Investigating User Experience for Local Community Platforms

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Master Graduation Thesis

Utrecht University
Human-Computer Interaction
October 7, 2023

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Abstract

A strong local community is important for the well-being of its residents, and this can bring numerous benefits, both social as well as economic benefits. While this contributes to the development of a strong local community, technological advancements have allowed for the creation of community building through digital means. A local community platform is easily distributable and accessible for members of a community and helps to build connections, enables the sharing of skills and assets, and facilitates a local currency wallet.

However, designing a community platform for everyone in a community is challenging since the platform and its interface must be accessible and understandable for all members of a community. Different users have different needs when using a local community platform, and there are specific design guidelines for different users which makes designing a platform difficult.

So, there is a need for a set of design guidelines specifically developed for local community platforms. To establish these guidelines a systematic literature review was conducted, so the guidelines were based on relevant literature; this resulted in 5 design guidelines. However, the guidelines needed to be validated by practice as well, so a case study was done using an existing local community platform called LocalforLocal. In this case study, first a user test was done with the existing LocalforLocal platform, then the guidelines were applied to create an iterated version and the user test was conducted again. Then the results were compared to see if the guidelines had an impact on the user experience of the platform. The AttrakDiff survey showed a partially significant increase in usability and engagement, and the System Darkness Scale showed a non-significant decrease in the darkness of the system. Furthermore, the task results and the qualitative results showed an increase in user experience.

The results from the case study showed that the guidelines had an overall positive impact on the user experience, which means that the guidelines are appropriate for designing local community platforms. Future work includes replicating the case study with other local community platforms with a more diverse sample of the population. By validating the guidelines even further they could become the norm for designing local community platforms.

Contents

Chapter 1

Introduction and Problem Statement

1.1 Building Stronger Communities: Introducing Local Community Platforms

A strong local community is an essential aspect of a thriving society as it contributes to the overall well-being and resilience of the society (McMillan & Chavis, 1986). By investing in building and maintaining strong local communities, we can create a better world for ourselves and future generations. A local community is a group of people who live and work together in a particular geographic area and share common interests, values, and goals (Hughes, Hughes, Black, & Kaldor, 2007; Phillips & Pittman, 2008). There are five aspects that determine the strength of a community. The first aspect of a strong local community is membership. Membership is a feeling that one has invested part of oneself to become a member and therefore has right to belong (Nunkoo & Ramkissoon, 2012; McMillan & Chavis, 1986). The second aspect that indicates the strength of a community is community influence. Members are more attracted to a community in which they feel that they have influence (Phillips & Pittman, 2008; McMillan & Chavis, 1986). Thirdly, the reinforcement and fulfilment of needs is another aspect of a strong local community. The community becomes stronger when the needs of the members can be met (McNamara et al., 2021; McMillan & Chavis, 1986). The fourth aspect is a shared emotional connection. This is an important aspect of a strong local community as this determines the interactions of members. The emotional connection is based on a shared history that members can identify themselves with (Ntontis, Drury, Amlôt, Rubin, & Williams, 2020; McMillan & Chavis, 1986). Finally, when trust is established members of a community are more willing to commit time and resources to develop relationships (McNeish, Rigg, Tran, & Hodges, 2019).

Building and maintaining a strong local community can bring three main benefits. Firstly, one of the most significant benefits of a strong local community is the sense of belonging it provides (McNamara et al., 2021). When people feel like they are part of a community, they are more likely to feel a sense of purpose and connection to the people around them. This, in turn, can lead to increased

mental health and well-being (McNamara et al., 2021). The second benefit of a strong local community is the social support it provides (Ntontis et al., 2020). In times of need, community members can come together to provide assistance and support to those who are struggling (Asgarizadeh & Gifford, 2022). This can be particularly important during times of crisis, such as natural disasters or economic downturns (Ntontis et al., 2020). The third benefit of a strong local community is that the community can provide economic stability (Storper, 2005). When people work together to support local businesses and organizations, they can create a more robust local economy that is less dependent on external factors (Phillips & Pittman, 2008). This, in turn, can lead to increased job opportunities, higher wages, and a better overall quality of life for community members (Phillips & Pittman, 2008).

While these factors that are mentioned above contribute to the development of a strong local community, technological advancements have allowed for the creation of community building through digital means. A community platform helps strengthening the community. A community platform is a platform that is accessible to everyone in a community that helps building connections (Escobedo, Zheng, & Bhatt, 2021), exchanging of skills and a local currency wallet (Schroeder, 2015). Making an online community platform for residents has many benefits (Schroeder, 2015). Technology is an integrated part of many peoples' daily lives, so an online platform is easily distributable and accessible for members of a community (Bevan, 2009b). So this platform needs to be accessible for everyone in a community, from teenagers to the elderly. By including all these groups, it becomes easier for members to make new connections. Additionally, members of the community are more inclined to help others (Bevan, 2009b). This means that the more groups that are included in the platform, the more the local community will benefit from the platform. This platform needs to be easy to use, accessible, attractive and understandable for everyone in the community (Diniz, Siqueira, & Van Heck, 2018).

However, designing a community platform for everyone in a community is challenging. The platform and its interface must be accessible and understandable for all members of a community, and different users have different needs when using a platform. A community platform needs to be accessible for all user groups in a community, however there are different design guidelines when designing for, for example, the elderly or for teenagers (Zaina, De Mattos Fortes, Casadei, Nozaki, & Paiva, 2022). So, there is a need for a set of guidelines to follow when designing a community building platform (Elsden et al., 2018; Bødker, Lewkowicz, & Boden, 2020). When everyone in a community enjoys using this platform and benefits from it, the local community becomes stronger and is controlled by its own residents. Members buy locally, this means less transport costs and emissions resulting in a better environment (Kim, Lough, & Wu, 2016), and more social opportunities to make people feel more connected and have a stronger sense of belonging in the community. So, in order to design the platform interface so that it is accessible and user friendly for all user groups in a community, a set of guidelines is needed. These guidelines are created based on literature and existing guidelines, and need to be validated by applying them to a community platform interface and testing the usability and user experience of that interface with end users.

1.2 Identifying the Challenges of Local Community Building

Positive user experience is an especially important part of the acceptance of a new system (Bevan, 2009a), so this research focuses on gaining insights into what aspects of a platform interface are most important and developing a set of guidelines for designing future community platforms. Right now, there are no guidelines for designing local community platforms (Elsden et al., 2018; Bødker et al., 2020), so that is the gap that this research tried to fill. This leads to the research question of this thesis.

RQ: What are guidelines for designing a local community platform that makes the local community stronger?

To design an interface for a community platform all aspects need to be considered. When residents and local businesses are introduced to a new form of communication and payment, the interface of the platform can influence how the users will interact with the platform and determine if the platform will be actively used by the community. The guidelines that are established are only based on existing literature, so these guidelines must be tested in order to prove that these guidelines provide interfaces that have positive user experience. This means a methodology needs to be defined to test for user experience and usability in community platforms. Additionally, the goal of the platform is enhancing local communities, meaning that members of the community are more inclined to shop locally, share skills and goods with other members and make connections with the people around them. So the platform needs to facilitate this goal and the interface has to be accessible for all members of the community. This leads to the following four sub-questions:

- *SQ1: How can a local community platform encourage the development of strong local communities?*

- *SQ2: What are the most suitable methodologies for accurately measuring engagement and usability in local community platforms?*

- *SQ3: What are the key factors that influence users to adopt a local community platform?*

- *SQ4: Which features should be included in a local community platform to enhance user experience?*

Answering these sub-questions will help towards understanding the key elements that are needed in order to make an engaging platform interface that will help towards improving the local community and economy. By finding out what aspects of an interface need to be included to make the platform easy to understand and use, and make the platform as attractive as possible for users, it is more likely that the local community platform will be accepted by a community. By answering the sub-questions and main research question, a set of guidelines can be formulated for designing interfaces for local community platforms which can actively strengthen the local community and bring people together.

1.3 Method

This thesis first gives a deeper understanding of local communities, community platforms and user experience in chapter 2. This provides a background and base to build upon. The method of this study was divided into three phases. The first phase was the establishment of the design guidelines for designing local community platforms, this can be found in chapter 3. This was done by defining keywords and conducting a systematic literature review.

The second phase of the method was a case study to validate the guidelines, this can be found in chapter 4. In the case study the local community platform called LocalforLocal was used to validate the guidelines that were established in the first phase. Using the LocalforLocal platform, two user tests were conducted and these user tests consisted of a qualitative part and a quantitative part. The first user test was a baseline test, using the platform interface as is. This showed what the user experience was of the LocalforLocal platform and formed a baseline measurement. Then the guidelines that were established in the first phase were applied to the interface and resulted in an iteration on the interface design. Then this iterated version of the LocalforLocal platform was used to conduct the user test again. This gave the measurement of the user experience after the guidelines were applied, the results of these two users tests can be found in chapter 5. This method of establishing guidelines based on literature, then doing a baseline study and an iteration study is not a widely used method in user experience research, so no predefined method could be found in literature. However, for this research this is the best method since it exclusively tests the influence of the guidelines on user experience.

In the third phase, the results from the two user tests were analysed and compared to see if the platform where the guidelines were applied improved user experience, this an be found in chapter 6. From this analysis it could also become clear if the guidelines need improvement. This method was chosen since it exclusively measures the influence of the guidelines on user experience. In figure 1.1 a diagram of the method can be seen.

Furthermore, the results are reviewed in the discussion, see chapter 7. Here the research question and sub-questions are answered. The the limitations of the research are discussed and recommendations for future works are given. Finally, the thesis is concluded in chapter 8.
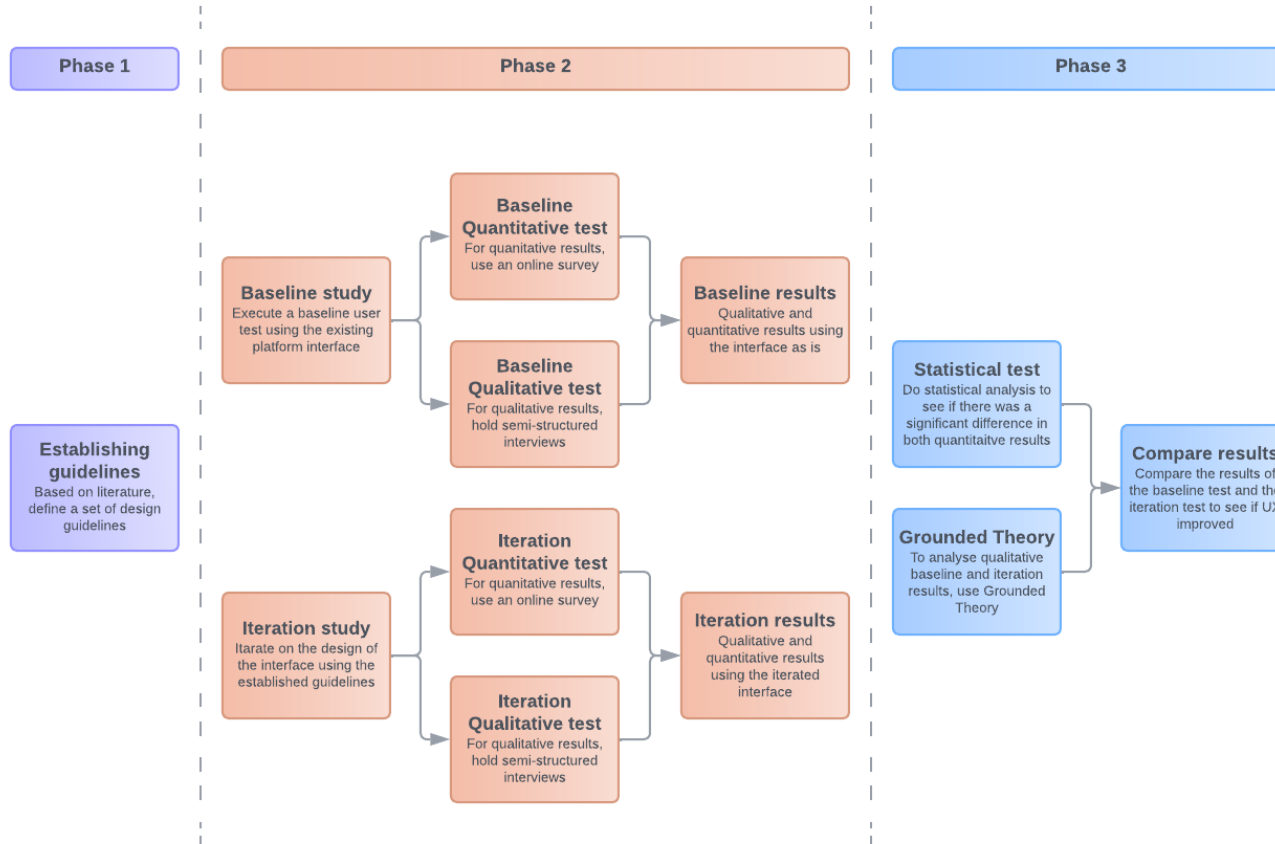
Figure 1.1: Diagram of the method of this thesis. In phase 1 a set of guidelines was established. In phase 2 a case study was conducted to find out if applying the guidelines to an existing system improved the user experience. In phase 3 the results from this case study were analysed.

Chapter 2

Literature Review

In this chapter a literature review of relevant literature can be found. The literature review consists of five sections. Section 2.1 gives background information about what strong local communities are and what the benefits are that these communities bring. Section 2.2 introduces community platforms and gives examples of existing community platforms. Furthermore, in section 2.3 design challenges are explored for designing inclusive interfaces. Then, in section 2.4 usability and user experience is explored, and scales to measure this are shown. Finally, in section 2.5 existing guidelines for designing interfaces and platforms can be found.

2.1 Strong Local Communities

Building and maintaining a strong local community is important for the overall well-being of residents and the local economy. There are five components that indicate the strength of a community. These components are membership, influence, need fulfillment, emotional connection and trust (McMillan & Chavis, 1986; Nunkoo & Ramkissoon, 2012; Phillips & Pittman, 2008; McNamara et al., 2021; Ntontis et al., 2020; McNeish et al., 2019). Once a strong local community is established it can bring three main benefits to the members of that community. These three benefits are sense of belonging, social support and economic stability (McNamara et al., 2021; Skinner, 2019; Uchino, 2004, 2006; Storper, 2005; Phillips & Pittman, 2008). These benefits show that maintaining a strong local community will provide a better mental and physical circumstances for the residents of the community.

2.1.1 Key Components of a Strong Local Community

Membership is a feeling that one has invested part of oneself to become a member and therefore has right to belong (Nunkoo & Ramkissoon, 2012; McMillan & Chavis, 1986). Membership provides security and emotional safety. Working for membership provides a feeling that one has earned their place in the community, this results in the membership becoming more meaningful and valuable. Acceptance by the community and a willingness to sacrifice for the community provides a feeling that one fits in the community (McMillan & Chavis, 1986). So membership contributes to making the relationships in a community stronger.

The influence that a member has on the community is an indication of the strength of the community. For a member to be attracted to a community, they must have some influence in the community. On the other hand, the influence that the community has over its members makes the community more cohesive (Phillips & Pittman, 2008; McMillan & Chavis, 1986). The influence that a member has on the community and the influence that the community has on an individual operate concurrently in a tight knit community (McMillan & Chavis, 1986).

Reinforcement and need fulfilment are primary functions of a strong community. Reinforcement as a motivator of behaviour is a cornerstone in behavioural research, and it is important that for any group to maintain a positive sense of togetherness, the individual-group association must be rewarding for its members. A strong community can fit people together so that people meet others' needs while they meet their own (McNamara et al., 2021; McMillan & Chavis, 1986).

The interactions of members in shared events and the specific attributes of the events may facilitate or inhibit the strength of the community. A shared emotional connection is based, in part, on a shared history. It is not necessary that group members have participated in the history in order to share it, but they must identify with it (McMillan & Chavis, 1986). Members who share an emotional connection feel a sense of togetherness with others and perceive themselves to be members of a stronger community (Ntontis et al., 2020).

