On the notion of the user in Service Design

Parag Deshpande

parag.deshpande@dh.umu.se

Umeå Institute of Design, Umeå, Sweden

Abstract

The prevalent design methods and tools being used in Service Design appear to have been informed by the prevalent design traditions within the technology design fields (e.g. HCI and User Experience Design). Such design traditions put users at the centre of the activity of design and aim to cater to their needs, aspirations and desires. But should the user in service design be conceived in the same manner as it has been conceived in technology design fields?

To investigate this question, in this paper, first, I discuss why the notion of user is important for the activity of design. I then discuss how the notion of user has informed the attributes of user artefact interaction within the technology design disciplines over the years. Following this I discuss some of the everyday services to identify attributes of user service interaction. By comparing the user service interaction attributes with the user artefact interaction attributes originating from technology design disciplines, I point out that user service interaction attributes are somewhat different than the user artefact interaction attributes within technology design disciplines. I conclude the paper by arguing for the need of re-conceptualization of the user in service design to assist service designers to design innovative, efficient and effective services.

KEYWORDS: user, constraints, design process

Introduction

Service design is concerned with design of services to be used by users at a variety of everyday human activity settings. It is a design centric discipline the objective of which is to design "the functionality and form of services from the perspective of the user" (Segelström and Holmlid, 2009). The aim of service design is to "ensure that service interfaces are useful, usable, and desirable from the client's point of view and effective, efficient, and distinctive from the supplier's point of view" (Mager, 2004).

The discipline of service design advocates user centred design approach to achieve the above design objectives. The user centred approach focuses on the desires, needs and aspirations of

users throughout the process of design (Norman et al, 1986). This approach, developed within the design centric disciplines associated with technological development (e.g. HCI, PD and interaction design) has matured over the years and incorporates a number of methods, such as, cultural probes, personas etc. to assist designers in every stage of the activity of design. Such methods rely on deep involvement of users during the activity of design, which is crucial for their success. [Holmlid, 2009].

Service design, when following the user centred design approach, employs a variety of such methods to maintain focus on the users during the activity of design. And yet, how to think about the user when designing services or the notion of the user to inform the design of service has received little or no attention within service design literature. It appears that the discipline of service design while adopting the user centred design approach (and associated methods) has also adopted the notion of the user as understood within the technology design disciplines. But should the user in service design be conceived in the same manner as it has been conceived within the technology design disciplines such as HCI and User Experience Design?

The aim of this paper is to examine the above question. In what follows, first, I discuss why the notion of user is important for the activity of design. I then discuss how the notion of user has informed the attributes of user artefact interaction within the technology design disciplines over the years. Following this I discuss some of the everyday services to identify attributes of user service interaction. By comparing the user service interaction attributes with the user artefact interaction attributes originating from technology design disciplines, I point out that user service interaction attributes are somewhat different than the user artefact interaction attributes within technology design disciplines. I conclude the paper by arguing for the need of re-conceptualization of the user in service design to assist service designers to design innovative, efficient and effective services.

The activity of design and problem formulation

Service design is a design centric discipline, that is, the activity of design is at the core of service design. The nature and structure of the activity of design, commonly seen as a type of problem solving activity, has received considerable attention within design research literature. Most such discussions have focused on understanding the nature and structure of the activity of design, based on two design paradigms, the paradigm of rational design and the paradigm of reflective design proposed by design research (Simon, 1969, Schön, 1983). In the context of this paper I would like to focus on the early stage of the activity of problem solving, that is the planning stage of problem solving, examination of which I believe is necessary to answer the question stated above.

The early stage of the process of problem solving involves three intertwined and difficult to tease apart processes of problem finding, problem representation and problem formulation (Pretz, et al, 2003).

Problem finding or problem recognition refers to one of the earliest stage of the process of problem solving during which the problem to be solved is found or identified within a design setting. Such problems are found in three different ways (Getzels, 1964). One, when the problem is given to the designer by someone (e.g. a client). Two, when the problem is discovered by the designer within a given design setting. And three, when the problem is created by the designer within a design setting.

