

Equitable Digital Public Services: Using Personas to Design for Equity

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Abstract.

The online availability of public services – e.g., digital registry, online forms to request passports or apply for financial support – is expected to enhance their efficiency, transparency and accessibility and to enforce values of equality and fairness in their provision. As these digital services become more ubiquitous, the question arises whether and to what extent they can be designed with the needs of citizens in mind, who differ with respect to gender, age, ethnicity, education and socio-economic background. In this paper, we will investigate a method commonly used to design digital public services: the persona-based design method. At the core of this method lies the creation of fictional, often archetypical, user models, which represent potential end-users of a service or product. Personas comprise ethno- and psychographic characteristics, including behaviours, goals and desires. This paper explores whether and to what extent the persona method can produce digital public services that realise equity. We argue that the use of personas themselves does not guarantee equity, but extensive user research, citizen participation, and awareness and transparency regarding equity criteria underlying the choices made in the research and design process, can increase likeliness of equitable outcomes.

Keywords: Design for Equity, Digital Public Services, Persona Design Method

1. Introduction

Governments are digitalising their services. These services can range between requesting tax returns, renewing a driver's license to fostering more active citizen engagement in government.

There are different reasons why these services are digitalised. The European Commission expects, for example, that the digitalisation of public services will enhance "efficiency and savings for governments and businesses" as there will be less need for personnel in local offices who help people to fill in forms [1]. The European Commission also expects the digitalisation of public services to provide people easier access, which could strengthen values of equality and impartiality in the provision of benefits flowing from these services [2]. The assumption is that when public services are accessible online, they will still be available to people who have difficulty to come to a physical office because of a psychological or physical constraint.

It has however often been questioned whether it is true that digitalisation of public services leads to accessibility for citizens. Research responding to this question has different foci; some researchers focus on barriers and facilitators of adoption of digital public services by citizens [3], others research citizen's choice of communication channels

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for contact with public authorities who digitalised their services [4-5], and there are also studies on the digital divide which focuses on how limited digital skills hinder access to information technologies and therefore also to digital public services [6].

These studies address broad problems that influence whether citizens use digital public services, and receive the benefits that they offer. In addition, in recent years, more specific in-depth analyses of case studies have become available, such as the one by Madsen and colleagues [7], who focus on experiences of single mothers applying online for public benefits in emotionally challenging situations, such as divorce or family separation. Or a study by Peeters and Widlak [8] who research data management systems used for Dutch civil registry and the excluding effect they have on people who live lives that deviate from the norm, such as globe trotters and homeless people.

All of these studies reveal (from different angles) that the digitalisation of public services does not self-evidently lead to more equality and impartiality in the provision of benefits flowing from these services to people. This calls for the development of strategies to attend to this, and make those benefits more equally accessible. One of the ways to do that is by means of design. Xu and Tang, for example, argue that when digital public services are designed with the needs and capabilities of different social groups in mind, they can succeed to benefit a diversity of people [9]. Well-designed services can create more equity through increased accessibility of information and support, but if they are not designed carefully they can aggravate existing inequalities. Xu and Tang conclude therefore that designers of such services should reflect more about the values that underlie their design.

This paper builds on this suggestion by Xu and Tang. It will focus on design which uses personas, which are fictional archetypes of particular user groups. This approach to design is very common and is used in various contexts, including also the design of digital public services. Personas are often used in the design of these services as a way to make them more inclusive and more able to realise equal access to benefits for everyone. However, very often only limited personas are chosen, which may make it difficult to design for the variation of people living in society. The main questions we seek to answer in this paper are therefore: can a persona-based design method contribute to equity in the design of digital public services? And if a persona-based design approach is used, what elements should be taken into consideration if equity is the goal of design?

2. The concept of equity

Before considering the concept of equity, it is important to say a few words about design and its relation to values. The interest of this paper in equity as a guiding principle for design of digital public services is rooted in broader literature on the role of values in design, most notably an approach called 'value-sensitive design' [10-11]. Value-sensitive design starts from the supposition that technology is never neutral, but that it is capable of steering human behaviour, (inter) action and relationships in profound ways. Consequently, it is important to reflect ahead of time about that steering power of technology and create it in a way that is valued. Usually, value-sensitive design has three phases: phase one is a desk phase focussing on exploration of literature that provides insight into the values that play a role in the context for which one is designing, phase two is empirical research and attempts

to find out about the values of envisioned end-user groups as well as other stakeholders, and phase three is the technological phase during which the technology is designed and built. The three phases follow each other up: the values explored in the literature and in empirical research inform the design of the eventually resulting technology.