Once trust is established, members of a community are willing to commit more time and resources to develop relationships. Trust is not only about a set of positive expectations, but it also includes the willingness to act on those beliefs (McNamara et al., 2021). Building trust is essential to develop strong relationships. Mistrust can present barriers to building relationships, so a high degree of trust among members is essential for a strong local community (McNeish et al., 2019).

2.1.2 Benefits of Strong Local Communities

Firstly, a substantial benefit of a strong local community is sense of belonging. The psychological sense of community is broadly positively associated with health and well-being. It is associated with reduced loneliness, as well as a higher satisfaction with life (McNamara et al., 2021). We live in a time where electronic devices have made it possible to communicate with someone on the other side of the world as easily as our neighbours. Even though this connectiveness with the world should mean it is more possible than ever to grow our sense of belonging, the reality is the opposite. Many people are extremely lonely and feel unsupported in these online societies (Skinner, 2019). So members of a community can benefit greatly from having a strong local community and the sense of belonging it brings.

The second benefit that a strong local community brings is social support. Social support encourages better health. It facilitates better behaviours such as exercise, eating healthy, not smoking, and adherence to a medical regimen (Uchino, 2006). It is even said that social support is negatively associated with cardiovascular diseases (Uchino, 2004). Aside from physical health, there are also mental health benefits to social support. Social support is associated with better moods, better control of emotions and less depression (Uchino, 2006).

Lastly, a strong local community can bring economic benefits and stability. Social capital benefits the economic development and social integration. It creates positive effects for the members of a community that have high levels of social capital, so that even members that do not actively participate still benefit from it. Social capital discourages things such as moral hazards, e.g. less crime in the neighbourhoods, and encouraging unpaid efforts, from which others can benefit (Storper, 2005). Phillips & Pittman (2008) identify four types of social capital (Phillips & Pittman, 2008):

1. Human capital; skills, capabilities, experience, etc.

2. Physical capital; buildings, infrastructure, etc.

3. Financial capital; community development banks, loans, community financial institutions, etc.

4. Environmental capital; natural resources, weather, recreational activities, etc.

Without social capital it becomes more difficult for a community to make progress and become stronger. The more social capital a community has, the more likely it can adapt to and work around deficiencies in the other types of community capital (Phillips & Pittman, 2008).

2.2   Community Platforms

The term 'platform' is usually used broadly in the sense of a set of digital frameworks for social and marketplace interactions, which organize and structure economic and social activity (Bødker et al., 2020). A local community platform can be defined as bringing people together who share a geographic region, a common language, values and interests, and are connected by electronic media (Stanoevska-Slabeva & Schmid, 2001; Hagel & Armstrong, 1999). Digital community platforms have two important elements; the members of the community and the medium that enables the platform (Stanoevska-Slabeva & Schmid, 2001). So community platforms serve as mediators for sharing goods and providing services, and they provide mechanisms such as payment or reputation management to support these transactions (Bødker et al., 2020).

2.2.1   Empowering Local Communities Through Technology

According to Spagnoletti, Resca & Lee (2015), face-to-face relationships mediated by synchronous communication means are the foundation of community platforms (Spagnoletti, Resca, & Lee, 2015). The members communicate through the community platform and thereby generate relationships, common content and meaning, and a shared history. The community platform provides communication channels without barriers and takes over the task to save and provide availability of content (Stanoevska-Slabeva & Schmid, 2001). So the community platform provides a meeting place for members of a local community to establish relationships and shapes the communication between members (Stanoevska-Slabeva & Schmid, 2001).

Elements of good community platforms that provide strong relationships between members and foster member commitment are shared history, a common vocab-

ulary, a meeting space and a specific organisational structure (Stanoevska-Slabeva & Schmid, 2001). The commitment and loyalty of members contribute to the success of a local community platform. In a successful community platform, the created content and knowledge should be well structured and easy to find (Stanoevska-Slabeva & Schmid, 2001). The requirements of a platform depend on the aim and needs of a local community which can become complex due to different features that are incorporated in community platforms (Spagnoletti et al., 2015). So, the seamless integration of different community types and technologies is an important aspect of a successful community platform (Stanoevska-Slabeva & Schmid, 2001).

Community platforms must be tailored to the specific needs of the members of a community, but they must also be flexible enough to embed new functionalities (Spagnoletti et al., 2015). The design of community platforms is subject to a wide range of change due to the constant addition of new technological capabilities and the changing of needs from the members of the community (Spagnoletti et al., 2015).

2.2.2 Exploring Different Kinds of Community Platforms

There are many types of community platforms, both for local communities and for online communities. Here we zoom in on a few community platforms that focus on enriching the community in different ways. First local currency platforms are discussed, then sharing platforms are explored and finally different types of online community platforms are mentioned.

Local currency platforms

Community currency refers to the complementary money that is generated and circulated within the boundaries of a specific geographic community (Kim et al., 2016). In the same way in which traditional payments are increasingly becoming digital, community currencies are also entering the universe of digital payment platforms (Diniz et al., 2018). Based on mobile applications, plastic cards, the blockchain and web sites, digital local currency platforms are one of the main trends in the field of community currencies (Warner, 2014). Local currency platforms allow for saving costs and better management of the money circulating within a community (Diniz, Cernev, & Nascimento, 2016).

Using community currency prevents money from draining out of a community, create local jobs and increase revenues by supporting local businesses. Moreover, it can decrease fuel consumption and carbon dioxide emissions by shorting the distance of product delivery (Kim et al., 2016). Local trade is good for the regional development, so the use of a local currency platform can give financial advantages to the region (Kovács-Szamosi & Varga, 2020). Moreover, local currency supports the local economy by increasing local business sales and promotion (Cepel, Ključnikov, Kozubíková, Krajčík, & Law, 2019). Local currency platforms also aim to increase local consumption and economic growth to facilitate the formation of job opportunities. In addition, local currencies provide informal employment opportunities, rewarding and valuing skills and labour which might be overlooked by the mainstream economy (Seyfang, 2001). Local currency platforms encourage local trading and therefore place less pressure upon national and international infrastructures. This may reduce excessive transport and fuel consumption, which consequently cuts

pollution in the atmosphere and the pressure on the road systems (C. Caldwell, 2000; Kim et al., 2016). Additionally, local currency platforms enable members to make shifts in their lifestyle towards more environmentally friendly consumption patterns. This is done through sharing, recycling, reducing resource use and localisation of the economy (Seyfang, 2001).

An example of a local currency platform is Palmas in Brazil. This platform is a mobile application that is only valid in a neighbourhood in the outskirts of a large city in Brazil. The goal of this currency was to be more inclusive for its resident than the national currency, and to provide services that support the local economy of the community. This currency was backed up by the national currency, meaning that the local currency could be traded back to the national currency for the same value. However, due to poor project governance, this platform failed (Diniz et al., 2016). An example of a local currency platform that was relatively successful is the Bristol Pound in England. This platform facilitates both paper and digital payment and found that face-to-face transactions help to reinforce trust in the currency. The digital payment system that was implemented in this platform required more time to complete transactions, allowing buyers and sellers to talk more to each other, this increased the relationships within the community (Ferreira, Perry, & Subramanian, 2015). The Bristol Pound, however, did not stand the test of time and was withdrawn from circulation in 2020. This was mostly due to the growth of crypto currencies and the Covid-19 pandemic preventing close contact (Wills, 2021). There are, of course, many more examples of local currencies over the years, such as the LETS model, and the NU scheme in Rotterdam (Blanc, 2011).

Sharing platforms

Sharing has been a feature of human societies for hundreds of years, for example borrowing books at a public library (Benjaafar, Kong, Li, & Courcoubetis, 2019). With the rise of digital technologies, the sharing economy has exploded and disrupted long-standing industries, from hotels to taxis. It has changed the way people shop, commute, eat, and hire (Attri & Bapuji, 2021). Sharing platforms are a novel and exponentially growing business model that has changed the way people travel, work and interact. Sharing platforms became mainstream in the developed world where sharing was not initiated by resource scarcity but rather by resource overabundance and corresponding cultural shifts of anti-consumerism and growing consciousness for sustainability (Akhmedova, Vila-Brunet, & Mas-Machuca, 2021). The novelty of sharing platforms compared to social media platforms was to facilitate offline interaction with the goal of sharing tangible or intangible underused assets (Akhmedova et al., 2021). The sharing economy platforms have made a significant shift in the operations of many businesses in various sectors such as in transportation through on-demand ride sharing services, and in tourism, through homestays and lodging. These business innovations have been applauded for reducing market inefficiency by putting idle capacity to use and providing cheaper, flexible and personalised services (Escobedo et al., 2021). The once relatively passive consumer who often participated in the one-directional industrial and service economy (e.g., business-to-customer) is consequently becoming more collaborative in arranging the production and consumption of assets that are privately owned (Ameri, Rogers, Schur, & Kruse, 2020).

Research suggests that sharing has the potential to generate positive social, economic and environmental benefits for communities. At a basic level, sharing (rather than owning) encourages and promotes productive usage of idle resources, reducing waste and environmental impacts and improving economic efficiency (Escobedo et al., 2021). Moreover, sharing leads to enhanced social interactions, embeds a sense of trust in the community and results in better societal well-being. In the communities where people share resources as simple as sugar, exists the potential to build social ties and strengthen community bonds (Escobedo et al., 2021). The platform economy empowers individuals to think differently about the operation of private assets (e.g. sharing a home, space, and vehicle), and thus has increased income opportunities for many people (Ameri et al., 2020). Collaborative consumption has the potential of increasing access while reducing investments in resources and infrastructure. In turn, this could have the benefit of improving consumer welfare while reducing societal costs (Benjaafar et al., 2019). Individuals who may not otherwise be able to afford a product now have an opportunity to use it. It also has the potential of providing a source of net income for owners by monetizing poorly utilized assets (Benjaafar et al., 2019).

The growth of sharing platforms provides greater opportunities for individuals to exchange goods, assets, and services on internet-based platforms such as Uber, Lyft, TaskRabbit, and Airbnb. These platforms are founded on social networks in which individuals and communities collaborate and exchange with one another via intermediaries (Ameri et al., 2020). Another example of a successful sharing platform is bHive. bHive Cooperative is a community-owned, person-to-person sharing economy platform. It allows local enterprises and people to build and operate a local sharing economy (bHive, 2023). Additionally, by reinvesting income and profits generated from these activities into the local economy, bHive aims to strengthen local economy (Escobedo et al., 2021). With this platform, bHive believes local communities will be able to 'develop as a digital innovation hub' which would boost the local economy (bHive, 2023). The founders of bHive also believe that by returning to local economies, many of the problems facing the local communities and the planet can be solved (bHive, 2023). Each member has control over their own data, which helps in protecting their privacy and data safety. This helps bHive in building trust in the communities (Escobedo et al., 2021).

Another example is the Nextdoor app. This is a sharing platform for local communities. On this platform, members can share and sell resources, get into contact with each other, and share experiences. This platform verifies the addresses of its members to make sure that you can only be a member of the community you live in (Nextdoor, n.d.). This platform, however, has some major issues. First of all, the app is owned by a commercial company, so the main focus of the platform is to make a profit (Zuurmond, 2022). Another issue is privacy. It is easy to trick the platform into allowing you to enter a community that you do not live in through your GPS location (Radar, 2019). Finally, according to Kurwa (2019), the nextdoor platform has racial biases. All of these issues are diminishing the integrity of the platform, and must thus in future platforms be avoided.

Other platforms

Discussion community platforms are dedicated to the exchange of information with reference to a defined topic. A common feature for all discussion communities is the emphasis on content generation and exchange related to a clearly defined topic. The emphasis of the platform design is on the support for creation and management of community knowledge and the communication channels (Stanoevska-Slabeva & Schmid, 2001).

In information sharing platforms actors make their own content available on the net, creating a resource available to all. This social interaction structure allows free participation. The essential element is the spontaneous action of the actor, and no form of collaboration is required. No formal rule or governance mechanism is necessary. The Twitter platform is a classic example (Spagnoletti et al., 2015).

In collaboration platforms actors follow rules and engage in activities that require substantial group coordination. Participants are required to adapt their behavior to others in order to have a group identity. Collaboration is considered a more complex social interaction structure than information sharing, as it requires a greater alignment between the objective of the group and the objective of the individual. It is important to coordinate the collaborative behaviour through governance mechanisms such as hierarchy and formal rules. Wikipedia and open-source software are classic examples of collaborative production (Spagnoletti et al., 2015).

2.3 Making Community Platforms Inclusive for All Users

The concept of human-computer interaction can be defined as one discipline concerned with the design, evaluation, and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them (Paez & Del Pilar Zapata Del Río, 2019). This field of research is directly related to technological changes and evolves constantly in response to them (Paez & Del Pilar Zapata Del Río, 2019). Accessible software design is not yet a reality, so it is important for designers to incorporate accessibility into their software design process (Zaina et al., 2022). In section 2.1 and 2.2 it became clear that community platforms need to be accessible to every user in a community in order for the community to become stronger, so it is important to explore design challenges that might occur when designing for different user groups.

2.3.1 Design Challenges for Accessible Interfaces

Among the millions of users who use mobile applications, we can find children, seniors, persons with disabilities and other groups (Paez & Del Pilar Zapata Del Río, 2019). In the information era, it is important to develop high-quality user interfaces, accessible and usable by a diverse user population with different abilities, skills, requirements and preferences, in a variety of different technologies (Stephanidis, 2001).

Different target groups have different needs when it comes to interfaces. De-

signing for elderly people that do not use technology in their daily lives is very different from designing for young adults that grew up with technology. Interfaces that are very intuitive for one user group can be very confusing for another (Savidis & Stephanidis, 2004). Understanding the physical, intellectual, and personality differences between users is vital for designing interfaces. Rethinking interface designs for differing situations often results in a better product for all users. Special needs for one group, such as curb cuts in sidewalks for wheelchair users, have payoffs for many groups, such as parents with baby strollers, skateboard riders, travellers with wheeled luggage, and delivery people with handcarts (Shneiderman et al., 2016).

In general, user interface designers have not had enough opportunities to work closely with elderly. Failure to design 'elderly friendly' interfaces may lead to reluctance to the use of mobile devices by the elderly, while a properly designed user interface that respects the elderly's needs can tackle this issue (Paez & Del Pilar Zapata Del Río, 2019). There are several impairments many seniors suffer from such as less acute vision or reduced tactile sense or missing prior knowledge such as special gestures or typing on a soft keyboard (Wong, Ibrahim, Hamid, & Mansor, 2018). For that reason, many elderly people cannot benefit from the large number of available mobile apps that could support their activities of daily living (Wong et al., 2018).

People with disabilities are one of the user groups with higher computer dependence because, for many of them, the computer is the only way to perform several vital tasks, such as personal and remote communication, control of the environment, assisted mobility, access to online networks and services, etc. Digital exclusion for disabled people means not having full access to a socially active and independent lifestyle (Abascal & Nicolle, 2005).

2.4 Designing Community Platforms with the User in Mind

Over the last few years, technology devices have never been so present in our daily lives. People are confronted with technologies in work, learning and leisure contexts. So, it is important that research efforts aim at a better understanding of human-computer interaction from a user point of view (van der Linden, Amadieu, Vayre, & van de Leemput, 2019). The user's social environment is a major factor to understand the user's subjective appraisal and behaviour (van der Linden et al., 2019). This section explores usability and user experience, and explores different scales to accurately measure this.

2.4.1 Usability and User Experience

The success of any type of application depends on how well it is being used by the user (Paz & Pow-Sang, 2014). The concept of usability is very important to any kind of product because if the users cannot achieve their goals effectively and efficiently, they can seek an alternative solution to achieve them. In another words, interfaces should be user friendly so that it allows users to accomplish their purpose in an intuitive way (Paz & Pow-Sang, 2014). According to (Punchoojit & Hongwarittorrn,

2017), a usable product seeks to achieve three main outcomes: (1) the product is easy for users to become familiar with and competent in using it during the first contact, (2) the product is easy for users to achieve their objective through using it, and (3) the product is easy for users to recall the user interface and how to use it on later visits (Punchoojit & Hongwarittorrn, 2017).