The problem itself refers to a situation "...when a living creature has a goal but does not

know how this goal is to be reached." (Duncker, 1945). The problem finder, when encountered with a problem develops mental representations of the problem on the basis of his/her understanding of the design setting and on the basis of the information about one or more appropriate solutions which, if deployed in the design setting, could change the existing situation of the design setting into one that is preferable for the finder of the problem. Problem finders can develop a single or multiple problem representations for a single problem identified (Newell, A. and Simon, 1972). Such mental representation can remain internal or could be externalized by the problem finder using verbal or visual means during the process of problem solving (Pretz, et al, 2003).

However, such problem representations vis a vis the design setting are seldom accurate.

When a problem is given to the designer it is based on the mental representations of someone (e.g. a client) about a design setting externalized by verbal or visual means. Such representations are based on the understanding of the problem giver (e.g. a client) who, unlike the designer, lacks problem solving expertise and consequently such representations also remain ill-structured.

The process of discovering or creating a problem entails the designer to investigate a design setting. Such a design setting is either provided to the designer by someone (such as a client) or identified by the designer him/herself (except in rare cases when the designer is carrying out the activity of design for him/herself and investigating his/her own life-world as the setting for design). The designer is therefore largely unfamiliar with the design setting when engaged in discovering or creating a problem. Consequently his/her problem representations of either discovered or created problems for the design setting remain ill-structured (Reitman, 1965).

Such ill-structured problem representations do not provide sufficient information to the designer to understand the problem and solve it. The designer, therefore, requires to formulate or define the problem (either given or discovered or created) in such a way that it clearly conveys the scope and goal of the problem vis a vis the design setting. In other words, the problem solver formulates the ill-structured problem into a well-structured one. In doing so, the designer makes sure that the 'right' design problem is solved to change the existing design setting to one that is preferable to the problem finder.

Finding the 'right' problem to solve is important for the process of problem solving because a strong relationship exists between the problem and the solution it leads to. (Duncker, 1945, Maier, 1963, Posner, 1973, Simon and Hayes,1976, Tversky and Kahneman, 1971). Additionally, an ill structured problem can influence the subsequent stage of the problem solving and result in significant monetary loss (Mintzberg et al. 1976).

Designers, depending on their design traditions, use two different approaches, problem driven approach and solution driven approach, to formulate the 'right' design problem. While both these approaches vary drastically in terms of the design activities carried out by the designers, they rely on constraints identified and used by designers during the process of problem formulation. Constraints allow designers to shape the design problem and transform it from an ill-structure one to a well-structured one.

While constraints for design can vary depending on the nature of the design discipline, the attributes of the user and the situations related to the use of the intended artefact remain the most common constraints for design. For example, the field of architectural design relies on the anthropometric data of the user as constraint for design when arriving at the dimension of spaces required for various types of activities. Similarly, the field of ergonomic design relies, again on anthropometric data of the user as constraint to arrive at the size of an artefact that is easy, comfortable and safe to use and the field of lighting design relies on user's reading preferences when designing lighting for their spaces.

Constraints in technology design: implications for user artefact interaction

Similarly, the technology design fields use the user preferences, their needs and desires as constraints when formulating the design problem during the activity of design. Given this, researchers have been constantly examining the notion of the user for design since the inception of such disciplines. Based on this, three successive paradigms shaping the area of HCI and interaction design have been identified (Bodker, 2006).

The first of these paradigms considered the user as a cog in the wheel or a part of the system devoid of any intelligence to take decisions when engaged in his/her work. With the objective to ensure efficient and effective user machine interaction the cognitive as well as physical abilities of the user were considered as constraints for the activity of design.

The second paradigm considered the user as an intelligent actor and focused on their cognitive abilities, such as their mental model when interacting with interactive artefacts, for the purpose of design. The focus of design of this paradigm was to ensure usability of screen-based applications, such as websites.