In line with the first phase of value-sensitive design approach, this paper was based on basis desk research. We explored literature on equality and equity of digital public services on the one hand, and literature on persona-based design on the other hand. By combining these two sources of literature, we developed basic points of interest that can guide the reflection and choices of designers and increases the chance that their persona-based design of digital public services produces equitable results.

Exploration of the literature on digital public services reveals a lot of interest in values like equality and equity. Equality and equity have been studied a lot in the context of digital public services and public administration [12-14]. They are important, as people live different lives in society and public services are meant to produce benefits to all that are entitled to it. This is, however, difficult to realise, as services are not designed for everyone individually; they are designed for a population, which contains people who differ with respect to gender, ethnicity, religion, age, sexuality, education, skills, relational environment, financial and social security, or lifestyle. All of these aspects influence the degree to which people have access to digital public services, their ability to take the measures needed to receive them, and eventually also the distribution of benefits that these services produce in society.

Reviews by Cepiku and Mastrodascio [12], Ruijter et al. [13] and Guy and McCandless [14] give a good overview over research into equality and equity in public services, and they explain well what these concepts mean. Guy and McCandless note, for example, that equality seeks identical treatment of people; e.g., it demands to treat women the same as men, regardless of their gender. Equity, however, goes one step further. Equity demands to adapt services to needs, which may differ between men and women [14]. It is important to attune services to needs of people, Crenshaw et al. state, because their individual capacities develop in differing ways, depending on the type of life they led until that point, which is shaped by social stratifying factors such as power, privilege and discrimination [15]. To address people's needs appropriately, it is therefore important to acknowledge the influence that these perpetuating underlying factors have on people; it means that people come to live very different lives [15].

Equity thus demands to acknowledge different needs and attend to them. Many authors argue that this is what digital public services should do to realise equity [e.g., 11; 12; 13; 14; 17]. However, authors also suggest different ways to do that. Ruijter et al distinguish on the basis of an extensive review, four different approaches to equity in the literature which are complementary to each other [13].

1. The first concept is *distributional equity* and is most prevalent in the literature on e-governance; it refers to *fair access* to government services or benefits. For example, to ensure distributional equity, digital public services must be available in various languages and be accessible regardless of abilities; people without internet

- connection need physical access points, people with low digital literacy need support to develop the necessary digital skills to acquire access.
2. The second concept of equity is *procedural fairness*. Procedural fairness means that people (as well as their data) must face the same tasks, actions, rules, and regulations, regardless of differences such as race, gender, socio-economic status, ethnicity. It would not be equitable, according to this approach, if some social groups have to deal with a higher administrative burden than others, merely because of aspects such as their gender or ethnic background. This approach to equity demands transparency of the procedure that is followed in the service, including also transparency of the technology behind the digital public service, in order to be able to control whether it demands different people to follow the same procedure or not.
 3. Thirdly, *process equity* imposes demands on the consistency in the quality of public services delivered to the citizens. It requires that different social groups have the same experience when they use public services, regardless of their personal characteristics or capabilities.
 4. Fourth, *outcome equity* prescribes that public services must have the same outcome for all users. According to this approach, citizens who start with different (digital) abilities, genders, socio-economic or ethnic backgrounds, should still be enabled to get the same social benefits if they are entitled to it. Outcome equity states that no matter one's starting point, the eventual benefits one obtains should be the same.

Based on this literature, it can be concluded that design of digital public services should take into account all of these approaches to equity. Values that flow from the literature, are however not the only ones guiding design; it is also important to study the perspectives of actual people. When considering development of digital public services, designers often make use of personas, which are fictional archetypes of actual users. Can these lead to equitable design?

