

# Modeling the Role of Empathic Design Engaged Personas: An Emotional Design Approach

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**Abstract.** Norman suggested three dimensions of emotion to approach user-centred design to raise awareness of the importance of designing for users to achieve a higher level of satisfaction. In other words, the design should satisfy the user's emotional desires beyond usability. This opinion explains user-centred design more broadly. Companies, such as Apple and Microsoft, have already employed anthropologist to observe users' daily behaviour. Unfortunately, gathering information on users' needs is costly, time consuming and complex and has, therefore, become a barrier for designers. Additionally, most emotional design only covers shape design instead of all emotional aspects. There is little previous work devoted to tackling these problems. This research, therefore, proposed using empathic design with the assistance of personas as the main approach to emotional design. We first investigated the designers' current design pattern to explore the difficulties and problems. Next, personas were used to ascertain how they could help designers to engage in emotional design. Comparisons were then given to show the effectiveness of the proposed method. This study invited 16 designers to partake in this assessment. We explored how personas help designers in idea generations by using emotional design and some guidelines were suggested for future research.

**Keywords:** User –Centred Design (UCD), personas, empathic design.

## 1 Introduction

Today, user-centred design (UCD) is widely regarded as the design philosophy that defines how a design should be made by understanding the user's needs. In addition, the whole design process is examined iteratively to be user-centric by the guideline ISO 13407 to enhance the practice of UCD [1].

In the early years, the promotion of UCD was meant to solve the problems that had been encountered by some designs, those that were difficult to use and that frustrated users. Norman pointed out the guidelines for designers in his book, "The Design of Everyday Things", helping them to correctly design functions by considering the users [2]. However, he argued in his next book, "Emotional Design", that design should cover not only the cognitive parts but also human emotion. Therefore, he proposed three dimensions of emotion, visceral, behavioural and reflective, and suggested that designers should not neglect the role of the user's emotions when designing [3]. In

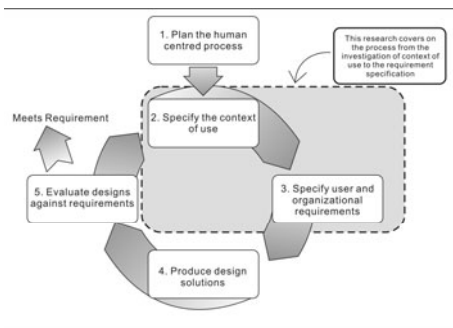
other words, design should be customised by taking both users' cognition and emotion into account. Jordan also has similar viewpoints. He suggested the "four pleasures", which are physio-pleasure, socio-pleasure, psycho-pleasure and ideo-pleasure [4]. In addition, the satisfaction in function and usability is not enough to make users feel pleasure at a higher level of satisfaction. Jordan's points also indicated that user-centred design could be more complete by the explanation of satisfaction in advance. Therefore, the design is not the argument of design by following "aesthetics" or "functionality"; the proportions of the design elements are subjective to users.

Nevertheless, UCD is now used more in large enterprises even though there are several approaches to achieving UCD, such as contextual design, participatory design and empathic design. The reason is because the involvement of users makes the design costly. Most designers have a problem in understanding users when faced with them since it needs a high level of skill to arbitrate the decisions among users in a meeting and a professional background to resolve the users' behaviour during observations. Consequently, empathic design focuses on more aspects for the designers in the early stages of design. In addition, although empathic design offers "observation" as the method, the key point is to understand the users. Therefore, we only adapt the meaning "understanding of users" as the basis. To ask designers to think and behave like users could be a comparatively cheap solution as there is no "real user" involvement. Hence, the researchers suggested a method based on empathic thinking in order to help designers in the early stages of design to promote the benefits of cost effectiveness that are easy to manipulate.

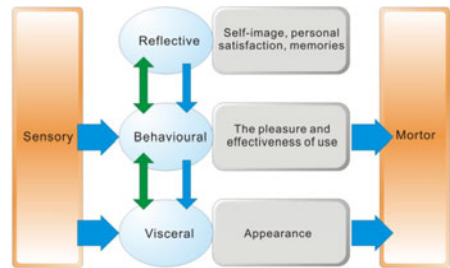
This paper aims to explore the use of empathic design mixed with personas in order to help designers in the early stages of design to undertake emotional design more easily, enabling it to be more cost and time efficient. By doing this, we can persuade more usage of emotional design. 16 designers were invited to evaluate the proposed model by two-phase experiments and the experiment methods were interviews, think-aloud protocols and video recording. More findings are discussed in the results and discussion section. Through this research, we found this proposed method helped designers in emotional design and future suggestions were given.

