verbally informed about the study during a study pre-visit. Because the students in both iterations were younger than 15, their guardian(s) needed to provide consent. Guardians were informed of the study via a paper form that was sent home with the students or via email. In the first iteration, 10 of the guardians responded via the paper form and 45 by email or cellphone, of which 52 gave consent. In the second iteration, the communication with guardian went by mail or mobile phone. Thirty-six of 54 guardians responded positively when asked to consent. The empirical material is being stored safely on protected servers.

4.8 Data analysis

This section describes the data analysis methods. The peer feedback from both studies was analyzed using thematic analysis and changes between the first and second sketches from both studies were assessed. The responses from the surveys were grouped according to the questions asked. For an overview of the six steps and the description of the processes in each paper, see Table 2 on next page.

Thematic analysis is a qualitative, reflective and iterative process and can be used in both an inductive and deductive approach to identify patterns in the empirical material that answer the research questions (Braun & Clarke, 2006; 2019). With this method, a researcher looks for patterns in the data, which are then grouped into themes. These themes do not wait passively in the data but rather are created by the researcher to describe the nature and scope of the phenomenon being studied (Braun & Clarke, 2019). An inductive approach of thematic analysis was used in both iterations, which means that the codes in the material were generated by the researcher (in contrast to the deductive approach, in which codes are based on theories). The analysis followed the six steps recommended by Braun and Clarke (2006). The empirical material was the written feedback comments and the first and second sketches in the first iteration, and the visual feedback and first and second sketches in the second iteration.

Table 2. The six-step procedure of thematic analysis, based on Braun and Clark (2006; 2009) and a description of the process in the two iterations.

	Description of the process	
Step	**Iteration 1**	**Iteration 2**
1. Familiarizing yourself with your data	Downloading the sketches and digitizing the feedback comments from Padlet, and getting the survey answers	Downloading the sketches and the visual feedback from Padlet, and getting the survey answers.
2. Generating initial codes	Initial codes were generated manually by reviewing all feedback comments and categorizing the changes between first and second sketches.	Initial coding of all the visual feedback techniques and categorizing the changes between first and second sketches
3. Searching for themes	Codes were iteratively divided and sorted into initial themes that were defined and named, and organized into groups.	Dividing and sorting the visual feedback into initial themes that were defined and named after technique used.
4. Reviewing themes	Confirmation with co-authors and the teacher in the study of the themes in relation to the coded parts and all the feedback comments.	Confirmation of the themes in relation to the codes and the visual feedback
5. Defining and naming themes	Refining the themes, organizing the themes. The themes were then validated by my co-authors and the teacher. The validation was done by first becoming familiar with the data and the identified themes, then defining and naming themes.	Refining, organizing and then confirming and reorganizing the themes with one of my co-authors and the teacher. Confirmation/ reorganization was done by first becoming familiar with the data and the identified themes, then defining and renaming them.
6. Producing the report	Choosing quotes that exemplify themes and link to research questions and literature. Producing a report of the analysis.	Selecting sketches to illustrate each theme relating back to research questions and literature. Producing a report of the analysis.

5. Summary of papers

5.1 Paper 1

This study explored the development of the visual idea process and how sharing visual ideas could be supported by digital peer feedback. Fifty-two eighth-grade students from a Swedish municipality primary school in Stockholm participated in three lessons in the subject art. The empirical material comprised the students' sketches and their feedback comments. The feedback model we asked the students to use was based on the model Two Stars and a Wish model (Berger, 2012) which we changed into one star and one wish. We used a thematic analysis on the feedback comments and formed five themes: Composition, Articulateness, The objects in the picture, Light source, and The effect of color. Fifty-two sketches were compared and changes between the first and second sketches were assessed by the extent to which they had been revised. We identified four categories of sketches: 1) sketches which the students changed significantly, 2) sketches which the students revised to some extent, 3) sketches in which students replaced their first visual idea with a new one, and 4) sketches which students did not significantly. A survey was conducted of the students' perceptions of the feedback process and idea process. Many students appreciated receiving and giving feedback, saying that they felt inspired and that the feedback helped them improve their visual ideas. Some students found the feedback to be hard work and were less optimistic about it.

5.2 Paper 2

This study is a continuation of the study described in Paper I and focused on students' development in peer feedback on visual ideas, digital sharing

of their ideas, and digital sharing of the feedback. This time the aim was to stay within the same media as when drawing the sketches, more precisely, to explore how the visual practice in providing and receiving visual peer feedback affected both the feedback process and the students' idea processes. The participating students were sixth-graders from a school in a suburb of Stockholm with the same teacher that collaborated with Paper I, and the subject was Visual art. The empirical material included the students' idea sketches and visual feedback. Four themes were formed in the thematic analysis, describing the techniques used by the students in their provided feedback: Editing existing elements into a new composition, Redrawing the composition with suggestions of changes, Enhancing the original composition, and Adding new graphical and textual elements. The sketches were assessed by the changes made between the first and second sketches: 1) changes connected to the feedback, 2) changes not connected to feedback, 3) no changes and 4) no second sketch. A survey was conducted of how the students perceived receiving and providing visual peer feedback and of the changes they made between the sketches. Many students liked getting new ideas, and felt inspired because they knew what to improve. A lot of the students who did not like the process also did not get feedback (primarily because students were sick or absent for other reasons – the study took place during the pandemic, so there was some absenteeism). Most students made changes based on the feedback they received, while almost as many made changes that however did not appear to be explicitly based on the feedback they received.