The third and the current paradigm, unlike the first two paradigms, does not frame the user in terms of his/her abilities to carry out the given task. Within this paradigm, the user is seen as a human being, with his/her existential attributes, living and working in their everyday environment. Consideration of the user as a human being has had a significant impact on the design scope of HCI and interaction design as it has assisted such disciplines to expand their design scope from the workspaces to everyday human activity spaces. The design objectives of such disciplines, therefore, are no longer limited to merely achieving efficiency and effectiveness of interactive artefacts to be used by the 'users' at their activity settings. Instead, the focus has shifted to designing frameworks to support experiential aspects associated with human use of interactive artefacts situated within their every activity spaces. (Hassenzahl, 2011).

User artefact interaction: key attributes

The shift in the notion of the user within the third paradigm has resulted in the emergence of a number of novel and hitherto unfamiliar design objectives in recent years (Pirhonen et al, 2005, Bannon, 2005). The following aspects associated with humans and their being in the world inform such design objectives.

A. One, human activity is a fundamental aspect of human being in the world. Human activities are carried out within a spatial context and involve multimodal human interaction with artefacts and things that populate the context. Informed by the novel nature of digital media, augmenting exiting human activities to make them more engaging to humans has emerged as the key design objectives of technology design disciplines.

   For example, the Drift Table was designed to replace the coffee table an important piece of furniture in our living room (Gaver et al, 2004). While the coffee table itself does not afford interaction it is often occupies the 'centre' of our conversations. The Drift table then is an interactive coffee table designed to display aerial photographs of the surrounding area and requires user to interact with it by distributing their weight on its surface. By adding interactivity to the otherwise 'inert' everyday coffee table the objective of design was to augment ludic activities triggered by the notion of curiosity, exploration and reflection that are often associated with everyday

conversation around coffee tables.

History tablecloth is another example informed by the objective of augmenting human activities (Gaver at al, 2006). Coffee tables and dinning tables in everyday home environments are often covered with tablecloths. Such tables are regularly used as surfaces to place a variety of objects such as teapots, cups and plates etc. The history tablecloth was designed to react to the objects placed on the table with a halo around them that enlarged in size over a period of hours. In this manner the history tablecloth not only externalized the flow of objects in the home environment, it also evoked reflection on the flow of objects over the table as well as about the use of technology in home environment.

Yet another example is the Digital shoebox (Banks et al, 2009). Digital shoebox was designed as an artefact to populate the everyday living environment to facilitate co-located browsing and sharing of digital photographs. Digital photographs stored and displayed by a computer are difficult to browse through and share like printed photographs. The digital shoebox not only stored the digital photographs, it also provided a means by which such photographs could be displayed for co-located browsing and sharing and thus making the activity of photo browsing more engaging.

B. Two, humans are constantly engaged in a dialogue with their life-world. This process allows humans to make sense of objects and things that populate their life-world. This is also the process through which humans develop attachments with their activity contexts as well as objects and things that they posses and use for a variety of activities. This aspect of being human has also emerged as the objective of technology design.

   For example, the Hunt Museum project allowed users to leave a personal trace giving them an opportunity to personalize the space (Ferris et al, 2004). In doing so, the project opened up possibilities of establishing emotional bonds between the people and the space of deployment of the installation, and thereby influencing the user's experiences within the space. Another example is the design project Sonic city (Gaye et al, 2003) that allowed people to create music by walking through and interacting with the urban environment. In this manner, it allowed people to link a particular space with a particular type of music and thus provided a novel opportunity to identify a particular location in a public space.

C. Three, humans transact with their life-world through variety of artefact and objects and therefore material nature of such artefacts and objects occupies the central role in human culture. Use of digital media to create such artefacts or objects is also beginning to receive attention in the technology design disciplines. In particular, designers have explored the role of digital media to create digital jewellery that seeks to extend and enrich the role of jewellery objects in human transaction with their life-world. Such pieces of digital jewellery has been designed both as a wearable piece, like conventional jewellery, and as a piece that is either to be handheld or to be located within a specific context.

