

# The user experience of self-service systems

## Considerations to be taken into account in the design process

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### ABSTRACT

Self-service systems are expected to become more widespread in society and we are increasingly encouraged to use them. Traditionally, the design have focused heavily on characteristics such as efficiency and ease of use, while less attention have been given to the overall user experience. This paper, as well as providing an understanding of the nature of self-service systems, aims to explore and identify general considerations that should be taken into account when designing for the user experience of self-service systems.

**KEYWORDS:** Self-Service, User Experience, Self-Service Quality.

## 1. INTRODUCTION

We are increasingly encouraged to interact with technology to access services as organisations and companies move toward the use of self-service systems. The advancement of information technology has throughout the years led to the development of various service channels that allow users to produce services by themselves. Despite its increased usage, many users are dissatisfied with certain self-service encounters. Problems with self-service encounters have shown to cause mild, temporary confusion and even major frustration for some, especially novice or casual users (Kaptelinin et al., 2014).

The issue of designing better user experiences for self-service systems have recently been raised by various authors (e.g. Geest et al., 2013; Kaptelinin et al., 2014; Halstead & Richards 2014; Günay & Erbug, 2015). User experience design aims to improve customer satisfaction through the utility, ease of use, and pleasure provided in the interaction with a product (Kujala et. al., 2011).

However, while designers continue to aim for rich user experiences with a variety of consumer products, the design of self-service systems have generally focused heavily on the utilitarian/pragmatic aspects such as usability and functionality of the system itself (Günay & Erbuğ, 2015; Geest et al., 2013; Collier & Barnes, 2015). When designing for user experiences, a holistic approach, which encompasses both pragmatic and hedonic aspects, should be pursued (e.g. Hassenzahl & Tractinsky, 2006; Desmet & Hekkert, 2007).

The ISO 9241-210 (2010) states that user experience “includes all the users’ emotions, beliefs, preferences, perceptions, physical and psychological responses, behaviours and accomplishments that occur before, during and after use”. With this holistic notion in mind, this paper aims to explore and identify aspects that contribute to the overall user experience, with an ultimate purpose to identify general considerations that should be taken into account when designing and implementing self-service

systems. The focus of this literature review is on self-service systems or kiosks that are commonly available in public spaces.

The nature of this literature review is exploratory and serves as an introduction. In the next section, a background on the use of self-service systems and service quality perceptions is presented, as well as a brief review on service design. Then, literature on the aspects of user experience is reviewed.

### 1.1 Methods

This paper reviews literature from various research domains. The point of departure for this literature review was the special issue “Designing a Better User Experience for Self-Service Systems” published by “Professional Communication, IEEE Transactions on”. Articles were chosen based on their relevance and whether they revealed other interesting insights that could contribute to this study.

The main keywords that have been used in the search for literature include: “self-services”, “self-service systems”, “self-service technologies”, “sst”, “technology-based self-service”, “self-service experience”, “service experience”, “service quality”, “service design”, “user experience”.

## 2. SELF-SERVICE

Self-service systems are often viewed as a particular class of touchpoint in the overall service, or as an alternative to accessing a service (Darzentas & Darzentas, 2014). Meuter et al., (2000) defined Self-Service Technologies (SSTs) as “...technological interfaces that enable customers to produce a service independent of direct service employee involvement”. Furthermore, Adcock and Millard (2006) defined self-services as “...any technological mediated interaction or transaction with a company where the only humans involved in the experience are the customers themselves”. These include ATMs, information kiosks, ticket vending machines, automated hotel checkouts, grocery self-checkout lanes and pay-at-pump gas stations and various

internet services (such as online banking). Other common examples are tax preparation software, automated car rentals, and online education.

A wide range of different self-service options have emerged from the advancement of technology. The wireless revolution and the evolution of smart phones and tablets – where users can perform services by themselves through apps – have led to self-service concepts like m-services (e-services accessed on mobile devices). Unlike traditional self-services such as ATMs and ticket vending machines, e-services often offer interactivity between the customer and a service employee (Scupola, 2011), allowing personal interaction if needed. Some interactive kiosks now offer interactivity by incorporating live video featuring service representatives who can answer questions or initiate service recovery if needed (Halstead & Richards, 2014).

The use of various self-service options are also getting more widespread within the overall service. An example can be seen in airport customer management where several service touchpoints have been replaced by technology. In the timespan of only a few years, travellers have been channeled into self-service activities such as ticket purchasing, seat allocation, check-in, luggage labelling and weighing and boarding pass scanning.