5.3 Paper III

This publication is a chapter in an anthology in visual arts for student-teachers (that is, at the university level). The chapter is a summary of the two iterations with a particular focus on how digital technologies can be used in the development of students' ideas in the visual arts. The chapter is based on three parts: Visual Idea Development, Peer Feedback, and Digital Technologies. It describes a model that can help students learn from and be inspired by each other. Based on the composition assignment

"Self-Portrait via Things," it describes what a digital feedback process can look like, both through written feedback and through visual feedback from peers. The chapter also provides guidance on how to practice peer feedback with a group of students.
This guide aims to help student-teachers set up a feedback environment in which students feel safe when sharing their work and feedback, which may lead to more successful outcomes. The chapter demonstrates how students can develop their own and others' idea processes through structured peer feedback.

6. Results and discussion

The subsections of this chapter discusses the four research questions proposed in Chapter 1:

1. What types of feedback were provided by the students?
2. (iteration I) How did the students use peer feedback in their final visual ideas?
3. (iteration II) To what extent did the students use the visual peer feedback in their final sketch?
4. How did the students perceive the visual idea and peer feedback process?
5. What were the differences between written and visual feedback?

6.1 The types of peer feedback

Papers I and II explored the types of feedback students provided to each other. The student feedback material was analyzed using thematic analysis to answer the first research question: What types of feedback were provided by the students? As in previous studies (Falchikov, 2001; Van Der Berg et al., 2006), students identified strengths and suggested (text-based or visual) ways to improve their peers' sketches. Regardless of the medium in which feedback was given, students took their role as peers seriously and participated in each other's development of the sketch, which is consistent with the social constructivist perspective on learning (Vygotsky & Cole, 1978). When providing feedback, students looked at their peers' sketches and became aware of different representations and thereby accessed a variety of ways to accomplish the task (Bartholomew et al., 2019; Lee et al., 2021; Liu & Carless, 2006), which was observed in both iterations.

In the first iteration, the feedback was text-based and used a modified version of Two Stars and a Wish (Berger 2012). In the second iteration, the feedback was visual. Students used a variety of techniques to communicate their ideas and thoughts on copies of their peers' sketches or on new sheets of paper.

It was possible to group the different types of feedback into themes that reflected the nature of the feedback. The feedback from the first iteration was written and included suggestions as well as compliments. The five themes we identified were Composition, Articulateness, The objects in the picture, Light source, and The effect of color. Every theme consisted of both stars and wishes. The feedback comments differed – some were more detailed with direct suggestions for improvement, while others more simple comments that did not propose concrete changes.

Similar to what Liu and Carless (2006) have previously found, the feedback was often a communicative process in which students engaged in a textual dialogue about their knowledge of pictorial composition and explaining the objects' shapes and appearances. We believe this type of feedback strengthens students' critical thinking skills. Abrami et al. (2008) found that students developed multiple strategies, such as analyzing, evaluating, and explaining skills, when participating in self-regulated activities, such as studying their peers' sketches and providing feedback. Awareness of different modes of expression and access to a variety of ways to accomplish a task have also been found beneficial for students' increased learning (Bartholomew et al., 2019; Lee et al., 2021; Liu & Carless, 2006).

Wish comments can be illustrated by the following quotes from students.

> The objects in the picture are a little bit too close to each other. Maybe move something to the left where it feels very empty. I like the way the tennis thing is lying on its side. (Student 17).
>
> I'd like to see you move the bag of sour cream and onions to the front and the rabbit to the back. That would give you more depth in

> the picture and maybe even angle the iPad a little more to the side as if it's coming into the picture. (Student 1).

Star comments tended to praise the choice of objects or their placement in the picture. In order to convey what they wanted to communicate and to ensure that there was no misinterpretation, star comments often included complimentary phrases such as "nice" and "well done" which is consistent with previous research (Cherry, 1956) and can be illustrated by the following quotes.

> I think you have chosen good objects for the picture because there are different shapes and sizes of objects. Some are circles and some are rectangles and so on. This makes the picture more interesting and a bit deeper. (Student 10)

> Good choice with the different things. The midground and background are clearly visible. (Student 16).

In the second iteration, the feedback comments were provided visually and were grouped into four themes: Editing existing elements into a new composition, Redrawing the composition with suggestions for change, Improving the original composition, and Adding new textual and graphic elements. Students had the opportunity to discover different visual solutions in their peers' sketches in a reflective and critical way, as found in previous research (Stavridi, 2015), and to visually experiment with their peers' compositions through feedback. Student feedback was communicated through detailed visual messages with information on what to change in the sketches, including advice and tips on compositional changes, an observation in line with previous research in communication theories (Dainton & Zelley, 2022).

The written feedback provided in the first iteration (hereafter called Iteration I) evolved into the use of visual feedback in the second (hereafter called Iteration II), leaving no room for praise comments, as has been shown to be less useful (Hattie & Timperley, 2007; Misiejuk et al., 2021; Noroozi et al., 2016). In Iteration II, instead of writing

comments in words, the students shared their knowledge and experience in pictorial composition and practiced their visual communication skills in feedback techniques in a dialogue where visual comments built on each other and created new meaning (Dysthe, 1996). In the visual dialogues of the students, in feedback regarding redrawn shapes and objects, a direct exchange took place in the interaction if the shapes and lines were reused in new compositions. When the feedback took the form of editing existing elements into a new composition, the social form of constructivism (Vygotsky, 1978) became evident, with meaning and understanding emerging in the encounters and interactions among students. What was significant about these visual dialogues was that the objects of the sketch were reused, cut out of the copy, and placed in new compositions. As found by Stavridi (2015), the different types of feedback from students demonstrated visual problem solving in a reflective and critical manner. In my opinion the process is similar to partners in a dance: traditionally one person leads and a partner follows, but here, the partner is more active, suggesting something new but still dancing the same dance. The different types of feedback the students gave to each other show that their feedback literacy was developed, which is in line with previous research (Ketonen et al., 2020).