The definition of user experience in ISO FDIS 9241-210 is: *A person's perceptions and responses that result from the use and/or anticipated use of a product, system or service* (ISO 9241-210, 2010). This contrasts with the definition of usability in ISO FDIS 9241-210: *Extent to which a system, product or service can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use* (ISO 9241-210, 2010). In the context of user centred design, typical user experience concerns include understanding and designing the user's experience with a product. It is important to understand the way in which people interact with a product over time, what they do with the product and why (Bevan, 2009b).

Although there is no fundamental difference between measures of usability and measures of user experience at a particular point in time, the difference in emphasis between task performance and pleasure leads to different concerns during development. In the context of user centred design, (Bevan, 2009b) identifies four usability concerns:

- Designing for and evaluating overall effectiveness and efficiency;

- Designing for and evaluating user comfort and satisfaction;

- Designing to make the product easy to use, and evaluating the product in order to identify and fix usability problems;

- When relevant, the temporal aspect leads to a concern for learnability.

Other important aspects of usability and user experience are likability and trust. Likability is the extent to which the user is satisfied with the ease of use and the achievement of pragmatic goals, including acceptable perceived results of use. Trust is the extent to which the user is satisfied that the product will behave as intended and the extend to which the user is satisfied with the security of the product (Bevan, 2009a).

2.4.2 Dark Patterns

There is increasing interest in critical aspects of human-computer interaction and user experience practice, including engagement with the impact of technology and design on society and the role of the designer in bringing about responsible change, particularly for vulnerable populations (Brignull, Miquel, Rosenberg, & Offer, 2015). We use the term dark patterns to define instances where designers use their knowledge of human behaviour (e.g., psychology) and the desires of end users to implement deceptive functionality that is not in the user's best interest. While persuasive technology is often praised for the good it is capable of producing in society and individual life, such as encouraging socially responsible behaviour or the bettering of personal habits, there are also substantial ethical considerations regarding designing explicitly to persuade (Gray, Kou, Battles, Hoggatt, & Toombs, 2018). Since
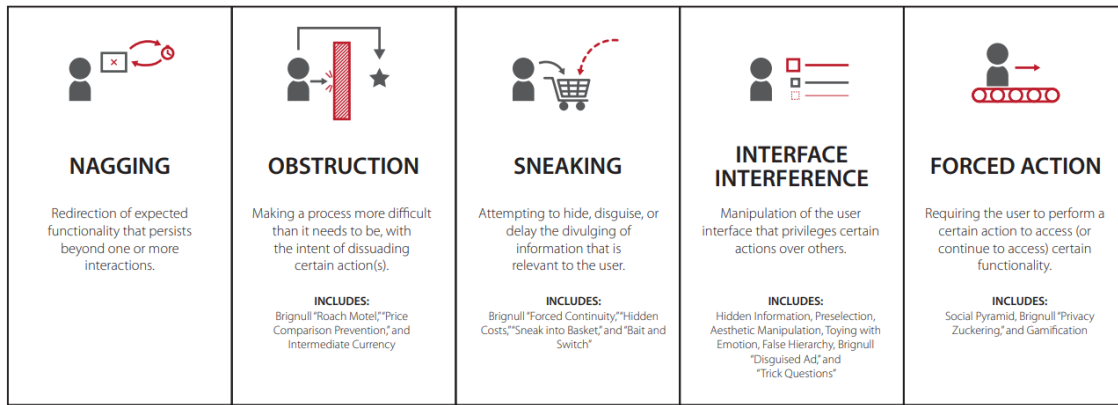
Figure 2.1: Dark pattern strategies (Gray et al., 2018).

the goal of a local community platform is not making profits, it is very important that dark patterns do not occur in local community platform. The users of a local community platform cannot be 'tricked' into taking actions that they do not want to, the platform must be completely trustworthy and transparent.

(Gray et al., 2018) describes five dark pattern strategies, see figure 2.1. These five strategies are nagging, obstruction, sneaking, interface interference and forced action. Cognitive biases make rationality difficult and these design tricks platforms use to manipulate users into taking actions they might otherwise have not, weaponize the design of built online environments to harm consumers and their privacy (Waldman, 2020).

2.4.3 Exploring Scales for Measuring Usability and User Experience

Many software developers regard satisfaction as a personal response that cannot be quantified, and in much usability testing only qualitative feedback on satisfaction is obtained. Ad hoc questionnaires are sometimes used, but psychometrically designed questionnaires will give more reliable results (Bevan, 2009a). Simple questionnaires such as SUS (Brooke, 1996) measure the user's assessment of the ease of use. Longer questionnaires can measure more specific aspects, such as affect, efficiency, helpfulness, control and learnability in SUMI (Kirakowski, 1996). Trust can be measured using the System Trust Scale (Jian, Bisantz, & Drury, 2000), and pleasure with questionnaires such as AttrakDiff (*AttrakDiff*, n.d.). All of these scales are validated, meaning that they are reliable tools for measuring aspects of usability and user experience (Bevan, 2009a). A scale to measure if the system uses dark patterns is the System Darkness Scale (van Nimwegen, Bergman, & Akdag, 2022). See table 2.1 for an overview of the five scales mentioned above and their advantages and disadvantages. By reviewing the advantages and disadvantages of these scales, one or more of these can be chosen to use in the user study.

The System Usability Scale (SUS) provides a "quick and dirty", reliable tool for measuring the usability. It consists of a 10-item questionnaire with five-item likert scale; from strongly agree to strongly disagree. It allows for evaluation a wide variety of products and services, including hardware, software, mobile devices,

websites and applications (Brooke, 1996). Benefits of using SUS are that is a very easy scale to administer to participants as it is a short questionnaire with easy questions. Additionally, it can be used on small sample sizes with reliable results. Furthermore, the SUS scale is valid as it can effectively differentiate between usable and unusable systems and it can identify specific areas of a product that needs improvement (Brooke, 1996). Downsides of using the SUS scale is that it has a limited scope; it only measures the usability of a system but it does not provide information on other aspects of user experience such as satisfaction, engagement and task performance (Orn & Orn, 2023).

The Software Usability Measurement Inventory (SUMI) is a solution to the recurring problem of measuring users' perception of the usability of software. It provides a valid and reliable method for the comparison of competing products and differing versions of the same product, as well as providing diagnostic information for future developments. It consists of a 50-item questionnaire developed following psychometric practice. Advantages of using SUMI are that it covers a wide range of usability factors, such as efficiency, learnability, attractiveness and helpfulness. Additionally, it provides feedback on specific aspects of software usability that can inform design decisions and improve overall usability (Kirakowski, n.d.). Disadvantages of SUMI are that it is intended to be administered to a sample of users who have had some experience of using the software to be evaluated and that the questionnaire is time-consuming for participants (Kirakowski, 1996).

AttrakDiff is a scale that helps to understand how users personally rate the usability and design of an interactive product. The AttrakDiff model separates four essential aspects: The product quality intended by the designer, the subjective perception of quality and subjective evaluation of quality, the independent pragmatic and hedonic qualities and the behavioural and emotional consequences (*AttrakDiff*, n.d.). Advantages of AttrakDiff are that it is user-centered and captures users' subjective perceptions of the quality of the product. Another advantage is that the scale can be customised to specific product applications and contexts. Disadvantages of AttrakDiff is that it can be time-consuming for participants as it is a long questionnaire, and that while it captures many aspects of user experience, aspects such as emotional responses and social interaction are not measured (*AttrakDiff*, n.d.).

One component in the successful use of automated systems is how much users trust these systems to perform effectively. For instance, trust can affect how much users accept and rely upon increasingly automated systems. To understand the relationship between trust in computerized systems and the use of those systems, we need to be able to measure trust effectively. This can be done using the System Trust Scale (Jian et al., 2000). This measurement tool allows for researchers or designers of computerized systems to better predict patterns of use of such systems, based on participants' assessment of trust. Factors in trust include reliability, robustness, familiarity, understandability, explication of intention, usefulness, and dependence (Jian et al., 2000). Advantages of the System Trust Scale are that it can identify specific trust issues in systems and the System Trust Scale captures users' subjective perceptions of system trust, which makes it useful for designing systems that meet users' needs and preferences. Disadvantages of the System Trust Scale are that it focuses primarily on cognitive and affective dimensions of trust, so it does not capture all aspects of user trust, such as trust in specific system features or functions.

Another disadvantage is that is a relatively short questionnaire, with only 10 items, which may limit its ability to capture all aspects of user trust (Jian et al., 2000).

The System Darkness Scale is a scale that is designed to give insights into dark patterns in a system (van Nimwegen et al., 2022). SDS as a tool does not give precise insights into this perception process, meaning that it is not designed in a way that points out how the user assesses each dark pattern of a system, but rather shows the overall assessment of the system. The scale is short and easy for participants to fill in as it consists of five likert scale questions. The score of the SDS will showcase if a user interface contains deceitful design or not. The scale does not however, point out exactly which dark pattern occurs in a system. Besides, the System Darkness Scale was developed recently so it has not yet been widely validated. However, this makes it even more important to use it more often. In all systems, but especially in local community platforms, dark patterns need to be avoided at all costs. So, testing systems for dark patterns needs to become more staple.

Table 2.1: Overview of usability and user experience measurement scales.

Scale	Advantages	Disadvantages	Source
SUS	• Short questionnaire with easy questions • Can be used on small sample sizes with reliable results • Can effectively differentiate between usable and unusable systems	• Only measures usability of a system • It is a relatively short questionnaire, which limits its ability to capture all aspects of usability	(Brooke, 1996), (Orn & Orn, 2023)
SUMI	• It covers a wide range of usability factors, such as efficiency, learnability, attractiveness and helpfulness. • It provides feedback on specific aspects of software usability	• It is intended to be administered to a sample of users who have had some experience of using the software • The questionnaire is long and time-consuming for participants	(Kirakowski, 1996)
AttrakDiff	• It is user-centered and captures users' subjective perceptions of the quality of the product • Can be customised to specific product applications and contexts • It separates four essential aspects of usability	• Can be time-consuming for participants • It does not capture all aspects of usability	(*AttrakDiff*, n.d.)
System Trust Scale	• Can identify specific trust issues in systems • Captures users' subjective perceptions of system trust	• It does not capture all aspects of user trust, only cognitive and affective dimensions of trust • It is a relatively short questionnaire, which limits its ability to capture all aspects of user trust	(Jian et al., 2000)
System Darkness Scale	• Gives insights into overall deceitfulness of a system • It is short and easy for participants to fill in	• Does not specify exactly which dark pattern occurs in a system • It is not yet widely validated by other researchers	(van Nimwegen et al., 2022)

2.5 Existing Guidelines for Designing Interfaces

This section explores existing guidelines for designing systems and interfaces. There are many sets of guidelines developed for designing different kinds of interfaces, however, there are no guidelines for designing local community platforms (Bødker et al., 2020). This research is trying to fill this gap. By exploring existing guidelines for designing designing general interfaces and guidelines for online platform interfaces, a set of guidelines for designing local community platforms can be formulated. First general design guidelines are discussed, then guidelines specific for online platforms are discussed. An overview of these guidelines can be found in table 2.2. The guidelines that are defined in this section, while not exhaustive, cover every aspect of the user needs and design challenges, see section 2.3 and 2.4. These guidelines are international standards and are widely reviewed and validated by other researchers, and thus give a good overview of existing relevant design guidelines.

2.5.1 Design Guidelines to Ensure Consistent and User-Friendly Interfaces

In this section five sets of guidelines are explored. These five sets discuss different kinds of guidelines. Firstly, there are Nielsen's heuristics which are general rules of thumb for designing interfaces (Nielsen, 2005). Secondly, the Web Content Accessibility Guidelines are explored. These guidelines are the standard for web content accessibility (B. Caldwell et al., 2008). Thirdly, guidelines for navigation are mentioned (Koyani et al., 2004). Furthermore, guidelines for designing for the elderly and for children are discussed (Shneiderman et al., 2016).

The Nielsen's heuristics are ten general principles for user interface design (Nielsen, 2005). They are called "heuristics" because they are more in the nature of rules of thumb than specific usability guidelines. The first heuristic is *visibility of system status.* The system should always keep users informed about what is going on, through appropriate feedback within reasonable time. The second heuristic is *match between system and the real world.* The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. The system should make information appear in a natural and logical order. The third heuristic is *user control and freedom.* Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. A system should be able to support undo and redo. The fourth heuristic is *consistency and standards.* Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions. The fifth heuristic is *error prevention.* Preventing problems from happening is even better than good error messages. Either get rid of situations that could cause errors or give users the possibility to confirm their action before they commit. The sixth heuristic is *recognition rather than recall.* Minimize the user's memory load by making objects, actions, and options visible. The user should not have to remember information from one part of the system to another. Instructions for use of the system should be visible or easily retrievable whenever needed. The seventh heuristic is *flexibility and efficiency of use.* Accelerators may often speed up the interaction for the frequent user such that the system can cater to both inexperienced and experienced users.

Table 2.2: Overview of existing guidelines for designing interfaces. The first five are general guidelines for designing interfaces and the bottom two are guidelines for designing online community platforms.

Name	Guidelines	Source
Nielsens heuristics	• Visibility of system status • Match between system and the real world • User control and freedom • Consistency and standards • Error prevention • Recognition rather than recall • Flexibility and efficiency of use • Aesthetic and minimalist design • Help users recognize, diagnose, and recover from errors • Help and documentation	(Nielsen, 2005)
WCAG	• Text alternatives • Alternatives for time-based media • System needs to be adaptable • System needs to be distinguishable • System needs to be navigable • System needs to be readable • System needs to be predictable	(B. Caldwell, Cooper, Reid, & Vanderheiden, 2008)
Navigation guidelines	• Standardize task sequence • Ensure embedded links are descriptive • Use unique and descriptive headings • Use check boxes for binary choices • Use thumbnail images to preview larger images	(Koyani et al., 2004)
Elderly	• Control over font sizes • Control over display contrast • Control over audio levels • Easy-to-use pointing devices • Clearer navigation paths • Simple command language	(Shneiderman et al., 2016)
Children	• Interactive engagement • Control with appropriate feedback • Supports social engagement with peers	(Shneiderman et al., 2016)
Collective action	• Online community platforms should combine core services and interfaces that supports a mix of information sharing, collaboration and/or collective action • Information sharing platforms should be connected to popular online social networking services • Collaboration platforms should engage anonymous members of large communities and embed peer control and coordination mechanisms • Collective action platforms should engage trusted members of small communities in the exchange of concrete information	(Spagnoletti et al., 2015)
Online platform design	• Identify the personal characteristics of the participants • Use common language and meaning • Identify the roles in a community • Use valid communication patterns and protocols	(Stanoevska-Slabeva & Schmid, 2001)

Allow users to tailor frequent actions to speed up the interactions, so the system can cater to both experienced and inexperienced users. The eighth heuristic is *aesthetic and minimalist design.* Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with relevant information and and make the information less visible. The ninth heuristic is *help users recognize, diagnose, and recover from errors.* Error messages should be expressed in plain language, precisely indicate the problem, and constructively suggest a solution. Finally, the tenth heuristic is *help and documentation.* Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large (Nielsen, 2005).

Web Content Accessibility Guidelines (WCAG) is developed through the W3C process in cooperation with individuals and organizations around the world, with a goal of providing a single shared standard for web content accessibility that meets the needs of individuals, organizations, and governments internationally (B. Caldwell et al., 2008). The WCAG consists of seven guidelines. The first guideline is *text alternatives.* The system should provide text alternatives for any non-text content so that it can be changed into other forms that users may need, such as large print, braille, speech, symbols or simpler language. The second guideline is providing *alternatives for time-based media*, such as videos or animations. The third guideline is that the system needs to be *adaptable.* The content needs to be created so that it can be presented in different ways, for example a simpler layout, without losing information or structure. The fourth guideline is that the system needs to be *distinguishable.* The system needs to make it easy for users to see and hear content, and be able to separate the foreground from the background. The fifth guideline is that the system needs to be *navigable.* It needs to provide ways to help users navigate, find content and determine where they are. The sixth guideline is that the system needs to be *readable.* The text content needs to be readable and easily understandable. Finally, the seventh guideline is that the system needs to be *predictable.* Interfaces of a system need to appear and operate in a predictable way (B. Caldwell et al., 2008).

