

Deriving User Requirements From Face-To-Face and On-Line Focus Groups.

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Lacking user-related data in concept design, and not being experienced in the principles of user-centred design, design students find themselves having to predict or imagine user requirements when generating concepts. Computer mediated focus groups between dispersed participants and designers may be a cost effective way for designers to capture user requirements in distant markets. However, little is known about how the on-line focus groups compare to their face-to-face counterparts in terms of the elicitation of user requirements and design related discussion. This paper describes focus group techniques designed to achieve understanding, identification and categorization of user requirements in concept development.

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Abstract

Lacking user-related data in concept design, and not being experienced in the principles of user-centred design, design students find themselves having to predict or imagine user requirements when generating concepts. Computer mediated focus groups between dispersed participants and designers may be a cost effective way for designers to capture user requirements in distant markets. However, little is known about how the on-line focus groups compare to their face-to-face counterparts in terms of the elicitation of user requirements and design related discussion. This paper describes focus group techniques designed to achieve understanding, identification and categorization of user requirements in concept development.

Introduction

User-centred design is used to increase understanding of user's needs and desires in new product development. However, if direct user input is not available in concept design, designers often find themselves trying to predict or imagine user requirements when generating concepts. This becomes especially difficult for products designed for niche or foreign markets. This research takes a focus group approach in which the designer can interact with the participants as a way of providing the designer with information about the product he/she is designing for.

Focus groups have been employed in the design process to capture users' opinions and perceptions in market research and for product evaluation. Such groups are normally run in face- to-face mode. This research considers the potential role and organisation of virtual focus groups for the design profession. In these, participants from the target marketplace can be recruited and engage in a cyber-discussion of user requirements, needs and desires. Such virtual focus groups could be supported in two ways – by a web site, and a mainly text based asynchronous discussion forum, or through a videoconference. This research explores the potential of the latter to generate user requirements for industrial designers wishing to design for global markets.

A comparison of the results and interactions of on-line groups with their face-to-face groups will help in determining what features need to be considered when organizing a virtual focus group and more importantly address any biases in the user requirements

generated by each method.

From a market research perspective, Greenbaum (1996) claimed that videoconferencing of focus groups could be a means of achieving live group discussion and enabling clients to observe the process remotely. Bruseberg and McDonagh (2003) stress that end users can participate in design sessions exploring new product development and human factors/ergonomics, and that such methods contribute to 'evidence-based design decision-making'. With the maturation of technology and development of applications (e.g., FocusVision and Group Net), focus groups-via-videoconferencing have several significant advantages such as, saving money for client organisation, increasing the size, and representativeness of the target audience and ease of conducting additional sessions (see also Table 1). However, there are disadvantages in conducting focus groups in cyberspace, such as communication and co-ordination problems, meeting facilitation and moderation, remoteness and lack of control, and development of rapport.

Table 1: Summary of the advantages and disadvantages of face-to-face and on-line focus groups

<i>Technique</i>	<i>Advantages</i>	<i>Disadvantages</i>
Face-to-face focus group	'Focused data, revealing experiences and reasons for behaviour, can be elicited in a short period of time (Bruseberg and McDonagh, 2003); Quick and efficient technique for exploring user's thought.	Qualitative data from small sample sizes may affect the validation of quality.
Online focus groups	More people involved means more opportunity researchers may have; Better representation from the target Market; Save money on travel costs, facilities leased, recruitment administrative.	Pilot study need to be undertaken before running online discussion.

Vinsonhaler *et al.*, (1998) have argued, for example, that desktop video conferencing performs as well as face-to-face communication. Tang and Isaacs (1993) also anticipated that desktop conferencing could be used as a tool for multimedia- supported collaboration in distributed small group work. To overcome technical problems, Greenbaum suggested that 'researchers must plan appropriately to help neutralize the problems associated with this technique' (1996, p3) and that moderators should exhibit more self-confidence, be better organised and summarise the findings of the session (Greenbaum, 1998).

Harris and Sherblom (2002) state that characteristics of small group communication include complex transactions and interactive complexities amongst group members.