Sometimes, the self-service system provides more options for the consumer compared to traditional service delivery. In some airports, passengers who choose to check in with a human agent do not have the access to seat allocation as those who have chosen the self-service option (Darzentas & Darzentas, 2014). Another example of increased self-service use can be seen in the case of reduction of serviced ticketing hours for public transport in Europe, which increasingly require passengers to use self-service ticket vending machines in order to purchase tickets (Siebenhandl et al., 2013). Examples like these illustrates attempts to stimulate the greater use of self-service by making the traditional services either less attractive (e.g. Reinders et al., 2008) or less accessible.

Generally, the reasons why customers adopt self-service systems is said to “depend upon the benefits they can receive from its usage” (Yan et al., 2013). According to Collier & Kimes, 2013 previous research highlights efficiency as a prominent factor of why self-service is a preferred service channel. Benefits such as convenience, availability, cost and time savings and feelings of independence, have also been mentioned (Meuter et al. 2003). Bitner et al. (2002) cited three reasons why consumers potentially could prefer to use self-service options:

- It can help consumers in difficult situations.
- They are often a better alternative in cases where it can help them save money or time, or that they provide easier access (i.e. checking in with the self-service option in airports).
- It can provide reasonably reliable, consistent and accurate services.

However, not all outcomes of technology-based self-service encounters are positive. Consumers often experience service failure, especially if service employees are not readily available to assist them in situations they are not able to complete the task (Robertson et al., 2012; Rosenbaum, 2010). Not offering interaction with an employee as a fall-back option have also been found to cause negative attitudes toward using a self-service system (Reinders et al., 2008).

## 2.1 What is good service in self-service?

Parker & Heapy (2006) emphasise that: “the common challenge that all service organisations face is how to create more intimate and responsive relationships with their users and customers”. According to Geest et al. (2013), research literature about customer experiences related to perceived service quality agrees that the quality of the service employee’s interaction and engagement is the most important facet related to customer satisfaction in service encounters. Empathy, “the provision of caring, individualised attention to customers” is one of five dimensions of the widely used SERVQUAL instrument of service quality assessment (Parasuraman et al., 1988). Also, Halestead &

Richards (2014) states that both service providers and customers seem to be aware of technology’s lack of ability to deliver high touch (personal) service.

However, some authors (e.g. Meuter et. al., 2003) found that self-services can be perceived to deliver higher service quality, illustrated by the customers perceptions that they can perform the service better by themselves or that it provides more control over the transaction. Contradictory, Yan et al. (2013) found that consumers were more satisfied in their interaction with the human agent, even though both the human agent and self-service system solved the consumer’s problem. Also, despite the identified benefits of using self-service found in literature, being forced to use the self-service option have shown to cause negative attitudes towards both the system itself and the service provider (Reinders et al., 2008). Ho et. al., (2013) supported the value of providing different options as some customers may not be interested in using the self-service system.

During the last decade, a number of attempts have been made to develop a context specific service quality measurement scale for technology based services. Lin & Hsieh (2011) developed the SSTQUAL instrument which aims to systematically and psychometrically measure the quality of technology based self-services across contexts. The instrument is comprised of the following seven dimensions:

- **Functionality:** deals with the ease of use, responsiveness and reliability of the system.
- **Enjoyment:** whether the system is enjoyable, provides interesting additional functions and provides all relevant information.
- **Security/privacy:** concerns with confidentiality, feeling safe in during transactions.
- **Assurance:** if the service provider is well known and has a good reputation.
- **Design:** aesthetically appealing layout and appears to be up-to-date with technology.
- **Convenience:** convenient operating hours and how accessible the system is.

- Customisation: whether the system understands the users specific needs and provides personalised service.

In evaluating this model, the authors found that the overall design has the strongest influence on the users overall quality perceptions. The other most critical contributors to the user perceptions are security/privacy, assurance and functionality.

Issues with the design have been found to be critical in many of the current self-service systems. In a study comparing three types of public self-service encounters, Ho et al. (2013) found that “poor design” had the biggest influence on the dissatisfaction level of many of the current self-service systems and emphasised that one should provide a stable system that customers can easily access, consider the security, convenience and flexibility of payment features in self-services geared towards money transactions, and to ensure that interfaces are user-friendly in order to promote self-reliance.

## 2.2 Self-service in service design

Mager & Sung (2011) quoted: “service design looks at the experience by focusing on the full customer journey, including the experiences before and after the service encounter”. However, not much have been said about self-services in service design literature (Darzentas & Darzentas, 2014). Kapetelinin et al. (2014) noted that service design and the design of interactive artefacts have been relatively independent of one another and suggested that perspectives from both service design and interaction design need to become more integrated into the design of self-service systems.