Since navigation can be difficult for many users, providing clear rules is helpful. (Koyani et al., 2004) propose five guidelines for designing navigation in interfaces. The first guideline is *standardize task sequences.* Allow users to perform tasks in the same sequence and manner across similar conditions. The second guideline is *ensure that embedded links are descriptive.* When using embedded links, the link text should accurately describe the link's destination. The third guideline is *use unique and descriptive headings.* Use headings that are unique from one another and conceptually related to the content they describe. The fourth guideline is *use check boxes for binary choices.* Provide a check box control for users to make a choice between two clearly distinguishable states, such as "on" or "off". Finally, the fifth guideline is *use thumbnail images to preview larger images.* When viewing full-size images is not critical, first provide a thumbnail of the image (Koyani et al., 2004).

Interface designers can do much to accommodate older adult users, and thus to give older adults access to the beneficial aspects of computing and network communi-

cation (Shneiderman et al., 2016). As the world's population grows older, designers in many fields are adapting their work to serve older adult citizens. Larger street signs, brighter traffic lights, and better night-time lighting can make driving safer for drivers and pedestrians. Similarly, desktop, web, and mobile devices can be improved for all users by providing users with control over font sizes, display contrast, and audio levels. Interfaces can also be designed with easier-to-use pointing devices, clearer navigation paths, consistent layouts, and simpler command languages to improve access for older adults and every user (Shneiderman et al., 2016).

Appropriate design principles for children and teenagers' software recognize young people's intense desire for the kind of interactive engagement that gives them control with appropriate feedback and supports their social engagement with peers. Other concerns are short attention spans and limited capacity to work with multiple concepts simultaneously (Shneiderman et al., 2016).

2.5.2 Design Guidelines for Creating Effective and Engaging Online Platforms

This section discusses two sets of guidelines for designing online platforms. The first set of guidelines explores guidelines for online platforms that promote collective action. The second set explores guidelines for designing online platforms.

Online platforms for collective action provide a private, safe, and secure environment in which members can exchange information, reach a consensus, make a collective action, and act as a group to achieve a common goal. In such environments, the exchange of concrete and uncodified information (e.g., help request via instant messaging) enables intimate interactions and the exchange of resources both in the virtual and in the physical world. As trust is an important condition here, collective action functionalities support the creation of private groups of invited users whose identity is made explicit through reliable authentication methods (Spagnoletti et al., 2015). Online collaboration platforms rely on the capability to manage a shared repository of information. Community members must be able to easily access relevant information, provide feedback through rating and comments and eventually generate new content by adding, recombining, modifying, and integrating contents contributed by other members (Spagnoletti et al., 2015). Information sharing, collaboration, and collective action are combined in different ways by accommodating the requirements posed by the environment of the platform system (Spagnoletti et al., 2015). Spagnoletti et al. (2015) proposes four guidelines for designing different kinds of online platforms. The first guideline is for general platforms that support *online communities*. In general, these platforms should combine core services and interfaces that supports a mix of information sharing, collaboration and/or collective action. The second guideline is for online platforms that support *information sharing*. Platforms that support information sharing-centered online communities should be connected to popular online social networking services to enable the diffusion of codified and abstract information. The third guideline is for online platforms that support *collaboration*. Collaboration-centered online community platforms should engage anonymous members of large and loosely coupled communities and embed peer control and coordination mechanisms in order to ensure the quality of new content. Lastly, the fourth guideline is for platforms that support *collective action*.

Online platforms that support collaboration-centered online communities should engage trusted members of small and tightly coupled communities in the exchange of concrete information and provide coordination mechanisms (Spagnoletti et al., 2015).

A platform should enable and support a community of agents (Stanoevska-Slabeva & Schmid, 2001). The first step of the design should be the identification of the community and its features in terms of common vocabulary, interests and values, subject of discourse and organizational structure. For the platform to provide as much support for community building as possible, the community features should be modelled in a form suitable for implementation. Stanoevska-Slabeva and Schmid (2001) define four aspects of designing an online community platform. The first aspect are the participating agents. To design an effective platform it is important to identify the personal characteristics of the participants such as demographic features, desires, beliefs, capabilities, intentions, needs and preferences as well as role within the community. The second aspect is the domain of discourse as the foundation for common language and meaning. This can be defined in form of an ontology, taxonomy and vocabulary. For example, in transaction communities, this task is performed by electronic product catalogues and product information. The third aspect is the roles that appear in the community. Each role is a different type of community participant (for example moderator, contributor or visitor) and is described in terms of required capabilities as a prerequisite for role performance, rights and obligations. Finally, the fourth aspect is valid communication patterns and protocols. This includes the etiquette and the rules defined by the community (Stanoevska-Slabeva & Schmid, 2001).

Chapter 3

Establishing Guidelines

As could be seen in figure 1.1 in the introduction, the first phase of the method was establishing a set of guidelines for designing local community platforms. This was done in four steps. The first step was defining keywords that describe challenges for designing local community platforms. These keywords were based on the literature in chapter 2. These keywords were defined by combining existing guidelines that are explored in section 2.5 with the needs of the users of the platform, see section 2.4, and design challenges that are mentioned in section 2.3. This was done following the method by Spagnoletti et al. (2015) for defining design principles based on keywords from existing literature. The second step was a systematic literature search. This was done following the method by van Vulpen & Jansen (2023) using the keywords (van Vulpen & Jansen, 2023). A query search was done and relevant papers were selected. Then in the third step, these selected papers were searched for the keywords that were defined in the first step. This produced a set of quotes that were extracted from the relevant literature. Finally, by classifying each keyword based on the amount of occurrences in the relevant literature, the most important keywords were used to establish a set of design guidelines for local community platforms. See figure 3.1 for a diagram of the method for establishing the design guidelines.
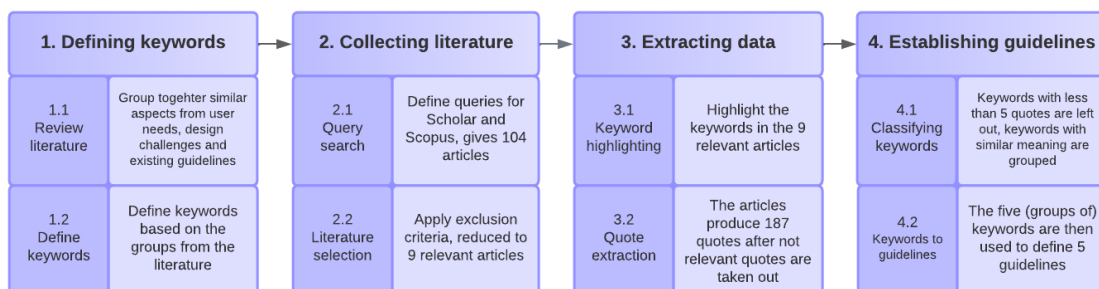

Figure 3.1: Diagram of the method for establishing the design guidelines.

3.1 Defining Keywords from Existing Literature

In the paper presented by Spagnoletti et al. (2015), the researchers proposed a method to define principles for online community platforms (Spagnoletti et al.,

2015). In this method relevant literature is reviewed and from this literature, platform principles can be derived. These platform principles are derived by finding patterns and recurring issues in the literature.

Following the method from Spagnoletti et al. (2015), findings from literature in chapter 2 was reviewed. The existing guidelines, user needs and design challenges all have similar aspects and challenges that arose from reviewing the literature. The findings from the literature review were summarised and similar aspects were grouped together. For example, an aspect that was recurring in the literature was characteristics of users. In a local community there are many different user groups, and all these user groups have different needs. So, a recurring aspect in the existing guidelines, the user needs, and design challenges was taking the personal characteristics of users into account when designing a local community platform. Grouping these aspects and challenges together results in a set of keywords that are identified by the researcher, see table 3.1 for an overview of the groups that were formed and the keywords that were derived from those groups.

3.2 Systematic Literature Review

Following the method from van Vulpen & Jansen (2023), a systematic literature review was done using the keywords that were defined in section 3.1. The systematic literature review consisted of three steps. The first step was finding relevant literature by defining a search query for Scholar and Scopus. Then using Nvivo, quotes were extracted from the literature by highlighting the keywords that were defined in the articles. Finally, by counting what quotes occurred in the literature the most, and by grouping keywords together, these (groups of) keywords were then used to establish the guidelines for designing local community platforms. By using this method, the guidelines are backed up by relevant literature and can be further validated by conducting a case study.

First a query is defined to search through Scholar and Scopus, these two literature search engines were chosen as they are the two biggest search engines for literature. The Scholar query that was defined was: *allintitle: platform design guidelines OR UX platform design guidelines OR UI platform design guidelines OR community platform design.* The Scopus query that was defined was: *TITLE((platform design guidelines) OR (UX platform design guidelines) OR (UI platform design guidelines) OR (community platform design)).* This query resulted in a set of 104 unique papers. Papers that were not relevant to this research were excluded based on four criteria. These four criteria are:

1. The paper is not available

2. The paper is not in English

3. The paper is not peer-reviewed

4. The paper does not provide guidelines for designing platforms or interfaces

By applying these criteria, the number of relevant papers was reduced reduced to nine. The nine papers that were used can be found in table 3.2.

Table 3.1: Keywords derived from common themes from literature in chapter 2.

Keywords	Existing guidelines	User needs	Design challenges
1. Personal **2. Characteristics**	• Identify the personal characteristics of the user (Stanoevska-Slabeva & Schmid, 2001) • Identify the roles in a community (Stanoevska-Slabeva & Schmid, 2001)	• Elder users suffer from acute vision or missing prior knowledge such as special gestures or typing on a soft keyboard (Wong et al., 2018) • Younger users need interactive and social engagement (Shneiderman et al., 2016)	• Failure to design elderly friendly interfaces may lead to exclusion (Paez & Del Pilar Zapata Del Río, 2019) • People with disabilities have a higher computer dependence (Abascal & Nicolle, 2005)
3. Consistency **4. Navigation**	• Standardize task sequence (Koyani et al., 2004) • Clear navigation paths (Koyani et al., 2004) • Recognition rather than recall (Nielsen, 2005)	• Understanding the physical, intellectual and personality differences between users is vital for designing consistent interfaces (Shneiderman et al., 2016) • Since navigation can be difficult for many users, providing clear rules is helpful (Koyani et al., 2004)	• Interfaces that are very intuitive for one user, can be confusion for another, so interfaces must be consistent (Savidis & Stephanidis, 2004)
5. Trust **6. Transparency** **7. Errors**	• Platform needs to be predictable (B. Caldwell et al., 2008) • Help users recognize, diagnose and recover from errors (Nielsen, 2005) • Error prevention (Nielsen, 2005)	• The successful use of platforms depends on how much users trust these platforms. Trust can affect how much users accept and rely upon platforms (Jian et al., 2000)	• Platform designers cannot use design tricks to to manipulate users into taking actions that they otherwise might not have taken (Waldman, 2020) • The design of platforms cannot be weaponized to harm users and their privacy (Waldman, 2020)
8. Communication **9. Language**	• Use common language and meaning (Stanoevska-Slabeva & Schmid, 2001) • Platform needs to be readable (B. Caldwell et al., 2008) • Recognition rather than recall (Nielsen, 2005)	• It is important for elderly users that a platform has a clear command language (Shneiderman et al., 2016) • For younger users it is important that the platform gives them appropriate feedback (Shneiderman et al., 2016)	• Platforms can be designed to persuade the users without them knowing, which brings considerable ethical considerations (Gray et al., 2018)
10. Control **11. Flexibility**	• Flexibility and efficiency of use (Nielsen, 2005) • Platform needs to be adaptable (B. Caldwell et al., 2008)	• Users need to be allowed to tailor frequent action, so the platform can alter to both experienced and inexperienced users (Nielsen, 2005)	• Users often make mistakes, so they need a clearly marked exit to leave the unwanted state (Nielsen, 2005) • A platform should be able to support undo and redo (Nielsen, 2005)

Table 3.2: Selected papers for systematic literature review.

Nr.	Title	Source
1	A design theory for digital platforms supporting online communities: A multiple case study	(Spagnoletti et al., 2015)
2	A versatile experimental platform for tactile internet: Design guidelines and practical implementation	(Shi, Feng, He, Li, & Jiang, 2022)
3	An inductive experimental approach to developing a web-based travel survey builder: developing guidelines to design an efficient web-survey platform	(Chung, Srikukenthiran, Miller, & Nurul Habib, 2021)
4	Join the ride! user requirements and interface design guidelines for a commuter carpooling platform	(Arning, Ziefle, & Muehlhans, 2013)
5	Let's Talk@ Clubhouse: Exploring Voice-Centered Social Media Platform and its Opportunities, Challenges, and Design Guidelines	(Jung, Park, Kim, & Lee, 2022)
6	Multiple Platform First: Design Guidelines for Multiple Platform Games	(Andersson, 2019)
7	The development of guidelines to design collaborative serious games for a new educational platform	(Poort, 2017)
8	Towards Design Recommendations for Social Engagement Platforms Supporting Volunteerism Targeting Older People in Local Communities	(Lindberg, Signer, & De Troyer, 2022)
9	USER INTERFACE AND INTERACTIVITY DESIGN GUIDELINES OF ALGORITHM VISUALIZATION ON MOBILE PLATFORM	(Supli, 2019)

Next, data needed to be gathered from the relevant papers. This was done using the keywords that were defined in section 3.1. The keywords were highlighted in the selected papers. The Nvivo software scanned the papers and highlighted the keywords in the text including the context that the keyword was in, this is called a quote. However, not every quote was relevant to this research, so the researcher went over all the quotes and extracted the relevant quotes by hand. Quotes that were not about designing platforms or interfaces were excluded. For example, keywords that were found in the reference section of a paper were excluded. This resulted in a data set of 187 quotes that were divided over the design principles.

The third step was counting the number of quotes that occur in the reviewed literature. Keywords that had a higher number of quotes, and thus occurred more in relevant literature, were more important to designing platform interfaces. Quotes that had 5 or less hits were excluded as these were not relevant enough to be included in the guidelines. Keywords that had similar meaning were grouped together into themes. Finally, these themes were then used to define guidelines for designing local community platform interfaces. By using this method, the guidelines are based on and backed up by relevant literature.

3.3 Five Guidelines for Designing Local Community Platforms

After conducting the systematic literature review, five themes emerged that were the most important for designing local community platforms. These five themes were used to formulate five design guidelines for designing local community platforms. The five guidelines are:

1. *Clear communication*
   A local community platform needs to communicate clearly for all users. This means that the platform should give appropriate and immediate feedback, and

available actions need to be recognisable by using visuals rather than text.

2. *Trust*
Since trust is an important aspect of a successful community platform, the interface needs to be designed in a trustworthy and transparent way, meaning that dark patterns need to be avoided at all costs. The platform cannot persuade the user into taking actions they do not want to take, and users must be able to exit unwanted states.

3. *Personal characteristics of users*
Platform design needs to be user friendly for the specific users in the community. For example colourblind friendly, read-aloud friendly. And users should only see the information that is interesting for them, so unrelated content should be allowed to be filtered out.

4. *Consistent platform*
The layout and interface of a platform should be consistent and recognizable, which reduces cognitive load for the user. A navigation path should be clear to the user so that the user does not get lost on the platform.

5. *User control*
User should be able to personalise their content and account, such as changing the font size and filtering out content that is not interesting to the user. User should also be able to view and edit privacy settings, and at all times be able to exit actions that the user does not want to take.

These are the five guidelines for designing local community platforms. When looking at each guideline separately, they do not seem new or groundbreaking. However, it is the combination of these guidelines that makes these guidelines interesting.

