

# REFLECTION IN DESIGN EDUCATION USING VISUAL TECHNOLOGY

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## ABSTRACT

Product design students are trained to express themselves through visual media like two-dimensional (2D) and 3D drawing, prototyping, and digital media. Thus, written language is not always their first choice of communication. The aim of this study was to explore how multimedia can add to or broaden the scope within reflective work, and to identify the changes that may occur when product design students reflect through a visual and technological media like film instead of writing. Further, the disclosed findings are discussed through theory on reflection in education. The study was conducted via two workshops with product design students, participatory observation, and questionnaires. Sharing reflection through film introduced a different process to the students. One element was that the participants reflected in groups; this changed the process from individual to collective. Participants shared their reflections with others through both making and showing the film. Most of the students preferred filmmaking to written reflection, but the research also indicated that alternating between the two would be ideal. It was found that filmmaking increased the time and effort spent on reflection. Moreover, working in groups gave the students an arena to thoroughly discuss their discoveries and learn from each other. Exploring the potential of including several media adds to our understanding of reflection. As such, this paper sheds light on an alternative approach to reflection, and contributes a method of carrying out reflective work within design education and other educations using visual media and creative tools.

*Keywords: Reflection, Collective reflection, Filmmaking, Digital storytelling, Digital media*

## 1 INTRODUCTION

Reflection is one of the characteristics that constitute us as humans. The word “reflection” has Latin origins and is a compound of “*re*,” which means “back” or “back words,” and “*flection*,” which means “to bend” or “to turn.” In an educational context, reflection can be considered a process in which thoughts are “turned back” so that they can be interpreted or analyzed. In more familiar language, we often call this *looking back* or *looking again*. Thus, the focus then on the visual sense of seeing (looking) is apparent, and this leads us to the visual and imaginative aspects of thought. When thinking back, we use our imagination. According to Kaihovirta-Rosvik [1], “*Imagination is the faculty of imagining and the process of forming mental images or concepts. Imagination helps provide meaning to experience and understanding to knowledge. It is an apparatus through which people make sense of the world*” [1]. The exploration in this article will convey the role of visual language in reflection.

It has been a century since John Dewey published his theories of how we think [2]. The book discusses many ways of thinking, including reflection. In 1938, Dewey [3] defined reflection as: “*An active, persistent and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and further conclusion to which it tends.*” According to Schön’s [4] description, reflection often takes form of a reflective conversation with a situation. Amongst others, a discovery of new levels in a situation emerges in this conversation. In addition, the conversation can reveal recognition of feelings a situation can evoke, consciousness of choices made and the grounds for them, and ideas and anticipations that help to address meaning [5]. In this conception, reflection is about learning from experiences, as Dewey [6] claimed. As Dewey [3] wrote: “*What (an individual) has learned in the way of knowledge and skill in one situation becomes an instrument of understanding and dealing effectively with the situation which follow. The process goes on as long as life and learning continue.*” It is important to emphasize that the mentioned writers all view reflection

as more than opinions on a theme or a situation. A reflective process should raise questions of a social, political, or cultural character and challenge assumptions and “certainties” that underlie practice [7, 8]. Boud et al. [9] defined reflection as a “*generic term for those intellectual and affective activities in which individuals engage to explore their expressions in order to lead to a new understanding and appreciation.*” Through this, they emphasize the importance of feelings in the field, a notion that was elaborated on previously by Lindeman [10], who viewed reflection as a tool to start a process using knowledge, feelings, and experiences to understand and solve a problem. The process of reflection was considered a lasting and ongoing process by Schön [4] which he described as “reflection-in-action.” In this way, he introduced the idea of reflection being not only a glance at the past on something that had been or was a retrospective process, but also an ongoing action to connect knowledge and practical experiences. John Sandars’ [11] definition of reflection corresponds with Schön’s view. He described it as a “*metacognitive process that occurs before, during and after situations with the purpose of developing greater understanding of both the self and the situation so that future encounters with the situation are informed from previous encounters*” [11].

