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## Learning from co-designing

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**Abstract:** *A designer-focused approach is often taken when observing co-design processes and the designers' learning is reflected rather than the users. This study takes an all-inclusive angle in observing an inclusive design workshop which involved five professional designers, five users from a diverse backgrounds, and five design researchers. Questionnaires were distributed to the designer and user participants, before and immediately after the workshop, to gather data about their opinions on broader issues relating to inclusive design. The design researchers carried out observations during the workshop, gathering detailed notes and audio-visual data. Follow-up interviews were conducted to identify any issues relating to the workshop, and to let participants reflect on their experiences. It was found that the participants interpreted inclusive design and user-involvement in many different ways. The designers were not necessarily 'user-centred', but the fact that they were brought together with the users in the workshop did make them think more inclusively. Challenges for co-design were identified and suggestions were made to improve the co-designing process.*

**Keywords:** *Co-design, inclusive design, workshop.*

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## Introduction

The underlying driver for co-design is that the design team will be better at designing if they have an empathic understanding of the people to design with and for (Mattelmäki et al 2011: 79). To embrace co-creativity requires that one believes that all people are creative (Sanders and Stappers 2008). The questions are: do designers naturally empathize with people? Do designers believe users are creative?

Ideally, in the co-design process, 'users', or 'design partners' are equal participants as designers. Fixperts (fixperts.org), the recently introduced co-design initiative which is rapidly expanding globally, emphasises this aspect by stating that the design process (documented in short films) should "place emphasis on the equally important roles" between Fixpartner (e.g. an end user) and Fixpert (e.g. a designer). In reality, do designers and users play equal roles in the co-design process?

The research aims to investigate these questions while focusing on inclusive design.

## Method

A popular method for co-design is workshops, which can take many different formats. A half-day workshop was organized for this research, with the following objectives:

- To introduce designers and users to each other

- To understand design from the participants' perspectives

- To organise co-design activities and observe interactions between the designers and the users

- To evaluate the co-design workshop

The workshop took place at Tongji University in Shanghai, China, in August 2012. Figure 1 shows the environment. The workshop had a focus on inclusive design, which refers to the "design of mainstream products and/or services that are accessible to, and usable by, people with the widest range of abilities within the widest range of situations without the need for special adaptation or design" (British Standard Institute 2005). This focus allows users to be chosen from a diverse background, thus giving an ideal opportunity to observe the interactions between designers and different types of users.



Figure 1. Co-design workshop environment

### Participants

The workshop participants were recruited through the researchers' existing networks with local designers and users/user organisations. The criteria for selecting designers were that they must have worked in the industrial design/product design fields as professional designers for more than five years; this was to ensure that they reflect the real-world design practice. The selection of users was aimed to cover a wide range of different types of abilities and age groups; this was to ensure all aspects of 'inclusion' were considered in the co-design process.

When the design researchers first contacted the designers and the users, they briefly introduced the aim of the workshop, asked the participants to prepare for the workshop (e.g. bringing self-introduction materials such as photos and their most liked and least liked designs), and answered any questions raised. The users were visited (at their preferred venue) to establish mutual trust between them and the researchers. The profiles of the participants are shown in Tables 1 and 2.

Table 1. User profiles

ID	Age range	Gender	Education	Profession	(Dis)ability
Ua	15-25	M	Middle school	Jobless	Cerebral palsy
Ub	36-45	F	Primary school	Community volunteer	Deaf
Uc	46-55	M	High school	Jobless (used to be a chef specialised in making desserts)	Poliomyelitis
Ud	61-75	F	University	Retired lecturer	Healthy
Ue	76-85	M	High school	Retired worker	Healthy, with vision declining

Table 2. Designer profiles

ID	Age range	Gender	Education	Professional experience	(Dis)ability
Da	26-35	F	Postgraduate	12-year design	Healthy
Db	26-35	M	Postgraduate	7-year product design	Healthy

<b>Dc</b>	26-35	M	Postgraduate	10-year product design	Healthy
<b>Dd</b>	36-45	M	Postgraduate	20-year product design (General Manager)	Healthy
<b>De</b>	26-35	M	University	10-year product design	Healthy

In addition to the ten ‘formal’ participants, two junior designers and two carers/guardians also attended the workshop. Five design researchers observed the co-design session, with a few postgraduate design students helping with recording and logistics.