These five guidelines were based on relevant literature found in chapter 2, and a systematic literature review. So, the guidelines for designing local community platforms are backed up by literature. However, this does not necessarily mean that the guidelines work in practice. This is why the guidelines needed to be tested by conducting a case study.

Chapter 4

Case Study

The guidelines that were established in chapter 3 were validated by literature, but they also needed to be validated by practice. This was done through a case study. First, a baseline measure was formed by user testing an existing platform to understand the user experience with that platform. Then the established guidelines were applied to this existing platform and the user test was executed again, this resulted in an iteration measurement. Then when the results from these two user tests were compared, it could be concluded if the guidelines improved the user experience.

This case study was divided into two stages. In the first stage the user test was executed using the interface of the case study application as is to form a baseline measurement, this will from now on be referred to as the 'baseline study'. Then, in the second stage, the same user test was executed again with the improved interface to form an iteration measurement, this will from now on be referred to as the 'iteration study'. With the results from these studies, it could be investigated if the usability and user experience improved by redesigning the interface following the guidelines. The complete study will from now on be referred to as the 'case study'.

4.1   LocalforLocal

For this thesis research a case study will be done using an existing local community platform. The platform chosen for the case study is the LocalforLocal platform[1] in development at the company Centric[2]. This is an international company that mainly focusses on developing software for municipalities, supply chain and the financial sector. Centric provides bespoke IT services and solutions. One project that is in development at Centric is the LocalforLocal platform. This platform is a digital community centre where users can see social and economic initiatives, sharing and trading of goods, people that need help, local stores and more. In this platform users have a wallet for the local currency that they can spend at the local stores. The goal of the platform is to lower the threshold to contribute to a stronger community, see figure 4.1 for an overview of the screens of the LocalforLocal application. The way the platform works is most easily described by providing a use case:

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[1]`https://localforlocal.io/`
[2]`https://centric.eu/`

In the LocalforLocal platform you see that a neighbour posted that he needs someone to walk his dog today, since he just broke his leg. He offers 5 local currency tokens for this. You have some free time so you accept this post and come into contact with the neighbour. You agree upon a time and you head over to walk the dog and chat with your neighbour for a little while. Afterward you head over to a local bakery since you're out of bread. This local bakery accepts the local currency as a form of payment. You find the bread you want and using the Local for Local platform you use the local currency tokens to pay for your items. The local business can then transform the local currency tokens back into the national currency. By using the LocalforLocal platform you are rewarded for using your time to help your neighbours and you get into contact with your neighbours. And local businesses profit since you decided to buy bread at a local bakery instead of going to a supermarket franchise.
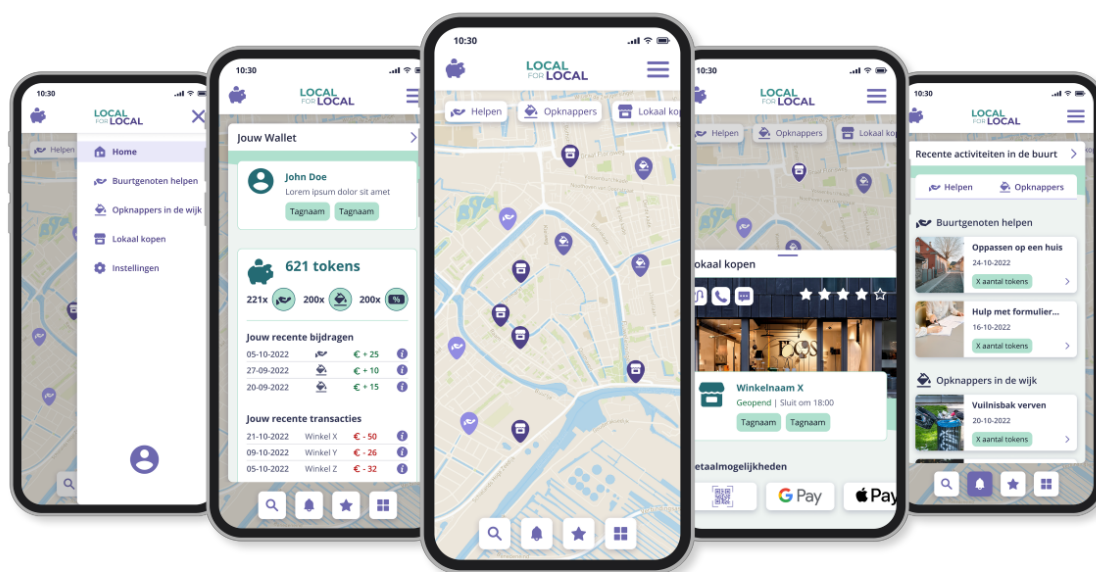
Figure 4.1: Overview of a few screens of the LocalforLocal application.

So people that live within a certain area/community can sign up for the platform. In the platform the user can see their own personal wallet with their local currency tokens, how they received these tokens and recent transactions. Users can also buy tokens. Furthermore, users can also see what their neighbours need help with. This is done in the form of posts, and then the user can respond to these posts and accept them. Then the user can chat with the neighbour they are helping to get to know each other and make arrangements. The municipality can also make posts. These posts are for improving the neighbourhood, such as painting park benches. The municipality makes sure that the user that accepts the post gets the appropriate supplies needed. Users are also allowed to make posts for neighbourhood improvements. Next, there is a page where the user can see the posts they made themselves and posts they responded to. Additionally, there is a page on the platform where the user can find all the local stores in their community, and it is possible to make transactions when the user buys something from a local store. Finally there is a settings page where users can see their personal information and privacy settings. It is possible for users to change what personal information other users can see, for

example they can choose if they want to have a picture next to their name. In the platform it is possible to search for stores, people that need help and neighbourhood improvements.

There are three stakeholders for a local community platform like this. Firstly, there are the residents of a community that benefit from the platform by receiving help and receiving local currency tokens in return for providing help. Secondly, there are the local business owners. By accepting the local currency as a payment method, people are more inclined to buy at this local store. And the store can convert the local currency to the national currency through the municipality. The municipality is the third stakeholder. By making a local community platform available, the residents can obtain the benefits of a local community platform, and make the community more resilient. Additionally, the municipality can post projects to fix up the neighbourhood in return for an amount of local currency tokens. This makes the community a better place to live in.

The platform is still in development and was used to test the formulated guidelines, and can be used to gain insights into what users think of platforms such as this one and what they think need to be included for them to actively use the platform. As the platform interface is still in early stages of development, it gives the opportunity to iterate on the design of the platform and its interface.

4.2   Evaluating the Platform

The user test for this case study consisted of two parts; a quantitative part and a quantitative part. These two parts were conducted separately. For the quantitative part an online survey was done and for the qualitative part semi-structured interviews were held. This was the study design for both the baseline study and the iteration study.

4.2.1   Gathering Participants

For this case study, a between-subjects design was chosen. This was the best option for this study as this minimizes the learning effect (Charness, Gneezy, & Kuhn, 2012). Since the participants had to execute certain tasks using the platform, it is not beneficial to have the same participants to do the user test with the iterated version of the platform. So, because of this, a between-subjects design was chosen.

Participants were gathered through purposive sampling. This means that the researcher relied on their own judgement when choosing members of the population to participate in the user test. Purposive sampling was used because for this study it was important to have participants from a wide variety of age groups and technological ability. To make sure that both the baseline study and the iteration study had a good representation of the population, the participants were selected to participate in either the baseline study or the iteration study.

A requirement for participating in the study was that the participant was at least 18 years old.

4.2.2   Materials

The materials that the case study used were an online survey created with Qualtrics XM, the LocalforLocal prototype which was made in Figma, and an interview which consisted of 12 questions.

After the participants were recruited they received an email or message with the link to the online survey, which had to be opened on a computer. The online survey consisted of several elements. First there was an information page where the participant could read what the study was about and what was expected of them, and the participant had to give consent to participate in the study, see Appendix A.1. Then the participant had to fill in some demographic questions, see Appendix A.2. Furthermore, in the survey the participant had to click on a link to go to the LocalforLocal prototype, which opened in a new tab in their browser. The participant had to complete five tasks using the LocalforLocal platform and then indicate how well the task went, see Appendix A.3 for the tasks. After the tasks were completed, the participant had to fill in two surveys, first the AttrakDiff survey and then the System Darkness Scale survey, see Appendix A.4 and Appendix A.5, respectively. Finally, five participants were selected to do an interview, see Appendix A.6 for the interview questions.

4.2.3   Online Survey for Quantitative Results

The quantitative data was gathered through an online survey. The participant could do the user test whenever they had the time to complete it and could take however long they needed to complete it. This survey could be widely distributed to people of many different user groups, since it was important to include as many different types of user groups as possible for testing the local community platform. In research by St. Louis et al., (2009) this method is also used, but then on paper (St. Louis, Lubker, Yaruss, & Aliveto, 2009). Participants received an envelope with a questionnaire and images of a prototype that were numbered. Then in the questionnaire the participant was asked to look at a specific image and answer the questions on the survey. This method can be transferred to the online domain. In the online survey the participant could click a link to a part of the interactive prototype and execute the given task, then answer the questions on the survey. A downside of using this method was that the researcher could not supervise the test as the participants did the user test remotely, so to make sure the survey was clear, a pilot test was executed.

For this quantitative test, the participants first needed to answer some demographic questions. Then the participants received some short tasks to execute using the platform. these five tasks were:

1. When you open the platform you see the homepage. Now look up how many tokens you have in your wallet.

2. You want to post an advertisement because you need someone to look after your dog Max. Try to make a post.

3. You are at Bakery Barry to buy a loaf of bread and you want to buy the bread with tokens. Look up Bakery Barry in the platform and do all the steps to do

a transaction.

4. In settings, try to change your privacy settings.

5. Look at the posts that other people posted. Read the description at the post 'looking after a house', and respond to this post.

After completing a task, the participant was asked to indicate how the task went and if they had difficulties or were unable to complete the task, they were ask to briefly describe what went wrong. After all the tasks were completed, the participant was asked to fill out a short online survey with questions from usability measurement scales. For this quantitative user test, the AttrakDiff scale and the System Darkness Scale were used, see table 2.1 for the advantages and disadvantages of the scales. Even though a disadvantage of the AttrakDiff scale was that it was relatively long, it was easy for participants to fill in. Another aspect of the AttrakDiff scale that was beneficial for this study was that it captures user engagement and attractiveness very well, which made it easier to compare the baseline study with the iteration study. Furthermore, the System Darkness Scale was used. Since dark patterns should not occur in local community platforms, it was important that the SDS was included in the survey. In chapter 2 more scales were explored, however not all of these could be used in the online survey as that would make the survey too long. The scales that were not used in the online survey were instead used as a base for some of the questions for the semi-structured interviews. See Appendix A for the full survey, including the informed consent form, the demographic questions, the tasks, the AttrakDiff survey and the SDS survey.

4.2.4 Semi-Structured Interviews for Qualitative Results

For the qualitative results, semi-structured interviews were held in person. From the participants of the online survey, five participants were selected based on their age to do the semi-structured interview. This was done to ensure that people of as many different age groups as possible were included in the interviews.

The semi-structured interview was conducted with in-depth questions about the participants' opinions and ideas. For this study a semi-structured interview was the best option as with this method the researcher had a pre-defined set of questions, but could deviate from these questions if interesting topics arose while conducting the interview (Kallio, Pietilä, Johnson, & Kangasniemi, 2016). This was important for this research as the platform was still in early development, meaning that the platform was not yet completely functional. So, during an interview, participants could have interesting insights and ideas which could then be further discussed. See Appendix A for the interview questions.

4.2.5 Protocol for the User Tests

An overview of the protocols for both the qualitative part and the quantitative part can be seen in figure 4.2. There were eight steps of the protocol, or nine steps if the participant was selected to do the interview:

- Welcoming the participant: The participant needed to feel at ease during the user test. The researcher assured the participant that they could leave the
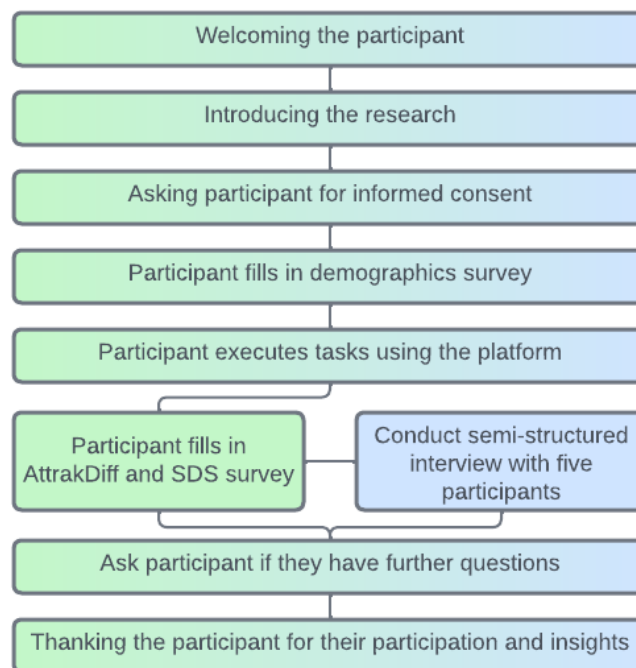
Figure 4.2: Diagram of the protocol for both the qualitative part of the user test and the quantitative part of the user test.

test at any time, without having to give a reason. Additionally, the researcher told the participant that their insights and experiences were very important to the research.

- Introducing the research: In this phase of the user test the researcher described the aim of the study. Also, the user test was explained to the participant so that they knew what to expect. The researcher also explained how the gathered data was stored and used. In case of the qualitative user test, the researcher asked the participant if they were comfortable with audio recording the interview and explained that the audio recording was only used to be transcribed during the analysis phase, and was deleted after analysis was completed.

- Asking participant for informed consent: The participant gave their written consent for participating in the study, see Appendix A for the informed consent form. The participant received the informed consent form, which contained the information that was given by the researcher in the previous stage so that the participant could read all the important aspects of the user test in more detail, and could ask any question if needed.

- Participant filled in demographics survey: The participant received a short questionnaire with demographic questions such as age, gender and experience with technology. This was useful to get a good overview of the population and to see if a representative sample of each user group was included in the user test.

- Participant executed the tasks using the platform: The participant received the prototype and specific tasks that had to be executed using the platform. The researcher reassured that the tasks were not to test the knowledge of the participant, but to test the system, so the participant should not worry about making mistakes. The researcher could not help the participant if they could not execute the task.

- For the quantitative evaluation, participant filled in AttrakDiff and System Darkness Scale: As part of the quantitative test, the participant filled in the AttrakDiff and the System Darkness Scale surveys.

- For the qualitative evaluation, semi-structured interview were conducted: As part of the qualitative test a semi-structured interview was conducted. In this interview participants were asked about their opinion on specific aspects of the prototype and about aspects that could be added to the platform. Since the interview was a semi-structured interview, a set of predefined interview questions were asked during this interview. However, if interesting insights arose, it was possible to ask additional questions.

- Ask participants for further questions: The researcher asked the participant if they have any further questions, remarks or final insights that they wanted to share with the researcher.

- Thanking the participant for their participation and insights: The researcher reminded the participant how their data was stored and handled. Then the researcher thanked the participant for their participation.

Chapter 5

Results

In this chapter first the results of the baseline study are given in section 5.1. Then the design of the LocalforLocal platform was iterated on based on the guidelines that were established in chapter 3 and the results of the baseline study. This can be found in section 5.2. Furthermore, the results of the iteration study are given in section 5.3. These results were then used to compare the baseline study to the iteration study to see if the user experience improved, this can be found in chapter 6.

5.1 Baseline Study

The baseline study was conducted using the LocalforLocal platform. The results of the baseline study can be found in this section. These results were used to iterate on the design of the LocalforLocal platform, and this iterated design was used in the iteration study, see section 5.2. The results of the baseline study were also used to compare to the results of the iteration study, see chapter 6.