   For example, "Blossom" designed by Jayne Wallace for a particular person, is a handheld piece of jewellery that attempts to celebrate the ties between the person and her family and the family land in Cyprus (McCarthy et al, 2005). This piece of jewellery, in possession of its owner in London is connected to a rain sensor located in the owner's family place in Cyprus. The glass dome of this jewellery piece encases Cypriot postage stamps that are closed like the petals of a flower. The postage stamps slowly open like a flower once the rain sensor register a predetermined quantity of rain in Cyprus. In this manner this jewellery piece acts as a memory trigger to the past relationship of the owner with her family and the family land.

Another example, Skintile is a piece of jewellery to be worn like a traditional jewellery piece (www.stella-project.de). This jewellery piece infused with wireless sensors changes its colour and even shape depending on the mood of the person wearing it.

D. Four, humans interact and coordinate with other human beings in their day to day life to accomplish a variety of actions within a variety of contexts. To support this social aspect of humans has also emerged as a design objective of technology design disciplines.

   For example, iFloor, designed for a specific context namely the public library, allows library users to post questions and read answers posted by other library users (Petersen et al, 2005). The questions are sent in form of texts using a mobile phone and then displayed on the floor. The displayed text is then interacted by library users using a shared curser through their body movements.

As it is evident from such examples, the objective of design, informed by the notion of user as human being, has gone far beyond achieving ease of use and efficiency of user interaction with the artefact. This is also reflected by the attributes of user interaction with the artefact that are not limited to simple action-reaction interaction. Instead, the focus here is on user engagement, which is achieved by creating an interaction narrative and by allowing the user to walk through them. Such narratives of interaction are governed by the formal and functional attributes of the artefact and its context of use. It is this narrative nature of user interaction with artefacts that lies at the heart of design for experience, the current meta design objective of the technology design disciplines.

What, then, are the key attributes of this narrative user artefact interaction, guided by the notion of user as a human being?

Attributes of user-service interaction

In our everyday life, we use a variety of services, some old and well established and some new and evolving. In order to identify attributes of user service interaction I discuss the following well-established service exemplars –

1. Dabbawala (http://mumbaidabbawala.org/) is a well established, over a century old service, in Mumbai, India. Mumbai is the largest city in the Marathi speaking province of India. 'Dabba' in Marathi refers to lunchbox and 'wala' refers to the person who brings in the lunchbox. Thus, the term 'Dabbawala' refers to a service that provides freshly made hot lunch to office workers all over the city.

   The Dabbawala service is activated by phone for a specific period of time. The Dabbawala then delivers the freshly cooked meal, packed in a Dabba, at lunchtime, on the next working day. The Dabba is then picked up by the Dabbawala later during the day or next day.

   Attributes of user and Dabbawala service interaction

   It can be noted that duration of interaction is very short and in many cases, the office worker does not even get to see the person who delivers the Dabba. It can also be noted that the service is associated with lunchtime and Dabbawala make sure that the Dabba reaches its destination on time every time.

The user in this case is only interested in receiving the freshly made hot meal for lunch and not the container which is carried back by the Dabbawala. In this sense, the Dabbawala service can be seen as ephemeral in nature.

The Dabbawala service is very strongly associated with the work context. However, its association with the work context is not the same as the human relationship with their activity contexts.

2. ATMs or Automated Teller Machines can be seen as touch points of a bank service that allows us to make cash transactions. ATMs are standalone machines installed at various convenient locations within the city that are public and semi public in nature. The user, in order to withdraw money from the ATM is required to approach it and initiate the interaction with it using their bankcard. The machine then displays a menu and the user is prompted to choose the amount of money to withdraw. The machine then dispenses the money to the user.

   Attributes of user ATM interaction

   The interaction with the ATM is quick. The interface of the machine is designed for ease of use and efficiency so that the user is not required to spend more time that necessary standing in front of the machine.

   Even though the ATM is a tangible and physical artefact, it is owned by the bank and located in public and semi public spaces. Its relationship with its user therefore cannot be seen in the same light as the human artefact relationship.

   The ATM is strongly associated with a context, that is, public and semi public spaces, to make it assessable to everyone. However, its association with the public spaces is not the same as the human relationship with their activity contexts.

