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Methods that emerge from designers' discourse

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Abstract
This paper presents partial results of a research conducted with product designers in Rio Grande do Sul (Brazil) aiming to understand their methodological approach. Based on designers discourse we aim to verify if and how practitioners adopt formalized methods available in design literature. Our approach is qualitative and it is based on in-depth interviews and content analysis. Eighteen product designers who work in different environments, with different academic backgrounds and levels of experience, have been interviewed. We found different approaches to design processes which are related to their field of activity and experience level. Some of them use formal or quasi-structured processes, especially those who work as internal designers, but most of them adopt a flexible and, in some cases, an intuitive approach. We suggest that the nature of business and the type of experience with product development have a stronger influence in these designers' discourses, than their academic background

Keywords: Design Methods, Product Design, Design practices, Designer discourse

1 Introduction

A commonly recognized problem is the gap between the methods that are taught in undergraduate design courses and methods that designers use in their practice [1][2]. The Design Methods Movement, in the 1960s, aimed to increase the designers' performances through the exchange of methods that practitioners used to adopt at that time [3]. In some sense that effort did not work well, as John Ch. Jones, one of the pioneers and a leading researcher, concluded after working for more than a decade in this field [4]. A reason for that was the pursuit of a general design method which many designers and academics dreamed to discover, a phenomenon that the German design theorist Gui Bonsiepe named as "methodolatry" [1] and that resulted in prescriptive design methods disseminated by engineering design authors such as Roozemburg and Eekels [5] and Pahl and Beitz [6].

Studies concerning how designers work have been developed based on different approaches. In the 1950s Henry Dreyfuss, an early and well-known industrial designer, published his book *Designing for People*, and described his design process [7]. Some authors that feature interviews with designers, as McCormack [2] and Coran and Fraser [8], contribute to disseminate contemporary ideas about the design process. In the 1990s, Protocol Analysis

emerged as a useful methodological approach to analyse how designers perform their activities in experimental settings, as presented by Christiaans [9], Dorst and Dijkhuis [10] and Cross et al. [11], for example. Furthermore, researchers as Lloyd and Snelders [12] and Cross [13] have analyzed how prominent designers think and work. These studies share the perception that designers do not follow rigid methods as some authors have recommended.

Design education in Brazil, as in some other countries, was affected for the evolution of design methods in the 1960s and 1970s. The first Brazilian researchers in design methods were up to date, but the industrial environment was not favourable at that time and product design had no room for development. In the 1980s, Bonsiepe worked in Brazil and achieved a major role as a design theorist and since then some of his books have been used as textbooks in Brazilian design schools. In the late 1990s, when industrial environment changed and product design became an important activity in Brazil, Mike Baxter's book [14] was translated to Portuguese and it was adopted as a major reference about design methodology.

Design education and design practices in Brazil are still distant and sometimes unrelated fields. In this context, we are conducting a research with product designers in Rio Grande do Sul (Brazil) aiming to understand their methodological approach. We intend to verify if and how they adopt formalized methods available in design literature. Our approach is qualitative and is based on in-depth interviews and content analysis, according to Bauer and Gaskell [15] and Gibbs [16].

2 Methods

We developed an in-depth interview protocol comprising different aspects: early professional life, influences, theoretical approach, barriers and difficulties, perceived challenges, vision of design, and design process. This protocol was structured in three levels: general topics, general questions and specific questions. We defined the general topics based on the research objectives, while for the general and specific questions we adapted questions we found in literature [8]. The interviews were recorded by digital video, and the designers were encouraged to register, in paper, models, schemes, diagrams, flowcharts or whatever they remembered during their speech. The results we present in this paper refer to the general topic "On the work process", for which we use the question "How do you work?". We reinforced the question asking each designer to describe his/her design process by means of drawing diagrams. For this general topic we defined three general questions: “How is your work process?”; “How would you summarize your design approach?”; and “What words would you use to define your design process?” Results were analysed by means of qualitative content analysis [16].