Until recently, literature and research within the field of reflection almost solely considered reflection to be a written task. In an effort to make Dewey’s thinking more accessible, Carol Rodgers [12] distilled four criteria from his writing. Her third and fourth criterion is of relevance for this article. Her third criterion is as follows: “*Reflection needs to happen in community, in interaction with others.*” This is an interesting statement, as reflection is often performed individually. In Rodgers fourth criterion, she states that “*reflection requires attitudes that value the personal and intellectual growth of oneself and of others.*” This shows that Dewey considered reflection to be more than a personal matter; rather, it should be done in interaction with others and be beneficial to others. This was later supported by Kemmis [7], among others, who referred to reflection as a social process, and by Vince [5] and Raelin [13], who argued for a shift from individual to collective reflection. The idea of reflecting in groups and sharing reflection is interesting. Over the past few years, the field of reflection has developed, and research and practice related to the creative use of digital media and storytelling has started to evolve [11]. In particular, digital storytelling has been invoked in this sense [11, 14, 15]. The Oslo and Akershus University College of Applied Sciences has run a project called Digital Storytelling for Learning [16]. In this project, they have among other things worked with reflections from practice. They describe a digital story as “*a short personal ‘film’ produced by the narrator. The story is supported by photos, (videos) and soundtracks. The editing is done in accessible and easy to use software.*” The favoring of digital storytelling instead of film as a reflective tool is probably related to the openness and lack of professional pressure these new multimedia tools offer. The reflector needs less technical knowledge to create a digital story than is required for a film. Using multimedia containing elements like images, sound, voice, text, time, and animation in a film, opens new ways of expressing yourself. A multimedia approach can also inspire to make the presentation public, thereby sharing the reflection.

## **2 BACKGROUND**

The research in this paper is based on two different workshops for two different second-year undergraduate product design classes. There were approximately 40 students in each class. The first workshop was arranged in 2012 and the second in 2013. The intention of the first workshop was to investigate the differences between written reflection and reflection through film. The second workshop’s aim was to experience how students reacted to reflecting through film and to see if the findings corresponded with those of the first workshop. An additional aim for both workshops was to impart to students the importance of reflection and how it can change from individual to collective [5, 13]. To learn from experience [3, 6] is an important part of the learning process. In the learning outcomes defined by the European Higher Education Area, one of the skills a student should possess at the undergraduate level is the ability to reflect on his or her professional practice. This study explores the learning potential in reflecting through multimedia [11, 14-16]; this theoretical perspective could lead to learning outcomes of relevance for design education [17].

### **2.1 Research question**

Product design students are trained to express themselves through visual media like two-dimensional (2D) and 3D drawing, prototyping, and digital media. The written language is not always their first choice of communication. To explore the benefits of using this knowledge within reflective work, we

asked the following research question: How does the inclusion of multimedia affect the reflection process for product design students?

### **3 METHOD**

The research question was analyzed through student projects [18], participatory observation [18], and questionnaires. The student projects involved two different workshops, where two different product design classes participated. The first workshop involved a combination of lectures, experiencing differences between text and film (digital multimedia story), and discussion in class. Meanwhile, the second workshop's focus was on students reflecting in groups [5, 8, 13] and expressing their reflection through multimedia. Here, the findings are discussed through theory on reflection in education [3, 5, 8, 11].

#### **3.1 The first workshop**

In this workshop, we particularly explored the issue of how reflection depends on the medium used in the process. This suggests that a reflection process will evolve differently and perhaps have different content with the use of different media. We wanted to determine what changes might occur in the transformation from text to sound and images. Thus, we tried to identify and discover these differences by changing a student's written reflection note into a film with images and voiceover. In the workshop, students first read a copy of a selected reflection note previously written by a student from another class. They were then asked to comment on it and give their opinion in an open discussion. The comments were written on a whiteboard to support the discussion. Following this, the students were shown a 2 minutes long digital story representing the course leader's interpretation of the same reflection note. After the viewing, the discussion procedure was repeated, with comments again written on the whiteboard. This was followed by a dialog where the aim was to locate the differences between the text and the digital story.

#### **3.2 The second workshop**

The main aim of this workshop was to determine how the students experienced reflecting through multimedia. It was conducted as a two-day workshop, where the students reflected upon the newly finished project they had worked on for the last two months. The workshop started with a lecture/discussion on reflection with a focus on why we do reflective work and how to do it through different methods. The students were given the task of reflecting through multimedia by creating a film or digital story. The students were used to reflecting through writing but had no previous experience in reflecting through film. Two digital stories were shown as examples of reflecting through a medium other than text. The students were encouraged to work in groups, and chose to do so. Through the workshop, we hoped to create a better understanding of how a different reflection method influences the reflective process and to determine whether it was a better way for product design students to reflect. At the end of the second day, the students presented their results in class. The workshop was analyzed through participatory observation [18] and a short questionnaire. The questionnaire was a mixture of selecting answers and writing down opinions and thoughts. All participants completed the questionnaire.

