

DESIGN PROCESS OF NOVICE FASHION DESIGN STUDENTS: AN EDUCATOR'S REFLECTIVE ANALYSIS

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Abstract

This paper centres around a creative design project for first-year fashion design students. This project was informed by (1) the theoretical underpinnings of design thinking, (2) a human-centred approach to design and (3) protocol studies of novice engineering and industrial design students' approaches to the design process. The design project assumed a design process method that focused on human beings – and their needs – as the driver for fashion design. The aim of adopting such a human-centred method for creative design was three-fold. Firstly, the design project aimed to create a culture and awareness of human beings and their needs as a driver for fashion design. Secondly, the project aimed to explore the design process of first-year fashion design students with regard to how they framed a design problem and design needs of human beings within a community, in an attempt to find the best possible solution. Thirdly, the design project aimed to establish whether the design process of novice fashion design students yielded similar or different results to that of empirical findings of protocol studies.

In this paper, guided by the research question, which pertained to how novice fashion design students approached a human-centred design process, I offer a reflective analysis, as a fashion design educator, concerning the design process employed in this particular design project. I then compare my reflective analysis to findings from protocol studies conducted with novice engineering and industrial design students. The paper begins with a theoretical discussion of design thinking and human-centred design. The discussion then shifts to the findings of protocol studies of novice engineering and industrial design students and their approach to the design process. Subsequently, the paper briefly contextualizes the creative design project and then focuses on my reflective analysis concerning the design methodology employed by novice fashion students drawing comparisons with the protocol studies.

This research adopts a qualitative paradigm, and makes use of my detailed notes to support my reflective analysis. Based on a comparative method of analysis, I draw comparisons or differences between my reflective analysis and the findings of protocol studies. The paper contributes to the discourse on the design process, human-centred design and design education from the perspective of fashion design and fashion design education.

Keywords: *design thinking, human-centred design, fashion design process, reflective analysis*

Introduction

This paper departs from a theoretical discussion of design thinking and human-centred design. The discussion then shifts to the findings of international protocol studies on novice engineering and industrial design students and their approach to the design process. Thereafter, the paper contextualizes a creative design project attempted by first-year fashion design students. Guided by the research question (how novice fashion design students approached a human-centred design project), the paper then focuses upon my reflective

analysis, as a fashion design educator, regarding the design methodology employed by novice fashion design students in identifying a design problem and the needs of human beings within a community. Drawing from my reflective analysis, I elicit comparisons with international protocol studies.

Design thinking and human-centredness

The notion of design thinking is an extremely broad-based multifaceted phenomenon with no single definition; this is due to the contrasting perspectives of several design theorists. Within, for example, a cognitive process paradigm, design thinking is positioned within questions pertaining to how designers work, how they frame problems and the co-evolution of complex problems and solutions. Cross (2006, p. 18), expanding on the ideas of philosopher Peirce, states that designers exercise abductive thinking in contrast to deductive or inductive thinking. Peirce (cited in Cross 2006, p. 18) argues that 'deduction proves that something must be; induction shows that something is operative' while abduction denotes that 'something may be'. Adams, Daly and Mann (2011, p. 588) postulate that design thinking epitomizes 'what designers understand about design and how they go about the act of designing based on this understanding'. Buchanan (1998, p. 13) puts forward his interpretation of design thinking in the form of a matrix describing design, both in theory and practice, in four broad themes or orders: communication, construction, strategic planning and systemic integration. Buchanan (1995a; 1998) relates these orders to specific abilities: inventing, judging, deciding, and evaluating.

Moreover, Tonkinwise (2011, p. 534) asserts that design thinking denotes a co-evolution of 'problem-definition/solution-proposition'. Dorst (2011, p. 522) takes the position that design thinking is the manner in which designers 'create frames' to address open, multifaceted problems. Beyond that, Cross (2006; 2007; 2008; 2011) maintains that within the design thinking framework, a designer's performance is a set of interacting ideas confronting ill-defined problems and a solution-focused strategy.