6.2 How students used peer feedback

The second research question focused on (in iteration I) how students used written/visual peer feedback in their final visual ideas, (in iteration II) to what extent did the students use the visual peer feedback in their final sketch? In both iterations, changes between the sketches were evaluated to see how much they differed and identify similarities and differences between the iterations. In the first iteration we found four amounts of change between the first and second sketches, representing four different categories: significant changes, some changes, new drafts, and no significant changes. In the second iteration the differences between the first and second sketches also resulted in four categories: changes related to the feedback, changes with no relation to feedback, no final sketch and no significant changes. The categories followed the

feedback method, textual or visual, which is why they are not the same in both iterations.

One interesting common feature of each iteration was that certain students did not change their second sketch. Why this happened could be due to different reasons, such as that the feedback was not helpful enough, the student did not know how to use peer feedback to improve, or the student was determined to carry on with their first idea. It may also depend on trust and ability to provide useful feedback to increase their confidence in the helpfulness of peers (Bacon, 2016). As Anker-Hansen & Andrée (2019) suggest, there could also be different views about what constitutes quality work. Some students in this study might have been high achieving and therefore feedback might have had a smaller effect on their changes (Hamer et al., 2014; Li & Ga, 2016). Or it might have been that these students were more self-regulated and more confident in their own abilities and capacities to learn and needed less help from others (Perry et al., 2008).

There were several differences between the set-up of the two iterations. In Iteration I, the changes between the two sketches were evaluated. Here, the focus was on the text of the comments themselves, with the wish comments driving more change than the star comments. In Iteration II, it was easier to see the changes with and without feedback in the sketches, and there was a clear and direct relationship between the feedback and the categories changes connected to feedback. It seems that visually provided feedback made it easier for students to reuse lines or cut out objects, both when giving and receiving feedback – in other words both parties got direct practical feedback to use and apply to the second sketch. From a research perspective, these sorts of changes could be tracked more easily.

Iteration I had smaller and finer differences between the categories such as significant changes and some changes. The category new drafts may indicate that students in this category received input from outside, or through the digital sharing. Analogously, in Iteration II, sketches in the category Changes with no relation to feedback may have been inspired

by the digital sharing itself, but with alternative ways of developing ideas that they would not have gotten working alone (see e.g., Hattie & Timperley, 2007; Latifi et al., 2016; Noroozi et al., 2016).

Regardless of the modality of feedback, there were changes in most students' second sketches, such as compositional changes or objects being removed or added. The changes in both iterations may be related to the teacher's training and instruction, or to the students' self-regulation of their learning (Zimmerman, 1986; Fox & Riconscente, 2008). Students activated and reinforced the sketching process through the feedback they both gave and received, which is in line with previous findings that it is beneficial to use collaboration to help students become more independent learners (Higgins et al., 2016).

The students compared and evaluated their own sketches and, by making judgments and suggestions about their peers' sketches, they practiced self-assessment by reflecting on the feedback and work of others (Boud, 1995), and they were able to develop a feeling for where they were in relation to other sketches and task goals (Nicol & MacFarlane-Dick, 2005). Refining the second sketch may have been easier when the feedback was provided visually in Iteration II, as the communication has direct visual suggestions for improvement that could easily be judged as helpful or not. The peer feedback may have challenged the students' inner reflection and development, and likely supported their development in line with the concept of the zone of proximal development (Vygotsky, 1978).

6.3 The students' perceptions of feedback

To answer the question about the students' perceptions of working with the visual idea and feedback process, the answers from the surveys were divided by the questions asked and then grouped according to the type of answers. The questions themselves were necessarily slightly different because the feedback modality was different (see Table 3 in the next section for the questions), but otherwise, I attempted to keep the two as

similar as possible. Iteration I's survey had four questions and Iteration II's had three. The questions in common were about whether students made changes in their second sketch, how students experienced giving feedback, and how they experienced getting feedback; the question unique to Iteration I was about how students experienced looking at other students' sketches.

Overall, the students were positive and enjoyed receiving feedback from others. They felt that the feedback they received helped them to get ideas about what they could change, which is consistent with previous research on how feedback can provide access to greater insight and alternative solutions for reaching goals (Liu & Carless, 2006). The feedback made them think from a different perspective, as has been previously found in a study on peer assessment of student-teachers (Ersöz & Şad, 2018). Most students found it beneficial to receive peer feedback, which may have helped them to identify standards and make judgments about their work (Boud, 1995).

Some students felt the feedback they received was unclear, and some found the feedback unhelpful, which may depend on some students being more self-regulatory and therefore more confident in their own abilities (Perry et al., 2008). It is possible that there was a lack of clear visual communication – the recipient needed to understand the message, otherwise information was lost (Dainton & Zelley, 2022). It is also possible that the feedback came too late in the course of the project for some students to feel comfortable making large changes.

A feedback activity is a dialogue between students (Dysthe, 1996, 2003). In giving feedback, many students appreciated the chance to study each other's work, perhaps both out of curiosity to see what others had achieved and to share visual experiences in the digital encounter, where meaning and understanding are created; the social aspect is suggested by previous research on the social aspects of learning (Vygotsky, 1978). Many students found giving feedback to be inspiring and enjoyed developing others' sketches, making suggestions for improvement and showing the way forward in the idea process. That some students felt this

way is consistent with previous research on how questions and comments trigger self-assessment (Boud, Cohen & Sampson, 1999).