**User-Centered Design:** User-centered design (UCD) is a design concept first mentioned by Donald Norman (1990). The definition of UCD is as its name implies, design according to users' needs. Norman criticised many inadequate designs that surround us and highlighted how they discouraged users from using the products. The significant difference of UCD is that it aims to persuade designers that design should consider the users' needs during the whole design process rather than adjusting users to accommodate the products. Even though more and more companies are aware of the advantages of UCD and believe UCD to be an important philosophy, the different properties of products mean that following UCD becomes a difficult task. The International Organisation for Standardisation (ISO) provides a framework in ISO13407. It suggests the human-centred design mechanism of the application and the evaluation. Although ISO 13407 offers a basic guideline for the interactive design process, it is not intended to specify the particular methods required to approach UCD. In addition, one of the major points in ISO13407 is the iterative structure of the design process, as shown in Figure 1. It clarifies how the design should consider the user during the whole process.

**Emotional Design:** In “Design for Everyday Things”, Norman admitted that user-centred design defines design by considering the user’s wants. However, at that time he only considered that products “make sense”. In other words, he only suggested the guidelines for cognitive thinking. Later, Norman proposed a supplement to this in his book “Emotional Design”, which pointed out the important role played by human emotions when designing interactive products. The main points of emotional design are based on three levels of emotional processing: Visceral, Behavioural and Reflective. As we can see from Figure 2, using this model we can easily reflect design elements according to emotional behaviour. In other words, different users may reflect their different desires on different aspects of design elements, such as aesthetics, functionality and usability. This can explain the reasons why some products that are difficult to use are still loved by some customers, whereas those that look good are more attractive to certain users.



**Fig. 1.** The process of UCD and the area of this research [5]



**Fig. 2.** The three-levels of human emotion reactions connected to the product characteristics.[3]

**Empathic Design:** This is an approach to UCD where the designer attempts to get closer to the lives and experiences of users and to apply the knowledge from end-users during the design process [5]. The goal of empathic design is to ensure that the product or service is designed to meet the needs of the end-users and is usable. Nevertheless, the users are only indirectly involved in the design project. It therefore tends to become ‘designer-centred’ instead of UCD. Additionally, professionals in empathic design promote the use of observation, although sometimes it is difficult to have the chance to freely observe the users in a particular situation. In addition to this, the involvement of users requires the design to need more skills and costs. Consequently, in this research, “personas” are used to overcome these issues and enhance the use of empathic design.

**Personas:** After Alan Cooper first promoted personas in his book, “The Inmates are Running the Asylum” [6], personas have been widely used in the computer science domain. Personas provide user profiles that can represent a group of people. The two main benefits of the use of personas are for communication between teams and to help designers to focus more on their users [7]. More findings, in terms of the use of personas, have been researched by Microsoft. In their work, they used personas to

develop their popular software, such as “Office” and “Messenger”, finding that the use of personas was a great benefit to design tasks. In addition, famous Japanese businesses are using them for organisation communication. The authors will use personas as the key technique and, inheriting many of the advantages from work previous to this research, we intend to investigate how personas can help a designer to develop their product concept in their individual work. This research will analyse the aspects that the individual designer can use to connect with emotional design, especially few scholars contributed in the area that the process of the use of personas with emotional design.

## 2 Methods

By reviewing the literature we will propose methods for this assessment. There will be a two-phase assessment. First is to investigate the current design pattern of the participants. The second will be to apply the proposed model to observe how designers conduct the idea generation. We will then compare the differences before and after the use of the persona-method to reach the conclusions.

### 2.1 The Proposed Method: Empathic Design with Personas

We have arranged a two-phase experiment. In the first phase, we aim to survey designers’ current design patterns. During the second phase, we will conduct the proposed method and then make comparisons in order to further evaluate the effectiveness. The plan of the experiment is showed in Figure 3.



**Fig. 3.** The Illustration of the assessment plan

16 designers participated in the assessments. Even though this research can apply to various product categories, some control factors were defined in order to examine the comparable information in this assessment. Firstly, we assigned the same product in all the design tasks in which designers were asked to develop their product concepts. Additionally, the interviewees were required to have a similar background and to be able to manage the development of a design concept for a single product. Moreover, the designated task was confined to designing a product for use by an individual instead of a multi-user product. Also, the specified design task needed to cover all the elements of “appearance, function and usability”. Each participant spent about 30 minutes undergoing interviews and the design tasks. A personal use product was specified to simplify the use of the personas. The design task needed to contain the appearance, function and usability in order to project the three emotional layers. Due to the criteria mentioned above a portable MP3 player for the group “pages 25-34, office ladies” were selected as the experimental task.