Cross (2006, p. 20) argues that designers tackle broad-based, 'ill-defined' (as opposed to 'well-defined'), real-world design problems with the intention of finding solutions rather than solving problems. Rittel and Webber (cited in Cross 2007, p. 23) advocate that design problems are widely perceived as 'ill-defined, ill-structured, or wicked'. Design problems are wicked since they are 'ill-formulated, where all the information is confusing, where there are many clients and decision makers with conflicting values, and where the ramifications in the whole system are thoroughly confusing' (Rittel cited in Buchanan 1995b, p. 14). Cross (2006, p. 20) expands on the notion that design problems are ill-defined, ill-structured, or wicked because some of the essential information concerning the problem is unavailable. Furthermore, these broad-based problems are not 'susceptible to exhaustive analysis' and, as a result, an ultimate unerring solution is not warranted (ibid).

It is evident from the above that design thinking is viewed from different lenses. However, linked to the notion of design thinking, is the zeitgeist movement towards human-centred design. At the 2000 DEFSa Conference, keynote speaker and design theorist Dr Richard Buchanan (2000) recognized, in the powerful opening address arguments put forward by former and late South African Minister of Education Dr. Kader Asmal, a new form of design thinking, a philosophy that positions human beings as the nucleus for design. According to Buchanan (2000), Dr Asmal's address conveyed an influential message that design, within the South African context is rooted in purpose, values, society, human dignity and human rights. Buchanan (2000) refers to this ethos as human-centred design, an affirmation of and incessant support and improvement of human dignity. Corresponding to human dignity, human rights and human needs, several authors (Buchanan 2001; Amir 2004; Brown 2008; Koskinen, Zimmerman, Binder, Redström & Wensveen 2011; Chmela-Jones 2011) confirmed a metaphysical positioning of human-centredness as a disposition for design.

Having theoretically positioned both design thinking and human-centred design, this discussion now moves to global protocol studies regarding the activities and approaches to design employed by novice engineering and industrial design students.

International protocol studies on design process

Similar to the broad-based complex nature of design thinking, the ontology of design processes discloses contrasting perceptions; this is despite the fact that there have been numerous attempts to model the design process (Cross 2008; Lawson 2010). Lawson (2010, p. 33) postulates that the common facet between design process models/maps is a 'sequence of distinct and identifiable activities which occur in some predictable and identifiable logical order'. Some design process models simply 'describe' the activities associated with designing while others 'prescribe a better or more appropriate pattern of activities' (Cross 2008, p. 29). Several sources (Cross 2001, 2008; Aspelund 2010; Lawson 2010) concur that the design process occurs in an ad-hoc, unsystematic and non-linear process with iterative feedback loops between activities. Despite the divergent standpoints on the design process, individual student designers approach their design processes in a particular manner.

Cross (2011, p. 120) notes that in studies of 'successful and unsuccessful teams of student industrial designers', Rianne Valkenburg and Kees Dorst established that;

The successful team developed a sequence of five framing concepts during the project, in contrast to the single frame used by the unsuccessful team. And the unsuccessful team spent much greater amounts of time on naming activities – i.e. on identifying potential problem features, rather than on framing and developing solution concepts.

In another protocol study on novice and advanced industrial design students, Henri Christiaans and Kees Dorst (cited in Cross 2011, pp. 120-121) ascertained that some students become over-involved with information gathering instead of continuing with the solution generation phase. However, novice students 'did not gather a lot of information, and tended to solve a simple problem' un-mindful of several 'potential criteria and difficulties' (ibid).

Henri Christiaans (cited in Cross 2011, p. 130) in his protocol studies with industrial design students sectioned student activities into three modes: information gathering, sketching, and reflecting. Christiaans noticed that, in generating creative design concepts, students who displayed 'evidence of rapid alternation between the activity modes' were more successful (ibid). Protocol studies on engineering design students conducted by Cindy Atman and colleagues (cited in Cross 2011, p. 144) established that those novice students who expended 'a large portion of their time defining the problem' did not actually generate 'quality designs'. Additionally, these novice students 'became stuck in problem- definition and did not progress satisfactorily into further stages of the design process' (ibid). Cross (2011, p. 144) proposed that, in 'studies of problem solving, novice behaviour is usually associated with a depth-first approach' implying that the novice recognizes a problem and instantaneously initiates in-depth solution exploration.