Answers to the fourth, unique question in Iteration I showed that most students appreciated the opportunity that digital sharing gave them to study other students' sketches, which may also have increased their awareness of what was needed to accomplish the task and the variety of possible solutions (Latifi & Noroozi, 2021; Liu & Carless, 2006). If true, sharing sketches helps fulfill the Swedish National Agency for Education's guidelines (2015) about the desirable starting point of developing ideas in the visual arts.

However, some students thought that looking at other people's sketches made their own sketches seem worse in comparison. Even though the discipline now focuses on critical thinking skills (Stavridi, 2015; Yefimenko et al., 2021), some students tend to develop a way of looking at their own work a bit too critically. The way forward, according to previous research in general communication theory (Dainton & Zelley, 2022), is to sharpen visual communication skills so that others can understand them and so that the students themselves can value them. However, the time for practicing drawing skills in the subject is tight (Åsen, 2006), and to visually express lines, compositions, and shapes to communicate the visual idea process is hard work. In my experience, training in expressing one's opinion, arguing in favor of one's conclusions, and daring to present what one has done is essential for an individual's development and the group's shared bank of knowledge.

6.4 Written and visual peer feedback

The differences and similarities are shown in the table below and discussed further in the text. The two iterations were compared in terms of how they were conducted and the feedback methods and techniques used to answer the final question of how did the type of feedback differ between written textual and visual feedback? The differences and similarities are shown in the next table and discussed further in the text.

Table 3. Comparing two iterations in the study.

	Iteration I	**Iteration II**
Research questions	1. What types of feedback were provided by the students?	
	2. How did the students use peer feedback in their final visual ideas?	To what extent did the students use the visual peer feedback in their final sketch?
	3. How did the students perceive the visual idea and peer feedback process?	
Peer feedback	Written peer feedback	Visual peer feedback
Method	One star and a wish, a version of Two Stars and a Wish (Berger, 2012)	Visual peer feedback
Participants	A teacher, K-12 setting, students in grade 8	The same teacher, K-12 setting, students in grade 6
Analysis	Thematic analysis	
Material	Sketches, written peer feedback	Sketches, visual peer feedback
Themes	1. *Composition* 2. *Articulateness* 3. *The objects in the picture* 4. *Light source* 5. *The effect of color*	1. *Editing existing elements into a new composition* 2. *Redrawing the composition* 3. *Enhancing the original composition* 4. *Adding new textual and graphical elements*
Changes between first and second sketch	1. *Significant changes* 2. *Some changes* 3. *New drafts* 4. *No changes*	1. *Changes connected to feedback* 2. *Changes not connected to feedback* 3. *No changes* 4. *No second sketch*

Survey questions	• *What kind of changes were made in your second draft after receiving feedback on the first draft?* • *How did you experience getting feedback from others on your work?* • *How did you experience giving feedback to others?* • *How did you experience looking at the visual ideas of other students?*	• *How did you feel about others drawing/cutting your picture (getting feedback from others)?* • *How did you feel about drawing/cutting someone else's picture (giving feedback to others)?* • *What changes did you make in your second sketch based on the feedback you received on your first sketch?*
Conclusions	Although suggestions in wish comments resulted in more changes than star comments, the survey showed that students appreciated positive comments. The survey showed that the students appreciated giving and receiving digital peer feedback.	Visual suggestions such as the reuse of shapes, cut out and put together in new compositions or suggestions sketched resulted in most changes. The survey showed that the students appreciated giving and receiving visual peer feedback.

Written peer feedback was easier to conduct because the digital technology made it possible to write directly under the sketch in Padlet. When using the words, the students' thoughts and reflections had to be translated into writing, which suits some people more than others. The written feedback had a character of exchange and reflection on the image making and the object chosen. The students expressed their creativity, offered, and sometimes even conveyed ways to construct new ideas. The feedback method used, a modified version of Two Stars and a Wish (Berger, 2012), may have influenced the nature of the comments and resulted in much praise, which previous research has suggested is not necessarily useful (Hattie & Timperley, 2007; Misiejuk et al., 2021; Noroozi et al., 2016). The students verbalized their thoughts and provided written advice with forward-looking information (as per Kluger & DeNisi, 1996) about how they thought the sketch should be changed, with the result of improving the knowledge and skill of their peers (e.g., Shute, 2008; Tunstall & Gipps, 1996).

Visual peer feedback required more coordination on the part of the teacher than written feedback – for instance, the sketches had to be copied so that students could make feedback. Keeping the visual feedback in the same media, within the student's visual language, made it easier for the students to accept the suggested changes. It was also helpful for the feedback provider to reuse the objects or shapes of objects in the original sketch in new ways, using various techniques such as cutting, drawing, and coloring. Perhaps not surprisingly, the visual feedback process resulted in fewer verbal comments than the written feedback process. In contrast to Iteration I's written feedback, the visual feedback became an even greater exercise in working with composition because students were practicing their subject-specific language through observation of others' work (Häikiö Karlsson, 2021). According to Duncum (2001), visual language must be understood as one sign system among others, fulfilling the same functions as other systems but requiring a different kind of practical engagement. Consistent with previous research on the effects of peer feedback on student reflection and critique (Misiejuk & Wasson, 2021; Topping, 2009), with visual feedback, students sharpened both their critical eye and visual skills through analysis of the images. With visual feedback, most students made a lot of changes; the feedback they got was rich in visual suggestions with a direct connection to the subject matter and needed no translation.

In contrast to written feedback, with visual feedback, self-assessment can take place directly in the context of critiquing and comparing a student's own sketches with those of others, giving that student access to multiple and concrete practical and aesthetic ways of completing the task (Bartholomew et al., 2019; Lee et al., 2021; Liu & Carless, 2006). Another advantage that visual feedback has over written feedback is that when students use signs instead of words for explanation and communication, they probably develop a deeper understanding and greater awareness of visual communication.

