

# REFLECTION IN DESIGN PRACTICE – QUALITY ASSURANCE OF PRACTICAL TRAINING IN PRODUCT DESIGN EDUCATION

Bente SKJELBRED<sup>1</sup> and Arild BERG<sup>1,2</sup>

<sup>1</sup>Oslo and Akershus University College of Applied Science, Norway

<sup>2</sup>Aalto University, Finland

## ABSTRACT

Students' experiences through practical training can be used for curriculum development based on interactive research between education and work practice. To work collaboratively and reflect during the design process is a general competence that is central in a product development team. Studies have shown that such communication can support personal and collective learning processes so that organizations were able to develop in line with the growing need for creativity and innovation. This study relies on students' reflection notes from practical training as an empirical basis to develop the curriculum of a master study in product design. The methodical approach was archival analysis of reflection notes written by the students during their practical training. The course responsible used this as a follow up to assure students' learning outcomes. The findings exemplify how complex issues in practical training were categorized in relation to the design education institutions need for quality assurance. Practice places were varied like furniture industry, sports industry, fair trade industry and cultural institutions. The findings were evaluated and discussed in relation to quality criteria in higher education and to knowledge, skills and general competence in reflective practice. The students' had developed their communication skills in business practice. The conclusion was that the method of archival analysis of student reflections based on quality criteria of higher education can be used as an approach to develop the curriculum in dialogue with a changing and innovative work life.

*Keywords: Design curriculum, design knowledge, reflective practitioners, design practice*

## 1 INTRODUCTION

By being able to work in teams and reflect during the design process a general competence can be developed that is central in a product development team. There is a need for more knowledge of how to develop the skill of reflection in a practical context where the team members can contribute to create an identity of their own organization [1]. It is further a need for more examples that show how such a dialogue-based design process can stimulate social awareness so that the design contributes to sustainable development [2-4]. Studies have shown that more knowledge is needed to understand how such communication can support personal and collective learning processes so that organizations are able to develop in line with the growing need for creativity and innovation [5-9]. In a design research perspective there are specific challenges for professional practice in product design education compared to professional practices in e.g. teacher education or nursing education because they to a larger extent have established institutions and practices that are quality assured in advance, institutions like schools and hospitals. This requires a special attention for more research on approaches for quality assurance of the learning outcomes for design students in a variety of business practices [10-12].

### 1.1 Quality in higher education

Internationally, there have been several attempts to find a clear definition of what quality in higher education means. It is still a lack of guidelines on how this can be addressed in educational level. The definitions are at different levels, and many of them are not particularly relevant and normative when it comes to the teacher's role to facilitate and plan teaching. However there are some relevant studies presented by Harvey and Green [13]. They state that there are five ways to define quality in higher education. For some quality is related to the unique and outstanding (1), as identified by experts,

people who have knowledge or status to access quality. Quality can also be linked to specific standards that should be followed (2) and one example they give is that students should have a certain grade point average, or otherwise demonstrate certain skills or knowledge to be recorded on a given study. Relevance (3) is another definition exemplified by programs that are tailored to the work that the education is directed towards. Another understanding of quality is related to economy (4). The example they give on this is if the institution fails to increase graduates without having received additional resources. The last definition is that quality can be defined in terms of change and development (5). Within such an understanding is a quality characteristic for organizations when one is able to adapt to new conditions in the form of changes in requirement of the course and develop new teaching methods or curricula [13]. Through an analysis of the findings through concept mapping [14] we would like to point out some findings that is of relevance to the topic. These are that reflection notes give an access to evaluate the students learning environment and their learning outcomes. The study focus on problem based learning activities that promotes reflection through the design process in practical training [15, 16]. By organizing practical training in educational programs there might be challenges when it comes to handle the quality requirements. Still it is according to Harvey and Green [13] a quality that the education is attuned to practice as it is in work life. It is the responsibility of the educational institution to facilitate for highest possible quality in the learning outcomes for the students. In both practice and theory it is therefore a need to study how the practical training in product design can be facilitated optimally.

## **1.2 Guidelines in Norway**

In Norway the quality of higher education is guided by the criteria from the Norwegian Agency for Quality Assurance in Education (NOKUT). NOKUT has been evaluating the quality management systems in universities and university colleges since 2008. NOKUT was a formalization of handling guidelines for quality assurance as required by the Bologna Process and the development of the EU implementation and evaluation of the Quality reform which led to the implementation of a national qualifications framework [17]. NOKUT is an independent organization under the Ministry of Education. NOKUT's purpose is to ensure and promote the quality of higher education and vocational training by evaluating and encouraging the development of quality of education at Norwegian institutions. NOKUT emphasizes five aspects of the studies as particularly important for institutional quality assurance: knowledge and study culture(1), the study's content, learning outcomes and qualifications (2), teaching, supervision and working methods (3) assessment, diplomas and achievement (4) and infrastructure, management and the total learning environment (5).