### **4 FINDINGS**

#### **4.1 The first workshop**

As mentioned above, the students read through a reflection note and were asked to discuss it. Their first reaction was that they felt the reflection seemed dishonest, written with the aim of pleasing the teacher. However, not everyone in the class shared this impression. Approximately half of the students felt that the reported experience and insight was truthful and realistic. This led to a discussion of whether there should be grades given on reflection. The focus on truthfulness changed when the students discussed the digital story. They were clearly much more receptive to this experience, and did not consider it to be dishonest. They said that it was much simpler to understand, that it communicated directly and had a pulse. The digital story appealed to feelings through its use of sound and pictures. However, some students pointed out the use of special effects as something that could stray the audience's attention from the content and make it less critical or serious. Some students assessed the digital story in terms of how the effects of sound, pictures, and text communicated. These are all formal qualities that only reflect the content to a limited extent. They assessed it as a product, which

may indicate a problem related to using this type of reflection in design education. This was a short workshop, and the findings required further investigation. This led to a second workshop where the students could experience reflection through digital media.

#### **4.2 The second workshop**

The general response from the students to reflection through film was very positive, and they felt it was an open and playful media compared to writing. There were even many comments on the workshop being fun. Most of the students (2/3) preferred this kind of reflection. The reflections were in general a bit less personal, lacking the complexity that may be expressed through written text. To share reflection through film changed the focus and selecting only one or two things to focus on became an issue. Because they had to choose and deeply discuss a limited area, some comments emphasized that reflection through film was a bit restricted. Nevertheless, having to make choices provided focused discussions between the students involved. In addition, there were several comments on the benefits of reflecting in groups, where the participants felt that they learned through the experiences of others. The film language opened up the possibility of using more senses. Several students felt that this led to clarification of how the message could be interpreted. The findings also showed that nearly all the students were against grades on reflective work.

### **5 DISCUSSION**

A written reflection is usually not intended for sharing and going public. You normally write the note for yourself and maybe a supervisor. One major change from a written note to a multimedia reflection is that the results often become public, due to the multimedia's suitability for sharing. When group work is also involved, this turns into a social process and shifts from individual to collective reflection. Rodgers [12] emphasized in her interpretations of Dewey that reflection should be carried out in interaction with others and should be beneficial to them. As she wrote, "*[i]n isolation what matters can be too easily dismissed as unimportant.*" This is a significant aspect when it comes to reflective films, which support sharing insight and understandings with others. When a film is created in small groups, the reflective dialog within the group offers possibilities to see things through different eyes and detect different meanings, which again might broaden students' understanding [12]. One student expressed that "*[i]t [reflective film] brings forth values which cannot be expressed verbally.*" This might be due to the nature of visual and multimedia language, which offers a range of communicative and expressive facets that appeal to the use of several senses and the imagination. Imagination helps to provide meaning to experience and understanding to knowledge; it is an apparatus through which people make sense of the world [1].

The idea of engaging in social and collective reflection to enhance learning has been put forward by several researchers [5, 7, 8, 13]. When working in groups and displaying reflection publically, the student/practitioner is no longer communicating the message from only his or her perspective; instead, other people and cultural codes are included, thus adding dimensions to the reflective situation. This, in turn, could lead to the intensification of the reflection. On the other hand, its public nature might affect the direction a creator takes in making the film such that he or she maintains some privacy. As one student noted, "*You are not very personal when you know everyone will watch it.*" On the other hand, another student conceived this public element of film very differently: "*One of the best things was that we did it together with someone, which made it possible to discuss and talk about what we had learned. Being several people together made it easier to be honest.*" Apparently, the students had different perceptions concerning how personal and honest a digital multimedia story could become. Exposing feelings is a personal choice and differs from student to student. It is also the possibility that strong individuals within a group may dominate the reflective process. This indicates that the best way of reflecting will differ from individual to individual. This assumption is confirmed by Sandars [11], who claimed that the method of reflection should be determined by the individual, since different individuals will prefer distinct approaches.