### *Questionnaires*

Both designers and users were asked to fill out a short questionnaire before they attended the workshop, and immediately after they had finished the co-design activities. The pre-workshop questions aimed to illicit the participants’ existing knowledge and practice relating to design.

The pre-questionnaire for the users and the designers were similar, and they both included the following questions:

What are your criteria for judging good design and bad design?

What is your understanding of the design profession? (e.g. what do designers do? What responsibilities do designers have?)

What role do you think you can play in the design process?

The post-questionnaire asked the same questions again to see whether there were any changes to people’s answers before and after the workshop (i.e. whether the co-design activities contributed to people’s understanding of design, designers and their own roles in the design process). In addition, more open-ended questions were asked in the post-questionnaire. i.e.

What are your comments to today’s workshop?

What relationship do you think should be established between designers and users?

What suggestions do you have for our future workshops?

### *Observation*

In-situ observations were conducted. The design researchers were allocated to each group, and they sat among other participants, focussing on recording everything happened in that group, such as the interactions between the designers and the users, the activities and the decision-making process. Notes were taken, and annotations were made to help interpret the situation. Figure 2 shows a typical scenario where one design researcher was observing the co-design activities and taking notes, and another capturing visual data.



Figure 2. A typical co-design scenario

### Follow-up interviews

Follow-up interviews were arranged with the participants within two weeks of the workshop. The aim of the interviews was to identify any issues that were not shown in the workshop and to help the participants reflect on their co-design experiences.

The interviews took place in the participants' preferred venue (in most cases, user's home or designers' studios). The interviews with users were informal and open ended, and the interviews with designers were semi-structured. Specifically, designers were asked to explain their typical design process and comment on how users were consulted in their existing practice. They were also asked to comment on whether they think there is a need for designers to get to know the users, what inclusive design meant to them, and what methods and tools could support inclusive design.

## Results

### Questionnaires

The answers to the first three questions in the pre- and post- questionnaires are summarised in Tables 3a-3b, 4a-4b and 5a-5b. The differences between the answers are highlighted.

**Table 3a. Users' answers to the question "What are your criteria for judging good design and bad design?"**

	<i>Pre-workshop</i>	<i>Post-workshop</i>
Ua	Functionality	The combination of aesthetics and functionality
Ub	Functionality	The integration of functionality, appropriateness, durability, and low-carbon
Uc	I do my best in any job (misunderstanding of the question)	Not aesthetics, the only thing matters to me is appropriateness for purpose.
Ud	Simplicity, economy, appropriateness, aesthetics, plus 'newness and uniqueness'	Simplicity, economy, appropriateness, aesthetics, plus 'newness and uniqueness'

Ue	Functionality, aesthetics, novelty	Functionality, safe and convenience, novel style, and attractiveness
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**Table 3b. Designers’ answers to the question “What are your criteria for judging good design and bad design?”**

	<i>Pre-workshop</i>	<i>Post-workshop</i>
Da	The smaller the ratio between price/use time, the better the product	The same as before
Db	Outstanding in any of the following aspects: multi-channel, feeling and emotion, experience, or functionality	The same as before
Dc	Seamless experience	Depends on contexts. ‘appropriate design’ is good design, but from whose perspective?
Dd	Basic requirements: easy to use, appropriate appearance, comfort ergonomics – all are important. Higher-level requirements: taste – depends on individual, and difficult to standardise	The same as before
De	Functionality + aesthetics	Good design strives to meet the needs of the mass population

The results show that a key criterion of ‘good design’ from the users’ perspective was concerned with ‘functionality’, while designers had more criteria. The users’ criteria for judging good design changed more than those of the designers, after participating in the workshop.

