

WAYS TO ENCOURAGE REFLECTION ON DESIGN METHODOLOGY AND PROFESSIONAL PRACTICE

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ABSTRACT

Reflection is not only an integral part of designing, it is also a powerful instrument to enhance learning and improve one's strategies. It is argued that in order to enable design students to critically analyse their own approach and become reflective practitioners, they not only need regular practice in the studio critiques but also a theoretical framework against which to reflect. As part of a mandatory Master level course on design theory and methodology students were required to interview design professionals or students from related disciplines on topics of the course and analyse these in relation to the literature. The analysis of reflective comments from 126 student assignments showed that students became more aware of their own process, appreciated the theoretical framework, and could relate to how topics of the course were relevant issues in practice. Implications for educational provision to encourage reflection are discussed.

Keywords: reflection, design methodology, design process

1 RELEVANCE OF REFLECTION FOR DESIGNERS

The ability to reflect is a powerful instrument that humans possess to flexibly adapt to different situations and changes in their environment. No single behaviour or strategy is applicable to all situations, so the ability to recognize what is appropriate and to adapt accordingly is a crucial success factor in complex, evolving situations such as design projects [1,2]. Reflection occurs naturally but it can also be taught and practiced as a meta-cognitive skill. As such it has been utilized by educationalists as an essential part of experiential learning: students observe a role model practicing a task, then engage in the same activity and afterwards are prompted to reflect on their approach and what worked well and where they got stuck [3]. Reflection is said to enhance student motivation and ownership in their own learning in ways that are not provided in traditional achievement testing [4].

Reflection has been discussed from two perspectives: as a description of how practitioners deal with a given situation, and as the conscious analysis of one's own thoughts and actions. The first concept of reflection in practice was introduced by Schön [5]. Based on studies of designers in architecture and professionals from various other disciplines, Schön formulated the idea of design as a reflective conversation with the materials of a given situation. He coined the term reflection-in-action: "Alternatively, we may reflect in the midst of action without interrupting it. In an action-present – a

period of time ... during which we can still make a difference to the situation at hand – our thinking serves to reshape what we are doing, while we are doing it.“ [6, p.26]. The second perspective on reflection refers to the conscious analysis of one’s strategies and actions carried out in the past; reflection-on-action in Schön’s terminology. If we consider designing to be an iterative process of analysis, synthesis and evaluation, reflection can be understood as a meta-cognitive process in which one questions whether the approach was appropriate and underlying rules are assumed [7], see fig. 1.

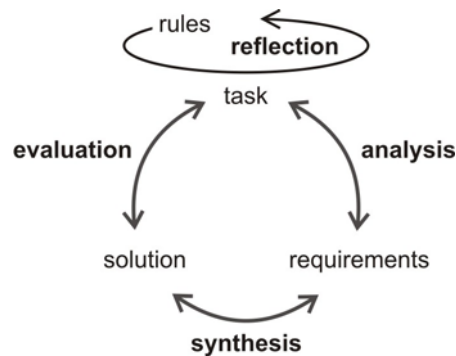


Figure 1 Reflection as meta-cognitive activity in designing [7]

People are often triggered to reflect when they encounter a mismatch between what they expected and the actual situation, accompanied by emotions such as frustration or anger (see fig. 2). Self-instructions such as “keep calm” can help to cope with these disturbing emotions. The self-reflection starts with recalling what one has done and then evaluating whether these actions were successful in terms of the goal one was aiming for. Then one needs to decide whether or not to change one’s behaviour. Psychologists refer to this crucial step from intention to action as “crossing the Rubicon” (indicated as dotted line in fig. 2). If sufficiently motivated to think about a modification of one’s former strategies, people continue with a thorough analysis and adopt a new strategy.