Focus groups are one type of small group and running a successful session requires consideration and facilitation of group interaction, the relationships and interactions between the group members and the whole process as these will directly influence the amount, depth and usefulness of the contributions made by participations.

The overall aim of the research was to understand the problems that can arise from conducting focus groups in cyber space, and whether there is a qualitative and quantitative difference in the user requirements generated by these remote, on-line focus groups.

Method for deriving user requirements in design sessions

In this section we will introduce the data collection and analysis procedure used to derive user requirements from both the face-to-face and computer-mediated focus groups. The focus groups were of a similar composition and were used to generate requirements for the same product (digital camera for a young person) at comparable design stages. In identifying user requirements during the design sessions we hoped to:

- investigate how the user requirements were generated
- understand more about the dynamics of computer mediated focus groups
- develop recommendations for more effective on-line focus groups

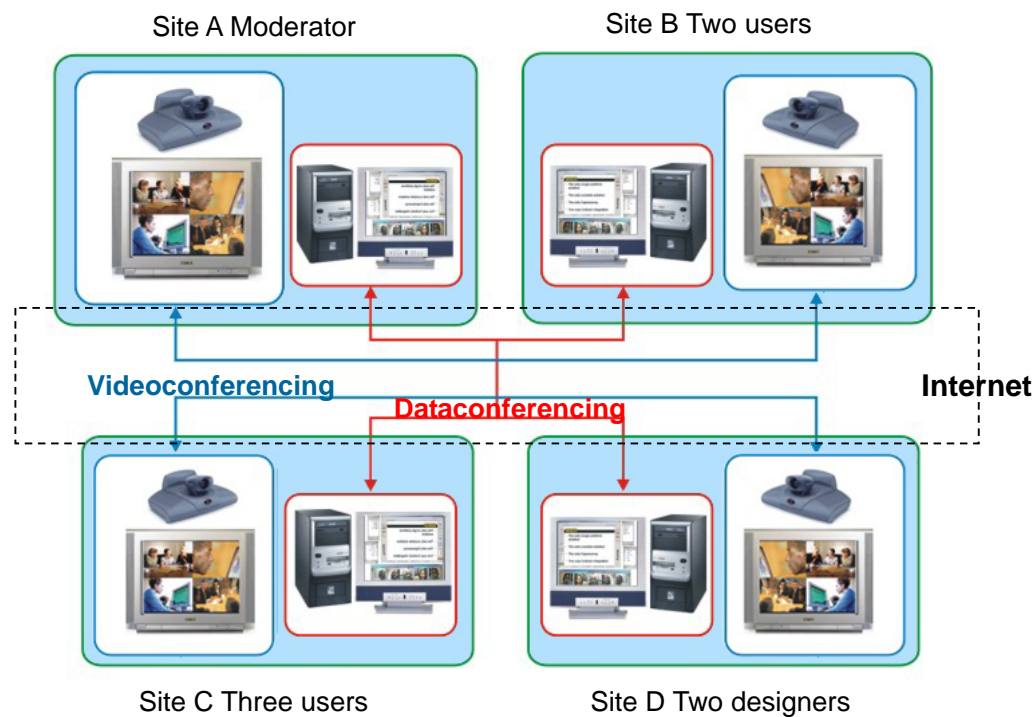


Figure 1: A hybrid structure including videoconferencing and dataconferencing

Conducting the focus groups

The face-to-face focus group met three times, during design briefing, concept generation, concept refinement, the remote group had an additional preliminary meeting as a technology pilot. Groups consisted of 9 participants, two designers and a mediator. Discussion was supported by design concepts and the competitor's profile that allowed design concepts to be selected during the course of the focus group.

Both videoconferencing and dataconferencing were used to support the on-line focus groups (as shown in Figure 1). Previous research reveals that these communication channels could support both video/audio signals and data messages smoothly flow through the infrastructure (Scrivener, Lee and Woodcock, 2003). So, in the remote sessions (Figure 2b) the designer used both video conferencing and data conferencing to support mediator and user discussion.