## **1.3 A challenge in design education: facilitate for optimally learning outcome in practical training**

The requirements to a designer's competence are complex and need continuously to be adjusted to the local and global market. Critically reflections towards the designers role is therefore found necessary [12]. In a study plan for a Master's Degree Programme in Product Design in Norway it is described a module of internship studies and in how to facilitate that the students can acquire knowledge of relevant organizational models, decision-making mechanisms and how to gain experience of the methods used in the organization. The goal is that students will be able to further develop their skills in the product design environment. Harvey and Greens [13] state that a teachers should focus on change and development in relation to work life, and this is also in accordance with NOKUT's guidelines. Through analyzes of the current arrangements the gap between the current situation and the need for design expertise will be explored. Based on this, needs of changes, adjustments, and what might be needed for further development of the curriculum can become clearer. The research question was how optimal learning outcomes can be facilitated through students' reflections in professional practice? The aim was to develop the teaching, supervision and working methods as well as the learning outcomes in the curriculum.

## **2 METHOD: CASE STUDY OF INTERNSHIP STUDENTS' REFLECTIONS**

To explore the research question a case study in an interactive research approach was found appropriate [14] because it could document the requirement and challenge in detail from a diverse group of students in a real world context. The method was archival analysis of a random sample of 20

reflection notes from master students in product design. The reflection notes were analyzed by the use of concept mapping and categorization [14] and the external validation was increased by relating the findings to criteria in higher education [13] and in relation to the Norwegian national qualification framework NOKUT [19]. The internal validation of the research design [14] was increased by involving students and their understanding of practice by relating their reflections to the existing learning outcome formulations. This provided a basis to discuss how these could be adjusted on a local level in the institution.

## 2.1 The course: Practical Training

The Practical Training course is an important and popular part of the Master's Programme in Product Design at (xxx) University College. The period lasts for 12 weeks (20 ECTS), and the students do contact current businesses or public institutions themselves and were encouraged to create their own relationships as if they applied for a job. The students learning process were therefore related to different environments through a variety of businesses such as furniture and interior industry, sport industry, fair trade industry, and cultural institution. They are also responsible for signing agreements. The business or firm is not getting paid and it is therefore not a formalized basis from the educational institution to demand a certain amount of guidance and follow-up. The course leader from the university college guide the students mainly on their learning processes and the learning methods, but also sometimes about design related problems if needed. Most of the time they use their contact persons at the practical placements for guidance towards the practical issues they are working with.

To make sure the students are in a fertile learning environment, reflection notes have been used through the course as compulsory assignments. The students have turned in reflection notes 3 times during the period, with approximately 3-4 week intervals. These are found very important and essential to get access to the student learning process in this course. The exam for the course was a report where the students should describe one chosen project or a part of a project they have been working with through their practical period. They should connect reflections about their learning outcome towards this. The course is graded by the university college based on specific learning outcomes for the course. The existing learning outcomes for internship master students were that on successful completion of the course a student should be able to develop, plan, implement and evaluate self-produced work under guidance from professionals in industry-based business, design consultancies, public institutions or research projects. Further the student should be able to comprehend the purpose of given tasks in the broader context of goals and objectives. The students should also be able to identify design principles and factors in practice and to draw on sustainable design processes and methods in practice. The student should be able to cooperate professionally with work colleagues, team members, clients etc. in fulfilling a design brief and to challenge personal design competences under pressure from deadlines and other design project criteria. The student should also be able to arrange and organize time and resources effectively and to adjust and implement design processes in a dynamic environment. Finally the student should be able to reflect on experiences gained from the practical training in relation to the learning outcome of the course.

## 3 FINDINGS: REFLECTION NOTES IN DESIGN PRACTICE

Through analyzing 20 reflection notes written through the first 9 weeks of the period it is found 5 categories of competence based on what the students reflected most frequently about as important learning outcomes. The findings demonstrated a more specified understanding of the learning outcomes in practice and were also a basis for development and adjustment of the existing curriculum based on what was happening in practice. There will be given some examples in the form of statements from the students' reflection notes towards each of the categories;

Reflection on social and environmental aspects of the firm or business (Category 1):

*...we have just started a project for Jotul that design casted iron fireplaces (Figure 1) and we will take part from the start. It means that we are involved in concept development on the same line as the other employees, and feel that we are seen. Our (..... and mine) sketches are also selected for review. The leader I perceive as a teaching and caring leader. He is concerned that we thrive, and are good at giving feedback and praise us if we have done a good job. We also assigned each our workplace that is as big as the others, which also helps us feeling included and equal...*

*...I've always felt that I have difficulties to concentrate, but I see now why, and I for sure don't it feel it like that here. At the same time as it was a very calm atmosphere in the venue, I felt sometimes that I*

*interfered with the others if I had to make a phone call, or if I was working on something that made a lot of noise and sound...*



Figure 1. Jøtul design of casted iron fireplace

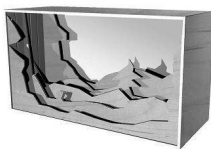


Figure 2. Student own woodwork experiments from practice



Figure 3. The firms' design presented by student at design exhibition

Reflections on awareness towards observation and active listening (Category 2):

