

# ASSESSMENT CRITERIA FOR INTERACTION DESIGN PROJECTS: FOSTERING PROFESSIONAL PERSPECTIVES ON THE DESIGN PROCESS

**Mattias ARVOLA**

Department of Information and Computer Science, Linköping University, Sweden  
School of Communication, Media and IT, Södertörn University, Sweden

## **ABSTRACT**

Quite often the product of design is assessed in interaction design education, but we need to develop criteria also for courses that focus on learning to conduct and manage the design process. An earlier approach to set grading criteria has been grounded in the SOLO (Structure of the Observed Learning Outcome) taxonomy. Students need, however, to learn practitioners' criteria, rather than teachers' criteria, to make a successful transfer to practice. One way of achieving that is to align criteria with the conceptions of design process quality used by professional interaction designers. The question is then what those conceptions are, and how they can be accounted for in assessment criteria for projects in interaction design education. A phenomenographic research method was used, and interviews were conducted with ten experienced interaction designers. The interviews were analyzed using qualitative content analysis. The results show that professional interaction designers see design process quality as inspiration, a well-grounded rationale, employment of established methods, and constraints management. These conceptions are mapped to a criteria-referenced grading scale. The criteria should, with careful transfer, be applicable also in other design disciplines.

*Keywords: Interaction design education, design process, design project, assessment, grading*

## 1 INTRODUCTION

This paper concerns assessment and grading of students' interaction design projects with a focus on the process of design rather than the product of design. Interaction design is in this context conceived as a design discipline concerned with shaping the conditions for interaction between people and primarily digital products, services, and systems, and shaping the conditions for interaction between people by means of those mediating products, services and systems [1].

The education of designers and architects often involve open-ended projects similar to real practice, critique sessions, and a public presentation of the work at the end of the project. The presentation typically focuses on the designed products. It is, however, possible to focus the design education on process rather than product, by asking design students to keep a design log (a.k.a. sketchbook, idea log or design diary). The design log is a sequential visual record of ones ideas and insights [2]. Teachers review it to get an idea of the student's design process. A design log is about clear and functional sketching of ideas in depth and breadth. It is not about fine art. A log can fill an important role in assessing the design process, but what criteria should be used when grading it? If we look at the interaction design literature the answer would be correct use of a set of user-centred design methods for research, prototyping and testing [3, 4, 5], clear presentation of the argument behind the design [6], close work with users [7], or a critical or reflective stance to the design effort [8, 9, 10].

This paper reports development of assessment criteria for process-centred interaction design projects within a criterion-referenced grading system, which means that the student's performance is compared to some pre-defined standard as opposed to relative grades. This is the grading system used in Sweden. One way to articulate the criteria for the different grades is to ground it in taxonomies, such as the SOLO (Structure of the Observed Learning Outcome) taxonomy [11]. Leung [12, p. 157] made an adaptation of the criteria to design education at the following five levels:

1. Pre-structural: "Display incompetence in design. Problem is not attempted or the key aspects are

not clearly defined or solved. Fail to relate the ideas presented to the problem. Information produced does not benefit solving the problem.”

2. Uni-structural: ”Display limited design abilities. Problem is defined from a narrow perspective at a superficial level. One or a few aspects are picked up in designing. Some important aspects are missing in the design ideas. Although not many aspects of exploration and judgment are observed, they can lead to weak or simple solutions to solve problem with minimum quality.”
3. Multi-structural: ”Display comprehensive design abilities, but in isolation. Problem is defined from wide perspectives with many design ideas generated. Essential and important aspects are picked up in designing. Many elements of exploration and judgment are observed. However, the design ideas are loosely organized, with different ideas not integrated coherently. Some design features misfit another, and judgments are not consistent.”
4. Relational: ”Able to relate different design skills to form coherent analysis, statements, design ideas and judgments. Answers are not only a sound design proposal to the problem, they are presented in a coherent and structured way. Explanation of why and how the solution is developed, realized in practical terms, and evaluation judgments on how far the solutions satisfy the original needs and specifications, are components.”
5. Extended abstract: ”Display higher modes of operation in structuring knowledge to solve a problem. In addition to what can be observed at the relational level, some new and creative ideas through logical and mature design developments are presented.”

Leung’s topic-specific application of SOLO mixes an assessment of both the product and the process. In this paper we will focus on assessment of the design process. Leung’s taxonomy is also based on criteria developed by design teachers, and students adapt their learning activities to the examination and assessment criteria decided by the teacher. It is, however, not the values of the teacher that will assist the students to make a successful transfer to professional practice. They also need to learn the values practitioners have. One way of achieving that is to integrate professional conceptions of design process quality in the assessment criteria. This does not imply completely abandoning academic criteria. The question for this study is then what conceptions professional interaction designers have of design process quality, and how they can be accounted for in assessment criteria for projects in interaction design education.