The analysis we performed has considered work context and level of expertise; these categories emerged from data analysis, as recommended by Gibbs [16]. We classified the work contexts as: designer in a studio, external designer, freelancer designer, internal designer or store owner. We defined acting as a designer in a studio differently of working as an external design considering the role the designer plays: the first one corresponds to acting as an employee in a design studio and working in the operational level; the second one refers to cases when the designer has a higher involvement, tactical or strategic, both as a consultant or a design studio owner or partner. Internal designer refers to acting as an employee in an industrial company and working in any level (operational, tactical or strategic). Freelancer designer refers to a non-employed designer; and store owner corresponds to a designer who has his/her business and who projects, produces and sales his/her own designs. Regarding expertise, we classified the designers in three levels: experienced, intermediate and novice.

3 Results

We interviewed eighteen product designers who work in different contexts and have different levels of expertise. Concerning their academic background, three of them are architects, one has a degree in Arts and fourteen have a degree in Product Design. In this section we present a summary of each designer's discourse in order to characterize their approaches. We adopt the designers' expertise levels to compare approaches and processes. For each level we present a brief summary for each designer, after that we present and discuss the design processes that emerged from their discourses.

3.1 Experienced designers

Seven of the designers we interviewed are experienced professionals who have worked for more than 15 years at local market. DES_1 is a self-taught designer who has worked for years both as an internal designer and as an external designer for industrial companies. After some years working as a product designer, he got an Arts undergraduate degree and a Master's degree in Design. DES_2 is a graduate product designer who has a long career that started as an interior decorator and changed to a furniture designer and furniture store owner. DES_3 is a product designer who started working for an event planner company during his undergraduate course and nowadays is a design studio partner. DES_4 is a product designer who has worked mainly as an external design in his own design studio. He got a MBA degree in Marketing, a specialization diploma in Customer Communication and a Master's degree in Design. DES_5 is an architect who has a long career as an external designer working for industrial and service companies. Nowadays he acts in his design studio designing mainly corporate furniture and shopping mall decoration. DES_6 worked more than 25 years as an architect and during this period he had a successful career in the building industry. In the middle 1990s, he took the opportunity to work as external designer for a furniture company and decided to change his professional activities. Nowadays he is senior partner in a major design and innovation office. DES_7 worked for some years as an architect before changing her carrier to work as a furniture designer and a furniture store owner. She built a local well known brand, based on an authorial approach. Sometime she designs products for a Brazilian furniture and decoration retail chain. Table 1 presents a synthesis of experienced designers design processes, as well as their profiles (background and context of activity).

Table 1 Experienced designers: academic background, context of activity and design process

DES_1	DES_2	DES_3	DES_4	DES_5	DES_6	DES_7
Arts *2004 (1989) external designer*	***Product Design*** *1990 own store*	***Product Design*** *1990 external designer*	***Product Design*** *1992 external designer*	***Architecture*** *1984 (1993) external designer*	***Architecture*** *1969 (1996) external designer*	***Architecture*** *1983 (1996) own store*
Problem clarification	Demand	Briefing	Thinking beyond the brief	Knowing client needs	Knowing the client	Idea
Research	Formal and functional experiments	Brainstorming	Target group Research	Searching for references	Concept development	Formal and functional experiments
Conceptualizing and testing	Modelling	Modelling	Brief reframing	Checking restrictions and expectations	Commercial stage	Modelling
Embodiment	Prototyping	Prototyping	Conceptualizing	Conceptualizing		Prototyping
Production	Detailing	Detailing	Development of strategies	Modelling		Detailing
Launching			Concept development	Detailing		
				Production and implementation		

*(year) informs when he/she started working as a product designer

DES_1 and DES_6 present similarities despite the fact they described their processes in different levels of detailing. Both of them work for medium and large industrial companies