5.1.1 Quantitative Results from Online Survey

The quantitative part of the user test was an online survey where participants could test the platform and then had to answer questions about their opinion of the platform. In total there were 22 participants that completed the user test (13 male, 8 female and 1 non-binary). The participants' ages ranged from 20 to 64 (M=38.8, SD=15.7). The participants were asked to indicate how much experience they had with technology. Two participants indicated that they had a little experience, seven indicated that they had average experience and thirteen participants indicated that they had a lot of experience with technology.

Tasks

For all tasks, most participants could execute them without difficulty; fifteen or more participants indicated that they had no trouble completing the task. The task that caused the most problems was task 3, this was the task where the participant had to do a transaction at a local store. Five participants were having difficulties with executing the task, and two participants were not able to execute the task at
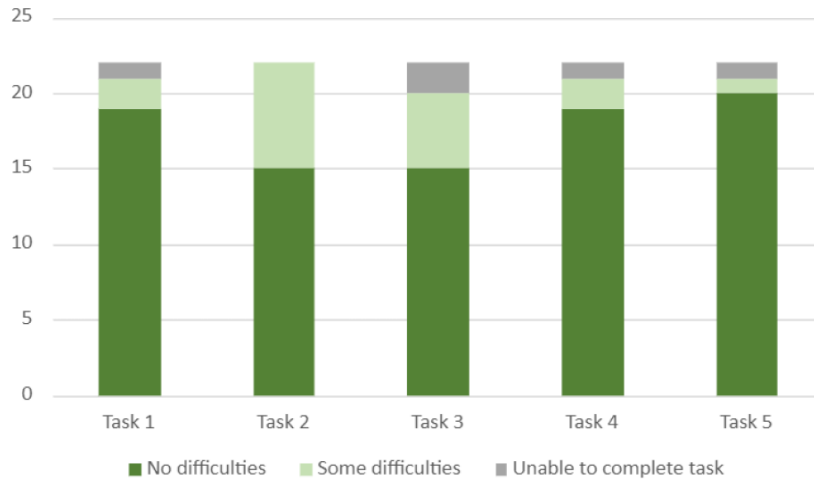
Figure 5.1: Task results of the baseline study.

all. This means that this part of the platform needed to be designed in a way that is more intuitive for users. See figure 5.1. There was no correlation found between the ability to correctly execute the tasks and the experience with technology that the participant indicated.

AttrakDiff

In figure 5.2 the results of the AttrakDiff questionnaire can be seen. After doing a Shapiro-Wilk test, looking at histograms and Q-Q plots, it could be concluded that the data was normally distributed. All the word-pairs of the AttrakDiff questionnaire are separated into four categories. The mean scores of these four groups were:

- Pragmatic Quality: M=5.04, SD=0.27

- Hedonic Quality - Identity: M=4.92, SD=0.64

- Hedonic Quality - Stimulation: M=4.24, SD=0.51

- Attractiveness: M=5.15, SD=0.22

The mean scores of Pragmatic Quality, Hedonic Quality – Identity and Attractiveness were all quite close to each other. The mean score of Hedonic Quality – Stimulation was lower than the mean scores of the other three categories. After conducting an ANOVA test, it became clear that the mean score of Hedonic Quality – Identity was significantly lower than the mean scores of the other three categories ($F(3.24)$=5.11; p=.007). This means that the perceived stimulation and excitement of the LocalforLocal platform had the most room for improvement.

One thing that was worth noting after reviewing the results was that in 22 of the 28 word pairs, the participants that indicated that they had a little or average experience with technology scored the word pairs (not significantly) more positive than the participants that indicated they had a lot of experience with technology. This could indicate that people with more experience with technology are more critical when evaluating new systems.
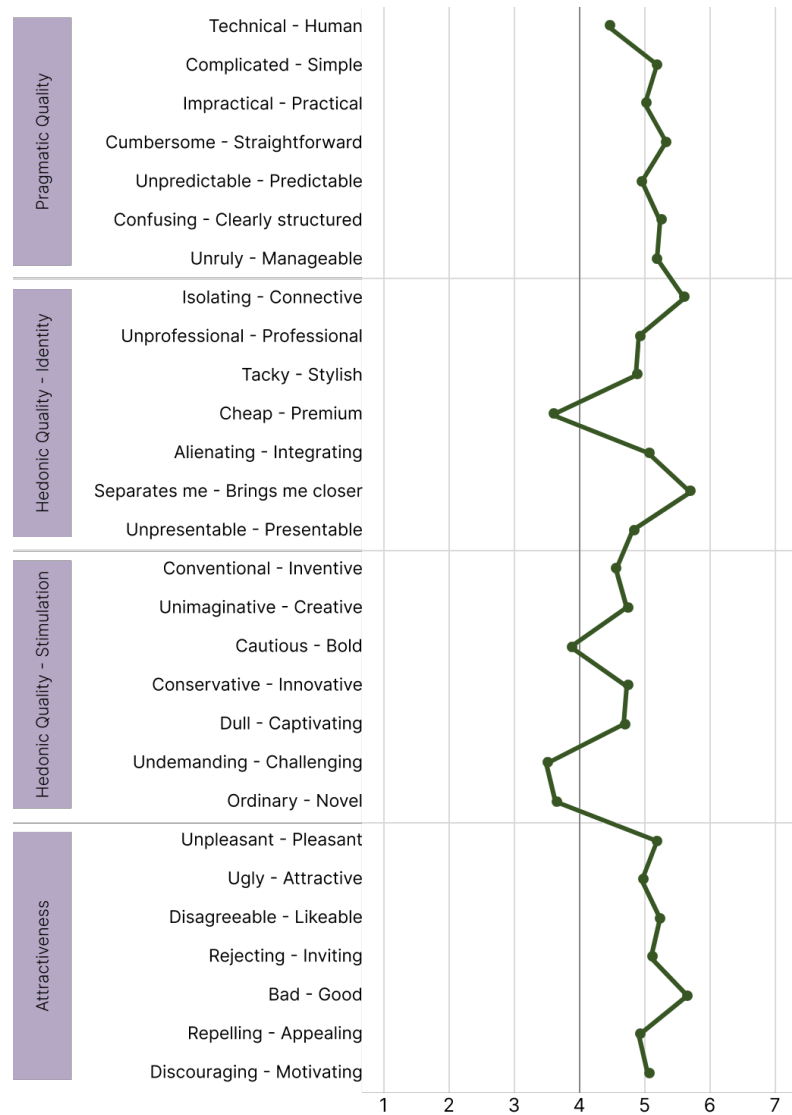
Figure 5.2: AttrakDiff results of the baseline study.

System Darkness Scale

The System Darkness Scale has its own scoring system, a score of 100 means that the tested system is the darkest system possible. A score of 0 means that the tested system is not dark whatsoever. The System Darkness Scale score that the platform received was low (M=10.91, SD=11.84). This shows that the LocalforLocal platform might have some minor dark elements, but overall does not have dark patterns. The results show that the standard deviation is higher than the mean. This could mean there is a lot of variation in the data, and it might be abnormally distributed. After testing for normality using a Shapiro-Wilk test and looking at the histograms and Q-Q plots, it became clear that the data was not normally distributed. This means that when comparing the baseline study to the iteration study, a non-parametric test must be used.

5.1.2 Qualitative Results from Semi-Structured Interviews

The qualitative part of the user tests were semi-structured interviews. Five participants that had already completed the user test's quantitative part agreed to do the interview (2 male, 3 female). The ages of the participants ranged from 23 to 57 (M=37.00, SD=14.85). The interviews were recorded and transcribed and together with the answers to the open questions on the online survey, this formed the data set used for analysis.

To analyse the qualitative data, open coding was done using NVivo. From this analysis, sixteen codes were derived. These codes were grouped by first looking at which codes had the most hits, then dividing the rest of the codes among these. This resulted in four groups: visuals, overview, trust and feedback. These four groups show what users liked about the platform, but it also shows where the biggest issues lie within the current platform. Participants were positive about the look of the platform and the way the icons looked, so the visuals were perceived positively. Furthermore, the platform gave a clear overview of available actions and the platform was not complicated. Trust was an issue for participants. Some participants were confused when completing a transaction in the platform, and participants mentioned that being able to chat with other users would increase trust. Finally, the feedback that the platform gave was perceived as appropriate, however there were also some issues with feedback. Participants mentioned that there should be more confirmation messages when, for example, they placed a new post. By keeping these issues in mind while applying the guidelines to the platform, the user experience of the platform will improve.

5.2   Iterating on the Platform Design

The guidelines for designing local community platforms that were established in chapter 3 were applied to the LocalforLocal platform. Per guideline that was established, it can be seen from the results of the baseline study how the design of the LocalforLocal platform could be iterated on to improve user experience. In this section a few screens of the existing and iterated version are shown, see Appendix B and for the screens of the baseline version of the LocalforLocal platform and see Appendix C for the iterated version.

5.2.1   Guideline 1: Clear Communication

There were some issues found with *clear communication* in the platform, so the platform was adapted to make the communication more clear. Firstly, the wallet needed some changes. The shortcut to the wallet was unnecessary and the name 'wallet' was not intuitive for many participants since the icon is a piggy bank.
Quote: *"It says 'my wallet' but the icon is a piggy bank, that's not right."*
So, the name of that page was changed into 'sparen en uitgeven' (saving and spending). Furthermore, the icons on the wallet page were not clear for participants. So, these icons were replaced with a button to do a new payment, see figure 5.3.
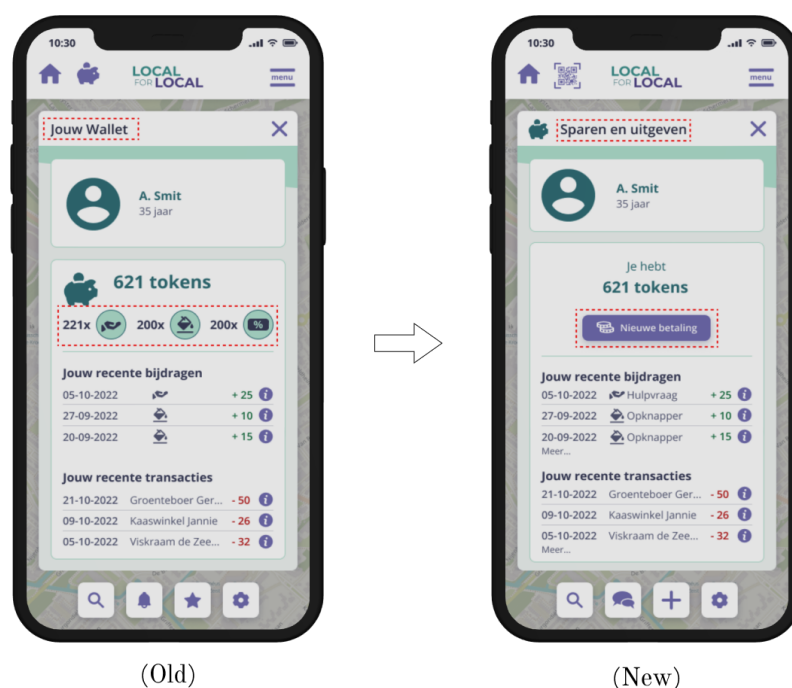
Figure 5.3: Changes made on the 'wallet' page. The changes are indicated by red boxes.

The 'bell' icon was also not intuitive for most participants, and after explaining what the shortcut was for, namely notifications, participants said that this was not intuitive.
Quote: *"That bell icon, how would I interpret that? I don't know."*
So, this icon was removed. The same goes for the star icon, participants either did not know what that meant or they thought it meant 'achievements'. These icons

were replaced by a shortcut to the chat page and a shortcut for placing a new post, see figure 5.4.

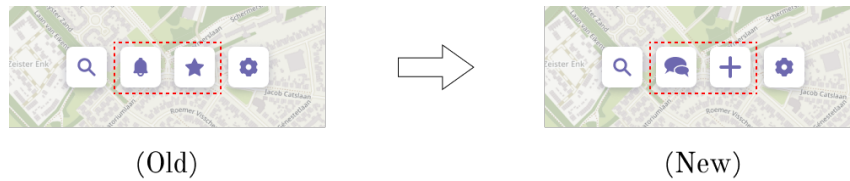(Old)   (New)

Figure 5.4: Changes made to the shortcuts at the bottom of the screen indicated by the red boxes.

Feedback is an important part of clear communication. Four feedback issues occurred so the design of the LocalforLocal platform needed to be adapted to improve the feedback of the platform. Firstly, after placing a new advertisement, several participants mentioned that they felt the need for a small confirmation that the placement was successful.

Quote: *"But then how can I see that the post has been placed?"*
Quote: *"Add something that the new post catches your eye, that it glows for a little bit or something like that."*

So, a small popup confirmation message in combination with a glow outline around the newly placed post was added, see figure 5.5.

Figure 5.5: New version of the screen after the user places a post. A popup banner was added as well as a glow outline around the new post.

Secondly, when reacting to a post several participants got confused. Participants mentioned that it was not clear to them that when they responded to a post, that the post would be added to the 'gereageerd' (responded) section on the 'mijn advertenties' (my advertisements) page.

Quote: *"Maybe a little popup saying like your reaction has been send"*

So a popup message was added after responding to a post, and the user is redirected immediately to a chat page with the placer of the post, see figure 5.6.

Figure 5.6: Chat page added to the new version with a confirmation banner.

Furthermore, many participants were confused when completing a transaction. Participants thought that they had to place an order first and then pay with tokens. **Quote:** *"With the QR-code I thought, I first have to order and then pay right?"* **Quote:** *"How do you know that the store received your QR-code?"* This confusion made it clear that the process of paying needed to be changed. So, a page was added with payment options, and the big placeholder image of a QR-code was replaced with a button. Then after the user clicks the button, the camera opens to scan the QR-code from the store, and after successfully scanning the QR-code the user is redirected to the transaction overview page, see figure 5.7.

(Old)   (New)   (New)
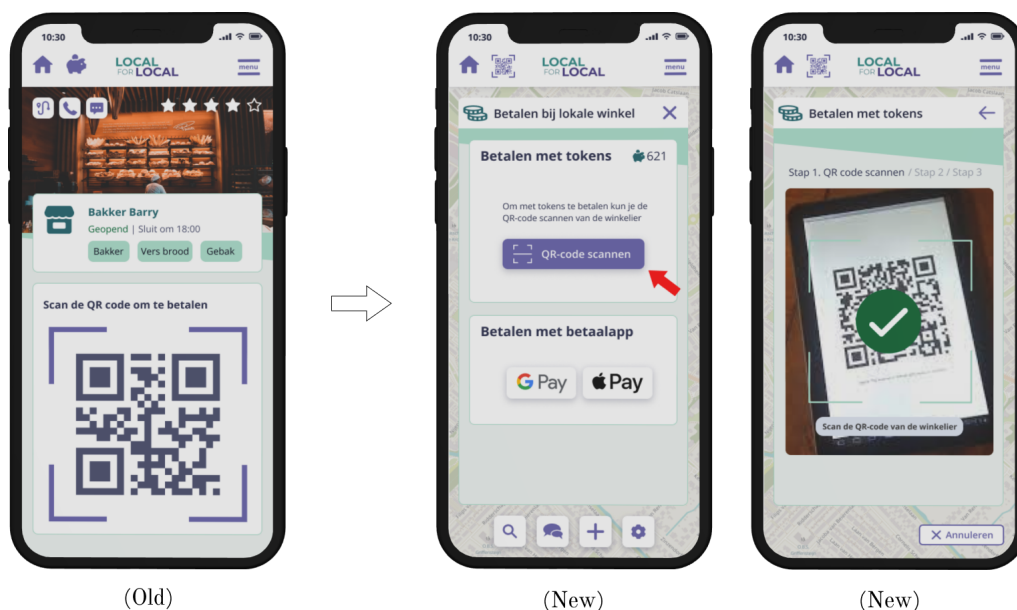
Figure 5.7: Screens for paying and scanning the QR-code.

Finally, all participants were able to change their privacy settings, however,

many of them were confused that there was no way to save the changes they made. So, a 'change settings' button and a 'save' button were added. Furthermore, some participants thought that the privacy settings were under 'general settings' and did not see the privacy settings on the settings page.