Figure 2a: Face-to-face focus group (on the left) and 2b, online focus groups (on the right)

The use of video conferencing enabled the geographically dispersed participants to create a shared environment. This meant using a synchronised group discussion Polycom MCU (Multipoint Control Units) and Interwise (a real-time communication platform) as shared applications over four sites. However, technological difficulties required limiting the number of participants (see Table 2 for comparisons between the two trials).

Table 2: Profiles of face-to-face and computer-mediated focus groups

<i>Characteristics</i>	<i>Face-to-face focus groups</i>	<i>Computer-mediated focus groups</i>
Participants	Moderator, Users*6, Designers*3	Moderator, Users*5, Designers*2 and facilitators
Communication media	Verbal communication	Videoconferencing and dataconferencing

Applications	None	Polycom MCU, Interwise
Visual stimuli	Product samples, prototypes, product categorized board,	Product samples, Website,
Activities before group discussion	Payment form, name cards, refreshment,	Payment form, Technical trial,
Design stages	Design briefing, concept generation, concept refinement	Pilot study, design briefing, concept generation, concept refinement
Design projects	Designing a digital camera for young people	Designing a digital camera for young people

Identification of user requirements

Most of the user requirements identified were located in the users' utterances rather than those of the moderator and designers. Popovic's (1996) coding scheme for focus group was used to analyse the protocols, an example of which is shown in Table 3.

Table 3: Generating user requirement in participant's protocol

<i>Coding</i>	<i>Utterance</i>	<i>Requirement</i>
00:11:00		
25 U1	Such kind of dimension I can accept, <u>but its anti-slip does not handle with carefully.</u>	Product hand-holdability

The user requirements were grouped into nine main categories relating to function, form, quality, usability, portability, lifecycle, price, product property and others. Two others validated the coding. Table 4 illustrates the requirement categories and their sub-categories appertaining to the product in question, i.e. a digital camera for young people.

Table 4: Categories developed to classify user requirements

<i>Requirement categories</i>	<i>Sub-categories</i>
Function	Basic function (e.g., auto-focus, video-recording, lens-extending, mp3..etc), additional function, resolution
Form	Appearance, colour, dimension, weight, material, surface texture and finishing
Quality	Product quality, overall feeling
Usability	Product operationability, easy to use, hand-holdability
Portability	Easy to carry,
Lifecycle	Product life, years of use, warranty period
Price	Sale price, budget
Product property	Features of LED screen, battery, camera

	lens, memory card, flash, protective lens,
Others	Rest of above requirements, such as brand, compatibility, generality, users' psychology, after-service..etc.

In the following sections we will consider in more detail the types of requirements generated in each category in each design stage in the two different conditions (face-to-face and on-line focus groups).

User requirements through face-to-face focus groups

Figure 3 shows the number of user requirements that emerged during each session for the face-to-face group.