3. Persona-based Design Methods

Persona-based design is not usually coupled to values, although values do often play a constitutive role in the background. Persona-based design was first introduced by Alan Cooper in 1999, who thought that good interaction design needs to be founded on “goals and personas; purposes and people” [18; p.149]. Cooper described personas as fictional depictions of target users, which allow developers to better understand end users, in all their diversity, and tailor their design to them. The description of a persona usually consists of a personal background story, a description of the typical environment, and a list of distinct goals, needs, skills, typical behaviours, motivations and attitudes [18]. While this description is most often fictional, the characteristics of personas are usually based on either qualitative or quantitative research (or a combination) [19]. Having specific details in the persona description is thought to help designers relate to personas as if they are ‘real’ people [18; 19], although there are also authors who argue that having too many fictional personal details distracts from the core ethno- and psychographic characteristics of the actual people on which they are based [22].

Personas remind the designers of the needs and desires of various users in the absence of the direct involvement of these users [21]. In a scenario-based design personas

play a role as main character; in these scenario's designers identify a problem, design a solution to the problem and subsequently envision how different users interact with the said solution in different scenarios representing the user journeys of the service. Moreover, personas serve as a tool to facilitate clear communication within the design team, as well as with collaborators from other organisations, management, or external stakeholders [19; 20; 21]. A persona can be seen as a shared mental model, which can be referred back to at any time to communicate the goals of what is being designed and for whom. Personas inform small- and large-scale decision-making, in all aspects and phases of the service design and delivery [21].

The use of personas is originally not meant to realise equity in design; it is meant to improve the product by making the design process and its outcomes more user-centred. However, when considering equity, it is a small step to think that choosing personas well and reflecting appropriately about user journeys, may help to realise equity for different types of users. What considerations should guide persona-based design if it were to satisfy the four above-mentioned approaches to equity?

4. Persona Creation

Whether or not persona design contributes to equity, will depend on the selection and construction of these personas. Several scholars have observed that design teams often make use of a maximum of eight personas [22; 23], but sometimes there are less [22]. Usually, these user descriptions do not have equal weight and influence over the eventual design; there is a hierarchy indicating the relative importance of the personas. Calde et al. distinguish a hierarchy between five personas [22]. The *primary persona* is considered the main target user, whose needs and desires are distinct enough to necessitate their own interface design. This primary persona is the most important one according to different authors. Codina and Pérez-Montoro, for example, recommend satisfying 100% of the needs and desires of the primary persona [23]. The *secondary persona* is a persona whose needs are similar to those of the primary persona, but who might need some minor modifications in the interface design to fully make use of the service. A third *supplemental persona* is someone who can adapt and is capable of using the interface designed for the primary persona. Fourth, a non-user of the service who is indirectly affected by it, can be described as a *served persona*. For example, in an information system designed for healthcare management, the patients will never directly interact with the information system, but their needs and desires still need to be taken into account. Here, the patient is a served persona [22]. Finally, the fifth *negative persona* is an exemplary non-user whose needs, goals and behaviours are explicitly *not* taken into account in the design [22].

When considered from an equity perspective, it is crucial to find out how this hierarchy between five personas is being created. There seem to be no criteria for setting this hierarchy [19]. What is described in the literature on the persona method of design, are the ways to gather empirical data on the backgrounds, skills, attitudes, desires, needs and goals of various types of users, but there's no discussion about what makes these empirical data important characteristics of the first, second or fifth persona, or what may be a reason to leave them out entirely. Initially, persona creation was solely based on qualitative research methods, such as in-depth interviews and focus groups with open questions that allow to

develop a deep understanding of users and their motivations, behaviours and needs. These methods are valued for their ability to paint specific and rich characterisations of the user and their environment [20]. According to Janssen et al., qualitative research leads to empathy for the users; in-depth interviews that are part of qualitative research allow to develop a deeper and stronger connection between the designer and the users [20].

The downside of qualitative research is considered to be their focus on just a small number of users, which does not provide insight into the broad diversity of possible users. To extend scale, there has been a shift in the last decade to more quantitative research methods [20]. These methods are applicable to a large population and allow researchers to collect data about the needs and goals of a large number of possible users, thus providing an overview over their backgrounds, skills, needs and purposes [20; 23].

