

User-Centred Design Research Methods: The Designer's Perspective

Anne Bruseberg and Deana McDonagh-Philp

Department of Design and Technology, Loughborough University

ABSTRACT

Direct contact with users can provide a valuable resource for designers, who often design products for use outside their own experience. Design research is currently being undertaken, which is concentrating on developing a training package and guide for the use of focus groups during the designing process – aimed at both undergraduate and practising designers. The initial stage of the project investigated the resources available to designers with particular emphasis on those resources that were regularly utilised. This paper reports the results of a series of interviews with practising industrial designers – to examine methods used during the concept generation stage, and highlight designers' perceptions toward focus group methods.

1 FOCUS GROUPS FOR USER CENTRED DESIGN

A focus group is a collection of individuals that have been brought together to discuss a particular topic, issue or concern. A moderator (a chair) provides a framework and structure to the meeting, integrating open-ended questions to promote discussion. The method relies upon the interaction between the individuals, encouraging *synergy* within the group (1). Focus groups assist in qualitative data collection, providing detailed insights into individuals' beliefs, experiences and perceptions, rather than statistically secured facts (2).

For the designer, user needs should be paramount. Products satisfy a number of needs, from the functional to the emotional. The user needs should be considered as early as possible – ideally, before and during the concept generation phase. Product developers, such as Industrial Designers, need to immerse themselves in tangible data (e.g. anthropometric, market research) and less tangible data (e.g. symbolic associations, user perceptions) to enhance effective product development. Designers can find themselves designing products for use outside their own experience, understanding and expertise. To a certain extent the designer can rely upon personal knowledge and experience, but this is often limited. Direct contact with users, to gain information about the potential users and the product in use, can provide a rich resource for the designing process (3). Hence the authors recommend that focus group methodologies may offer an effective form of data collection during the informative stages of the designing process (e.g. concept generation). Focus groups enable direct communication between designers and users. Employment of this method enables general and specific exploration of issues, as focus groups combine both context and depth. They provide backgrounds, reasons for individual opinions and experiences (2). Focus groups are suitable to retrieve data that is not readily available or experience not previously expressed. They provide depth for habit-driven topics (4).

It has been recognised that designers would benefit from the inclusion of design-research methods at undergraduate level. Recently graduated designers have been found to consider themselves as “poor researchers and now view researching as an important aspect of design education” (5). Designers need to immerse themselves into the design task specified by the design brief by collating a range of different types of information. We suggest that designers would benefit from the ability to carry out focus group research themselves. Designers often do not have access to the original material collected by market researchers. Through this division of labour, vital details may become lost through summarising the results. Moreover, designers may be particularly suitable to decide which are the most relevant questions to users regarding the design of a product. In focus group discussions, users provide feedback in their own words, thus helping the designer to understand user needs, including their aspirations and emotional bonds to products, as well as their cultural background.

The project currently undertaken at Loughborough University concentrates on the development of methods to support user-centred design. It is a one-year project funded by the EPSRC (Engineering and Physical Sciences Research Council) to develop focus group methods for designers. The method needs to be adapted to the requirements of designers. It may be combined with a variety of other methods from design practice and ergonomics (e.g. observation of product handling, rating scales, task analysis, or mood boards) to ensure an optimum output. A set of suitable techniques will be developed through a practical application to the design of a small domestic appliance. The final outcome of the project will be a resource of focus group material, a training guide for designers, as well as a range of conceptual products (e.g. kettle, toaster and coffee maker).

2 THE CASE STUDY

2.1 The aims of this case study

At this early stage of the project, the needs of designers require clarification, as they will be the users of the focus group guide and methodology. Hence, the working practice of designers needs to be understood – particularly to what extent design practice differs from the resources described in the literature. We also need to know whether, and under what conditions, designers perceive focus group techniques as appropriate to their work, and how the technique would fit into the methods commonly used. More information is needed about the formats of data that designers prefer, and how focus group data is currently being communicated to designers from external sources.

2.2 The interviews

A total of five designers were interviewed during this study, lasting between one and two-and-a-half hours. They included two freelance designers, one working for a design consultancy, and two working for a major manufacturer. Their ages ranged from 22 to 52 years. They were chosen to gain an overview over a broad cross section of design practitioners. The designers were interviewed using both open questions and a questionnaire. The questionnaire (refer to Figure 1) listed a range of different methods derived from the literature. It functioned as the basis for discussion, enabling coverage of many different design areas, as well as the different activities that designers engage in. It was also intended to identify which methods described formally in the literature (refer to Table 1 for a complete list), and taught at University level, differ from design practice. The list also included tools (e.g. CAD), and

information resources (e.g. databases). All methods were briefly explained to provide clarification. Due to the extensive range of methods covered, a grid was utilised to indicate the different modes of method usage. Designers were invited to provide initial comments as appropriate and fill in the questionnaire.