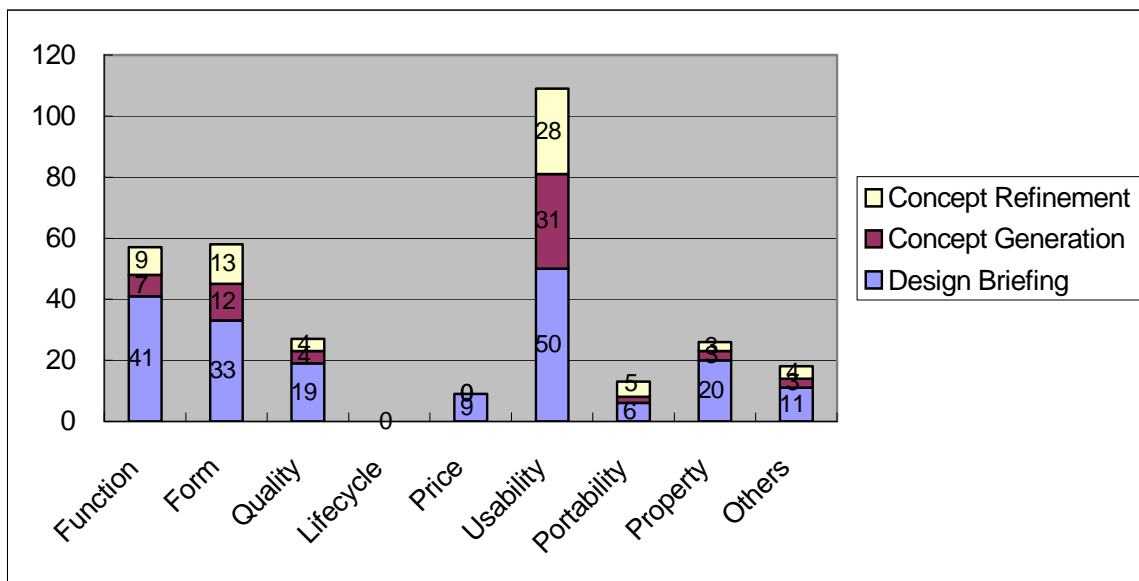


Figure 3: Summary of frequency of user requirements occurred in each face-to-face session

It was believed that the objects available for inspection by the participants, such as product samples and image boards, influenced the participants in the face-to-face focus group. The usability requirements generated related to operationability, easy to use, hand-holdability. This may mean that the digital camera is an operation-led product – (however, different results emerged for the on-line group). When talking about the product participants were able to consider their own experiences and aspirations. In the design briefing stage, the categories of usability, function and form provided the three largest groups of requirements. This may due to the stimulus material (*i.e.*, product samples, visual stimuli) presented during the meeting (Greenbaum, 2002). Usability issues continued to remain high in the remaining sessions.

Table 5 summarises the focus group interactions relating to user requirements in each of

the sessions. In all three sessions moderator-participant interactions were the most frequent, although this figure fell dramatically during the concept generation session. The moderator acted as a spokesperson during the meeting allowing participants to elaborate on the user requirements. Participants rarely talked directly to each other in any session.

Table 5: All face-to-face user requirements occurred during design stages against participants' interaction

Stages	Interaction Req.	Moderator-participant		Designer-participant		Participant-participant		Subtotal
		F	P	F	P	F	P	
Design Briefing		160	84.7%	22	11.6%	7	3.7%	189
Concept Generation		33	53.2%	26	41.9%	3	4.8%	62
Concept Refinement		59	89.4%	2	3.0%	5	7.6%	66
Total		252	79.5%	50	15.8%	15	4.7%	317

Key: F=Frequency, P=Percentage

Table 6 breaks down the user requirements contributions of each participant and shows the interaction patterns. This clearly shows the dominance of P1 and P6, and the crucial role of the moderator.

Table 6: All face-to-face user requirements identified in participants' interaction

Participants	Partic. Frequency	Participants						Subtotal	Total	Percentage
		P1	P2	P3	P4	P5	P6			
Moderator	M	71	35	38	18	61	29	252	252	79.5%
Designers	D1	6	1	1	—	4	3	15	50	15.8%
	D2	7	5	1	1	3	1	18		
	D3	4	1	3	3	5	1	17		
Participants	P1	—	—	1	—	2	—	3	15	4.7%
	P2	2	—	3	—	—	—	5		
	P3	1	—	—	1	—	—	2		
	P4	—	—	1	—	1	—	2		
	P5	1	1	—	—	—	—	2		
	P6	1	—	—	—	—	—	1		
Subtotal		93	43	48	23	76	34	317		
Percentage		29.3%	13.6%	15.1%	7.3%	24.0%	10.7%	—		
Frequency of speaking		183	130	139	76	139	101	768		
Req. generation (%)		50.8%	33.1%	34.5%	30.3%	54.7%	33.7%	41.3%		

Requirements generation= (subtotal/frequency of speaking)*100

User requirements through online focus groups

The material generated by the online focus groups was analysed in a similar way. Overall less user requirements were generated and the categories of form, function and usability accounted for the highest number of requirements (as shown in Figure 4), as opposed to usability, form and function for the face-to-face group. This may due to the different participants and communication technologies being used. For example, in the concept generation stage, participants watched computer-generated 3D images and may become more interested in their product preferences than usability, leading to more form related requirements.