and adopt an iterative and interactive approach for concept development, also they use to be involved during all stages of product development, from research to launching. DES_1 has developed a detailed design process, based on his practical experience, colleagues' influence and theory he got by means of self-education and formal education. This process is oriented to deal with business needs, and involves exhaustive research in order to know all significant aspects about production, users, competitors, sales, logistics, etc. Conceptualizing and embodiment are done by means of an intensive iterative and interactive work. He follows all the production and launching stages, in order to guarantee the product quality. Similarly, DES_6 developed a three-stage design process that is oriented to deal with company's technological base and business strategy. He states "(...) when you're in the technological process perfectly mastered, then you go to the product". For him the concept development is an iterative process, described by means of a conical helix that represents how the initial concept becomes an increasingly tangible concept during product conception, embodiment and detailing. The final stage also involves iterations; but these, represented by a cylindrical helix, are not supposed to be done in order to improve the concept; they aim to solve some problems related to production and sales. Despite of some differences, we consider that these designers present a similar approach. Both of them aim to develop a potentially successful product based on business strategy and they recognize that they need to work closer as possible with internal stakeholders. In their discourse we noticed a singular difference, while DES_6 presented a higher level of self-esteem, DES_1 presented himself as an actor, not as an author. His approach may be exemplified by means of his belief that concepts should be subjected to all sorts of criticism and attack, for this he uses to call them "Judas"[1]. He considers that he has to develop so many "Judas", or concepts for discussion, as it could be necessary to reach a satisfactory solution for the problem.

DES_2 and DES_7 clearly represent a cluster of professionals who are involved with a more informal context, and their processes reflect this fact. DES_2's former experience and the market he performs his professional activities leads to an informal and intuitive methodological approach. He described his design process as a creative process that has two origins: own demand and a company demand. In both cases the work starts by doing formal and functional experiments with materials aiming to reach a clean result, using very few elements as it is possible in order to get the best solution. In his process, after this stage, prototypes are used to final formal adjustments and to solve production problems. He believes that his repertoire and sensibility allow him to avoid unpleasant paths, as when he draws he considers how the product will be done: how will be the components and how they will be assembled. On the other hand, DES_7 stated that her process always starts with an idea, either when she is working for a client or not - sometimes the idea "comes from nothing". She argues that the initial idea is the final idea, so her work involves idea's improvement in order to reach the desired result and to make it a feasible. Her design process does not follow any rules, as she declared, "In some cases, this process leads to new ideas, abandoning the original. But usually, the initial idea is the basis of the final result". In her work, culture plays a main role: products she has designed present strong cultural references linked to Extreme-South Brazil and Uruguay. Both of them stressed the importance of formal and functional experiments for their design processes, following an authorial approach: the products that they design reflect their personnel values and tastes. The way they described how they work is the closest one in this study. As a summary, we can say that intuition, cultural references, and functional, constructive and formal possibilities exploration compose their design approach.

[1] In Brazil, during Easter, there exists a non-official catholic tradition of mistreatment of Judas Iscariot effigies that involves hanging and flogging. So the name Judas is used in the sense of something that should not be respected.

Working for many years at events market, DES_3 presented a process that he developed to meet his design studio needs that are mainly concerned with designing booths for trade shows. He does not adopt a formal or structured methodology, his design process is a potpourri based on theory and practice. In some sense, his design process is similar to DES_2 and DES_7, as he focuses on exploring (by means of brainstorming), modelling, prototyping and detailing. The main difference among them is that he adopts a product-oriented approach to deal with business requirements. He does not perform as an authorial designer.

DES_4 and DES_5 do not work for industrial companies who have formalized processes, so they are allowed to work more freely, according their preferences. DES_4 believes that a design method should be an open space to research and improvement. His design process starts by asking himself about what could be done in order to exceed client's expectations, stated in the brief. For him the creative principle emerges after doing some research, when he is able to reframe the brief, leading to a concept. On the other hand, DES_5 described his design process in a way that corresponds to his current activity and reflects his background as an architect. His works starts in a preliminary meeting with client, the next step is searching for similar situations by means of internet research and specialized books, after this step and before starting to develop the first concepts, he uses to return to the place for which was commissioned the project to analyse local restrictions and verify client's expectations. Only then he starts developing design concepts, initially by means of hand drawing. Both of them described the way they work as individual-centred processes, but they do not present themselves as authors. They adopt product-oriented approaches to deal with business requirements.

This group presents a heterogeneous composition concerning academic background: DES_1 is a self-taught designer; DES_2 and DES_4 studied at the same undergraduate Product Design course, in São Paulo; DES_3 also studied at a Product Design course in Rio de Janeiro[2]; DES_5 got his degree in Architecture from a local university; finally, DES_6 and DES_7 studied Architecture at another local university. This variety does not emerges in their discourses. The differences among them are not related to their academic background. We observe that work context emerges as a factor that affects their discourses: external designers who work for industrial corporation adopt corporate-oriented approaches; external designer who work for different clients adopt product-oriented approaches; and store owners adopt authorial approaches.