**Table 4a. Users’ answers to the question “What is your understanding of the design profession?”**

	<i>Pre-workshop</i>	<i>Post-workshop</i>
Ua	Aesthetics and functionality	To design perfect products.
Ub	To understand user requirements and their specific needs. To design better, more appropriate, more practical products.	To listen to users more, to understand users’ specific needs. The designers’ responsibility is to understand people’s real needs and to design for the real needs.
Uc	Designers will encounter difficulties in their process which is understandable. I hope designers will design convenient items for disabled people. (misunderstanding of the question)	It’s good to see that designers are considering the clients/users in their design process.
Ud	It is designers who make decisions of whether products will be liked, accepted, or used.	To synthesise existing ideas, to adapt current social context, and to upgrade those out-of-date products.
Ue	Design should be human-centred. Designers should study people’s needs, and design easy to operate, convenient,	Designers should build their knowledge through studying people’s life, and create more needed, more convenient and

	and safe products.	safer, functional products.
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**Table 4b. Designers’ answers to the question “What is your understanding of the design profession?”**

	<i>Pre-workshop</i>	<i>Post-workshop</i>
Da	To make good design available to more people; at the same time to create profits for businesses. To create more, better designs.	Designers are only a small part (of the whole system), but to do our job well will reduce potential problems.
Db	To plan, to create artifacts.	Had some reflections during the workshop, but due to the limited time, failed to develop new understanding.
Dc	<ol style="list-style-type: none"> <li>1. to communicate users’ needs.</li> <li>2. to identify users’ needs.</li> </ol>	Designers can take more responsibilities than creating profits for the commercial world. They can influence design specifications. Good improvements without extra cost have the potential to let more people benefit from the design.
Dd	To integrate all elements and resources. Designers’ responsibility is to improve people’s life and to create new life styles.	The same as before. Designers materialise products and mediate the relationships between technology and people. He has responsibilities in several levels: personal value, clients’ profits, users’ ease of use, and ethics and environmental responsibilities.
De	To better meet consumers’ needs for different products, to pursue higher and better life standards.	The designers’ responsibility is to meet mass consumers’ needs.

The results show that users’ understanding of the design profession is more ‘product-focussed’, while designers’ understanding of the design profession is less ‘product-focussed’. After the workshop, three out of the five users emphasised the importance of designers’ taking consideration of people’s needs into the design process.

**Table 5a. Users’ answers to the question “What role do you think you can play in the design process?”**

	<i>Pre-workshop</i>	<i>Post-workshop</i>
Ua	To express my humble ideas and inspire better ideas.	To beautify objects. (The user likes drawing and he’s good at drawing)
Ub	To explain user needs to designers, to help designers better understand users. To provide feedback to existing products.	To help improve products, e.g. make them easier to use.
Uc	If I want to do something, I’ll do it well and try to achieve the ideal.	If I have good ideas and suggestions, I’ll try to have more, and do better.
Ud	To learn from existing designs.	You can design when you have a “Eureka” moment.
Ue	To express my ideas.	To provide my ideas for (designers)’

	reference.
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**Table 5b. Designers’ answers to the question “What role do you think you can play in the design process?”**

	<i>Pre-workshop</i>	<i>Post-workshop</i>
Da	To provide in-depth insights and suggestions.	The same as before.
Db	To investigate and explore from many different means and channels.	From problem solving to problem-healing.
Dc	To find where to start.	In my viewpoint, designers play the role of a facilitator in many cases. He needs to have good communication skills to influence the process and help to define the direction (of product development).
Dd	To integrate self-knowledge and all resources in order to lead design towards the direction that I believe is right.	The same as before.
De	To help businesses to pay deep-attention to consumers while helping create added-value to their products.	To make decisions on design. To provide guidance to clients.

While several users regarded their role in design (before the workshop) as ‘providing information to designers’, designers tended to see themselves in design as ‘providing solutions and creating added value’. Interestingly, after the workshop, four out of the five users started to realise that they could be actively involved in the design process beyond merely providing information for designers.

The findings relating to the last three questions in the post-questionnaire will be incorporated in the Discussion section.

### *Observation*

In-situ observation results were captured by notes. Here is an example of such notes in its natural sequence.