## **2.2 Phase I: The Investigation of the Current Design Pattern**

During this phase, semi-structured interviews and think-aloud were undertaken in order to acquire details of the interviewee's background.

## **2.3 Phase II: The Investigation of the Use of the Persona**

The second phase is to introduce the personas in order to investigate how they can help with the design task. Before the task is examined, some assumptions are proposed: The designers are trained to have the design common sense to design and they are assumed to have the imagination for the operation of fictional characters. Otherwise, the participants and the target task remained the same as for the first phase. The persona should be developed from the anthropology survey, except for the name and the photo, according to the previous literature. This is to avoid stereotyping a persona from familiar names and photos. Additionally, for reasons of ethics, it is essential to protect any private and personal data. Therefore, this study licensed photos from the FERET database (Figure 4. left side). The names were chosen from the most popular UK names on the website. The profile of the persona was taken from a lady who was located in our target market segment. Due to the limited task time available, the authors only assigned one persona, as the illustration on the right side of Figure 4. shows. Task 2 took 10-15 minutes and the participants were asked to design, applying the same conditions as the first phase. The only difference was they needed to develop their concept using the specified persona provided. The persona is located within the same market segment, "25 to 34 year-old office ladies". The point of this research is the investigation of the interaction between designers and the personas and the creation of personas is another big process.

# **3 Results and Discussion**

## **3.1 The General Background and the Context of Design from the Interview**

Thirteen of the designers were from Asia, two of them were from the UK and one was from the US. As we can see from Table 1, industrial designers were interviewed in the first and second phases. Within the group there were eleven senior designers with more than five years of work experience. Five of the group were junior designers with between six months and up to five years experience. The final group member was a senior design student who had only run independent design projects and group projects.

However, six designers felt that they needed to study the market on their own before they designed. Consequently, to avoid unfairness in the experiment, the researchers confined the task. We provided the same product information and only asked them to develop their product concepts.

Furthermore, the designers were asked to describe their present methods of practising idea generation and their general design cycle for a project. Interestingly, when the question was asked, "Does the user matter in your design projects?", only six of them answered "Yes", whereas nine responded that they did specify users but tried to



**Fig. 4.** The left side is example photos from the FERET database. The right side is the persona in this task.

**Table 1.** The background of the participants

Samples	Work Experiences	Project Lifecycle <sup>2</sup>	Idea generation methods	Emotional design
1	Senior	1-3m	Similar work gathering	C
2	Junior	1-3m	Brainstorming/Similar work gathering/Scenarios/sketch	C
3	Junior	<5m	Similar work gathering/Sketch	A
4	Senior	1-3m	Brainstorming /Similar work gathering	C
5	Senior	1-3m	Sketch/Discussion/Similar work gathering	C
6	Senior	1m	Sketch	C
7	Junior	1m	Sketch	C
8	Student	1-2w	Sketch /User data gathering	C
9	Senior	3-5d	Sketch/ Brainstorming /User data gathering/ Similar work gathering/Sports	A
10	Junior	1-3m	Sketch/ Brainstorming /User data gathering/ Similar work gathering	C
11	Senior	>6m	Sketch/ Brainstorming /User data gathering	C
12	Senior	1-2m	Sketch/ Brainstorming /User data gathering	C
13	Senior	2-3m	Sketch/ Brainstorming /User data gathering/ Similar work gathering	C
14	Senior	1-3m	Sketch/Brainstorming/User data gathering	C
15	Senior	1-4w	Sketch/Brainstorming/User data gathering	C
16	Senior	1-3m	Sketch	C

ensure the design covered all user groups in order to gain maximum benefits. This demonstrated the current design problems that designers were usually asked to do design greedy cover the market. The final participant believed that users were not important in their design. We also asked them how much they understood emotional design. Surprisingly, only one of them showed an understanding. Most of them either said they had never heard of it or they had heard of it but they did not exactly understand the definition of emotional design. These patterns will be compared in the design task to see if the interview answers were identical to their design behaviour.