## 2 METHOD

This paper builds on a phenomenographic method, where the unit of analysis is conceptions [13, 14]; in this case, interaction designers’ conceptions of design process quality. Semi-structured interviews were conducted with ten experienced interaction designers (four female and six male) in Sweden and Finland. The different areas that the participants worked with covered government websites, intranets, office applications, electronic medical record software, air traffic management software, concept design for future home communication, ambient media, interactive exhibitions, and mobile phone applications and services. The interview guide focused on the participants’ workplace, role, projects, background, views on design quality, and design processes. All taped material from the interviews was transcribed. The procedure of analysis was qualitative content analysis [15], performed in the following manner: The text about the participants’ perceptions regarding design process quality was extracted from the transcripts. Meaning units were identified in the extracted text. Condensed meaning units were abstracted and labelled with a code. The various codes were compared based on differences and similarities and sorted into sub-categories and categories, which were discussed by a group of researchers and revised. Finally, the underlying meaning of the categories was formulated into themes.

## 3 RESULTS

When analyzing the conceptions of design process quality among interviewed interaction designers, two overarching themes emerged: strategic design work and operative design work.

### 3.1 Strategic Design Work

The two first conceptions concerns strategic design work related to innovation and learning. The term strategic implies here that the designers have some control over resource allocation and objectives for the design work. It is about using design integrated with business strategy.

### **The Process as Inspiration**

A really good design process is inspirational to all parties involved. The following verbatim excerpt from the interviews exemplifies this conception:

*We have done a bit more experimental things and there have been kind of one they they they awaken things on peoples mind and users and they bring it home and do something.*

(Interview 2, Row 117)

One aspect of this conception has to do with *engagement*. As seen in the excerpt above the outcome is that people are engaged and bring the design work home and create and act based upon it. This includes sketching publicly together with different stakeholders to ideate, confront, provoke and stimulate discussion. In this way the designer makes others creative in discussion and ideation. In this conception, the design process becomes a process of participation.

Another aspect is that the design is an eye opener and an opportunity for reflection for people involved in the design process. This means that the design makes them see the design problem differently and say, for example, "of course, why didn't I think of that." In order to reach such insights, the design needs to experiment with new things in new environments. Visions may go beyond the immediately realizable, but they need to be *thought provoking* for people and in some way break new ground or offer a novel point-of-view.

### **The Process as Development of a Well-grounded Rationale**

A good design is thought through and the designer feels that he or she can stand for it and has created an understanding for the design situation. The following verbatim excerpt from the interviews exemplify this conception:

*Creating knowledge, I mean, that aspect of design. To explore and express. To like, really feel that I haven't only made a drawing of your list of functions that you want, but I have, I have explored what the list of functions come out of. I have understood the list of functions and I have maybe even added or removed something from this requirement specification. Can't sort of take that for granted. It isn't an axiom what the client says, but rather, I have understood what the customer means and here is what the end-user needs. And here we have the result of, of my process.*

(Interview 4, Row 358)

In interaction design, thinking things through involve, envisioning sequences of interactions, screens, or states. It involves thinking through why something is a problem to someone; i.e. understanding purposes and motives. It involves how to approach the problem in depth. It is also about working with alternatives, in breadth, both at a holistic and concept level, and also at the level of detailed interaction. Only if you have *exploration* in breadth and depth can you make informed motivations of conscious design judgements and decisions based on facts. Thinking things through also means contextualizing the design and working through all possible problems that comes with it, to make it sustainable and durable over time, both technically and contextually.

This conception is also about learning. People who are involved gain experiences and learn from them. The designer expresses his or her own understanding of, and point-of-view on the problem. In order to do so you need to really *probe constraints and possibilities*, probe the problem and what lies behind it, and do a design solution as good as you possibly can, and not just good enough.

Design work is about being a strategic discussion partner for the client's business. Without business, no design work. This is central to the client perspective for design consultants. However, equally central is the user perspective, which means taking users' goals, needs and ways of work as the starting point for the design effort. The perspectives of *multiple actors* and stakeholders need to be balanced and understood thoroughly.

This conception of the design process boils down to giving a solid argument for the design, that is, a complete and not fragmented reasoning behind the design.

## **3.2 Operative Design Work**

While the previous section discussed a theme related to strategic design work, the two following conceptions concern operational design work and technical performance of the day-to-day activities of the design project and simply getting the job done.