3. While the Postal services offer many services to its customers, it can be said that taking the post from one person to another is their central service. Post offices are situated in various types of public spaces to ensure their accessibility to everyone. Apart from the post offices, post boxes, located at various parts of the city, can also be used by people to access the postal services. Both post office as well as the post boxes can be seen as the touch points for postal services.

   User interaction when sending the letter is very simple and involves the user approaching to the post box or the post office to drop their letter in a post box or hand in their letter to the person in the post office.

   Attributes of user Postal service interaction

   In most cases, the user interaction with the post office or the post box is very short and quick.

   Like ATMs, post boxes are tangible and physical artefacts, and are owned by the post office. While such post boxes are located within public and semi public spaces, their relationship with users can not be seen in the same light as the human artefact relationship.

   The post office as well as the post boxes are strongly associated with a context, that is, public and semi public spaces. However, their association with the public spaces is not the same as the human relationship with their activity contexts. Making them accessible to the public is the reason behind their location within public spaces.

All three exemplars noted above appear to focus on efficiency and effectiveness so that the

user interaction with the touch point can be kept as short as possible. The time of the availability of the service instead of the time of interaction with the touch point seems to have received more importance in all the three cases. It is also clear from the three exemplars that the user service relationship is not the same as the human artefact relationship even though it can be said that both the ATMs as well as the post boxes are known to their users because of their formal and use characteristics. Furthermore, it can be said that while services to occupy public activity contexts their relationship to their context of location is not the same as the human relationship with their activity contexts.

Discussions and conclusions

Given that the discipline of Service design follows design process and associated methods prevalent in technology design fields, e.g. HCI and Interaction design, the objective of this paper was to examine if the notion of user in service design is also the same as it is within the technology design fields. In this paper, I have shown why the notion of the user as a constraint is important for design and how the change in the notion of user within technology design fields has resulted in change in design objectives as well as change in the attributes of user artefact interaction.

The definitions of service design (e.g. Mager, 2004), seem to point to the creation of usable and efficient interfaces as well as create desirable experiences, at the same time, as the objective of service design. That is, design of both the 'front stage' and the 'back stage' are considered important for design of successful services. As discussed earlier in the paper, the design objectives of efficiency and that of desirability and experience are associated with two different notions of user adopted at different stages by the technology design disciplines. Informed by these notions of the user, the design objective of the ease and efficiency of use and that of the desirability and experience cannot go hand in had as the former relies on shorter action-reaction interaction cycle and the later on longer and narrative interaction cycle.

It therefore appears that the notion of the user as a human being, as prevalent in technology design disciplines, may not be a suitable constraint for designing services. Indeed, this was confirmed by the examination of user service attributes, associated with the everyday services examined in this paper, where the focus was on shorter action-reaction interaction cycle in order to achieve service efficiency. The design objective, in this case, appeared to be informed by the notion of user as a cog in the wheel or a part of the system adopted by the early stages of technology design disciplines and not by the notion of the user as a human being associated with the design objective of creating desirable experiences which was not clearly reflected by the user service interaction attributes.

However, this does not mean that ease and efficiency of use and desirability at the same time, as proposed by the service design discipline are unattainable as design objectives. But this requires clarity on how we think about the user as a constraint when designing services. With the apparent absence of a clear notion of user in service design, I believe that there is a need to think and re-conceptualize the notion of the user in service design to assist service designers to design innovative, efficient and effective services.

References

Banks, R. and Sellen, A. (2009) Shoebox: mixing storage and display of digital images in the home. In *Proceedings of TEI '09*, ACM Press, 35-40.

Bannon, L. (2005) A human-centred perspective on interaction design. In A. Pirhonen, H. Isomäki, C. Roast, & P. Saariluoma (Eds.), *Future Interaction Design* (pp. 9–30). Berlin, Germany: Springer.

Bødker, S. (2006) When second wave HCI meets third wave challenges. *In Proceedings of the 4th Nordic conference on Human-computer interaction: changing roles* Oslo, Norway: ACM.