A creative design project for novice fashion design students

Drawing upon the theoretical discourse of design thinking and the design process, the metaphysical positioning of human-centred design and protocol studies on novice industrial and engineering design students, I set forth, as a fashion design educator, to develop a creative design project for first year fashion design students. The design brief – and the students' projects which illustrate their design process – remain the property of the institution and, for ethical reasons, were not included in this paper.

This design project assumed a human-centred methodology as the core for design products with a three-fold aim. Firstly, the design project intended to create a culture and awareness of human beings and their needs as a driver for fashion design. Secondly, the project aimed to explore the design process of novice fashion design students pertaining to their activities and how they framed a design problem based on human needs within a community, in an attempt to find the best possible solution. Thirdly, the design project sought to establish whether the design process of novice fashion design students paralleled (or did not parallel) results found in international protocol studies.

I sectioned the design process for this project into four modes of student activities. In the first activity mode, students selected a community and communicated their selection in an oral presentation which also included a statement of their intended information gathering methodology and discussion of any ethical considerations that they would take into account. The second activity saw students depart into the field to interact with community members to gather empirical data for problem-identification and identification of a human design need. In a written report, students described the context of the community and identified a problem or design need. Thereafter, the third activity involved students engaging in what I refer to as the conceptual development phase of the design process. This phase required students to think aloud in the form of visual representations comprising a series of conceptual sketches and drawings taking into consideration design elements, design principles and the design problem or human need. Conceptual development stages are imperative in any design process given that designers use drawings or sketches to show their thinking process and use these as a tool to communicate their design concepts (Cross 2006, pp. 34-35). The final activity required students to produce a final concept drawing of a design solution generated via iterative feedback loops between problem-identification and conceptual development. Given the current structure of the first year fashion design curriculum, the final design solution could not undergo the technological process of manufacture.

Methodology

To support my reflective analysis, I employed a qualitative research design since I was interested in exploring and understanding the situated activities of students and how these novice fashion design students approached a human-centred design process. Beyond that, I was interested in comparing my reflective analysis regarding the design process of novice fashion design students with findings from international protocol studies carried out with novice industrial and engineering design students. Stake (2010, pp. 13-16; 26) endorses the fact that qualitative research is situational, and that it is involved in understanding how things work, how activities take place and in comparing occurrences.

As a method of data collection, I made detailed notes on student activities and their design process methodology for the duration of the design project. These detailed notes remain the cornerstone of my reflective analysis as a fashion design educator. Denzin and Lincoln (2011, p. 417) confirm that 'personal experience reflects the flow of thoughts and meanings' of situations.

Having outlined the qualitative design methodology employed, the focus of this paper now shifts to my reflective analysis, as a fashion design educator, concerning the design process of novice fashion design students. Following that, I compare my reflective analysis to the findings of protocol studies conducted with novice engineering and industrial design students.

Reflective analysis

I reflect on the design process of novice fashion design students as per the four activity modes discussed above: 1) presentation and communication of ethical considerations, 2) textual report, 3) conceptual

development and 4) final design concept solution. To support this discussion, I use italicized quotations from my detailed notes.

My several years of experience as an educator led me to believe that novice fashion design students repeatedly design products based on their preconceived assumptions and dispositions. Transformation in mind-shift by creating a culture and awareness of human beings and their needs as a driver for fashion design was one of my intentions with this particular creative design project. I was of the opinion that these novice fashion design students would resist an ecological view of human beings as the focus for design. Presentations, in the first phase of this project, elicited students' evinced enthusiasm with the methodological approach of human-centred design. This point is supported by my own reflection that this *project is interesting and exciting as it creates opportunities to work with different people.*

The possibility exists that this design project allowed students opportunities to engage with communities and human beings as opposed to the constraints of a classroom or studio learning environment. Beyond that, students appeared to support a human-centred design process approach perhaps because they became aware of and recognized the value in design for purpose. This is evident in my reflection on students' comments that *now we understand what it means to design with purpose and we need more projects like this.* The notion of design with purpose is in line with Buchanan's (2000) claim that design within the South African context is rooted in purpose, values and society.