### **The Process as Employment of Established Methods**

There are many design methods, and one part of design education is to teach these methods. Some methods are shared between design disciplines and some are typical to a specific design discipline. In interaction design, there is a focus on user-centred design and participatory design, with methods and techniques like personas, scenarios, storyboards, paper prototypes, interactive computer prototypes, and usability testing. The following verbatim excerpt from the interviews exemplifies this conception:

*I can feel that what I have learned during my education is more of a way to work that can lead me to good design not perhaps what good design is.* (Interview 6, Row 291)

In this view of the design process there is an emphasis on being *methodical* to at least reach the decided design objectives, and also in research work in cooperation with users, clients, and other designers to identify and conform to users' needs and ways of working. It is therefore a *goal and user-oriented* process, preferably with measurable goals. The participants in the interviews also highlight the importance of the quick iterations and visualization in *idea sketching*, the openness to inspiration from unexpected sources, and parallel design with multiple alternatives.

### **The Process as Constraints Management**

It is one thing to have high ideals, and another thing when you need to manage all the constraint you have in real working life design projects. The following verbatim excerpt from the interviews exemplify this conception:

*Yeah but this is good you know, this is good enough, I'm proud of what I've done. And then you weigh in that some things have been difficult to get implemented the way you've imagined or like organizational difficulties.* (Interview 3, Row 7)

Sometimes you need to be satisfied with just doing the job *good enough*, as long as you *fulfil stated objectives* in your design brief. There may be a tight time frame to work within, difficulties in the client organization, or unexpected technical difficulties. The design process as constraints management comes down to balancing ambition and budget.

## **3.3 Grading Criteria**

Table 1 summarizes the conceptions expressed in the interviews and maps them to a grading scale where 3 is pass, 4 pass with credit, and 5 pass with distinction. Each conception consists of the criteria in the right hand column.

Getting the job done and following procedures is what define the operative level of design work. This forms a baseline for what can be expected from a design process. The strategic design works presupposes a well-performed operative design work. It functions as a meta-level on the process of getting the job done.

We can therefore see a hierarchical relationship between strategic design work and operative design work, where the design process at least have to be well-performed at the operative level, which means that it gives evidence of meeting the criteria for employment of established methods and constraints management. This can then correspond to the passing grade, or grade 3 in a five-point scale.

*Table 1. Conceptions of interaction design process quality among interaction designers*

<b>Theme</b>	<b>Grade</b>	<b>Conception</b>	<b>Criteria</b>
Strategic design work	5	Inspiring	Engaging others' creativity
			Thought provoking
	4	Well-grounded rationale	Exploring alternatives in breadth and depth
			Motivating judgements and decisions
			Probing constraints and possibilities
		Balancing the perspectives of multiple actors	
Operative design work	3	Employment of established methods	Methodical
			Goal and user-oriented
			Idea sketching
		Constraints management	Good enough
			Fulfils stated objectives

The passing with credit, or 4 on a five-point scale, is rewarded design logs that in addition to criteria for employment of established methods and constraints management, also give evidence of meeting the criteria for a well-grounded rationale.

The passing with distinction grade, or 5 at a five-point scale, can be reserved for design processes that in addition to the other criteria also, give evidence of meeting the criteria for an inspiring design process.

It would also be possible to make a distinction between a plus and a minus on each grade (e.g. 3+ and 3-). The plus could be awarded design logs that indicate a process that is *very* well-performed with regard to several of the criteria for that grade. The distinction between the well-performed and the very well-performed is, however, not clear-cut. The minus could be given to design logs that show a process that is not well-performed with respect to one or two of the criteria.

## 4 DISCUSSION

Looking back on the history of interaction design, one can see that there are connections to several traditions expressed as ideals in the conceptions of what interaction design process quality is. The conception of the interaction design process as engaging others to participate and encourage their creativity is clearly connected to participatory design [7]. The conception of the process as thought provoking is related to critical and reflective design [8, 9, 10]. Being able to give a well-grounded rationale can be firmly rooted in the ideas and methods of design rationale [6]. Finally, established methods are what most textbooks on interaction design are focused on [3, 4, 5].

The grading criteria for the design process can also be compared to the earlier application of SOLO in design [12]. We can then see some similarities on the two higher grades (4 and 5), but a difference on the passing grade (3), which in my scale is more pragmatic. The passing grade is simply about getting the job done. This may be a reflection of the professional values used to generate the criteria, compared to the academic values used to generate the design adaptation of SOLO.