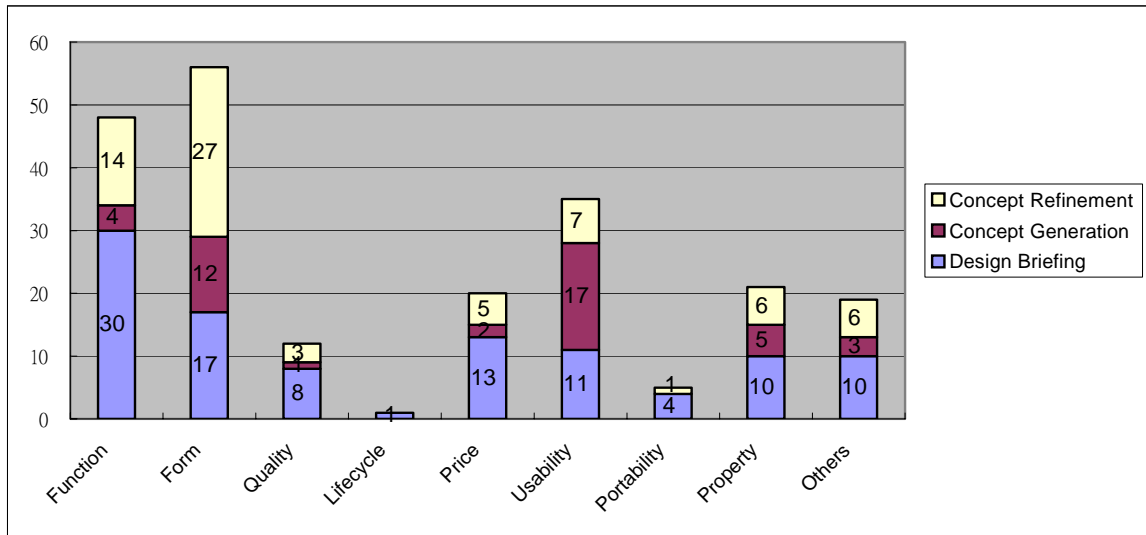


Figure 4: Summary of frequency of user requirements occurred in each online session

It may also be postulated that in the distributed on-line group, participants felt more distant from each other and were not able to engage in small talk or discussion unless requested by the moderator. This is clearly demonstrated in Table 7 where the moderator-participant interaction dominates all sessions.

Table 7: All online user requirements occurred during design stages against participants' interaction

Stages \ Req.	Moderator-participant		Designer- participant		Participant- participant		Subtotal
	F	P	F	P	F	P	
Design Briefing	103	99%	0	0%	1	1%	104
Concept Generation	39	88.6%	5	11.4%	0	0%	44
Concept Refinement	61	88.4%	8	11.6%	0	0%	69
Total	203	93.5%	13	6.0%	1	0.5%	217

Key: F=Frequency, P=Percentage

Unlike the face-to-face condition, all participants contributed a similar number of user requirements (ranging from 32-50) in their discourse with the moderator. Only one pair of participants generated a user requirement whilst talking to each other. However, in looking at the number of requirements generated per utterance, Table 8 shows the participants to be more task-focused generating more user requirements per utterance (110.7% as opposed to 41.3%).

Table 8: All online user requirements identified in participants' interaction

Parts		Participants							
		P1	P2	P3	P4	P5	Subtotal	Total	Percentage
Moderator	M	32	37	43	50	41	203	203	93.5%
Designers	D1	2	4	1	2	1	10	13	6%
	D2	—	1	—	2	—	3		
Participant	P2	1	—	—	—	—	1	1	0.5%
Subtotal		35	42	44	54	42		217	
Percentage		16.1%	19.4%	20.2%	24.9%	19.4%			
Frequency of speaking		32	41	31	53	39		196	
Req. generation (%)		109.4%	102.4%	141.9%	101.9%	107.7%		110.7%	

Requirements generation= (subtotal/frequency of speaking)*100

Reflections on running the focus groups

Advanced Preparations

Prior to running the on-line focus groups technical trials were conducted with a view to looking at the type of technical breakdowns that might occur and to develop avoidance strategies or rapid recovery mechanisms. A facilitator (see also below) was also provided at one of the sites to summarise important features prior to session being adjourned.