3.2 Intermediate level designers

Four of the designers we interviewed correspond to the intermediate level. All of them have a Product Design undergraduate degree and work as an internal designer for industrial companies. DES_8 has worked for the same industrial company since he was finishing his undergraduate course and nowadays he is the designer-chief. DES_9 started her career working for a design studio and for some years she is working for an industrial company as a member of the product development team. DES_10 worked for a design studio for some years before he started working for an industrial company. DES_11 is working as a product designer for an industrial company since she started her professional career. Table 2 presents a synthesis of their design processes, as well as their profiles (background and context of activity).

[2] The first undergraduate Product Design course in Rio Grande do Sul started in 1989.

Table 2 Intermediate level: academic background, context of activity and design process

DES_8	DES_9	DES_10	DES_11
Product Design *2005* *internal designer*	***Product Design*** *2005* *internal designer*	***Product Design*** *2006* *internal designer*	***Product Design*** *2007* *internal designer*
Needs exploration	Research	Opportunity exploration	Research
Opportunity evaluation	Concept development	Research	Concept development
Product project	Finalization	Concept evaluation	Concept evaluation
Product evaluation		Product development	Detailing
Production planning		Product evaluation	Injection mould development
Pilot batch evaluation		Injection mould development	Market test
Launching		Pilot batch evaluation	Launching
		Launching	

DES_8 works for a company that produces tools for professional and domestic activities. He and his team have developed an approach for product development that we classified as corporate-oriented. At the time he was interviewed the process was not formalized or described on a detailed way. It is a tacit-shared process that follows steps and uses well-defined techniques that he and his team apply in a flexible way, in order to meet different products and contexts they work for. Design team uses some different techniques as Task Analysis, Usability Tests, Mood Board, Brainstorming, but he considers Observation of Users the most relevant. DES-10, who works for a company that produces home utilities, described his design process as a well-structured process that presents similarities concerning DES_8's design process. However, differently from DES_8, he performs individually his activities as a product designer, and he did not cite specific techniques. We classified his approach as product-oriented. He stated that his design process is based on academic references, but he did not remember the authors that influenced him.

DES_9 works for another company that produces home utilities. As aesthetics has a central role in product development and evaluation, she values creativity and sensibility, although she also considers production restrictions as important as consumer's desires. She adopts a non-structured approach that is based mainly in personal values, beliefs and experiences. It is a self-centred design process, as she considers her repertoire is enough for developing new products. In some sense, her approach is close to DES_2 and DES_7, as individual creativity and formal and functional exploration have a major role for her.

DES_11 also works for a company that produces home utilities. Her design process is based on research, mainly focused on people, culture, market and materials. Initial research results usually generate new questions that lead to deeper researches in a narrowed focus. Before launching the product to the market, pilot batch is used to perform a market test in order to refine the product (mainly formal aspects and consumer reactions are considered at that moment). Even working as an internal designer at tactical and operational levels, her discourse demonstrated that she consider strategic issues.

This group is the most homogeneous in our sample, as all of them have an undergraduate degree in Product Design and work as internal designers. It is relevant to comment that DES_8, DES_9 and DES_10 studied at the same design course. So, it could be expected that, at least, these designers could share a common methodological approach. But among them only DES_8 and DES_10's described design processes that have similarities. Despite of the fact that they start their processes differently they share some considerations about the role of a product designer in an industrial company. Partially, the differences between their processes may be explained for the kind of products each of them designs. On the other hand, DES_9

assumed an authorial approach even working as an internal designer at operational and tactical levels. With a different academic background, DES_11 described activities and stages that are similar to those that DES_8 and DES_10 described; especially she is very focused on users as DES_8. We consider, based on their discourses, that commercial requirements and technological constraints contributed to conform the way that each of them acts as an internal designer. The interactions between each company' environment and each designer's personality generated different approaches: DES_8 and DES_11 are corporate-oriented; DES_9 is authorial; and DES_10 is product-oriented