		frequency of use				type of project			time line - please indicate when you use the methods					
		was it part of undergraduate training	never	rarely	often	always	minor improvements	modification of important details	major change, novel ideas	design planning	examine problem	generate ideas	evaluate and select	design of form/details
Feel free to add methods below														
EXAMPLE		√			√			√	√	█	█		█	
26	performance specification method													
27	quality function deployment method (QFD)													
idea generation														
28	constraint propagation													
29	product feature permutation													
30	orthographic analysis													
31	SCAMPER/ checklists													

Figure 1 Extract of the questionnaire

The questions asked retrieved information regarding the product area that the designers work in, the types of tasks they are given, and the scope and circumstances of methods varying with different tasks. Questions regarding focus groups included the following:

- the degree of familiarity with the methods;
- details about how focus group data are communicated to designers;
- when focus group data would be useful;
- whether designers would find it beneficial to carry out focus group research themselves;
- views on suitable formats for presenting a training guide for designers.

2.3 Findings

2.3.1 The resources used by designers during the concept generation stage

The data were evaluated qualitatively. The questionnaire provoked a valuable discussion about the design process and the methods used. At times, designers preferred to offer comments, rather than filling the questionnaire in. Designers reported they tend not to use the formal methods described in the literature. This is mainly due to time constraints. Instead, an intuitive approach, using elements of most of the methods listed, is used – without applying any formal analyses. Freelance designers rarely carry out design planning activities that involve marketing activities. The more systematic the methods were, the less likely they were to be used (e.g. objectives tree method, evaluation matrices). There were considerable differences between the individual designers’ preferences for methods. This is partly because design projects vary in content and context. Also, each designer seemed to have a personal set of adapted methods, adjusted to particular circumstances and requirements. All designers found it difficult to describe the creative design process and emphasised the iterative nature of designing – based on the repeated generation and evaluation of concepts in co-operation with the multi-disciplinary product development team.

Table 1 List of methods collected from the literature (including references)

corporate planning - design planning		
1	SWOT analysis	(6)
2	PEST analysis	(6)
3	tracking study	(6)
4	product maturity analysis	(6)
5	product development risk audit	(6)
6	systematic opportunity selection	(6)
7	competing product analysis	(6)
8	consider technological opportunities	(6)
9	style planning	(6)
preparation/ understanding the problem		
10	Parametric analysis	(6)
11	Problem abstraction	(6, 7)
12	Product function analysis	(6, 7)
13	Transform to other area	(7)
14	Random input to stimulate thought	(7)
15	Counter planning	(7)
16	Objectives tree method	(7, 8)
17	Functions/ means tree	(7)
18	Alternatives tree	(7)
19	Task analysis	(6)
20	Life cycle analysis	(6)
21	Interview customers	(9)
22	Focus groups	(2)
23	Observational analysis	(10)
24	Benchmarking	(9)
25	Visiting	(9)
26	Performance specification method	(7, 8)
27	Quality function deployment method	(6, 7, 9)
idea generation		
28	Constraint propagation	(9)
29	Product feature permutation	(6)
30	Orthographic analysis	(6)
31	SCAMPER/ checklists	(6, 8)
32	Analogies and metaphors	(6, 8)
33	Synectics	(6, 7, 9)
34	Clichés and proverbs	(6)
35	Brainstorming	(6-9)
36	Brainwriting	(6)
37	collective notebook	(6)
38	boundary shifting	(8)
39	morphological chart	(7-9)
40	new combinations	(8)
41	lifestyle boards	(6)
42	mood boards	(6)
43	theme boards	(6)
concept selection		
	evaluation matrix to rank concepts	(6)
44	utility function method	(7, 9)
45	Pugh's method	(9)
46	dot sticking	(6, 9)
embodiment and detail design		
47	physical models	(6, 9)
48	computational models	(9)
49	"just build it"	(9)
50	rapid prototyping	(9)
51	process-driven design	(9)
52	part elimination strategies	(9)
53	assembly design	(9)
54	tolerance design	(9)
55	component design	(9)
56	manufacturability improvement method	(9)
57	elimination and simplification strategies	(9)
58	standardisation and rationalisation	(9)
59	standardising internal components	(9)
60	guided iteration	(9)
61	analytical optimisation	(9)
62	taguchi method	(9)
63	probabilistic design	(9)
64	failure modes and effects analysis	(6, 9)
65	design review checklist	(8, 9)
66	value engineering method	(6, 7, 9)

2.3.2 Perception on the use of focus groups

It was clear that the designers had a generalised understanding of focus group activity. None of the designers had ever carried out focus group research. For most designers, focus group data was a rare source of information. Two designers from the manufacturing company had once observed a focus group session.