Quote: "But now how can I save that?"

So, to prevent confusion a 'privacy settings' tab was added that brings the user to the privacy settings page where they can change their privacy settings, see figure 5.8.

(Old)   (New)
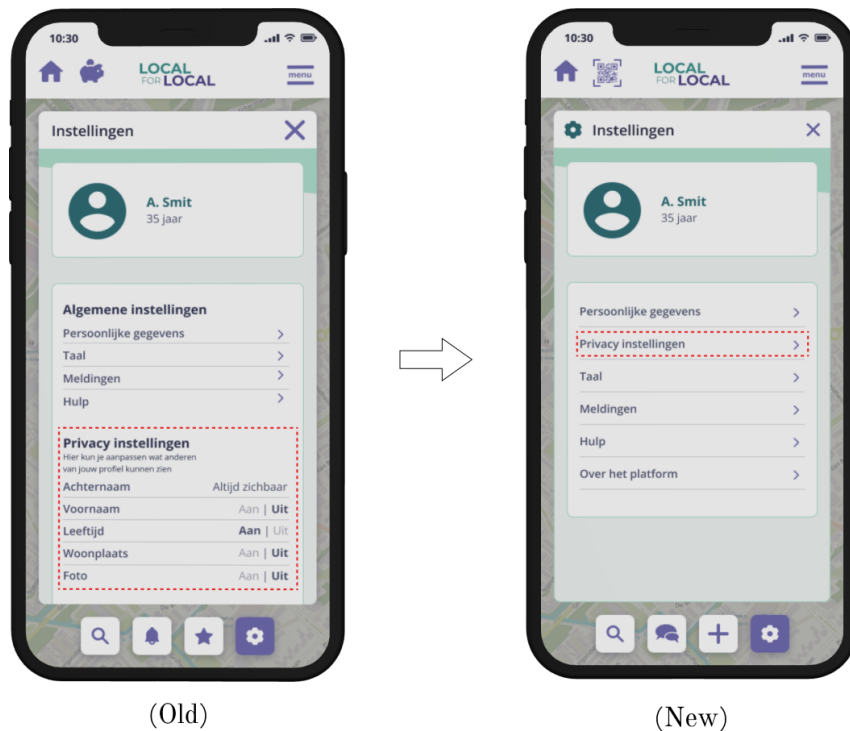
Figure 5.8: Settings screen. The changes that were made are indicated by red boxes.

5.2.2   Guideline 2: Trust

In the second guideline, *trust*, a very important aspect were dark patterns. It is important that a local community platform does not have dark patterns. From the qualitative results it became clear that participants felt that they could trust the platform, so that means that in general the platform does not have dark patterns. One small concern about transparency was that the participants wanted to be able to write their own message when reacting to a post, see figure 5.9.

Another issue was that the transaction overview also led to some confusion where participants thought that the loaf of bread cost 617 tokens, while the bread was actually 4 tokens.

Quote: *"It said that the bread cost 600 tokens."*

Quote: *"All those numbers were confusing, it should just say what the price is."*

So, participants were misled about the amount that would be deducted from their wallet. This was because on the transaction overview page you could see a before and after of the tokens in your wallet, and the tokens after the transaction were red, so participants thought that that was the amount that was deducted from their wallet.

Figure 5.9: Popup added where user can write the message they want to send to the placer of a post.

So, this overview was made clearer to be more transparent about the transaction, see figure 5.10.
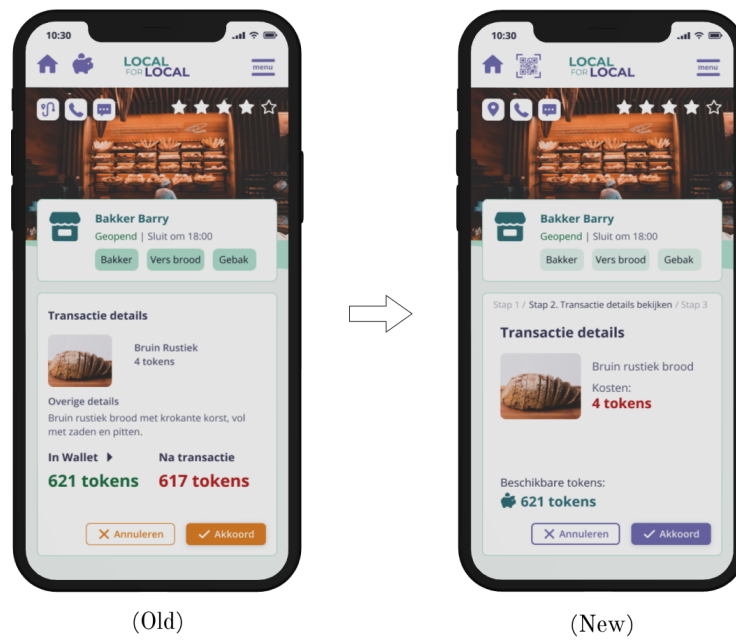

(Old)   (New)

Figure 5.10: Transaction details screen.

5.2.3 Guideline 3: Personal Characteristics of Users

For *personal characteristics of users*, no issues were found, so no changes were made. The colours of the platform were chosen with colour blind people in mind, and the platform will be read-aloud friendly when it is developed.

5.2.4 Guideline 4: Consistent Platform

For the fourth guideline, *consistent platform*, four changes were made. Firstly, the colours of the platform were changed slightly. The colour of the clickable buttons/icons/sections were made the same shade of purple or have had a purple outline added to it, so that it is easy to recognise what is clickable and what is not. Additionally, all clickable buttons have been given a drop shadow, and all the non-clickable items were not, to make those seem flat and part of the background. This has been changed all throughout the platform to keep the interface consistent.

The second change was made on the transaction page. Many people were confused by the procedure to complete a transaction. So, to make it clear what the steps are for completing a transaction, these steps were added to the transaction procedure, see figure 5.7. Above 'transaction details' in the new screen the steps can be seen.

The third change was adding more ways to place a new post. Many participants felt that the way to make a new post was too hidden and confusing.
Quote: *"I first already had to look where I could do that. Then it was not immediately clear to me that I had to look at 'my posts'."*
So a 'plus' button was added to shortcuts at the bottom of the page, to make it very quick and easy to add a new post, see figure 5.4. Additionally, the 'place new post' button was added to the page where you can see posts from other users, see figure 5.11. This way there are multiple straightforward ways to place a new post.

Finally, the fourth change was that the corresponding icon has been added to the title on each page. This was done because this makes it easier for users to recognise the page they are on, for example see figure 5.8 and 5.3.

5.2.5 Guideline 5: User Control

A change that was made for *user control* was adding a page to the platform for chat messages.
Quote: *"The trust has to grow slowly, so if you can chat with someone first it would help"*
Many participants pointed out that a page for messages was missing from the platform and thus this page was added. Since multiple participants addressed that they wanted to be able to see new messages easily, a shortcut was added, see figure 5.4.

Filtering is an important part of *user control*, and this was already part of the platform, so this did not need to be added. Also, no issues in exiting unwanted states were found. And the font size change was also already incorporated in the platform. One thing that could improve user control is that the user is able to change the shortcuts at the bottom of the screen. This way the user has control over which actions they take more often and thus have easier access to.
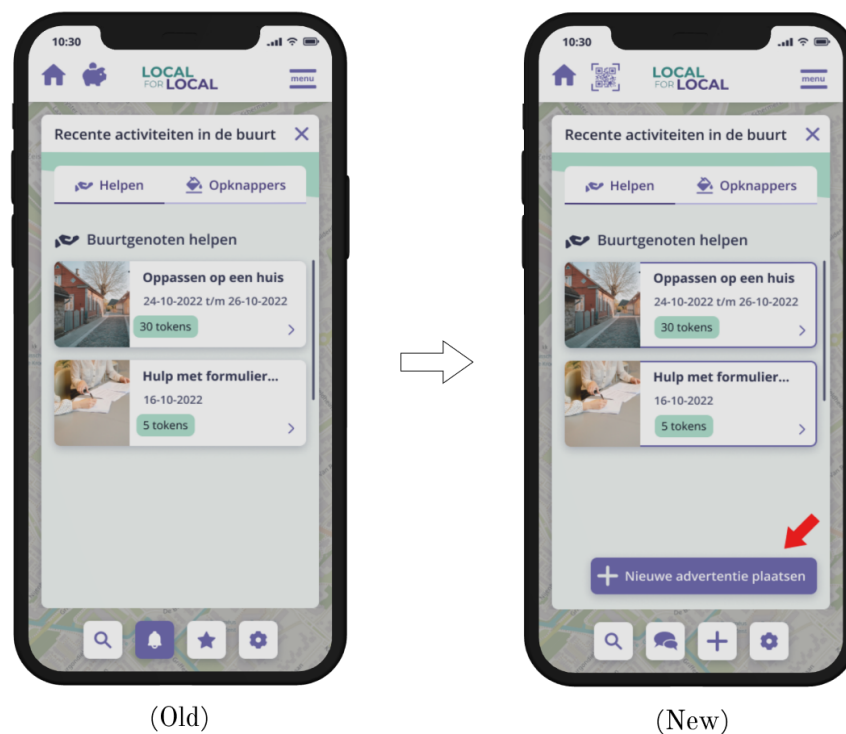
(Old)   (New)

Figure 5.11: 'New post' button added to the screen with posts of other users.

5.3 Iteration Study

The iteration study was conducted using the iterated version of the LocalforLocal platform based on the changes that were made in section 5.2. The results of the iteration study were also used to compare to the results of the baseline study, see chapter 6.

5.3.1 Quantitative Results from Online Survey

The quantitative part of the user test was an online survey where participants could test the platform and then had to answer questions about their opinion of the platform. In total there were 23 participants that completed the user test (10 male and 13 female). The participants' ages ranged from 18 to 83 (M=43.61, SD=18.86). The participants were asked to indicate how much experience they had with technology. Three participants indicated that they had a little experience, twelve indicated that they had average experience and eight participants indicated that they had a lot of experience with technology.

Tasks

For all tasks most participants were able to execute the tasks without difficulty, see figure 5.12.

There was only one participant that indicated that they could not execute one of the tasks, this was task 4. However, that participant indicated that this was due to a malfunction with the online survey and not because they had difficulties with the platform. So, this means that there were no participants that could not execute
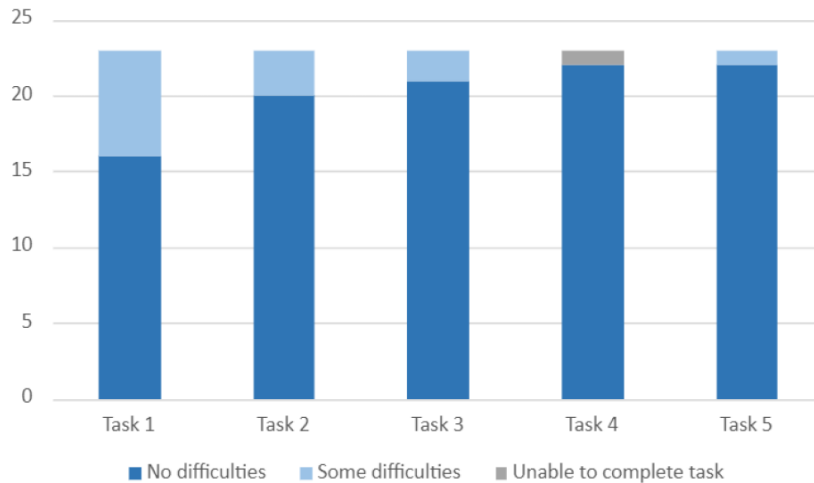
Figure 5.12: Task results of the iteration study.

a task using the iterated version of the LocalforLocal platform. And for every task, 16 or more participants were able to execute the task without difficulties.

AttrakDiff

The results of the AttrakDiff survey for the iteration study can be seen in figure 5.13. The elements of the AttrakDiff can be separated into four categories. For each of these categories the mean and standard deviation is given:

- Pragmatic Quality: M=5.30, SD=0.81

- Hedonic Quality - Identity: M=5.23, SD=0.53

- Hedonic Quality - Stimulation: M=4.63, SD=0.80

- Attractiveness: M=5.71, SD=0.77

The means of all the four categories are bigger than 4, which means that overall, the platform is above average. The category with the lowest mean was Hedonic Quality – Stimulation. This means that the perceived stimulation and excitement of the iterated version of the LocalforLocal platform still could use improvement.

System Darkness Scale

The average score of the results of the System Darkness Scale is M=10.87 (SD=13.49), so that shows that the iterated version of the LocalforLocal platform might have some minor dark elements, but overall does not have dark patterns. The standard deviation is higher than the mean of the results of the System Darkness Scale. This could mean that there is a high variation between the values of the population and might indicate an abnormal distribution of the data. After testing for normality using a Shapiro-Wilk test, and looking at the histograms and Q-Q plots, it became clear that the data was not normally distributed.
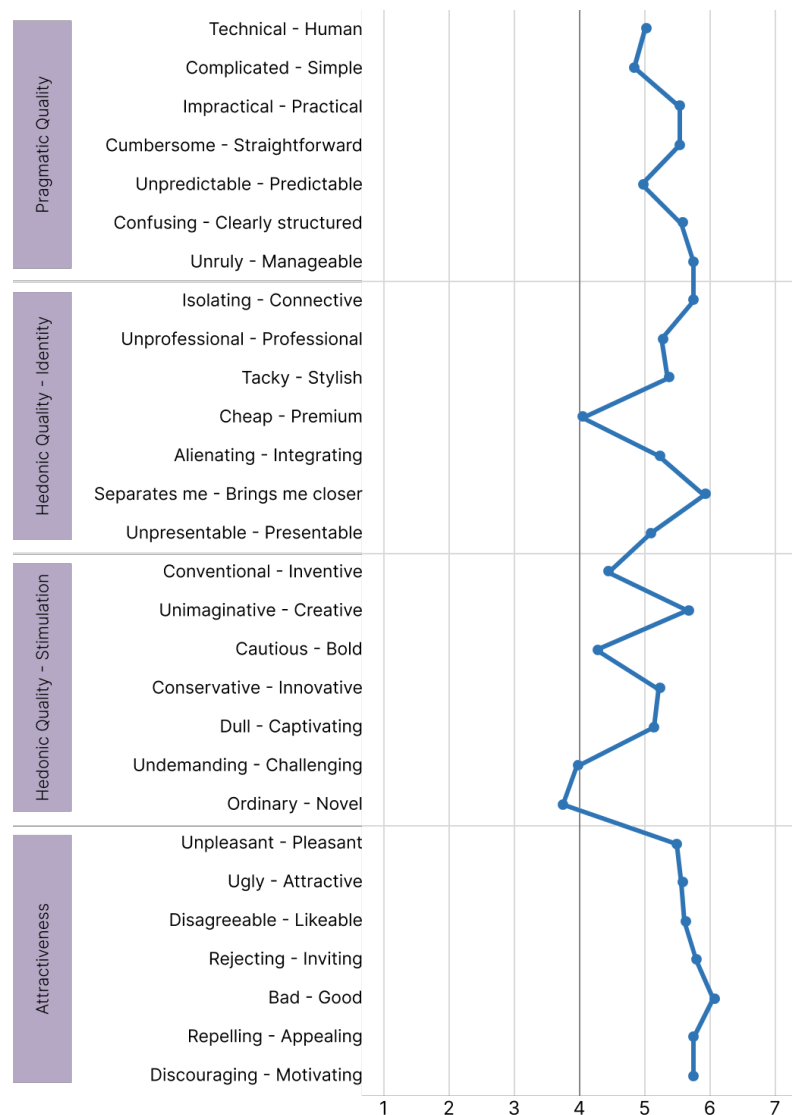
Figure 5.13: AttrakDiff results of the iteration study.

5.3.2 Qualitative Results from Semi-Structured Interviews

The qualitative part of the user tests were semi-structured interviews. Five participants that had already completed the user test's quantitative part agreed to do the interview (2 male, 3 female). The ages of the participants ranged from 24 to 55 (M=34.67, SD=14.38). The interviews were recorded and transcribed and together with the answers to the open questions on the online survey, this formed the data set used for analysis.