With regards to the design behaviour, several methods were used to inspire design ideas. Most of the designers tended to get the design concept by sketch, brainstorming and information gathering. Later, we gave them a design task that followed their

<sup>1</sup>\*Work experience:

1. >5 years: Senior  
2. <5 years: Junior  
3. School project student<sup>1</sup>  
don't know what it is. <sup>1</sup>

2 Project Lifecycle:

m:Month  
w: Week  
d: Day

3 Emotional design?

A: I can do it  
B: I knew it *but I don't know* how to do it  
C: I've never heard of it/ I've heard it but I

current methods. Before doing this task, a question was asked in order to record whether they had designed a similar product before. Four of them had designed once for the same market segment and two of them had designed the same product. This information was taken in order to record whether their memory of the previous design affected and contributed towards any bias in the design process that we asked participants to do. We asked them to do the same task twice to compare how useful the personas were.

### **3.2 Results from Phase I: The Investigation of the Use of the Persona**

Table 2 shows how the designers developed their product concept using their current methods. As can be seen, six of them were product-centred, which means the designer only considered the product elements to make it pretty, regardless of the user. Three of the designers tended to be designer-centred with five tending to be both designer-centred and user-centred. Finally, two of the designers were user-centric but were easily distracted.

When analysing the interview results, we found that one of the weaknesses of the designers' present work is that, regardless of their experience, there was less user-centred design. When we examined the status of the user-centred designers, when interviewed, the participants expressed that they were designing for the users. However, during the design tasks, the UCD designers were, unconsciously, designer-centred rather than user-centred. Another finding was that even though two of the designers said they had undertaken emotional design before, they actually regarded that "appearance design" meant emotional design. Another drawback was that most of the designers were concerned with the design shape rather than functional design. Hence, we may summarise that the designers, without the support from a user research team, tended to ignore the users in their design.

### **3.3 Results from Phase II: The Investigation of the Use of the Persona**

The design task followed the same conditions as the previous task. The results are shown in Table 3. As we can see in Table 3, when a persona is used, the design concepts from designers became similar in all aspects. However, they still had different ideas for their designs.

As shown by the information in the table and from interviews and observations, the designers were able to explore more design ideas. Additionally, the designers were found to use shorter timescales to make decisions. There might, however, be some errors attributed to the training effect due to the same product for the same users assigned to the same users twice. However, the supportive point from the interviews is that three of them had done the "MP3" project for the same group and one of them had designed the same product for a different group. However, there was no significant difference to the other designers.

One more important finding came to light when they were asked whether they felt the later concepts they made contradicted the previous task. All of the designers who were designer-centred and product-centred felt that the later designs were more likely to be suitable for the target users. However, the designers with more UCD in Task 1 said they did not feel there was a contradiction. They felt that Task 2 helped them to specify a design concept, such as a warm colour domain or a specific colour.

**Table 2.** The context of idea generations

Samples	Colour Scheme	Form	Special Functions?	Style/Tactile
1	Blue	Simple like an iPod	Wifi/ Convenient	Fashion
2	White with some pattern	Not specified	Not specified	Organic
3	Red or Pink	Sweet/ Stylish	Not Specified	Feminine and Elegant
4	Cannot decide now	Not specified	Simple MP3	Feminine
5	Black, to cover wider variety of users	Smooth/ Technology	Sound quality/Easy to play	Shiny surface for acceptance by the market
6	Pink series or multi-coloured mix	Round/ Delicate/ Match the dress	Simple keys	Elegant
7	Soft colour such as pink or white	Accessory	Friendly interface.	Plastic but metallic look
8	Red/Pink	Lipstick look	Simple buttons to operate	Shiny Plastic
9	Feel happy/pink series	Simple/Neat/ Accessory	Easy interface and to charge up	Delicate/ Fashion
10	Many colour selections such as red/pink series	Simple/ Clear	Can be used on the bus	Metallic
11	White series/ Shiny bright series/Pink series	Round/ Friendly/ Slim/Neat/ Easy to carry	Easy interface/ Shortcut to save files/ Rapid wireless to download albums	Rubber / Leather (soft feeling)
12	Silver +Black	Simple	Internet /Plug and Play and auto sorting	Metallic +Plastic
13	Cannot decide now (Multiple selection)	Simple like an iPod/ Square	Easy key/Touch panel	Plastic but metallic feeling
14	Pink/Feminine colour	Accessory to match the handbag	Bluetooth/Can have a mirror	Shiny/Plastic
15	Light pink	Curved	Not important	Comfortable
16	Silver and Green	Rectangular	DAB, Recorder/Subwoofer/Camera/Digital frame/ Lighter	Metallic and plastic

Regarding the emotional design, here we listed an example from participant 4. As we can see from Figure 5, we can see the context of the design. Unlike most of the present emotional products in the market, this design can further touch the behaviour level of emotion rather than only “appearance design”. This result is significant as it shows the mixed used of personas with empathic design can guide designers to reach empathic design without much training. Even if we only reviewed the interview data from participant 4, other participants showed similar results and we found that inspired ideas can connect to both the reflective and behavioural levels.