Several designers were concerned about the significance of information that focus groups provide. They emphasised that focus groups would have to be well planned with clear objectives to avoid unwanted data being collected. There was concern that participants in focus groups may not be intuitive enough to contribute to new concept generation. Some designers expressed concern about the skills required in conducting focus group research – regarding issues such as the quality of questions, moderator skills, and efficient data analysis. The designers raised issues including: the individual has to be teased to convey honest information; designers are good with *things* – not necessarily with people; the method needs to be less time-consuming. Only one designer was confident that asking users about their perceptions of new designs, when using prototypes is easily done.

Designers, who are dependent on work given to them by a client, viewed the use of focus groups as almost impossible in their situation – as clients would not be prepared to pay for additional user research. This is because the client would have obtained the information already, and because clients do not view research activity as one that designers should carry out. Designers are anxious that researching user needs would be regarded not just as an additional cost factor, but also as a weakness, because the designer “should know”. Designers working directly for a manufacturer emphasised the professional status of designers – “if you go and ask the public what to design you are not *flowing* – you are following culture, you are not *shifting*”. The use of the method for generating new design was seen as constraining – “you end up doing what other people have in their imaginations...it’s up to the designer to push a bit further”. It was pointed out that users couldn’t be expected to look into the future, as customers will rarely be prepared to reflect beyond the artefacts that they have interacted with, seen or heard of. One of the questions raised was “...what would then be the role of the designer?” It was suggested that attention has to be paid to the problem that focus group participants might have difficulties in focusing on the topic, as they need to get out of their usual mode determined by their daily concerns, into a more visionary one. One designer preferred a discussion with people of “similar beliefs”, so that there is some “common ground” based on trust – since it was seen as important to make a focus group a “shared experience”.

Designers had different views regarding the stage in the design process where the methods would be suitable. Some designers saw the importance of involving users early in the process, to assist in understanding cultural issues such as lifestyles and wider issues beyond functional details. Others preferred the use of focus groups for the evaluation of designs only, particularly as it would be most useful to be able to observe the product in use. One designer highlighted the difficulty of a group evaluation for a product designed by the person who moderates, as the personal aspects involved might cause an uncomfortable situation for both the participants and the designer. Interesting insights could be gained about the difficulties in integrating the information input into the creative process. It was described as an “intuitive learning process”, during which ideas ‘ripen’. The question was raised to what extent focus groups can be applied during this flexible process. There was resistance to data collected by other departments (e.g. marketing), as it was difficult to interpret and can prove restrictive.

Despite this negative reaction, designers conveyed their awareness about the need for a close consideration of user needs. Most designers regretted that they lacked detailed information, as it is often not provided by the client or market research departments. The need of immersion into the culture and aspirations of users and specific user groups was seen as particularly vital to design successful products. One designer emphasised the importance of knowledge about the product in use. Observation of product use was recognised as important, particularly where expert users have difficulties in reflecting about their routines.

2.3.3 Suggestions for the format of the training guide

The strongest message was that the guide should clearly show the benefits of the method to designers, inviting them to use it. Comments made included: present it as “I found it, it found me”; “send it as a birthday present”; “I would prefer somebody to talk me through it”. Designers pointed out that the method would be difficult to communicate. The application of the method requires a paradigm change, possibly making it necessary to “link it more into education”. Interactive presentations were recommended. A booklet outlining the benefits was suggested, in combination with a CD to explore the material according to what is most

relevant. One designer preferred a book version because of the number of hours spent using a computer. Different types of media (e.g. book, website) with a good structure and a range of visual material was suggested. It was recommended to combine text and video showing many examples of use, to keep the designer interested.

3 CONCLUSIONS

This study has highlighted the reservations designers have to toward focus group activities. This may be due to pre-conceptions, but also due to practical limitations. The study revealed a series of insights into the requirements of designers regarding the adaptation of focus group methods for application by designers. The examination of design methods revealed the diversity of design practice, and the need for flexible design methods, demonstrating that methods are rarely applied in the formal ways suggested by textbooks. Designers appreciate the value of user involvement in order to gain increased empathy to enhance the designing process. However, the way in which the method is presented is of paramount importance. The next stage of our project will be concentrating on a designer-friendly guide that may incorporate visual, audio and two-dimensional material. Product success relies upon the needs of the user being satisfied on a number of levels. Focus groups offer the designer, as a new product developer, a user-centred design approach that can enhance the final design output.

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