7. Limitations, further research, and concluding discussion

One limitation of this research is that it is it difficult to explain what actually caused students to make changes, and the cause cannot even be inferred when changes had nothing to do with the feedback they received. Knowing how much students learn from others by giving feedback would be interesting. Perhaps this area could have been addressed by interviewing the students to gain a deeper understanding of how the students not only experienced, but also experimented with and thought about the feedback and idea process. The questionnaire they answered provided a broad basis for certain but limited areas of their perceptions and how the feedback affected their changes. Further research could explore the benefits of providing visual feedback directly on digital sketches, for example using editing software and digital pens.

This licentiate thesis focused on peer feedback, visual ideas, and digital technologies, with the purpose of exploring how students can develop their visual idea processes through the support of digital peer feedback. In two iterations, two different methods of peer feedback were used and tested, written feedback in the first iteration and visual feedback in the second. The digital technologies were used to facilitate and enable sharing among students, both in terms of feedback work and visualization of sketches. The visual idea process served as a learning object and was influenced by both feedback methods and the sharing aspect of digital technologies. To get an idea of the students' voices and their perceptions of the feedback activity, a survey was conducted in each iteration after the project task.

The thesis shows the types of peer feedback that the students provided through a designed peer feedback activity. By assessing the differences

between the first and second sketches, it seems clear that many students made changes to their sketches based on peer feedback. Students gave and received feedback and reflected on their own and others' sketches and feedback. Students contributed with suggestions of various techniques to develop their own and their peers' visual idea processes. By supporting each other in the feedback activity and sharing, students became more aware of their own learning processes and improved their sketches through self-regulation.

As reviewed in Chapter 3, "Theoretical background", the ideas of self-regulation (Butler & Winne, 1995; Järvelä et al., 2011) and social constructivism (Vygotsky, 1978) were used to support and deepen peer feedback. In this thesis, the two ideas fit well together, considering that in peer feedback, students learn from each other, they supported each other's sketches with tips and advice to improve them. In practice, most of the sketches developed, some with clear links to the feedback given (although for others the link was not as clear). When students gave feedback on a sketch, they also (consciously or not) compared it to their own sketch, and perhaps for some students, the development took place without a link to the feedback they received, but to the feedback they gave. There is a process within the student of accepting or not accepting feedback when they receive it. In this process students become more aware of their learning and make decisions, they become more self-regulated (Higgins et al., 2016; Zimmerman, 1986).

Feedback in the two iterations each contained rich information with suggestions of how to proceed in the idea process. When the feedback was textual, direct suggestions resulted in more changes between the first and second sketches, confirming findings in related research on peer feedback. Furthermore, comparing the two types of feedback showed that visual feedback provided more detailed information than written feedback, with direct forms or signs that the recipient could directly use in their sketch. Various techniques for providing visual feedback led students to modify their sketches in an effort to both improve and develop their visual idea process and to meet the requirements of the assignment.

References

Abrami, P. C., Bernard, R. M., Borokhovski, E., Wade, A., Surkes, M. A., Tamim, R., & Zhang, D. (2008). Instructional interventions affecting critical thinking skills and dispositions: A stage 1 meta-analysis. Review of educational research, 78(4), 1102-1134. https://doi.org/10.3102/0034654308326084

Anker-Hansen, J., & Andrée, M. (2019). Using and rejecting peer feedback in the science classroom: A study of students' negotiations on how to use peer feedback when designing experiments. Research in Science & Technological Education, 37(3), 346-365. https://doi.org/10.1080/02635143.2018.1557628

Bacon, Katie. (2002) (2016). Exploring How Peer Feedback Affects Achievement and Mindset in the Middle School Art Room. School of Education and Leadership Student Capstone Theses and Dissertations. 4156. https://digitalcommons.hamline.edu/hse_all/4156

Barab, S. A., Thomas, M. K., Dodge, T., Squire, K., & Newell, M. (2004). Critical design ethnography: Designing for change. Anthropology & Education Quarterly, 35(2), 254-268. https://doi.org/10.1525/aeq.2004.35.2.254

Bartholomew, S. R., Strimel, G. J., & Yoshikawa, E. (2019). Using adaptive comparative judgment for student formative feedback and learning during a middle school design project. International Journal of Technology and Design Education, 29, 363-385. https://doi.org/10.1007/s10798-018-9442-7

Beattie, D. K. (1994). The mini-portfolio: Locus of a successful performance examination. Art Education, 47(2), 14–18. https://doi.org/10.1080/00043125.1994.11652259

Berger, R. (2012). Critique and feedback–the story of Austin's butterfly'[video](8 December). https://www.edutopia.org/blog/deeper-learning-student-work-ron-berger

Boud, D., Cohen, R., & Sampson, J. (1999). Peer learning and assessment. Assessment & evaluation in higher education, 24(4), 413-426. https://doi.org/10.1080/0260293990240405

Boud, D. (1995). Assessment and learning: contradictory or complementary. Assessment for learning in higher education, 35-48. In Knight, P. (Ed.). (2012). Assessment for learning in higher education. Routledge.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative research in psychology, 3(2), 77-101. https://doi.org/10.1191/1478088706qp0630a

Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. Qualitative research in sport, exercise and health, 11(4), 589-597. https://doi.org/10.1080/2159676X.2019.1628806

Brown, A. L. (1992). Design experiments: Theoretical and methodological challenges in creating complex interventions in classroom settings. The journal of the learning sciences, 2(2), 141-178. https://doi.org/10.1207/s15327809jls0202_2