*...I think it is interesting to observe and listen during a workday. We do not always work on the same task (Figure 2), but I try to learn from how they communicate at the same time as they work with other projects. It is inspiring to gain insight into how they communicate with costumers (Figure 3). They often make professionally talks, but they also try to be personal and a little funny. It seems as they are good networks builders...*

*...when the leader spoke with different people I tried to overhear call and pick up important details and information that I can use in my conversations. I was constantly on to the observing level since I was not working with my own projects. I thought it was important that I seemed as a part of the firm so my appearance became important and I wanted to be able to present her thoughts and ideas externally. In a way I stepped out of my role as a designer when I represented another designer than myself. Nevertheless when I was introduced to other designers I felt comfortable enough to tell them about myself and what I do besides my practical training...*

Reflection on structuring the workday and planning work (Category 3):

*...they have a fast pace, but still they manage a well portioned and distributed scheduling of the different tasks. This I think they get by planning well by for example, Monday meetings and follow-up meetings during the week. We are constantly updated through e-mail or verbal messages...*

Reflecting on building networking and how to make contacts (Category 4):

*...I have learned a bit about how I am going to contact people, when it is relevant to contact, and how to approach to those contacts...*

*...the entire class took this quite seriously in the application period. We supported each other, giving each other tips and encouraged each other as much as possible. It can be a rather intensive process to find an internship...*

Reflections on the role of the designer (Category 5):

*...they told me early to think about the market and sales. The numbers are important for them to keep their jobs. They are like any other company in which the sale is very important. They must make products that hold a certain market price to survive...*

*...and I was commissioned to document the deficiencies of the first prototype from the factory, and to draw a new and approved version and the 3D modelling program. I got helpful guidance if I needed help...*

#### **4 DISCUSSION AND IMPLICATIONS FOR DESIGN EDUCATION**

It is a not always easy to get access to this part of the learning environment for the students when neither they nor the institution can lead or affect this field of practice. Still an analysis of the empirical data indicates that it is possible to facilitate for optimal learning outcome in Practical Training. By using criteria from the quality definition of change and development as well as teaching, supervision and working methods [13] it seems to be possible to develop the teaching methods or curricula through reflections notes. The assessment of quality of education is directed at different aspect of learning and teaching process. According to Harvey and Green program quality is the quality of the curriculum and organization learning. Teaching quality is actually learning. Quality control is the students' ability to conduct quality assurance and quality improvement in their own business. Quality score will be an assessment of student learning outcomes as measured for example by exam results,

while the concept of frame refers to the human, organizational and equipment aspect in the education. Although there is no clear consensus on how to define quality in higher education, these options are often referred to in service that is relevant, as a product or service that is produced in a cost effective manner, as a change and development. The descriptions gives some kind of content but it does not give any directions on study program level and how to work systematically and targeted towards this. Each institution is responsible for the quality of the programs they offer. In order to fulfil this responsibility the institutions must have sufficient knowledge of the conditions and process that contribute to the quality of each study, and the results and effects of the actions taken [19]. These guidelines will be necessary to work with at each institution and not the least at the course level. A greater degree of definition and determination of efforts to secure and develop the quality of the Norwegian higher education has therefore been demanded [18]. To make these guidelines meaningful, it is necessary to work towards giving these complementary meaning and content meaning on a teaching level as it has been exemplified with the findings. The findings give the teacher a possibility to evaluate and adjust the learning outcomes in the course in relation to work life. The teacher is responsible for enabling a good work environment for students, a beneficial situation that has been highlighted both in this study and in other studies is that wellbeing is essential for the learning process [4].

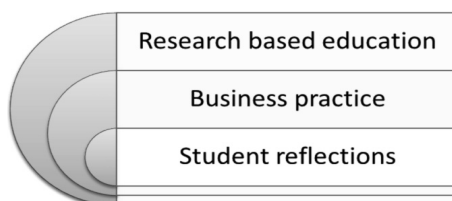


Figure 4. Interactive research between education and work practice for curriculum development

Through concept mapping of the empirical findings and through validation by the presented theory [14] a visual presentation of this concept has been synthesized (Figure 4) showing an interactive research between education and work practice for curriculum development where the students' experiences are central and documented through reflection notes and a reflective report.

## 5 CONCLUSIONS: HANDLING INDETERMINATE ZONES OF PRACTICE

The findings seen through Donald Schön's theory "Reflection-in-Action" support the initial proposition that this approach might be useful to facilitate and develop a high degree of learning outcome in practical training where business life is seen as an expanded field of the total learning environment. A national qualifications framework [19] can be experienced as a sort of technical rationality but as it is shown in this study it can be combined with other criteria for quality in higher education [13] and thus be a quality assurance to develop competence such as how practitioners actually handle indeterminate zones of practice [11] in a variety of practice fields. This is in line with the knowledge triangle from the Bologna process that aims for a dynamic interrelation between education, innovation and research [16].

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