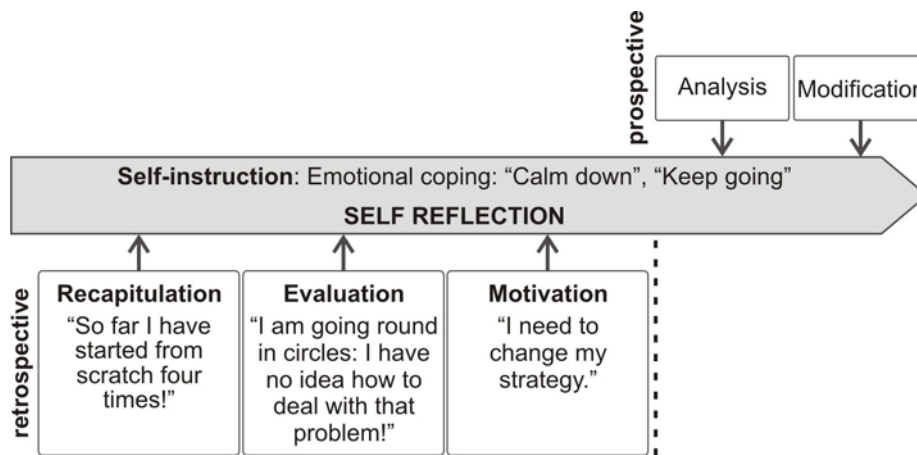


Figure 2 Retrospective and prospective forms of self-reflection

Empirical studies have shown that people often avoid self-reflection when they have been unsuccessful and reflection would have been appropriate [8]. It is suggested that

this is due to a tendency to avoid addressing one's own deficiencies and limitations, as this could be a threat to one's self-efficacy and perception of competence. Self-reflection therefore needs to be taught and practiced to become an effective mechanism to improve one's design practice.

The concept of reflection has also been applied to teams. Empirical evidence suggests that teams achieve better performance if its members are aware of the team goal, agree on procedures, strategies and rules, and know each other's strengths and weaknesses, as this makes them better prepared to adapt their strategies to novel circumstances. Adopting Schön's concept reflection-in-action, West coined the term group reflexivity as "the extent to which group members overtly reflect upon the group's objectives, strategies, and processes and adapt them to current or anticipated endogenous or environmental circumstances" [9, p. 559]. Thus, team reflection entails both aspects: the reflection-in-action concept and the self-reflection aspect on the team level.

2 EVIDENCE ON STUDENT REFLECTION

In order to foster the development of reflection as a skill and to instil a culture in which students regard reflection as an integral part of designing, design education needs to provide a framework against which to reflect on regular practice in the studio. The framework for reflection is the accumulated knowledge of role models, both in form of design educators and in the literature on design theory and methodology, as well as on empirical research on design thinking. We investigated how students reflect on their design process based on an analysis of student comments in written assignments in a course on Design Theory and Methodology course at the Delft Faculty of Industrial Design Engineering.

2.1 Course context and sample

The course Design Theory and Methodology was developed about 10 years ago at Master level with the aim to enable students to critically analyse the theories of their subject areas, and propose new models and theories if appropriate. The teaching of design methods forms part of the practical design exercises in the first two years of the Bachelor curriculum, after attempts to teach methods separately were seen as drifting away from the students' needs for practical methodological support in their design projects. The general aim of the course at Master level now is to help students develop a critical awareness of the nature of design activity and their personal working methods.

All assignments were carried out in pairs to foster reflection and 'cross-pollination' between students with different educational backgrounds. For this study we focused on the third assignment in which students are asked to interview two designers outside their own area of Industrial Design about selected topics from the course. The main learning objective of the assignment is to stimulate students to study the material in the reader as a theoretical framework for the preparation and analysis of the interviews, and to expose them to experience from professional practice. Reports were collected in November 2007 in a class of 270 students of which 30% are international or have a bachelor from another institution.

2.2 Data analysis

All co-authors analysed the reports they had originally been responsible for as tutors. We identified quotes that expressed what students had learnt or found surprising, and how they reflected on the interview experience and the course, and then content analysed these across all reports. It was also recorded 1) which topic the students had

chosen for their interview, 2) the discipline of interviewees, and 3) marks awarded for analysis, reflection and conclusion.

2.3 Findings

The majority of the students started their interviews by enquiring the participants on their typical design processes, followed by specific topics such as creativity or expertise in design (see Table 1). The reflection-in-action approach, which is also covered in the course, was the least frequent topic.

Table 1 Student interview topics

Topic chosen for interview	Frequency
Design process	97
Creativity	75
Expertise	54
Designing for the user	41
Problem solving	33
Teamwork, shared cognition	27
Reflection	13

In terms of discipline of interviewees, architecture and engineering were the most popular (see Table 2). Both are also easily available on campus, while interviewing members of their own discipline carried the added requirement to finding practitioners via personal contacts.