Burman, A., & Lundberg Bouquelon, P. (2022). I rörelse: Estetiska erfarenheter i pedagogiska sammanhang. Södertörns högskola.
Butler, D. L., & Winne, P. H. (1995). Feedback and self-regulated learning: A theoretical synthesis. Review of educational research, 65(3), 245-281. https://doi.org/10.3102/00346543065003245

Cherry, C. (1966). On human communication. https://sites.ualberta.ca/~michaelf/M665/sources/Colin%20Cherry%20-%20On%20Human%20Communication%20(toc%20and%20ch%201).pdf

Cornelius, L. L., & Herrenkohl, L. R. (2004). Power in the classroom: How the classroom environment shapes students' relationships with each other and with concepts. Cognition and instruction, 22(4), 467-498. https://doi.org/10.1207/s1532690Xci2204_4

Dainton, M., & Zelley, E. D. (2014). Applying communication theory for professional life: A practical introduction. Thousand Oaks, CA: Sage.

DiPardo, A., & Freedman, S. W. (1988). Peer response groups in the writing classroom: Theoretic foundations and new directions. Review of educational research, 58(2), 119-149. https://doi.org/10.3102/00346543058002119

Duncum, P. (2001). Visual culture: Developments, definitions, and directions for art education. Studies in art education, 42(2), 101-112. https://doi.org/10.1080/00393541.2001.11651691

Duncum, P. (2004). Visual culture isn't just visual: Multiliteracy, multimodality and meaning. Studies in art education, 45(3), 252-264. https://doi.org/10.1080/00393541.2004.11651771

Dweck, C. S. (2006). Mindset: The new psychology of success. Random house.

Dysthe, O. (1996). The multivoiced classroom: Interactions of writing and classroom discourse. Written communication, 13(3), 385-425. https://doi.org/10.1177/0741088396013003004

Eisner, E. W. (2008). The arts and the creation of mind. In The Arts and the Creation of Mind. Yale University Press. https://doi.org/10.12987/9780300133578

Ersöz, Y., & Şad, S. N. (2018). Facebook as a peer-assessment platform: A case study in art teacher education context. International Journal of Assessment Tools in Education, 5(4), 740-753. https://doi.org/10.21449/ijate.478277

Evans, C. (2013). Making sense of assessment feedback in higher education. Review of educational research, 83(1), 70-120. https://doi.org/10.3102/0034654312474350

Falchikov, N. (2001). Learning together: peer tutoring in education. New York, NY: Taylor & Francis. https://doi.org/10.4324/9780203451496
Forsler, I. (2020). Enabling media: Infrastructures, imaginaries and cultural techniques in Swedish and Estonian visual arts education (Doctoral dissertation, Södertörns högskola). https://www.diva-portal.org/smash/get/diva2:1428060/FULLTEXT02.pdf

Fox, E., & Riconscente, M. (2008). Metacognition and self-regulation in James, Piaget, and Vygotsky. Educational Psychology Review, 20, 373-389. https://doi.org/10.1007/s10648-008-9079-2

Getzels, J. W., & Csikszentmihalyi, M. (1976). The creative vision: A longitudinal study of problem finding in art. New York, NY: John Wiley & Sons.

Godhe, A. L. (2019). Digital literacies or digital competence: Conceptualizations in Nordic curricula. Media and Communication, 7(2), 25-35. https://doi.org/10.17645/mac.v7i2.1888

Golbeck, S. L., & DeLisi, R. (1999). Implications of Piagetian theory for peer learning. Cognitive perspectives on peer learning, 3-37.

Gundem, B. B. (2008). Didaktikk–fagdidaktikk, anstrengte eller fruktbare forhold?. Acta Didactica Norge, 2(1), Art-1. https://doi.org/10.5617/adno.1020

Hamer, J., Purchase, H., Luxton-Reilly, A., & Denny, P. (2015). A comparison of peer and tutor feedback. Assessment & Evaluation in Higher Education, 40(1), 151-164. https://doi.org/10.1080/02602938.2014.893418

Han, J., Forbes, H., & Schaefer, D. (2021). An exploration of how creativity, functionality, and aesthetics are related in design. Research in Engineering Design, 32(3), 289-307. https://doi.org/10.1007/s00163-021-00366-9

Hattie, J., & Timperley, H. (2007). The power of feedback. Review of educational research, 77(1), 81-112. https://doi.org/10.3102/003465430298487

Higgins, S., Katsipataki, M., Villanueva-Aguilera, A. B., Coleman, R., Henderson, P., Major, L. E., ... & Mason, D. (2016). The Sutton Trust-Education Endowment Foundation Teaching and Learning Toolkit. https://educationendowmentfoundation.org.uk/resources/teaching-learning-toolkit

Howard, T. J., Culley, S. J., & Dekoninck, E. (2008). Describing the creative design process by the integration of engineering design and cognitive psychology literature. Design studies, 29(2), 160-180. https://doi.org/10.1016/j.destud.2008.01.001

Hsia, L. H., Huang, I., & Hwang, G. J. (2016). Effects of different online peer-feedback approaches on students' performance skills, motivation and self-efficacy in a dance course. Computers & Education, 96, 55–71. https://doi.org/10.1016/j.compedu.2016.02.004

Huisman, B., Saab, N., Van Driel, J., & Van Den Broek, P. (2018). Peer feedback on academic writing: undergraduate students' peer feedback role, peer feedback perceptions and essay performance. Assessment & Evaluation in Higher Education, 43(6), 955-968. https://doi.org/10.1080/02602938.2018.1424318

Häikiö, T. K. (2021). Potentials and problem areas in assessment in visual arts education in Sweden. Educare, (2), 68-112. https://doi.org/10.24834/educare.2021.2.4

Jonsson, A. (2013). Facilitating productive use of feedback in higher education. Active learning in higher education, 14(1), 63-76. https://doi.org/10.1177/1469787412467125

Järvelä, A. F. H. S. (2011). Self-Regulated, Co-Regulated, and Socially Shared Regulation of Learning: University of Victoria, Canada University of Oulu, Finland. In Handbook of Self-Regulation of Learning and Performance (pp. 79-98). Routledge.