Darzentas & Darzentas (2014) suggested that there is a need to look beyond only providing good human-computer interaction with the self-service system itself, and that different considerations is needed to understand how they contribute to the overall service design. The authors claim that the development of service design methodologies that are adapted to self-services are missing and suggest that a customer journey approach could reveal new possibilities and enhance the service in its entirety by

empowering co-creation with the users. Yeh et al. (2013) proposed a methodology on how to apply customer journey in the design of self-service systems suggesting the following steps:

- Identify goals and targets.
- Draw customer journey maps for each segment.
- In-depth analysis of customer journey maps.
- Clarify needs and service contexts.
- Transfer into opportunities and challenges.
- Enlist candidate devices / interfaces.
- Brainstorm innovative service scenarios.
- Analyse and prioritise ideas.
- Business model and service scenario design.

Furthermore, Thornton & Flaherty (2015) suggested improvements of the Service Blueprint. According to the authors, most of the service design literature focuses on the design of high-touch low-tech services and that the Service Blueprint should be altered to better support customer-centric design of self-service systems. Proposed improvements were e.g. based on the lack of a representation of the user experience to complement traditional physical service evidence, ultimately limiting the extent of a design understanding to be captured in the design process. Suggested improvements of the Service Blueprint included:

- Incorporating Business Process Management Notation to allow representation of complex process and information flows.
- Embedding a user-interface storyboard.
- Include comment boxes to capture identified design gaps.

Before implementation, Ho et al. (2013) suggested that the service provider should first clarify the value of the self-service systems, and then involve all stakeholders in the design process, emphasising that customers not only should be treated as co-designers, but also as co-producers of the service delivery.

## 3. THE USER EXPERIENCE OF SELF-SERVICE SYSTEMS

In previous research on self-service, the user’s experience is often related to the customer’s ability to efficiently operate the system with a

sense of control and independence. Collier & Barnes (2015) suggest that efficiency or strict task completion may not be the only goal, further highlighting the potential of eliciting better user experiences by exploring the hedonic aspects of self-service. Günay & Erbuğ (2015) note that design improvements mainly focus on the instrumental qualities of the interfaces rather than the emotional experiences from the self-service encounter as a whole. The authors further emphasise that one should consider the context, the received products/services, and other technological products that could be used to interact with them.

While problems could be caused the self-service system itself, Darzentas & Darzentas (2014) note that the overall service needs to be carefully designed to provide clarity to the users. As an example, in the case of a case of a public car park, users need clarity on how the particular system works (e.g. pay before parking, pay on exit, where the transaction takes place, when to make the transaction, etc.). Other than interface familiarity or service knowledge, the authors state that another increasing problem is that the users expectations are not being met as they make assumptions from one system to another (e.g. whether a particular ticket vending machine accepts both cash and debit/credit cards or not).

Generally, the challenge is to design a system that would meet the needs of a great diversity of end-user groups, including both novice/casual users and experienced ones. As an example, Hassenzahl (2010) notes that an ATM with a well designed system from a usability point of view could be perceived as frustratingly slow for experienced users. In contrast, novice users or people with literacy problems may experience that the kiosk time them out as a result of them needing longer time to make the decisions (Darzentas & Darzentas, 2014). Other challenges include to ensure that universal design requirements are met.

User experience is often considered as an extension of usability (Ruso et al., 2015). Usability definitions usually emphasise on three key

factors: effectiveness, efficiency and satisfaction. According to Geest et al. (2013), previous case studies have often paid less attention to the satisfaction component, which either could be the consequence of the effectiveness and efficiency of a system, or that “satisfaction” could serve as a catch-for-all of the affective and emotional responses. Desmet & Hekkert (2007) state that usability is not an affective experience, but instead a source of product experience which most likely will influence the level of experienced satisfaction. Hassenzahl et al. (2010) found that hedonic quality was more related to positive affect than to pragmatic quality, describing hedonic quality as a “motivator”, capturing the product’s ability to create positive experiences. The authors also argues upon the notion that pragmatic quality is rather concerned with the instrumentality of a product and not a source of pleasure in itself.

Focusing on eliciting positive user experiences rather than only seeking solutions to existing problems is a prominent concept in design (e.g. Hassenzahl & Tractinsky, 2006; Desmet & Hekkert, 2007). This is also the main objective in an emerging field of positive design, which is focused on designing for experiences that contribute to well-being and happiness (e.g. Desmet & Hassenzahl 2012; Desmet & Pohlmeier, 2013). As technology based self-services have become highly related to daily life and will continue to expand (Davis et al., 2011), it can be assumed that the characteristics of self-service systems contribute to how we experience everyday life.