Reflecting on the student presentations, it was clear that their community selections were meaningful. *Homeless citizens, orphanages, informal garbage collectors and schools* were some of the identified communities. Students communicated their planned information gathering methods to identify and frame the design problem or human need within these communities. The themes of communication and strategic planning are in line with Buchanan's (1998, p. 13) interpretation of design thinking, as noted earlier. Planned information gathering methods could evolve but the proposed data collection methods served the purpose of guidance to students given that they were novice fashion designers.

In addition, *students appeared to lack an understanding regarding ethical considerations* perhaps because they were novice students. To ensure design problem identification and ethically sound data collection, I engaged in discussion with individual students rendering guidance and alternative solutions regarding ethical consideration. An example of ethical issues discussed involved data collection with minors. In my notes, I reflected that *this community is an orphanage so children cannot be interviewed – perhaps interview the caregivers* and this was then discussed with the students concerned.

With regard to the second activity, in some instances, students changed their community for logistical reasons: the data gathered did not yield sufficient information or accessibility to the community posed complications. Reflecting on this phase, students seemed to become mired in identifying and framing the design problem and gathering information. *Too much of time approaching members of the community, interviewing them and gathering empirical data,* I reflected at the time. In addition, evidence presented in the textual report did not generate rich, thick description given that students did not give cognizance to design elements and principles in the information-gathering phase. I had reflected, in my notes, that *the textual report has very little or no information about the design elements and principles.* This suggests that students embraced a depth-first approach as opposed to a exploring the breadth of the problem. This is in line with Cross's (2011, p. 144) aforementioned findings, in studies of problem solving, where novices identify a problem and usually adopt a depth-first approach immediately beginning with in-depth solution exploration.

Since students became fixated on problem identification and information gathering, the conceptual development phase of the design process did not elicit successful results. Although the conceptual

development phase did suggest a response to the design problem and need, students could not efficaciously carry out this phase because they lacked the cognitive ability to bring forth their design thinking in the form of a visual representation of a series of conceptual ideas, sketchers and drawings. Reflecting on this phase of the design process, in my view, students did not engage with iterative actions, alternating between and integrating activity modes, nor did they refine, evaluate and further improve their conceptual sketches and drawings. Indeed, in some cases, students merely *completed a series of final design solution concept drawings and selected one of these as their ultimate design solution*. In some cases, students purely *utilized a series of fashion related photographic visuals* without conveying their thinking process in a series of drawings and sketches. Beyond that, *little or no consideration* was afforded to *design elements and principles in conceptual development*. The clear lack of design thinking in conceptual development was evident.

In the final part of the design process, the final design concept drawing, students made little or no headway and lacked the ability to muster quality final design solutions. In some cases, I found that the design solution partially responded to the design problem but due to the possible dearth of rich information gathering and absence of knowledge, understanding and consciousness of design elements and principles, quality design solutions were not generated. In some instances, final design solutions could not lead to technological manufacture because the design solutions were impractical to manufacture as end-products. In one case, I reflectively observed that *a design solution is not functional because there are no fastening methods included*. This suggests that students worked in isolation with no integration of or thought given to technological methods. Beyond that, in certain cases, textiles selected for the final design solution were not appropriate to the design problem. An example of this could be found in my reflective notes: *the solution is a leotard that requires the use of a stretch fabric yet a non-stretch woven textile is used*. Material selection is a fundamental part of the design process and the ultimate design itself. This is in line with Cross's (2006, p. 9) claim that the design process incorporates the materials that would be suitable to attain the design concept.

Moreover, the absence of iterative feedback loops, integration and alternation between different activity modes was evident and may have been a contributing factor to unsuccessful final design solutions. Feedback loops and integration of activities is important to the design process, as evident in the fact that several sources (Cross 2001; Cross 2008; Aspelund 2010; Lawson 2010) concur that the design process occurs in an ad-hoc, unsystematic and non-linear process with iterative feedback loops between activities.

Comparative analysis

Drawing upon my reflective analysis of the activities and design processes of novice fashion design students, I compare these to protocol studies on novice industrial and engineering design students. A number of similarities, in design process and activities, exist but dissimilar results were also found. I elaborate on these similarities and differences below.