Based on empirical research (qualitative or quantitative, or a combination), designers analyse the data to identify trends in the user's needs and characteristics. These are subsequently used to create user segments and accompanying personas, to whose needs a design is adapted [20]. This means that the equity of design depends on how this process is executed; the diversity of personas created depends on how thoroughly the research has been carried out, how results are analysed and how this empirical input translates into the creation of personas.

5. Criticism on Persona Methods

The most common criticism is that persona design methods have tendency to simplify the complexity and diversity of actual behaviours, needs and desires of real users [21; 24]. One difficulty in creating personas is that people change; for example, a person's behaviour on the internet and consumption of digital content and services changes over time. According to Salminen et al., this behavioural change can cause a persona to expire, and thus, render the invested effort in creating the persona and tailoring the design to this persona, useless [24]. Others, object that the choice of the primary and secondary personas is to a certain extent arbitrary. This process is often based on the developers' assumptions, insights and experiences, which are often not made explicit in the design process [23]. When considering the topic of equity, however, this choice is crucial, as the personas that are eventually chosen as first and secondary persona will guide design and people who do not fit this description will be less important or left out of scope entirely. When other primary or secondary personas are chosen, this could lead to very different, and perhaps even more fitting, outcomes.

While the choice to create first and second personas (and third to fifth or seventh) seems to be important, most critical reflection on the persona method encountered in the literature focuses on the empirical methods underlying persona creation. The use of qualitative research methods is criticised for realizing a small data set which is not representative of the entire target population [20; 21; 24]. Moreover, qualitative methods allow for a certain degree of interpretation on the persona creator's part, which can lead to a lack of objectivity and rigour in the creation and implementation of the personas [19; 20; 24]. This diminishes the repeatability of the method, and complicates the choice of personas that is made based on the data. Results of qualitative research methods can be improved if research is repeated in different groups, as this enlarges the data set on which persona

creation is based. However, as qualitative research is time-consuming and costly, it is sometimes difficult (and some think: unfeasible) to scale up to a larger group of users [24; 19; 20; 21; 24].

Quantitative research methods, by contrast, collect data in a larger group of people and the analysis seems to be less dependent on subjective interpretation. Therefore, some think they support creation of more dependable personas that represent (or simulate) user behaviour, which allows to validate and test the architecture [20; 24]. Quantitative methods are however also criticized, for being just as complex and time-consuming as qualitative methods, thus leading to difficulties for projects with small budgets [20]. Moreover, a quantitative approach to persona creation can create a disconnect between the target users and their goals and desires, and lead to exclusion of people who deviate. The statistical nature of analyses of quantitative data, might give a skewed view of the wide variety of the users' goals and behaviours where all the interesting outliers are summarised into averages [20].

The answer to these problems seems to lie in a mix of qualitative and quantitative research methods, which can lead to more nuanced and detailed profiles, while still offering testable simulations of user behaviours. However, unsurprisingly, this approach is even more demanding when it comes to finances and effort and it requires expertise in both research methods. Furthermore, a mixed methods approach can result in conflicting results, which complicates decision-making of design teams about the eventual choice of personas and the hierarchy between them [20].

Because of this line of critical reflection, some designers conclude that personas will always be “abstract, impersonal, misleading and distracting” [25, p.1219]. Others, still appreciate personas for their focus on the users' goals, desires and needs, and consider simplicity of the resulting personas an advantage. Even if quantitative or qualitative research methods never offer a complete insight into the diversity of users, they can encourage a design team to step outside of their own perception and worldviews. If the purpose is to design for equity, however, it is important to reflect more deeply about the choice of personas and about at what point sufficient effort has been done to consider the perspectives of a diversity of potential users.

If equity is the purpose of persona creation, it seems wise to broaden and diversify research methods (including qualitative and quantitative methods) rather than narrowing them down. However, eventually, empirical research merely provides descriptive information about different user types. It does not offer argumentation for the selection of- or hierarchy between- personas. There is very little guidance available in the literature on persona-based design that would help designers to make these choices, and argue for them. While some plead that actual users should be involved in persona creation [20], there are to our knowledge no guidelines on who, when, how, or how many target users to involve in the persona creation process, nor about the ways in which their involvement can lead to persona-creation that helps to realize equity.