Table 2 Interview partners by discipline

Discipline of interviewee	Frequency
Architecture	82
Engineering (aerospace, civil, electrical, mechanical, software)	68
Other design related discipline	58
Industrial design	40

The average mark for the analysis and reflection part was 3.8 point (of a total of 5). Although the students with lower grades generally also performed poorly on the analysis and reflection part, there was no overall correlation between the grades and the level and depth of reflection.

The following sections provide a glimpse at some of the students' reflective thoughts on a series of theoretical design topics, which emerged as a result of the interviews carried out during the third assignment. While interpreting the responses from their interviewees, the majority of the students arrived at insightful reflections, linking the theories and empirical research presented to them to their own experience and to professional practice.

2.3.1 Reflection about their own design process

Students reflected on their own design process and behaviour and stated that they had become more aware of it through the collective learning process. Many compared and contrasted their own design process to those of their interviewees and were often

surprised about commonalities between quite distinct backgrounds. Some also explicitly acknowledged the role of theory and design methods for their learning process:

“It was interesting to look at our own design process and to notice that in the previous four years you’ve come to develop your own design method, you have tried out different methods (...)”

“Although prescriptive design models will always represent simplifications, not being able to encompass the complexity and situatedness of design processes, we see the value of such models. They attempt to create generic guidelines for how the process should be structured to ensure effective designing. (...) We think it is important to consider the prescriptive models as directions for how it is possible to structure the design process, not as absolute truths.”

“Design research is still straddling the boundaries between engineering and social science. There is no empirical proof for most of the theories postulated in the reader. However, it gave us a framework to start thinking about design as an activity. We can apply it not only to our future projects but critically evaluate and reflect on our own process.”

At least for these students the course seems to have succeeded in providing a framework for reflection.

2.3.2 Reflection about education and professional practice

On numerous occasions, students reflected on the connection between the theories they had been taught and design in professional practice. They resorted to their understanding of the theories to structure the analysis and interpretation of events, practices and behaviours exhibited/reported by their interviewees. They also came across ‘mismatches’ between what is recommended in the literature and how professionals encompass their design processes.

“(...) there are a lot of similarities with the industrial design practice [it refers to an interviewee with background in aerospace engineering]; a lot of things are quite the same (...) quite similar to what we see in the industrial design practice.”

“In this assignment we project what we have learned onto reality. We gain an idea of how our theory works within a practical design context. It helps us to interpret and place the gained knowledge in its correct context.”

“[expertise] is an evolving process where apparently interpretations on what you learn in school may change when being in a real world context.”

“We have seen that designers have different approaches when designing, which in many cases deviate from recommended design models.”

2.3.3 Other topics reflected by the students

Students also reflected on other topics, for example the assignment and the interview process in itself: *“preparing and analysing interviews more difficult than anticipated”; “We were surprised by our findings during our analysis of both interviews. We saw that our strategy of asking some similar questions worked to give a deeper understanding of our interviewees.”; “Because we had to choose topics we thought were interesting to investigate, the research was about something we ourselves wanted to gain more insight on, and therefore we were very motivated”.* Additional reflection topics included perceived gaps between theory and real-world design practice, differences and similarities between professional backgrounds outside the industrial design area.

3 DISCUSSION

The evidence from student comments suggested that the majority of them experienced the framework provided in the design theory and methodology course as a useful background against which to reflect and analyse their interview material. Despite the large size of the class, the format of working in pairs and assignments that focus on establishing a link between theory and practice appear to fulfil their intended purpose. However, this type of reflection only refers to the retrospective part of reflection-on-action. We believe that it is essential to complement reflective practice in the studio education, but it can by no means replace it.

In design schools where theory and methodology is not taught as a separate course in its own right, elements of this assignment could be included in other courses by presenting topics such as creativity or a given design method in a lecture. Students could then be asked to discuss and reflect their experiences in a tutorial group. Our students have consistently enjoyed the interview element as it enables them to select their own topics and interact with practitioners or students from other disciplines. Such interviews about another person's design process could also be incorporated in existing courses and then used to stimulate students to reflect on their own approach.

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