As mentioned earlier, Henri Christiaans and Kees Dorst in protocol studies on novice and advanced industrial design students (cited in Cross 2011, pp. 120-121) found that some students become too engrossed in information gathering. Despite this, Henri Christiaans and Kees Dorst (cited in Cross 2011, pp. 120-121) further note that novice industrial design students did not, in fact, gather a lot of information. In opposition, Cindy Atman and colleagues (cited in Cross 2011, p. 144) found, in protocol studies with novice engineering student designers, that students spent a large portion of their time on problem-identification and subsequently became stuck on this phase. My reflective analysis did not find the same results as that of Christiaans and Dorst's study, but it did generate similar results to that of Cindy Atman and colleagues seeing as novice fashion student designers expended tremendous time on problem-identification and gathering information even though it lacked rich, thick description.

Henri Christiaans and Kees Dorst (cited in Cross 2011, pp. 120-121) found that novice industrial design students were oblivious to numerous possible criteria and complications in information gathering. My reflective analysis revealed parallel results in view of the fact that novice fashion students demonstrated little or no awareness of design elements and principles in their information gathering.

Furthermore, as stated earlier, Cindy Atman and colleagues (cited in Cross 2011, p. 144) established that those novice engineering students who expended 'a large portion of their time defining the problem' and gathering information did not actually generate 'quality designs' and did not progress satisfactorily into further stages of the design process'. I concur with these findings for the reason that novice fashion student designers did not efficaciously advance with the conceptual development phase and did not produce high-calibre final design solutions to the problem.

Henri Christiaans (cited in Cross 2011, p. 130) in his protocol studies with industrial design students recognized that students who displayed 'evidence of rapid alternation between the activity modes' in generating creative design concepts were more successful. My exploration revealed that novice fashion design students did not reflect on the conceptual development phase of the design process, did not engage with backward-forward activities, did not alternate between and integrate activity modes, and did not refine, evaluate and further improve their design concepts; this appears to be in line with Henri Christiaans deductions.

Conclusion

In this paper, I set forth to engage with theoretical views on design thinking and human-centred design, and to deliberate upon my own reflections, as a fashion design educator, concerning the human-centred design process of novice fashion design students. This was done in order to compare my reflective analysis with that of protocol studies with novice industrial and engineering student designers.

Drawing upon the theoretical arguments, it remains evident that the ontology of design thinking is a broad-based multifaceted phenomenon with no lucid definition. The position of human-centredness implies that human rights, human dignity, human beings and their needs remain the core for design.

Based on my reflective analysis, it is evident that students were responsive to the methodological approach to this particular creative design project. However, novice fashion design students appeared to become mired in the problem-identification and information gathering phase and could not progress further with the design process nor could they produce quality designs. These results are, largely, similar to that of protocol studies on industrial and engineering student designers.

Drawing upon the design process of novice fashion design students, it is evident that there remains a gap between problem identification and solution generation. Furthermore, the absence of iterative feedback loops, amalgamation and alternation of different activity modes is apparent. Finally, consideration of design elements and principles does not support the information gathering, conceptual development and final design solution phases. Fashion design education has a fundamental role to play in addressing these gaps.

As a response to these voids, I propose that novice fashion design students ought to be educated and trained in a manner that interlocks different activity types of the design process in support of a non-linear, ad-hoc design methodology. Although acquiring drawing and artistic skills is important to creative design, in support of the co-evolution of problem and solution, I call for a culture of reflective activity, backward-forward action, moving between and consolidation of different activity modes within the design process. In so doing, it may be possible for students to refine, evaluate and further improve conceptual development and design solutions. In addition, I recommend more attention be given to the development of cognitive skills that enable students to

give rise to design thinking or conceptual development. Finally, fashion design students should have deeper theoretical knowledge and understanding of design elements and principles to assimilate this into quality design solutions.

I conclude with a position that fashion design and fashion design education could add value to human-centred design if opportunities are created for students to engage with communities, societal needs and design for purpose as opposed to designing to satisfy personal pleasure.

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