Ketonen, L., Nieminen, P., & Hähkiöniemi, M. (2020). The development of secondary students' feedback literacy: Peer assessment as an intervention. The Journal of Educational Research, 113(6), 407-417. https://doi.org/10.1080/00220671.2020.1835794

Kluger, A. N., & DeNisi, A. (1996). The effects of feedback interventions on performance: a historical review, a meta-analysis, and a preliminary feedback intervention theory. Psychological bulletin, 119(2), 254. https://www.teachsoutheast.co.uk/assets/documents/nqt/nqt2/The-effects-of-feedback-interventions-1.pdf

Latifi, S., & Noroozi, O. (2021). Supporting argumentative essay writing through an online supported peer-review script. Innovations in Education and Teaching International, 58(5), 501–511. https://doi.org/10.1080/14703297.2021.1961097

Latifi, S., Noroozi, O., & Talaee, E. (2020). Worked example or scripting? Fostering students' online argumentative peer feedback, essay writing and learning. Interactive Learning Environments, 28(3), 1–15. https://doi.org/10.1080/10494820.2020.1799032

Latifi, S., Noroozi, O., & Talaee, E. (2021). Peer feedback or peer feedforward? Enhancing students' argumentative peer learning processes

and outcomes. British Journal of Educational Technology, 52(2), 768-784. https://doi.org/10.1111/bjet.13054

Leahy, S., & Wiliam, D. (2015). Embedding formative assessment: Practical techniques for K-12 classrooms. Hawker Brownlow Education

Lee, Y. F., Lin, C. J., Hwang, G. J., Fu, Q. K., & Tseng, W. H. (2021). Effects of a mobile-based progressive peer-feedback scaffolding strategy on students' creative thinking performance, metacognitive awareness, and learning attitude. Interactive Learning Environments, 1-17. https://doi.org/10.1080/10494820.2021.1916763

Li, L., & Gao, F. (2016). The effect of peer assessment on project performance of students at different learning levels. Assessment & Evaluation in Higher Education, 41(6), 885-900. https://doi.org/10.1080/02602938.2015.1048185

Liu, N. F., & Carless, D. (2006). Peer feedback: the learning element of peer assessment. Teaching in Higher education, 11(3), 279-290. https://doi.org/10.1080/13562510600680582

Lindström, L. (2007, July). Understanding the creative mind: portfolio assessment in the visual arts. In The 13th International Conference on Thinking Norrköping; Sweden June 17-21; 2007 (No. 021, pp. 89-94). Linköping University Electronic Press. https://ep.liu.se/ecp/021/vol1/ecp07021.pdf#page=89

Lin, K. C., Yang, S. H., Hung, J. C., & Wang, D. M. (2006). Web-based appreciation and peer-assessment for visual-art education. International Journal of Distance Education Technologies (IJDET), 4(4), 5–14. https://doi.org/10.4018/jdet.2006100102

Lubart, T. I. (1994). Product-centered self-evaluation and the creative process (Doctoral dissertation, Yale University). https://www.proquest.com/openview/f7b5b8f6e64e6c193e680f148a5e2dae/1?pq-origsite=gscholar&cbl=18750&diss=y

Marner, A., & Örtegren, H. (2013). Four approaches to implementing digital media in art education. Education Inquiry, 4(4), 23217. https://doi.org/10.3402/edui.v4i4.23217

Misiejuk, K., & Wasson, B. (2021). Backward evaluation in peer assessment: A scoping review. Computers & Education, 175, 104319. https://doi.org/10.1016/j.compedu.2021.104319

Misiejuk, K., Wasson, B., & Egelandsdal, K. (2021). Using learning analytics to understand student perceptions of peer feedback. Computers in human behavior, 117, 106658. https://doi.org/10.1016/j.chb.2020.106658

Mirzoeff, N. (1999). An introduction to visual culture. Psychology press.

Nicol, D. J., & Macfarlane-Dick, D. (2006). Formative assessment and self-regulated learning: A model and seven principles of good feedback practice. Studies in higher education, 31(2), 199-218. https://doi.org/10.1080/03075070600572090

Noroozi, O., Biemans, H., & Mulder, M. (2016). Relations between scripted online peer feedback processes and quality of written argumentative essay. The Internet and Higher Education, 31, 20-31. https://doi.org/10.1016/j.iheduc.2016.05.002

Noroozi, O., & Hatami, J. (2018). The effects of online peer feedback and epistemic beliefs on students' argumentation-based learning. Innovations in Education and Teaching International. https://doi.org/10.1080/14703297.2018.1431143

Noroozi, O., Hatami, J., Bayat, A., van Ginkel, S., Biemans, H. J., & Mulder, M. (2018). Students' online argumentative peer feedback, essay writing, and content learning: Does gender matter? Interactive Learning Environments, 28(6), 698-712. https://doi.org/10.1080/10494820.2018.1543200

Perry, N. E., Hutchinson, L., & Thauberger, C. (2008). Talking about teaching self-regulated learning: Scaffolding student teachers' development and use of practices that promote self-regulated learning. International Journal of Educational Research, 47(2), 97-108. https://doi.org/10.1016/j.ijer.2007.11.010