In the face-to-face focus groups designers were able to bring in prompts for the participants such as objects, concepts and mood boards to learn about the users' preferences, emotions and opinions. When these were presented electronically to the on-line group they did not seem to elicit the same requirements.

The Role of the Moderator

Obviously the role of the moderator and the support received from the designers was essential to the success of the focus group. The moderator should steer the group, not lead it, or allow any one participant to dominate. By analyzing the discourse in the focus group the pattern of interaction emerged as exemplified in Figure 5.

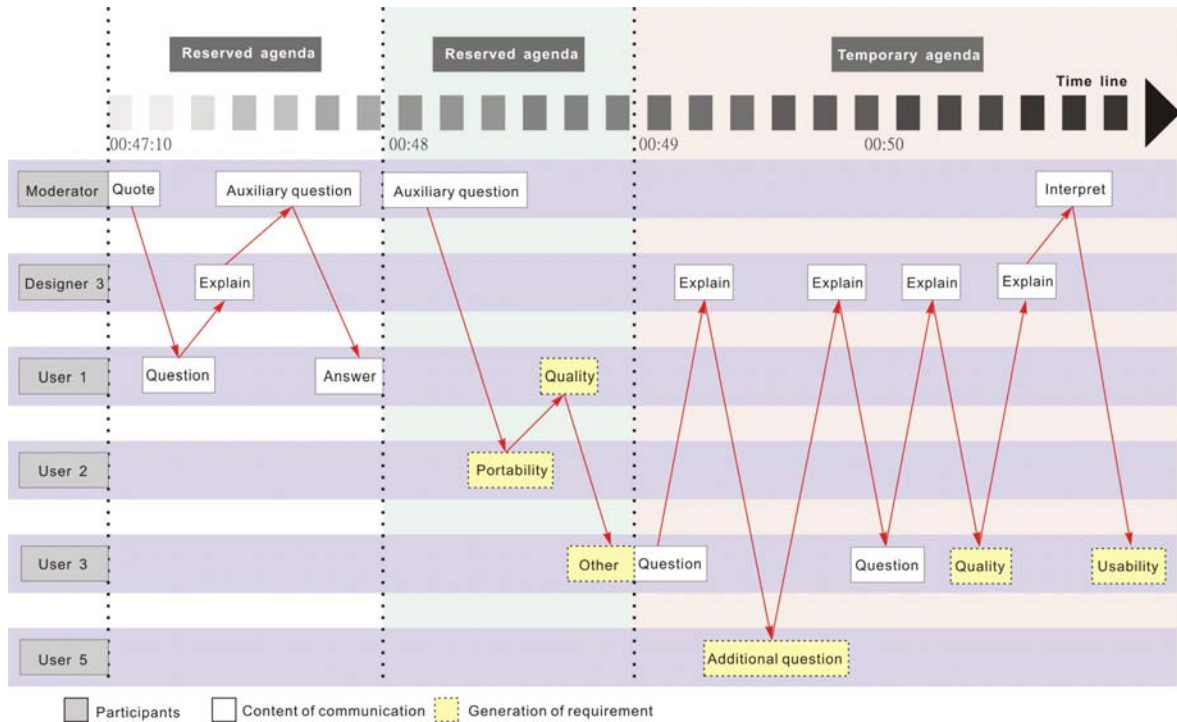


Figure 5: Requirement generation in face-to-face focus groups (in concept generation stage)

From the designer's perspectives, participating in focus groups enables them to experience first hand user needs and aspirations that can in turn guide the design. For example, in the design briefing session, the designers were confused about which design direction to take – whether to emphasize price, function, after services, or appearance, interface and texture. Working in advance, and during the session with the moderator led to clarity in this and other areas.

In terms of the organisation of the design sessions the moderator plays a key role in controlling the meeting in progress and to request participants to discuss interactively. The moderator had to be centrally concerned with ensuring participant engagement by fully attending to what was said and make appropriate nonverbal gestures, and making sure that all items were addressed in the agenda as well as taking note of key issues and specifications before meeting adjourned.