### 4.1 Recording the Process

A design log, which is a record of the design process, can be used as examination of process-centred interaction design projects. Within a criterion-referenced grading system the design log must provide evidence of meeting the assessment criteria, for example how the design process has engaged others, how thoughts are provoked, and how methods has been used. An alternative to using a design log as basis for grading is to have a written or oral report where the design process is described. Such an examination would however, be produced post-facto and is therefore not a record of the real process. It is rather a rationalization of events adjusted to the students' expectations of what the teacher wants.

### 4.2 Progression

If there are, within one curriculum, several courses that focus on process rather than product, one might establish a progression using the grading scale presented here. What is a passing grade for a basic course in design may not be enough in the follow-up course. At advanced or graduate level, the student may have to be able to present a well-grounded rationale or even an inspiring design process to pass the course. One might at the advanced and graduate level use more academic criteria, focused on analysis or research for the higher grades. Another way to define progression is to develop a wider range of methods.

### 4.3 Generalization

Another question to consider is how applicable these grading criteria are for other design disciplines outside interaction design (e.g. product design). I would argue that they are applicable to a large extent, but you need to exchange the methods that should be employed, and perhaps put more focus on ergonomics than you do on usability.

### 4.4 Future Research

Future evaluations of these criteria should to focus on understandability and inter-marker variance. The role of practitioners as assessors, as well as self-assessment and peer-assessment may also be explored.

## 4.5 Conclusions

This paper has, in conclusion, provided professionally grounded assessment criteria for grading an interaction design process, documented in a design log. Professional interaction designers see design process quality as inspiration, a well-grounded rationale, employment of established methods, and constraints management. The criteria should, with careful transfer, be applicable also in other design disciplines.

## ACKNOWLEDGEMENTS

Thanks to Johan Åberg and Eva Ragnemalm for comments on this paper, and to Josefine Ståhl for help with transcribing the interviews. The project has been funded by Östersjöstiftelsen.

## REFERENCES

- [1] Arvola, M. Shades of use: The dynamics of interaction design for sociable use. *Linköping Studies in Science and Technology Dissertation No. 900*, 2005. (Linköping University, Linköping).
- [2] Verplank, B. and Kim, S. 1987. Graphic invention for user interfaces: an experimental course in user-interface design. *SIGCHI Bull.*, 1987, 18(3), 50-66.
- [3] Cooper, A., Reimann, R. and Cronin, D. *About Face 3.0: The Essentials of Interaction Design*, 2007. (John Wiley & Sons, Inc, New York).
- [4] Saffer, D. *Designing for Interaction: Creating Smart Applications and Clever Devices (Voices)*, 2006. (Peachpit Press, Berkeley).
- [5] Sharp, H., Rogers, Y. and Preece, J. *Interaction Design: Beyond Human Computer Interaction*, 2007. (John Wiley & Sons, New York).
- [6] MacLean, A., Young, R. M., and Moran, T. P. 1989. Design rationale: the argument behind the artifact. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems: Wings For the Mind, CHI '89*, Austin, April 30 - June 4, 1989, pp. 247-252 (ACM, New York).
- [7] Schuler, D. and Namioka, A. *Participatory Design: Principles and Practices*, 1993. (Lawrence Erlbaum Associates, Hillsdale).
- [8] Gaver, B. and Martin, H. Alternatives: exploring information appliances through conceptual design proposals. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, CHI '00*, The Hague, April 01 - 06, 2000, pp. 209-216 (ACM, New York).
- [9] Löwgren, J. and Stolterman, E. *Thoughtful Interaction Design: A Design Perspective on Information Technology*, 2004. (The MIT Press, Cambridge).
- [10] Sengers, P., Boehner, K., David, S., and Kaye, J. '. 2005. Reflective design. In *Proceedings of the 4th Decennial Conference on Critical Computing: Between Sense and Sensibility, CC '05*, Aarhus, August 20 - 24, 2005, pp. 49-58 (ACM, New York).
- [11] Biggs, J. B. and Collis, K. F. *Evaluating the Quality of Learning: The SOLO Taxonomy*, 1982. (Academic Press, New York).
- [12] Leung, C. F. Assessment for learning: Using SOLO taxonomy to measure design performance of design & technology students. *International Journal of Technology and Design Education*, 10, 2000, 149-161.
- [13] Marton, F. and Booth, S. *Learning and Awareness*, 1997. (Lawrence Erlbaum Associates, Hillsdale).
- [14] Marton, F. and Pong, W. Y. On the unit of description in phenomenography. *Higher Education Research & Development*, 2005, 24(4), 335-348.
- [15] Graneheim, U. H. and Lundman, B. Qualitative content analysis in nursing research: concepts procedures and measures to achieve trustworthiness. *Nurse Education Today*, 2004, 24(2), 105-112.