3.3 Novice designers

We interviewed seven novice designers who have performed for less than five years as professional designers. In this group all of them have a Product Design undergraduate degree. DES_12 worked for an industrial company for few months after finishing her undergraduate course and she was working for a design studio at the interview moment. DES_13 presented himself an entrepreneur and he was working as an external designer for an industrial company. DES_14 was working for a design studio since he finished his undergraduate course. DES_15 was working for an industrial company as an internal designer at the time he was interviewed. DES_16 was a graduate student in a Design Program and she was working for a design studio, when she was interviewed. DES_17 never worked for a design studio or for a company; his experience as a professional has been developed by means of working as a freelancer product designer. DES_18 was a recently graduated product designer at the time he was interviewed and he is a partner of a new design and architecture studio. Table 3 presents a synthesis of the design processes of novice designers, as well as their profiles (background and context of activity).

Table 3 Novice designers: academic background, context of activity and design process

DES_12	DES_13	DES_14	DES_15	DES_16	DES_17	DES_18
Product Design *2009 designer in a studio*	***Product Design*** *2009 external designer*	***Product Design*** *2009 designer in a studio*	***Product Design*** *2010 internal designer*	***Product Design*** *2011 designer in a studio*	***Product Design*** *2012 freelancer designer*	***Product Design*** *2012 external designer*
Problem identification	Research	Know suppliers	Demand	Informational analysis	Informational project	Research
Research	Concept development	Visual research	Knowing the client	Informational project	Conceptual project	Concept
Analysis	Concept evaluation	Concept development	Research	Alternatives generation	Preliminary project	Concept evaluation
Alternatives generation	Concept refinement	Prototyping	Concept development	Detailing	Detailed project	Alternatives generation
Evaluation	Final evaluation	Evaluation	Concept evaluation	Finalization		Alternative evaluation
Research			Concept refinement			Prototype development
Analysis			Product evaluation			Pre-production
Alternatives generation (...)			Detailing			Production monitoring

Among them, some have similar academic background: DES_12, DES_13 and DES_14 studied at the same design course where DES_11 got her undergraduate degree; DES_15, DES_16 and DES_17 studied at a design course in another city. Only DES_18 got his undergraduate degree in another design course. Comparing their discourses we did not find any relation between academic background and approach. Each designer described his/her design process in a different manner.

However, we observed different levels of professional maturity. DES_12 and DES_15 described their process in ideal modes, far from practical concerns. In opposition, DES_13

and DES_18 demonstrated high engagement related to commercial and production issues and their processes reflect it. DES_14 described a design process that reflected his own role working for a design studio: he did not emphasised commercial aspects or users needs, these topics are defined for his chief. Finally, DES_16 and DES_17's discourses revealed their lack of experience.

Designers who are more idealist or less experienced tend to refer to some design theories. DES_12 stated that during her undergraduate she was very influenced by design theorists' books, and this influence affected the way she started working as a professional and later she knew IDEO's approach. She believes that a design process "has no finishing point: time and resources defines when it finishes". During her undergraduate course, DES_16 worked for her university junior‘s enterprise and in this period she developed some projects. For supporting these projects she studied several design method’s authors. As she would like to work with industrial waste, she developed a mixed and flexible approach that she calls a “five-phase methodology”. The names she gave for each phase and the techniques she described for the first phase - synchronic analysis, diachronic analysis, life cycle analysis, ergonomic analysis and functional analysis – reflect influences from product design and engineering design authors.

Designers that are business-oriented described their processes by means of a more realistic picture. DES_13 stated that each project requires a different methodological approach. The design process he described is a general process that has to be adapted according the context he is working. DES_18 described the process he and his colleagues developed to meet their design studio needs. From research to prototype development, this process may be considered as a continuous searching for get information about client's needs and possibilities (technology, network, suppliers) and to optimize product features. Both of them stressed the relevance of knowing client’s contexts. Their discourses are mature, compared with other novice designers we interviewed.