Designer e: Took the hand-made tool – a multifunctional peeler made by User c – from the table and studied its blade, observing its adjustable feature and its flexibility in peeling vegetable skins at different thicknesses, commenting: “ This is a rather good feature. Chinese people sometimes think it is a waste when peeling too much skins off.”

User c “ Yes, the tool I made, when you press the blade in, you only peel off very thin skins, and bend it this way will avoid hurting the user...”(stopped as Designer e started to talk again)

Designer e: “But I’m concerned with the durability of the blade, in addition, the material is not comfortable to hold.”

Designer c: “I’ve seen a peeler made of silicon.”...

Conversations on specific topics were also recorded by notes, and the following is a selection of the notes (not in their natural sequence) from one group about the participants’ discussion on ‘inclusive design’.

Designer a: "We have to find a focus which reflects inclusive design principles; it should be used by any human being."

Designer e: "But it is not necessary for children to use the kitchen. We should consider accommodating left and right-hand use."

Designer a: "For older users, they need to be able to hold the weight."

Designer c: "I think another inclusive concept would be to make one thing that can peel skins of many different vegetables."

Designer a: "The hand size of male and female users are different."

Designer e: "If we can make an ordinary person to cook food as good as a chef through our design, would this be considered as inclusive design?"

Designer a: "If the user does not have an index finger, how could this tool be attached to his hand?"

Designer c: "Inclusive design is not necessarily related to disability."

The implications of these notes will be discussed in the Discussion section.

### Interview

The interview with users suggested that although all the users appreciated their participation in the workshop, especially the opportunity to get to know designers and the design process, some of them were not comfortable in the co-design session as they felt that designers were dominating the process and were proposing "nice-looking but not practical" solutions to the problem.

Tables 6-9 summarise the key findings from the interviews with the designers.

**Table 6. Are users involved in your company's typical design process? Why?**

ID	Answers
Da	Yes. Because they know better the needs.
Db	Yes, mainly involved in earlier stages. The aim for user involvement was to clarify the problem and identify a focal point.
Dc	No, users are not much involved. Only when we design something we are less familiar with, clients will provide design specifications, including the input from potential users.
Dd	Relatively little user involvement, mainly because of the considerations of cost. Clients often do not want to spend time and money on user research. They tend to think that they are the experts of the product. They know better than anybody else. They pay attention to the sales, but are not interested in the reasons behind.
De	Yes, users use products, and designers cannot represent them, if the schedule and budget allow, we always get users involved and would like to involve them throughout the process. We also make use of our own networks and resources, such as relatives and neighbours for testing our products. Sometime we advice clients to conduct user research, even at the cost of ours.

User involvement varies in the existing company processes, from little, to a certain extent (e.g. earlier design stages), to as much as possible within available resources.

**Table 7. Do you think designers themselves need to get to know users? Why?**

ID	Answers
Da	Yes. We need to know who buy our products, our target users.
Db	Yes, but not every time. Designers are not designing for themselves, and direct contact with users is not always the best way to understand users.

<b>Dc</b>	Yes, it is important to get in touch with different types of users. Research reports are not sufficient; the process of contacting users contributes to the final design solution.
<b>Dd</b>	Yes. There is a need for designers to get to know users in person, but this also depends on projects. Different methods should be adopted in different projects. If it is a less familiar field, or if there are “extreme users”, we must do user research ourselves. However, if it is something we are already familiar with, there is no need for user involvement.
<b>De</b>	Yes, different types of products correspond to different needs of people.

All the designers think it is necessary for them to get to know the users, but not necessarily for every project.

**Table 8. Please explain what ‘inclusive design’ means to you.**

<b>ID</b>	<b>Answers</b>
<b>Da</b>	Designs that more people can use, can afford, and are fond of.
<b>Db</b>	Based on “human-centred design”, emphasising humanity and responsibility of design.
<b>Dc</b>	Do design broadly: broader target users, broader environments, and broader time span. But I doubt the practicality of inclusive design in commercial worlds. Not all the designers need to do inclusive design. On one hand, design can address broader audiences, on the other hand, design can be done in greater detail and depth.
<b>Dd</b>	I still do not know the differences between inclusive design and universal design. They do not differ much. They both aim to make products more convenient to use for more people. There is a need for universality, but not necessarily for every product.
<b>De</b>	Design to include more people, design to reduce the demand on user capabilities, design that everybody can use.