Some felt that reflection through digital media was limited because they had to focus on only a few elements and could not express a very detailed account of the experience. They also worried that the teachers did not get the same insight into their thoughts and understandings through this form of reflection. However, this only reveals a misconception concerning reflection in this context. In our opinion, the primary point of reflection is for the student's own sake and his or her fellow students. This attitude could be representative of some students' belief that reflection is for showing the teachers

how insightful they are rather than for their own learning. In contrast, we consider the part of the process where the students discuss their experiences and insights to be most important, with the finished result being of lesser importance. Nevertheless, the presentation of the result is important when it comes to learning from each other and sharing insight. Moreover, it is important to know what the students know in order to adjust the content of teaching. Still, we agree with the students that it should not lead to grades on reflective work. Both workshops indicated that if the reflection notes were to be assessed summatively, many students would write what they thought the teachers wanted to read and not what they had actually experienced. Thus, the students nearly all thought that reflection should be assessed formatively. This view on assessment corresponds with Biggs' [19] claim that *"[t]o use it for both formative and summative purposes, as may happen in continuous assessment, creates a conflicting situation for the students: they are being asked to display and hide error simultaneously."*

The findings showed that many of the participants found the workshop fun and entertaining. One student stated, *"it was a fun way to do it, because it allowed creativity."* This indicates that the students were pleased that they were able to use their specific skills and interests in order to carry out reflective work. Several of the movies from the workshop used humour as a communicative element. Normally, we are not used to students referring to reflection as fun, and it was clearly motivating for the students to approach it in this way. On the one hand the workshop was a good experience, and the positivity of the participants indicates that this is a good way to carry out reflection in product design studies. However, we also question if the lightness in attitude the students expressed may have affected the depth and quality of the reflection. A couple of the students also wondered if it might be less serious compared to writing. This might be due to writing and theory traditionally being perceived more scholarly and serious than making images or other visual sensuous communication. One of the findings in the first workshop was that some students believed the use of special effects in a video could distract from the content and make the result less serious. It can be a challenge to convince some students to give serious presentations in public. Probably because some feel it is difficult to express feelings and due to their wish for making a film that impresses others on a technical and entertaining level. There is no doubt that design students have achieved skills through their study, which is an advantage when working with film. On the other hand, they also take great pride in delivering a well-made "product"; this could lead to the students spending more time on creating a well-made film than on their reflection. One student who claimed to have concentrated *"more [...] on techniques and less on reflection"* confirmed this assumption. Moreover, although reflection through digital stories has been used with great success in several disciplines [11], it is possible that students who were less inclined toward creating digital stories, for example, fields outside of design education where multimedia creation is not a focus, would put less pride into their "product."

As mentioned above, two-thirds of the students preferred reflection through film. Some wanted a variation between the two, and only 10% preferred written reflection. One student stated, *"Reflection is often something one writes at the last minute because it is 'just writing.' Multimedia forces you to spend time on the reflection."* However, the questionnaire used was limited in relation to this issue. The students had to choose between written reflection and reflection through film. Some marked both options, indicating that alternation between the two would be ideal. Using visual technology represented a variation from how our students usually carry out reflective work. If expression through film were the rule and writing the exception, the results may have looked different. Sandars [11] claimed reflection should be something one does before, during, and after a project. This was not achieved through the method presented here, and for instance, a combination of writing a log and reflecting through film would probably lead to better learning. As a result, the student would engage in holistic reflection, reflecting through the whole process writing notes, and benefit from social and collective work using visual technology.

## **6 CONCLUSION**

This paper shed light on an alternative approach to reflection and contributes with a way to do reflective work within design education using visual media and creative tools. The learning outcomes from this study are related to both skills and general competence. Skills are related to the ability to reflect on one's own and others' practice. General competence is about conveying insight through relevant methods of expression. Using group work and multimedia in a reflective process within product design education emphasizes other qualities than those we find within written work. For

instance, filmmaking increases the time and effort spent on reflection. Both film and written text can involve the aspect of storytelling, but with film, multiple senses are involved. Working in groups gives the students an arena in which to thoroughly discuss their discoveries and learn from each other. The students are able to use their technological, aesthetic, and visual skills in this process. On the other hand, because design students take pride in their visual work, it can be a challenge to get some students to take the reflection seriously enough and stay focused at a cognitive level. It is easy to be seduced by visual effects and get lost in the enormous choices and potential within the medium itself. The temptation to create a well-made film might distort the reflective process.

This method of reflection was new to the students and was found to be very popular; however, it might have been conceived differently if they used this method every time they reflected. Further research is needed to evaluate this possibility. The multimedia approach that we used in this study was in many ways a successful way of reflecting on process, but was limited when it came to reflecting before, during, and after the process [11]. As mentioned in the Discussion section, it is likely that alternating between writing and using multimedia would be ideal. Further research into this assumption would be an interesting development of this project and could represent a possible aim for a third workshop.

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