In the virtual focus group, members stated their thoughts and experience rather than handling tangible objects (e.g., product samples) and reflect on their perceptions and wishes on it. For the on-line focus group, in particular a facilitator was also needed to support the moderator by identifying users' perceptions, experiences and wishes and to remind them of the key issues requested by designers (Mann and Stewart, 2000).

Differences in User Requirements

Figure 6 shows that the face-to-face group, with access to physical objects concentrated more on learning and operating the digital camera, i.e. the usability issues. The inclusion of such prompts, or representations of the final product are therefore important to include in the focus group as they enable users to visualize and concretize actions thereby providing the designer with more information for user-centred design. This is not so easy to accomplish in the on-line groups, and may account for the reduction in the number of usability requirements generated.

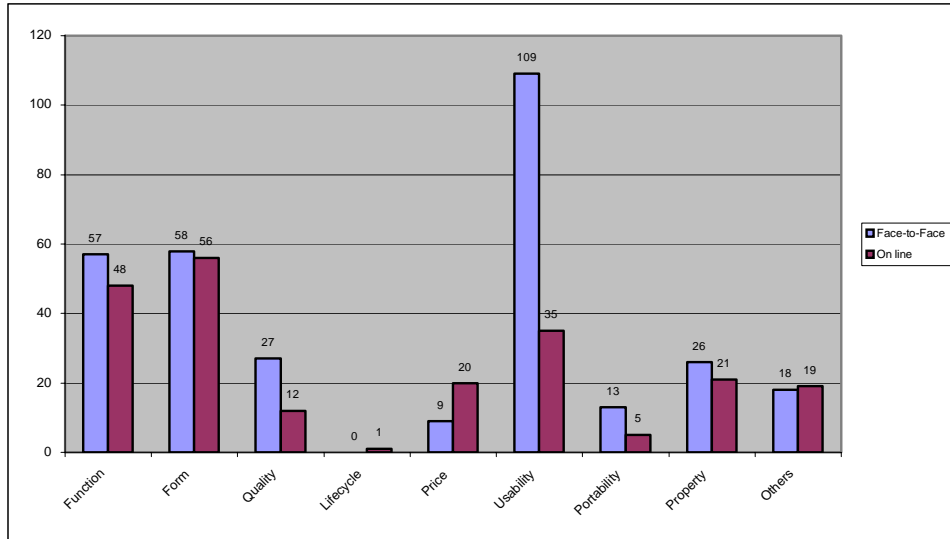


Figure 6: Types of user requirements occurred in the two focus groups

Conclusion and future recommendations

Discovering user requirements through group discussion (or focus groups) is essential training for industrial design students to understand user-centred design approach and user requirements. Student designers must know how to deal with user needs and desires and apply this knowledge in their creative works.

This research has looked at the way in which face-to-face and on-line focus groups might be used to elicit and later verify or supplement user requirements in the early stages of the design process. The results from both groups showed that a wide number of requirements could be generated, but that the moderator was a key actor in the process, with designer-participant interactions being very rare. It is important for designers to understand the effects of the group dynamics and leadership on the outcome (in this case as user requirements).

With the increased use of technology it is likely that requirements could be elicited from

potential users in overseas markets, living some distance from the designers. The preliminary findings reported here show that it is possible for user requirements to be generated, that participants tend to be more task-oriented, but that the requirements that are generated might be of a different nature. This will be important if it changes the brief specification (e.g. switching to a focus on form rather than usability). The results from this paper indicate that those running on-line focus groups need to ensure that participants have a set virtual and physical resources available for their inspection, at each site involved, and that designers are drawn into the process so that they interact with the participants.

Further research is required to confirm this finding and to look at ways of enhancing the group dynamics of on-line focus groups, especially in more complex teams in which different nationalities, disciplines and competencies are present. In such cases both the mediator and facilitator roles will become more important.

In conclusion, we believe that research of this nature will enhance design education curriculum development, especially in relation to user-centred design and will provide a set of best practice guidelines for designers wishing to conduct or participate in focus groups as part of their practice.

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