Perry, V., Albeg, L., & Tung, C. (2012). Meta-analysis of single-case design research on self-regulatory interventions for academic performance. Journal of behavioral education, 21, 217-229. https://doi.org/10.1007/s10864-012-9156-y

Kalina, C., & Powell, K. C. (2009). Cognitive and social constructivism: Developing tools for an effective classroom. Education, 130(2), 241-250. https://docdrop.org/static/drop-pdf/Powell-and-Kalina-U6g4p.pdf

Runco, M. A., & Smith, W. R. (1992). Interpersonal and intrapersonal evaluations of creative ideas. Personality and Individual Differences, 13(3), 295-302. https://doi.org/10.1016/0191-8869(92)90105-X

Scott, G., Leritz, L. E., & Mumford, M. D. (2004). Types of creativity training: Approaches and their effectiveness. The Journal of Creative Behavior, 38(3), 149-179. https://doi.org/10.1002/j.2162-6057.2004.tb01238.x

Shepard, L. A. (2000). The role of assessment in a learning culture. Educational researcher, 29(7), 4-14. https://doi.org/10.3102/0013189X029007004

Shute, V. J. (2008). Focus on formative feedback. Review of educational research, 78(1), 153-189. https://doi.org/10.3102/0034654307313795

The Swedish National Agency for Education. (2022). Få syn på digitaliseringen på grundskolenivå. Ett kommentarmaterial till läroplanerna för förskoleklass, fritidshem och grundskoleutbildning. Skolverket https://www.skolverket.se/download/18.6bfaca41169863e6a65d438/1553968018488/pdf3971.pdf

The Swedish National Agency for Education. (2015). Bild i grundskolan. En nationell ämnesutvärdering i årskurs 6 och 9. Skolverket. https://www.skolverket.se/download/18.6bfaca41169863e6a65b974/1553966248586/pdf3497.pdf

The Swedish National Agency for Education, Lgr 22 (2022). Läroplanen för grundskolan, förskoleklassen och fritidshemmet (Lgr22) gäller från höstterminen 2022. Skolverket https://www.skolverket.se/publikationsserier/styrdokument/2022/laroplan-for-grundskolan-forskoleklassen-och-fritidshemmet---lgr22

Stavridi, S. (2015). The role of interactive visual art learning in development of young children's creativity. Creative Education, 6(21), 2274. https://doi.org/10.4236/ce.2015.621235

Liljestrand, J. (2000). Roger Säljö (2000): Lärande i praktiken. Ett sociokulturellt perspektiv. Utbildning & Demokrati–tidskrift för didaktik och utbildningspolitk, 9(1), 109-113.

Säljö, R. (2015). Lärande: En introduktion till perspektiv och metaforer (1. uppl.. ed.). Gleerups Utbildning AB, 2015, isbn: 978-91-40-68826-2
Topping, K. J. (2009). Peer assessment. Theory into practice, 48(1), 20-27. https://doi.org/10.1080/00405840802577569

Tunstall, P., & Gipps, C. (1996). 'How does your teacher help you to make your work better?'Children's understanding of formative assessment. The Curriculum Journal, 7(2), 185-203. https://doi.org/10.1080/0958517960070205

Van den Berg, I., Admiraal, W., & Pilot, A. (2006). Designing student peer assessment in higher education: Analysis of written and oral peer feedback. Teaching in higher education, 11(2), 135-147. https://doi.org/10.1080/13562510500527685

Wang, F., & Hannafin, M. J. (2005). Design-based research and technology-enhanced learning environments. Educational technology research and development, 53(4), 5-23. https://doi.org/10.1007/BF02504682

Watts, L. L., Mulhearn, T. J., Todd, E. M., & Mumford, M. D. (2017). Leader idea evaluation and follower creativity: Challenges, constraints, and capabilities. Handbook of research on leadership and creativity, 82-99. https://doi.org/10.4337/9781784715465.00012

Webb, N. M. (1989). Peer interaction and learning in small groups. International journal of Educational research, 13(1), 21-39. https://doi.org/10.1016/0883-0355(89)90014-1

Vetenskapsrådet, S. (2017). Good research practice. Stockholm: Swedish Research Council https://www.vr.se/english/analysis/reports/our-reports/2017-08-31-good-research-practice.html

Wilson, B. (2000, May). Of diagrams and rhizomes: Disrupting the content of art education. In 2000 International visual arts conference: Art education and visual culture (pp. 25-52). Taipei: Taipei Municipal Teachers College.

Vygotsky, L. S. (2012). Thought and language. MIT press.

Vygotsky, L. S., & Cole, M. (1978). Mind in society: Development of higher psychological processes. Harvard university press. https://books.google.se/books?hl=sv&lr=&id=RxjjUefze_oC&oi=fnd&pg=PA1&ots=0jz1Y-q68u&sig=yWofkV1H9QUUK3k07CF0JYmfpCE&redir_esc=y#v=onepage&q&f=false

Yefimenko, I. V., Yakymchuk, O. M., Kravtsova, N. Y., Sotska, H. I., & Korol, A. M. (2021). Art education development in the context of global changes. Linguistics and Culture Review, 5(S2), 501-513. https://doi.org/10.21744/lingcure.v5nS2.1386

Zimmerman, B. J. (1986). Becoming a self-regulated learner: Which are the key subprocesses?. Contemporary educational psychology, 11(4), 307-313. https://doi.org/10.1016/0361-476X(86)90027-5

Åsén, G. (2006). Varför bild i skolan?–en historisk tillbakablick på argument för ett marginaliserat skolämne. Uttryck, intryck, avtryck–lärande, estetiska uttrycksformer och forskning, 4, 2006.