### 3.1 Emotion

Emotion is one of the most central aspects in the study of user experiences (Desmet & Hekkert 2007; Mahlke and Thürig, 2007; Hassenzahl & Tractinsky, 2006). Günay & Erbug (2015) suggest that emotional contentment is one of the user’s highest expectations for self-service systems, regardless of what type of task is being performed, further highlighting that designers should seriously consider this aspect of the self-service experience.

Emotions have also shown to play a big role in the context of technology adoption. In a study conducted by Partala & Saari (2015) it was found that the overall emotional valence of user experience was given very high ratings in successful adoptions and very low ratings in unsuccessful adoptions. The authors also suggested that these results supported Hassenzahl's (2010) holistic notion of user experience that: "feelings are integral to experiences (maybe even its core)". Based on the result of their study, the authors suggest that designers should pay a great amount of attention to emotions and psychological needs (e.g. autonomy, competence, security, pleasure-stimulation). Emotions are also, according to Wang et al. (2013), highly related to continued use of self-service systems.

### 3.2 Aesthetics

Visual and aesthetic experience refers to the pleasure that people gain from how beautiful something is perceived (P. Hekkert, 2006). Aesthetics is one of the most frequently researched dimensions in user experience research according to Bargas-Avila & Hornbæk (as cited by Tuch et al, 2012). It is also one of the most important determinants in the SSTQUAL assessment (Lin & Hsieh, 2011).

In an experiment testing the relationship between perceived usability and aesthetics, Tractinsky et al. (2000) found that the degree of a system's aesthetics affected the perceptions of both aesthetics and usability. Several other studies also support this aesthetics-usability link, while others do not. Based on these variable results, Tuch et al. (2012) analysed this phenomenon in a strictly controlled laboratory study and found that aesthetics did not affect perceived usability. However, their findings supported that good usability enhanced perceived aesthetics. Another study (Mahlke & Thüning, 2007) showed that users were most satisfied with a system of both high usability and appealing aesthetics. Results also revealed that usability had the greatest effect on both valence and arousal but that the perception of both

pragmatic and hedonic qualities influenced the appraisal of interactive systems.

### 3.3 Context

The influence of the context, following Hassenzahl & Tractinsky's (2006) notion that user experience can be a consequence of in what context within which the interaction occurs, have rarely been discussed in relation to self-services. Collier & Barnes (2015) highlights the importance the physical environment in a hedonic self-service setting. Results from their study showed that the design and layout of the environment had an effect on customers perceived control and a significant positive effect on perceived time pressure to complete the task. Furthermore, the authors highlight that the atmosphere and the layout of the self-service environment can play a significant role on how customers judge the transaction process. Halestead & Richards (2014) also proposed that enhanced design of the servicescape could have a significant effect on customers perceived user experiences with self-service systems.

Based on limited previous research, Günay et al. (2014) investigated how the social context may affect the user's experience when interacting with public self-service systems. Using theory from social psychology literature, the authors

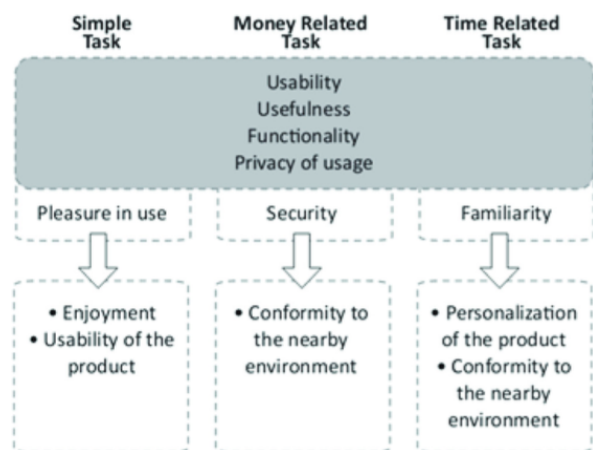


Figure 1: "Prominent dimensions in different tasks and corresponding design implications that could be done" (Günay, et al. 2014).

conducted a study on three different self-service kiosks to understand the influence of the presence or absence of other people. The authors found that social context had a big influence on all types of self-service kiosks that were taken into account.