Designers interpret inclusive design in different ways, and some do not think it is necessary for every product.

**Table 9. What methods and tools do you think would support inclusive design?**

<b>ID</b>	<b>Answers</b>
<b>Da</b>	Through campaigns and promotion, as we promote sustainable design. Try to change people’s mindset; no longer just focus on the new and the different, no longer just pursuit fame and profits.
<b>Db</b>	Empathy, inclusive process.
<b>Dc</b>	Workshop, prototyping and testing on site.
<b>Dd</b>	Communication with users, involvement of users, prototyping and simulation, visual recording.
<b>De</b>	1. Simplifying use 2. Iterative testing 3. Taking consideration of end users 4. Taking into account other stakeholders and factors, such as clients and cost 5. Putting designers’ feet in other people’s shoes; always trying to think from a different perspective.

Designers list a number of methods and tools, ranging from prototyping, testing with users, to changing people’s mind set.

## Discussion

The research is an in-depth study of co-design from both the designers and the users’ perspectives, in the Chinese context. Although the numbers of participants were small, and by no means representative of the population, interesting insights were gained.

## Insights

Designers and users see design differently. This is first demonstrated by the items they brought to the workshop as their liked and disliked designs. The items brought by the users were predominantly individually made arts and crafts (e.g. hand-knitted hat, scarf, decorations made from recycled materials, and hand-made kitchen utensils), while the items brought by designers were all mass-produced industrial products (e.g. cameras, milk/water bottles, lamps, mobile phone chargers, chopsticks, a comb and a pill dispenser). This might be because 'design' meant different things to designers and users. All the designers had an industrial/product design background; they tended to think 'design' from their professional perspective. The users tended to associate design with style, decoration, or tools.

Co-design did not seem to be a 'natural' process for either the designers or the users. The observation suggested that designers were more interested in listening to other designers, rather than the users; and they sometimes 'forgot' the users. Although designers did consult the users from time to time, mainly through asking generic and abstract questions such as "what is your opinion on this?" they did not seem to take users' comments seriously. One of the design researchers added a question in his notes: "are designers really listening to the user?" On the other hand, users did not speak much in the co-design session, and they were only engaged when there was a topic that they were familiar with, for example: 'peeling skins of new potatoes'. Sometimes users did not seem to know how to contribute to the conversation, and they started to use general terms such as 'functionality', 'aesthetics' to describe their needs.

The fact that designers and users were brought together in the workshop did make them think more inclusively. This can be seen from the selection of notes (Observation section) about the participants' discussion on 'inclusive design' where they talked about 'left and right handed use', 'older user', 'including different vegetables', 'male and female hand sizes' and 'disabled persons'.

Opinions had a degree of change after the participation of the workshop, both for users and the designers (see Tables 3a, 3b, 4a, 4b and 5a, 5b), although no consistent patterns were observed.

Back to the questions:

Do designers naturally empathize with people?

The observation suggested no. Design empathy requires designers not only be informed and inspired by users, but also be able to observe and feel for the users (Ho et al 2011: 96). The co-design session did not show such empathy. The designers used professional terms a lot, such as 'material', 'ratio', and 'usability', which were difficult for the users to understand. Sometimes the designers interrupted while the users were expressing an opinion. No detailed questions were asked about the users' experience. When confronted by a different opinion from the users, the designers simply made a comprise, rather than investigating why the users said that. Here is an example:

Design b: "In terms of aesthetics, we'd better adopt a low-profile style, not too unique, because different persons have different tastes".

User d: "I disagree. If the product is not unique, it won't sell. We cannot adopt the low-profile."

Design b: "Let User d decide on the aesthetic criteria then."

User a: "I agree to respect senior persons' perspective."

In this case, Designer b made a compromise, either because he did not have effective ways to communicate with the user, or because he was not interested in the user's opinion.