Consequently, designers who create persona, often offer little arguments that throw light on how they move from empirical data to the selection of personas. The Connected Citizens Report [26], for example, carried out extensive empirical research with 12.100 respondents but this led to creation of just seven personas for the design of e-government

services, which are supposed to help realize more direct citizen engagement in the government. It remains unclear how these seven personas were selected, and why they take into account differences in digital literacy, but not other physical and psychological constraints that may lead to accessibility difficulties (such as disabilities). Alternatively, the accessibility team of the United Kingdom's Government Digital Service (GDS), created a set of 'accessibility personas', therewith focussing on a set of visual, physical, and/or mental disabilities that may influence experience of the service [27]. However, in this case it is quite unclear what research led to the making of these personas, and how the selection of disabilities was made (and not others).

What remains unclear in both examples are the reasons behind the choices that were made regarding the limited set of personas and their characteristics. Values seem to figure in the minds of the designers, as they are obviously concerned about inclusiveness and equity. But these values are never made explicit in the choices that are made in the choice for an empirical research method, or in the choice of the eventually resulting (hierarchy of) personas. Values do not openly inform decision-making. But if values remain hidden in the background of the design process, it becomes difficult to argue for choices, or to disagree with them. The design process therewith becomes opaquer than it needs to be.

6. Designing for Equity with Personas: Points to take into account

If equity is what designers of digital public services are after, it makes sense to use equity as a criterium in the creation of personas. The four concepts of equity described by Ruijter et al. offer a way to justify choices that are made in design: distributional equity, procedural fairness, process equity and outcome equity [13]. Distributional equity concerns the accessibility of the digital service to people with different capacities, equity as procedural fairness requires that different people will have to go through the same steps when they make use of the service, process equity demands an assessment of user experiences, outcome equity demands that different people will get the same benefit out of the service.

From these concepts of equity, which stem from literature reviews, we can derive a line of thought that can support decision making in persona-based design, which may inform the set-up of empirical research as well as the eventual creation of personas and the way in which they play a role during design.

Based on these criteria, for example, it is possible to argue for empirical research that combines quantitative research with qualitative research: a digital survey carried out among a selection of the population that represents the population allows to identify characteristics of the largest and most general user groups, but qualitative research methods such as in-depth interviews and focus groups allow to acquire a more detailed insight into needs of specific user groups that are at risk of being left out. Together, the two types of research would support the creation of personas that cover a diverse range of users. Presupposed is of course, that one succeeds to identify which user groups are at risk of being left out and who need more attention with qualitative research. This calls for an extensive user mapping, which does effort to identify the user groups that are often marginalized and identify whose needs deserve to be explored with qualitative or quantitative methods.

Furthermore, in the literature on persona-based design we noticed that designers who are interested in fairness and equity tend to focus their attention on user groups that may encounter accessibility problems. For example, the Connected Citizens Report attends to varying digital literacy of people [26] and the UK's Accessibility Team undertook extra efforts to get to know the barriers experienced by people with physical or psychological disabilities to try to overcome them in design [27]. These efforts focus on distributional equity, which primarily deals with accessibility.

Other approaches to equity receive attention only in so far as they relate to the accessibility issues. For example, if a design team focuses on accessibility of the service to blind people, then they are likely to also focus on a blind persona when they develop a scenario for the user journey, during which issues may come forward related to equity as procedural fairness and process equity. This eclipses problems of other user groups who may experience procedural unfairness and process hurdles, without encountering accessibility problems. An example from the article by Peeters and Widlak illustrates this [8]. These authors showed how data management systems used for Dutch civil registry unintentionally exclude people who live lives that do not fit the definition of 'residency' on which the registry is based. This is because people who do not live in one municipality for over 4 months, do not count as 'residents' according to the registry and therefore are not eligible for social services and benefits. The group of people that the system excludes as 'residents' are globe trotters, expats and homeless people. These people may experience no problems accessing the system as they may be digitally literate, and may experience no other physical or psychological hurdle preventing them access to the service. However, they cannot follow all steps in the procedure as they do not fit the basic definition on which provision of the service is based. The result is procedural unfairness, as well as lack of outcome equity.