The designers would get a general image of this user by the photo, name and essential profiles, such as age and gender. Then they gave a rough appearance and sensory design. When the designer looked through the detail, they usually narrowed down the ideas in relation to the reflective part. Furthermore, they started to get inspiration from combinations of the details in order to provide a functional design, which is mapped to the behavioural level. However, we have no clues from the interview that they can do the visceral design by the provided personas.



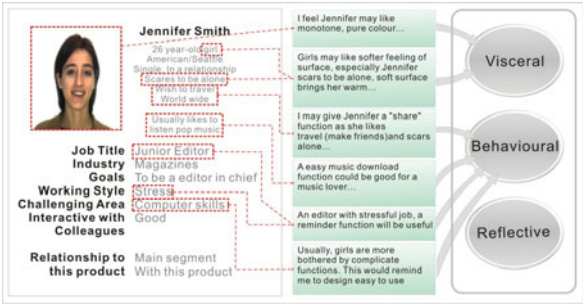


Fig. 5. The context of design in related to the persona

Table 3. The context of idea generations by using the personas

Samples	Colour Scheme	Form	Special Functions?	Style/Tactile
1	White	Like a T-shirt	Wifi/ Convenient	Clothes feel of material
2	Red	Rectangular/ Small	Agenda/Reminder/Schedule/Inspired quote to cheer up her mood	Plastic
3	White	Organic	The ability to share functions with friends	Some pattern on the plastic
4	Monotone/Simple	Rectangular/ Bigger screen but lightweight	Touch panel/ Reminder/Easy operation/ Music download /Share	Soft Surface
5	White	Smooth/Portable	Easy/Good sound/Enough music storage	Shiny Surface
6	White	Round	Play/Radio	Plastic
7	Pink	Cosmetic box	Easy keys	Shiny Plastic
8	Pink	Lipstick	Simple play Earphone design resembles earrings	Plastic/Looks elegant
9	Cute Pink	Small/Portable /Rectangular	Update files easily	Fashionable/ Leather
10	Red/Black	Simple	As simple as it can be	Simple/Elegant and professional looking/ Metallic hair silky
11	Light bright colour	Round smooth/ Square	MP3/Recorder/ Calorie measurement	Shiny plastic/Metallic look
12	High contrast colour with grey	Round smooth/ Square	MP3/Photo viewer Internet friendly/Upload and download friendly	Soft material
13	Pinky white with a flower pattern	Round smooth/ Square	Easy buttons with big touch screen/Photo Viewer/Sharing function	Shiny plastic
14	White with pink	Round smooth/ Square with curve for easier handheld	News/Music downloading from the internet	Soft on the back side for easy grasp/Shiny mirror screen
15	White with pink blue/red/orange /purple	Sportive	Calorie calculation Changeable cases for different moods	Soft material
16	Pink brown	Simple neat square	Small games to kill time	Soft material

In general, the participants were satisfied with the use of personas and felt surprised at the effect of them. They commented that the personas did help them to think about users’ emotion all the time without distraction. Also, they felt that this tool can help them towards self-communication and enable them to examine the ideas they made.

From the comparison of the task before and after the use of the persona, as we can see in Tables 2 and 3, we can see the design tendency converged to a similar colour domain in aesthetic design; functions are fruitful but still stick on the users. In addition, when designers undertook the task using the persona, they tended to design quicker and concentrate more.

## 4 Conclusions

We found the original design made it more difficult to approach user-centred design and, as a result, it was a less emotional design. In addition, most current emotional design only guides users to undertake appearance design. Instead, this method is able to lead designers to undertake emotional design without needing to be taught further design knowledge. This assessment provided the demonstration of the process of the idea generation engaged personas to launch emotional design.

In addition, this paper suggested that continuing on from this research, more characters of personas can be chosen to explore more evidences of how the personas engage with emotional design. Especially the visual personas and the profiles personas seem to provide different inspirations to designers. In addition, a complete product process can be undertaken to further assess the product with consumers.

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