Do designers believe users are creative?

Again, little evidence from the study suggests that designers believe that the users are creative. Users may innovate if and, as they want something that is not available on the market and are able and willing to pay for its development (Von Hippel, 2005). A good example of this is the peeler brought by User c who used to be a chef. The peeler has a lot of advantages over the similar products on the market, but the designers criticized it a lot. While they were brainstorming new concepts, little considerations were taken from the user's redesign of the tool, as if it did not have much value.

In reality, do designers and users play equal roles in the co-design process?

It proved to be a challenge for designers and users to play an equal role in the co-design session, as users seemed to be less confident. This might be because there were fewer users than designers (junior designers also participated in the co-design session, and the design researchers were regarded as 'designers' by the users) or because the environment and the working method were more familiar to designers, and less familiar to users. One designer made a suggestion in the post-questionnaire:

We should go to the users' environment to design. Discussion and sketching might not be a familiar method for users, maybe we can do something different, for example, let designers and users cook a meal together. In that kind of situation, users will perform more like themselves, and designers may be able to capture more design focal points.

### *Suggestions*

When asked for suggestions, users tended to give very positive comments on the workshop, and suggested that more such workshops be organised in the future.

Designers provided more constructive suggestions, for example,

Involving more users of similar (dis)abilities in the workshop

Giving opportunities for designers and users to get to know each other better

Providing more information about the aims, focus and the logic of the workshop, and giving more time for the co-design activities.

Briefing designers in advance to come to listen more, talk less.

Based on the observational data and the insights obtained, the following suggestions are proposed for consideration in organising such workshops in the future (Table 9).

**Table 9. Suggestions for future workshop: key points to brief designers and users**

	<i>Designers</i>	<i>Users</i>
Attitudes	Listen to the users, respect users' knowledge and expertise of using products. Be patient, and pay attention to users' real feelings.	Trust designers' abilities in design and communication. Listen to designers, especially when designers talk about topics that users

		are not familiar with.
Communication	Try not to interrupt while users were talking, avoid jargon.	Use plain and natural language, avoid unnecessary 'complication' or 'decoration'.
Dealing with disagreements	Explain with patience. Give convincing reasons.	Express one's viewpoints and provide convincing reasons.
Design process	Try to propose more practical, less conceptual solutions.	Be brave; express one's design ideas.

Sufficient time should be given for designers and users to interact with each other, and to establish a comfortable working relationship. Other more specific suggestions include:

**Briefing designers and users in advance**

Both designers and users need to be briefed in advance, so that they understand the value of co-design, and are prepared to respect and listen to each other more.

**CREATING AN APPROPRIATE ENVIRONMENT FOR CO-DESIGN**

The environment should make the designers and the users both feel comfortable. The studio environment for the co-design workshop was too unfamiliar to the users. If the co-design focuses on 'insights searching', it would be useful to use a familiar place for the users where they can talk and behave naturally. If the focus is on 'concept generation', the environment can be a materials workshop where lots of materials are available for co-design. It is also important to note that users (and manufacturers) tend to build prototypes of their innovations economically by modifying products already available on the market to serve a new purpose ( von Hippel , 2005). In the future, idle items from everyday life may be brought to the co-design workshop as materials for prototyping to engage users.

**USING VISUAL LANGUAGES FOR EFFECTIVE COMMUNICATION**

Visual languages and tools, e.g. 'generative tools' proposed by Sanders et al (2008), could be used to enhance communication between designers and users.

## Conclusions and future work

The co-design workshop brought designers and users together, and provided basic materials and tools for them to interact with each other; this has allowed the researchers to observe the whole process as it naturally happened. Key findings include:

The designers were not necessarily 'user-centred' or naturally empathetic with people, but the fact that they were brought together with the users in the workshop did make them think more inclusively.

It proved to be a challenge for the designers and the users to play an equal role in the co-design session. The designers showed more confidence and control in the process.

Suggestions were made to improve the co-designing process. More co-design workshops were planned for the future, to apply the knowledge learned from this study, and to investigate how designers and users can collaborate more effectively to achieve optimal design processes and outcomes.

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