Process equity and equity as procedural unfairness, may come to light only when considering a diversity of user journeys, either with fictional personas or with real users. To do this, it may be a good idea to not create a rigid hierarchy, separating between 'important' and 'less important' personas, but to instead do effort to include a diversity of personas as main characters in user journey scenario's. This may allow to detect problems related to procedural fairness or process equity. Following a diversity of user journeys, may prevent harms from occurring, such as harms that occurred in the Dutch child care support scandal [16]. In this case, an algorithmic discrimination inherent in a digital service aiming to detect fraud in child care support requests, led to the wrongful accusation of families with foreign names who in fact were eligible recipients of childcare support [16]. Accused families received restitution claims that caused severe financial problems for them. In this case, accessibility of the service was not the problem; the procedure that the system applied was unfair, as it was using unfounded criteria to separate between frauds and righteous requesters of financial support. A lack of equity was the result, which could have been prevented if effort was done in the beginning to include a diversity of personas in the user scenario's.

7. Conclusion

In this paper we asked two questions. The first was whether persona-based design methods can contribute to equity in the design of digital public services. The answer is: yes, but it demands to employ persona methods in accordance with values, and this is not common practice in persona-based design. Following Ruijer et al. [13] we distinguished distributional equity, procedural fairness, process equity and outcome equity. Based on these four concepts of equity, we answered the second question of this paper, which asked what designers should pay attention to if they want to realise equity in the design of public services using the persona method.

This paper argues that equity should be the guiding principle, and that if it is understood in the fourfold way suggested by Ruijer et al., this would help to make sensible choices in persona-based design. It helps to make an inclusive user-map, and select empirical research methods to explore the values, needs and preferences of the various user groups. Furthermore, it is observed, that proper consideration of the four approaches to equity that Ruijer et al. bring forward, allows to move beyond the predominant focus of designers on accessibility of services, which covers just distributional equity. Accessibility-problems that arise due to digital illiteracy or physical or psychological constraints are the first that come to mind when designers attempt to design for equity. But there may also be other difficulties, which relate to other aspects of equity: some people are able to access digital public services, but are excluded because their profile does not match the normative definitions that make a too rough and unjustified separation between who can and who cannot receive benefits of the service. This type of exclusion is tricky as it relates to the choices that are made in the design of the back-end of the service that a user never gets to 'see' but which may effectively bar some people to receive public benefits that they are entitled to.

To prevent these problems from occurring, designers should take all four concepts of equity into account throughout design. Persona-based design therewith becomes value-sensitive; it is guided by reflection on the value of equity. Taking equity as the guiding principles of design helps designers to be more transparent about the choices made in the design process, and provide arguments for those choices. This can help to foresee hurdles to equity, but also to detect and correct mistakes later on. Transparency about values underlying a design help to bring about such a continued discussion about the design of the service and -if needed- it may lead to correction.

As shown in the beginning of this paper, there's a call to reflect more deeply on design of digital public services, and this paper contributes to that [9]. This paper showed there is a lot of design research focussing on personas which attempts to serve values such as equity, without actually making equity a guiding principle of design. We have argued that in fact it makes sense to give equity such a guiding role in the development of a user map, in the set-up of empirical research and the choice of research methods to inquire into the needs of diverse groups of users, and in the eventual selection of personas and user scenarios. With this argument, we contribute to value-sensitive design, which uses values as guiding principle for design of public services, but never focused specifically on equity [27]. Equity-by design is not 'new' as an approach, but not for the design of public services [28].

This paper has obvious limitations. Whether a design-for-equity is successful will eventually depend on whether it leads to a digital service that can produce equitable outcomes for different people. The power of a designer over these outcomes will always be limited, even if equity is the guiding principle of design. Whether citizens make use of the service at hand and whether they indeed receive the benefits they are entitled to, will eventually also depend on the context and on the actions of the individual users themselves. This is something a design team can influence, but never fully control. Designers can increase the chance that outcome equity will result, by attending to all concepts of equity, but outcomes are not completely predictable. This should be checked with an impact measurement, once the digital public service is implemented and used.

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