We believe that individual differences (personality, cultural traces, life experiences, etc) have a major role for this group. Especially it was perceived on three cases: DES_12, DES_14 and DES_15. DES_12, who stated that design process "has no finishing point", had difficulties in order to deal with real problems when working for a industrial company. She expect to perform as a brilliant designer, a creative person, not as an actor in a process. DES_15 expressed similar expectancies during the interview: he would like to work as a creative professional not as a problem-solver. During the interview DES_14 adopted a laconic discourse when asked to talk about his design process, he felt noticeably uncomfortable at that moment. For him and for DES_14, it was very difficult to describe their design processes, basically because they would like to develop their projects by means of an ideal model, not as they actually perform. These three novice designers presented the same problem: the difficulty for dealing with real design processes in industrial companies that are absolutely different from projects that they had performed during undergraduate courses.

On the other hand, both DES_13 and DES_18 presented high level of self-esteem and noticeable professional attitude. We can suggest that they are able to deal with design at a strategic level because of this characteristic. It is relevant to consider that in Brazil product designers do not are professionally recognized as architects and engineers are. These are respected as authorities in their fields. Product designers have to prove their individual competencies in order to get professional respect and recognition.

Novice designers presented two work contexts that are not presented by experienced and intermediate level designers: designer in a studio and freelancer designer. In our sample, all of them presented lack of experience (DES_16 and DES_17) or some kind of difficulties (DES_12 and DES_14). Certainly it is not a representative sample of the designers in these work contexts.

4 Conclusions

We believe that the summaries we present in this work contain the essence of each designer's discourse concerning their methodological approaches. We consider that the way each of them used to talk about his/her process reflects habits (how they use to communicate), knowledge (what they know about formal design methods) and approaches (how they perceive the design process). Some of them use formal or quasi-structured process, especially who works as internal designers, but most of them adopt a flexible and, in some cases, an intuitive approach. Designers who described his/her process in a more formal way tend to constitute two clusters: designers who work as internal designers and novice designers who are more likely to adopt formal methods. It is relevant to consider that designers working for industrial companies or for design studios, in this sample, do not follows some kind of corporative methodological approach. We suggest that nature of business and type of experience with product development affect designers discourses, more than academic background.

We found different approaches: corporate-oriented, product-oriented and authorial. Among experienced designers we found a pattern: external designers who work for industrial corporation adopt corporate-oriented approaches; external designer who work for different clients adopt product-oriented approaches; and store owners adopt authorial approaches. Among intermediate level designers, all of them internal designers, we found also these approaches.

Few designers talked about techniques they use during his/her design process. Brainstorming was the most cited technique, but only for three of the designers. Several analytical techniques were cited, but designers' discourses did not point to a shared repertoire. Alternative generations was a common activity cited by the novice designers, but it was not present on other groups. For these concept development was the most cited activity concerning creative efforts in order to transform needs, requirements and constraints into a product.

An aspect we also analyzed was the identification of similarities among the respondents discourses and design methods available in literature. Depending on the background of each of them, association with an method or author could be either easier or extremely risky. One reason for this fact lies in the informal learning that led, in some cases, to the development of similar approaches to what some design methods authors have proposed. Methods, techniques and activities tend to be idiosyncratic, created and/or adapted for their needs. We need to reinforce the effects of interactions between each of the designers and the professional environment where he/she works.

None of them adopts a methodological approach based on design theory or design literature. All of them adapted their processes to the context of activity. These findings apparently point to a chaotic professional environment. For instance: how could managers evaluate so different approaches as DES_1 and DES_9 adopt? If design methods could be scientifically defined we could suggest some kind of validation process in order to define which one is the best one. We prefer to adopt another perspective to think about the different approaches and design

methods we found in our study. The methods that we found reflect a representative part of the state-of-art of Brazilian professional approaches for designing. They have been developed for these designers to deal with their practical problems. Probably some of them are not exactly the description of the way the designer actually performs her/his work. If some of them would be successful in the future, it is possible that they will be published and used as a method for design learning. That was the path that tacit and empirical design methods crossed in the past before became known.

Finally, it is relevant to reinforce that the results we presented in this paper are related to our local context. Despite the fact that is acceptable to talk about a Brazilian design culture, it is also true that in Brazil there exist large differences among regions. Especially, Rio Grande do Sul differs significantly from other Brazilian states, mainly for European cultural influences. In this state, some micro-regions have Italian and German roots, and most of these micro-regions are highly industrialized. It affects organizational culture, especially because most of the industrial companies are family based. To generalize any conclusion it would be necessary to analyse designers discourses in different Brazilian regions.

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