As illustrated in figure 1, Günay et al. (2014) suggests that aspects such as pleasure in use, security and familiarity were related to what type of task being conducted in the encounter. In simple tasks (no major concerns to the users other than finalising their goals), users looked for pleasure more than in money or time related tasks. In monetary self-service encounters, feelings of security were more important. Darzentas & Darzentas (2014) also note the importance of security/privacy when implementing self-service systems, such as ATMs, as users are concerned with violation of personal space as well as not being able to keep other people in their peripheral vision during use. In time related tasks, Günay et al. (2014), also found that familiarity of the system is important as users felt time and social pressure as a result of people waiting in line. Those who were familiar with the system, were able to complete the task more quickly with less concerns about pressure from other people.

### **3.4 Stimulation**

According to Blythe et al. (as cited in Günay & Erbug, 2015), hedonic aspects such as pleasure, fun, and enchantment have gained as much validity as usability. Sheldon (as cited by WINCKLER et al. 2013) mentions the psychological need for pleasurable stimulation, focusing on the joyful aspects of the interaction. Fun have shown to have a stronger relationship to customer delight than efficiency in a hedonic self-service setting (Collier & Barnes 2015). Dabholkar (as cited by Kim et al., 2014) suggested that fun in self-service could be an emotional reward that the customer gets from using interacting with self-service systems. Also, fun and a sense of presence have shown to contribute positively to users intentions to reuse technology (Kim et al., 2014).

When studying customers intention to reuse a self-service system, Cetto et al. (2015) found that hedonic value was more important than utilitarian value for customers with little experience, suggesting that the reason may be that they do not realise the utilitarian benefits because they are more focused on the fun factor of the interaction. Furthermore, while the authors found that hedonic value was prevalent for customers with little experience, utilitarian value were shown to weigh stronger for customers with more experience.

## **4. DISCUSSION**

This paper aimed to identify aspects that contribute to the overall user experience of self-service systems. It should be noted that data from the reviewed literature is collected from case studies on different types of systems, which implies that some of the conclusions could be unique to the specific cases. However, the findings presented in this article provide an overview of general considerations that should be taken into account when designing and implementing self-service systems.

Previous case studies suggests that the design of self-service systems and how they contribute to the overall service is not yet fully understood and need further research. Both designers and service providers could benefit from understanding what influences the overall user experiences of the users. While a wide range of service, interaction and product design methods and tools to design for user experiences exist, it could be further investigated how they should be used in the design of these type of products (see Geest et. al., 2013).

It has been suggested that there is a need to improve current service design methods to better understand how self-service systems contribute to the overall service. While some suggestions have been made, further research could investigate whether current methods and techniques are sufficient in capturing the complexity of the design and implementation of

self-service systems. Also, further research into specific types of self-service systems should be done to capture the unique characteristics and user experience dimensions to better understand user experience design goals.

Considering the overall service, the value of offering traditional service as an option should be acknowledged. Previous case studies have mentioned various implications of not offering an alternative, including challenges with service recovery and that some consumers would rather prefer to interact with a service employee. Simply knowing that a service employee is readily available as a fall-back option, could reduce negative attitudes toward the self-service option.

Designers and service providers should be aware of the influence of context (or environment), such as the presence of other people as well as the characteristics of the physical environment. It is well agreed that concerns with privacy/security are prevalent in previous research. Other concerns include perceived time pressure in time related tasks, further enhanced by an unfamiliar system.

Fun and enjoyment have been suggested to have a strong relationship to customer delight as well as affect user's intentions to reuse a self-service system. Experienced users may be less interested in the enjoyment factor and value the pragmatic aspects such as efficiency higher, which is shown to be one of the main benefits consumers get from self-service. Infusing elements of fun should be considered, but at the same time ensure that it could be efficiently operated as experienced users could be more interested in completing the task quickly.

Generally, designers need to pay attention to the users' emotional responses to self-service systems in order to promote positive user experiences. Also, fulfilment of psychological needs, such as autonomy, competence, security and pleasure-stimulation should be considered. A challenge, however, is to define user experience design goals that would meet the needs of a great diversity of end-user groups.

## 5. CONCLUSION

The purpose of this paper was to identify general considerations that should be taken into account when designing for the user experiences of self-service systems. Identified considerations include the users' emotional responses; familiarity with the system and service knowledge; social context and influence of other people; the characteristics of the physical environment; fulfilment of psychological needs such as pleasurable stimulation and security/privacy; how the self-service system contribute to the overall service; self-service recovery options; capturing the different needs of novice, casual and experienced users.

The reviewed literature suggest that there is a need for a better understanding of how to design for the user experiences of self-service systems. Further research should explored whether current design methods and tools need to be improved upon to better suit the design of self-service systems. It could be valuable to develop design guidelines built upon the considerations presented in this paper.



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