Dunker, K. (1945) "On Problem Solving," Psychological Monographs, Vol. 58, No. 5, 1945

Ferris, K., Bannon, L., Ciolfi, L., Gallagher, P., Hall, T., and Lennon, M. (2004) 'Shaping experiences in the hunt museum: a design case study', in *Proceedings of the 5th Conference on Designing interactive Systems: Processes, Practices, Methods, and Techniques* DIS '04., New York, NY: ACM, pp 205-214.

Getzels. J. W. (1964). Creative thinking, problem solving, and instruction. In E. R. Higard (Ed.), Theories of learning and instruction. Sixty-third Yearbook of the Society for the Study of Education, Pt. 1. Chicago: University of Chicago Press.

Hassenzahl, M. (2011) User Experience and Experience Design. *In:* SOEGAARD, M. & DAM, R. F. (eds.) *Encyclopedia of Human-Computer Interaction.*

Gaver, W.W., Bowers, J., Boucher, A., Gellerson, H., Pennington, S., Schmidt, A., Steed, A., Villars, N. and Walker, B. (2004) The drift table: designing for ludic engagement. *Proc CHI '04 extended abstracts on Human factors in computing systems*, ACM Press, 885–900.

Gaver, W., Bowers, J., Boucher, A., Law, A. Pennington, S. and Villars, N. (2006). The History Tablecloth: Illuminating Domestic Values. *DIS 2006*.

Gaye, L., Mazé, R., and Holmquist, L. E. (2003) 'Sonic City: the urban environment as a musical interface', In *Proceedings of the 2003 Conference on New interfaces For Musical Expression*, New Interfaces For Musical Expression. National University of Singapore, Singapore, 109-115.

Holmlid, S. (2009). Participative, co-operative, emancipatory: From participatory design to service design. *First Nordic Conference on Service Design and Service Innovation.* Oslo, Norway.

McCarthy, J., Wright, P.C. Wallace, J., and Dearden, A. (2005) The experience of enchantment in human-computer interaction. *Personal and Ubiquitous Computing.* 10, 6, 369-378.

Mager, B. (2004). *Service design: A review*. KISD, Köln.

Maier, N. R. F. (1963) Problem Solving Discussions and Conferences: Leadership Methods and Skills, McGraw-Hill, New York

Mintzberg, H., Raisinghani, D. AND Theoret, A. (1976) "The Structure of 'Unstructured' Decision Processes," Admin. Sci. Quart., Vol 21, 246-275.

Newell, A. and Simon, H A. (1972) Human Problem Solving, Englewood Cliffs, NJ: Prentice-Hall

Norman, D. A,, &Draper, S. W. (Eds.). (1986). *Usercenteredrystemdesign: Newperspec- tives on human-computer interaction.* Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

Petersen, M.G., Krogh, P.G., Ludvigsen, M. and Lykke- Olesen, A. (2005) Floor Interaction HCI reaching new ground. In CHI '05 Extended abstracts on Human Factors in Computing

systems (Portland, IR, USA, April 02 - 07, 2005).

Pirhonen, A., Isomäki, H. and Roast C. (2005) *Future Interaction Design*, Springer.

Posner, M. I., (1973) Cognition: An Introduction, Scott, Foresman & Co., Glenview, Illinois.

Pretz, J. E., Naples, A. J., & Sternberg, R. J. (2003) Recognizing, defining, and representing problems. In J.E. Davidson & R.J. Sternberg (Eds.), The psychology of problem solving, (pp. 3-30). New York: Cambridge University Press.

Reitman, W. (1965) Cognition and thought, New York: Wiley.

Schön, D.A. (1983) The Reflective Practitioner: How professionals think in action, London: Temple Smith.

Segelström, F., Holmlid, S. (2009). Visualization as tools for research: Service designers on visualizations. Nordes, Nordic Design Research Conference, 2009, Oslo.

Simon, H. A. (1969) The Sciences of the Artificial, The MIT Press.

Simon, H. A. and Hayes, J. R. (1976) "The Understanding Process: Problem Isomorphs," CognitivePsych., Vol. 8, 165-190.

Tversky, A. AND Kahneman ,D., (1981) "The Framing of Decisions and the Psychology of Choice," Science,Vol. 211, 453-458.