To analyse the qualitative data, open coding was done using NVivo. From this analysis, twelve codes were derived. These codes were grouped by first looking at which codes had the most hits, then dividing the rest of the codes among these. This resulted in three groups: Usage, clear structure and other users. The qualitative results of the iteration study show that the platform was very easy to use and there were no issues with performing the tasks. Participants commented that they liked the design and that the platform was clearly structured. There were a few aspects mentioned that could use some improvement or additions. These were

adding a tutorial for users with less experience with technology. Furthermore, it was mentioned that it would be good to add the token total on the home page so that it would be easier to see how many tokens the user has. Finally, participants mentioned that an improvement could be adding user profiles so that you can see more information about other users and what kind of help requests they have done in the past. Participants mentioned that this would create more trust.

Chapter 6

Analysis

The quantitative results of the baseline study and the iteration study can now be compared to see if the iterated version of the LocalforLocal platform had better user experience than the baseline version. This is done through statistical analysis. First the results of the tasks are compared, then the AttrakDiff survey results and finally the System Darkness Scale results.

6.1 Tasks

In general, participants had less issues to perform the tasks using the iterated version of the LocalforLocal platform than the baseline version, see figure 6.1. What is interesting to notice is that in the iterated version only one person indicated that they could not complete a task, and this participant indicated that this was because a malfunction with the online survey. So that means that for the iterated version, all participants could complete all tasks, while in the baseline version five participants could not execute a task.

Furthermore, for task 1, three participants indicated that they had difficulties or were unable to complete the task for the baseline version. For the iterated version, seven participants indicated that they had difficulties to complete the task. For task 1 participants were asked to see how many tokens they had in their wallet/piggy bank. The difference in performance could be due to the removal of the wallet shortcut on the home page. During the baseline study participants indicated that they thought this shortcut was unnecessary, thus it was removed. However, during the iteration study, participants indicated that they would like to have a faster way to see their tokens; either with a shortcut or to have their tokens displayed somewhere on the homepage. So, the removal of the shortcut could be the reason why during the iteration study, more participants had difficulties with executing the task.

For all the other tasks, less participants had difficulties with executing the tasks during the iteration study than the baseline study as can be seen in figure 6.1. This means that the iterated version of the LocalforLocal platform was easier to use for users.
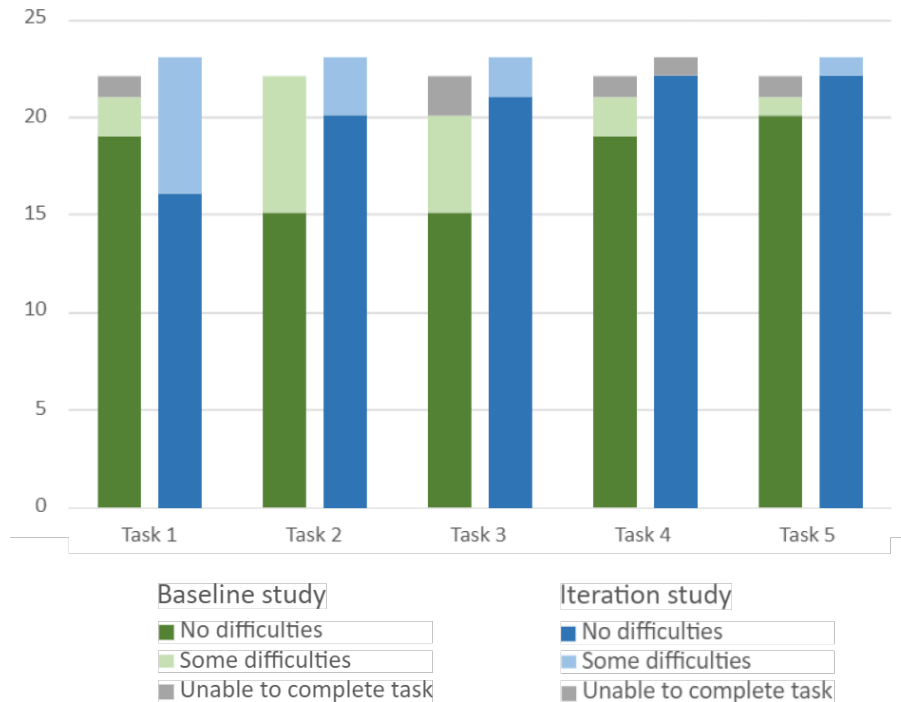
Figure 6.1: Comparison of the task results.

6.2 AttrakDiff

For 25 of the 28 word-pairs the iterated version of the LocalforLocal platform scored higher than the baseline version, see figure 6.2. This is also reflected in the means of the four groups that the word-pairs are divided into, see figure 6.3. For each of the categories, the iterated version of the platform had a higher mean. To see if there was a difference between the means, these were tested for significance where the hypotheses were:

H0: *Category mean of the baseline study is the same as the mean of the iteration study.*
H1: *Category mean of the baseline study is lower than the mean of the iteration study.*

If the p-value was lower than .05 then *H0* was rejected. In table 6.1 an overview of the statistical results can be seen. The t-value was negative because it was assumed that mean of the baseline study was lower than the iteration study. From the table it can be concluded that for the AttrakDiff category Attractiveness, the iterated version of the LocalforLocal platform scored significantly higher. This cannot be said for the other three categories, so even though the means for the other three categories were higher for the iteration study, there was no significant difference found.

6.3 System Darkness Scale

The mean of the SDS score for the baseline study was M=10.91 (SD=11.84). The mean of the iteration study was M=10.87 (SD=13.49). The mean of the iteration study was lower than the mean of the baseline study. This means that the iteration
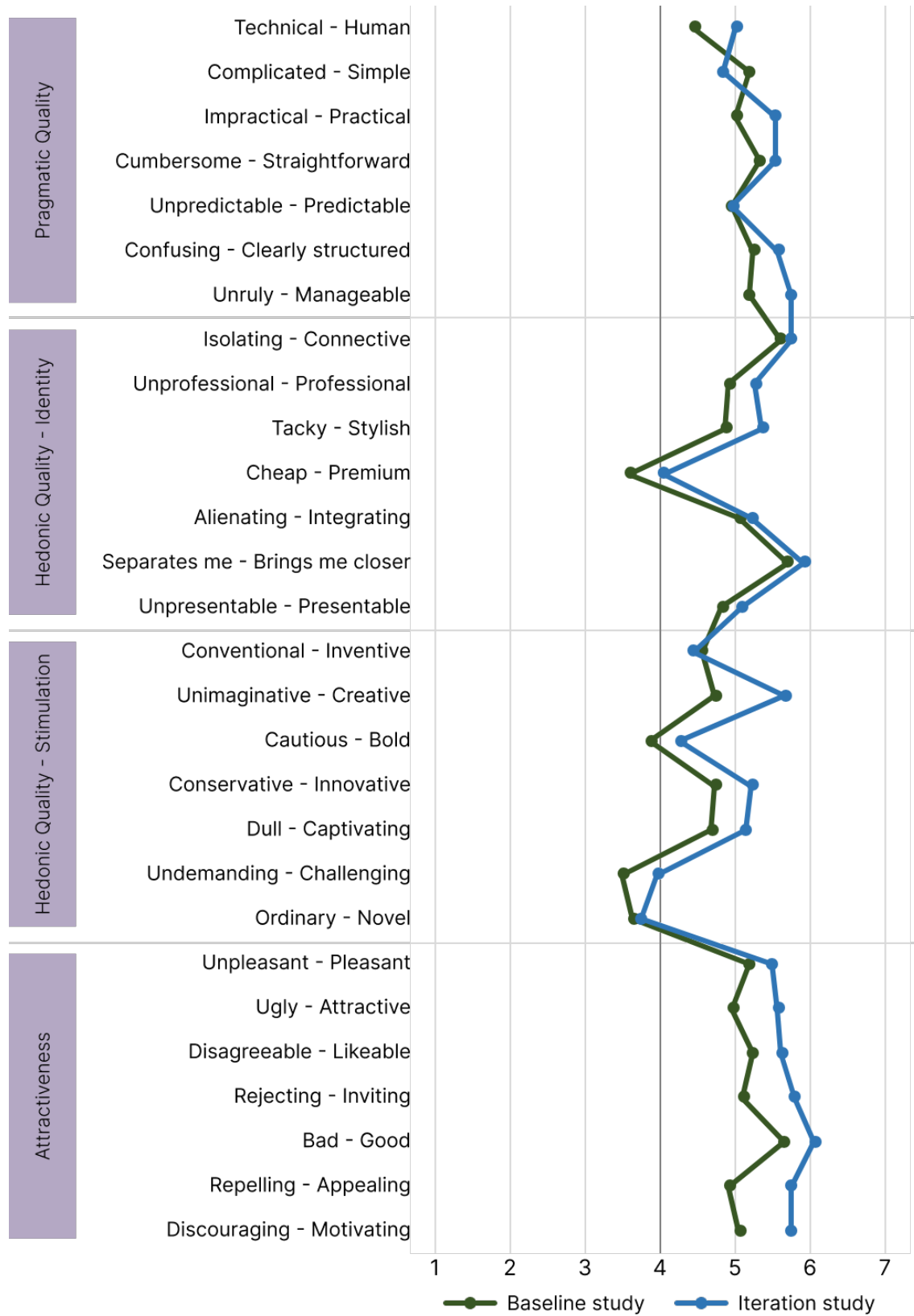
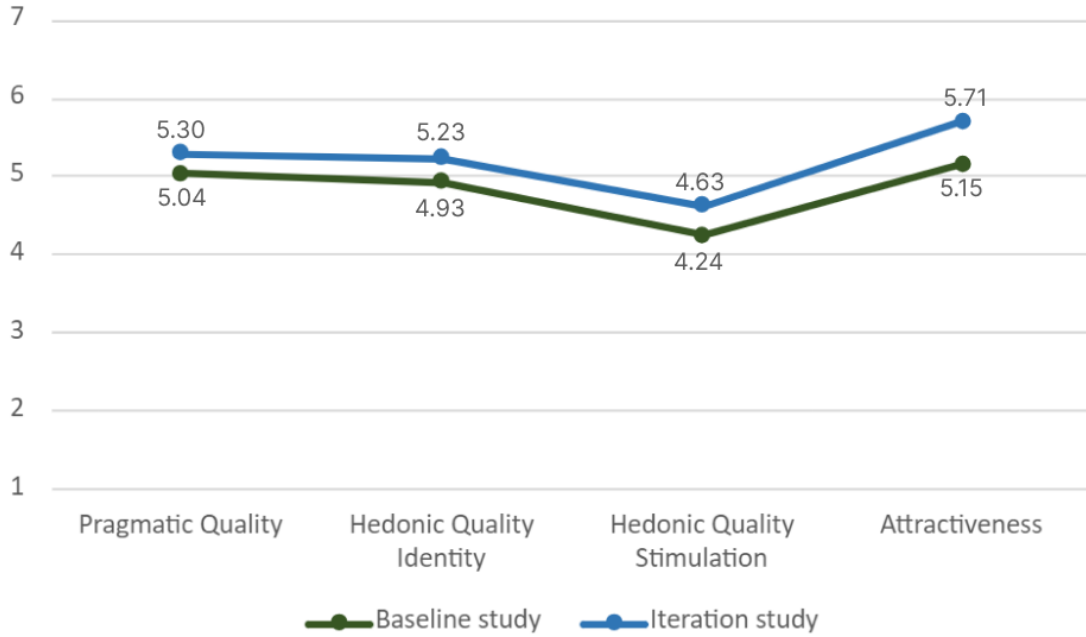Figure 6.2: Comparison of the AttrakDiff results.

Figure 6.3: Comparison of the mean score of each of the AttrakDiff categories.

Table 6.1: Overview of the statistical results of the AttrakDiff comparison between the baseline study and the iteration study.

	Pragmatic Quality	Hedonic Quality Identity	Hedonic Quality Stimulation	Attractiveness
Baseline study	M=5.04, SD=0.27	M=4.92, SD=0.64	M=4.24, SD=0.51	M=5.15, SD=0.22
Iteration study	M=5.30, SD=0.81	M=5.23, SD=0.53	M=4.63, SD=0.80	M=5.71, SD=0.77
t-value p-value	$t(43)$=-1.149 p=.129	$t(43)$=-1.624 p=.056	$t(43)$=-1.451 p=.077	$t(43)$=-2.358 p=.011

study scored better than the baseline study on the System Darkness Scale. This difference is, however, very small and needs to be investigated for significance to find out whether the iteration study significantly scored better.

Since the data was not normally distributed, a non-parametric test was used. There were two independent groups, baseline and iteration, so a Mann-Whitney U test was best suitable to test for significance. The analysis using the Mann-Whitney U test suggested that there is no significant difference between the baseline study ($median$=10, IQR=15) and the iteration study ($median$=5, IQR=17.5) conditions (U=239.00, p=.740). This means that the baseline LocalforLocal platform and the iterated version of the LocalforLocal platform scored the same on the SDS. However, both of these scores were very low, which is very positive.

Chapter 7

Discussion

The goal of this thesis was to establish guidelines for designing local community platforms and testing these guidelines with an existing system through a case study. The results from this case study are discussed in this chapter and together with the literature review and the guidelines that were established, the sub-questions and research question are answered. Furthermore, the limitations of this research are given and finally recommendations for future work are discussed.

7.1 Review of Results

The results of the case study from chapter 6 in combination with the literature review from chapter 2 were used to first answer the sub-questions and then answer the research question.

7.1.1 Key Factors that Influence the Development and User Experience of Local Community Platforms

Aspects that Encourage the Development of Communities

The first sub-question that was mentioned in chapter 1 was *"How can a local community platform encourage the development of strong local communities?"* From the literature review in chapter 2 it became clear that there are three aspects that influence the development of strong local communities. These three aspects are social development, environmental development, and financial development.

The social development aspects that a local community platform encourages are for example the sense of belonging. A local community platform makes it easier to get into contact with other members of the communities which makes the sense of belonging in a community stronger. This in turn provides all the benefits that come with a sense of belonging, like decrease of loneliness and feeling socially supported by the community. By making it easier to ask for help and to be able to provide help to those who need it, the relationships in a community become stronger, which in turn makes the community stronger. In the LocalforLocal platform, this is one of the main goals by creating an easy way for members of a community to get into contact with each other.

The environmental development aspect lies in creating a better and cleaner environment for members of a community in both the sense of social environment as well as ecological environment. By holding the members partially responsible for maintaining the community, this creates motivation for keeping the community clean and upkept. This is done by, for example, taking care of a community garden, or painting park benches. This can also be found in the LocalforLocal platform, these are called 'fixer uppers'. Additionally, local community platforms make it easier to share underused resources which is better for the environment; for example, a hedge trimmer or carpet cleaner. All this adds to creating a better environment for members of a community.

Finally, local community platforms can encourage financial development. Since a major part of local community platforms is the local currency, the local businesses benefit from a local community platform. The local currency circulates within the community without 'leaking' outside of the community, which increases local trade and therefor increases local business sales. Local currencies encourage members of a community to buy locally instead of going to, for example, a big national supermarket. Stimulating the local economy is an important part of the LocalforLocal platform. Another financial benefit is creating ways for people that do not have a job or have difficulty finding a job to create a source of income. By helping others in the community, and being paid in local currency, this can be spent at local stores, thus creating a source of income. This was not a main goal of the LocalforLocal platform, but it could be used for this purpose.

These three aspects that are mentioned above are the most important aspects in which a local community platform encourages the development of strong local communities. This forms the answer to the first sub-question.

Testing Usability and Engagement for a Local Community Platform

The second sub-question that was given in chapter 1 was *"What are the most suitable methodologies for accurately measuring engagement and usability in local community platforms?"* This question could be answered based on existing literature that was reviewed in chapter 2.

From the literature review it became clear that positive usability and user experience are important for users to adopt new systems. It is thus necessary to evaluate a new system on its usability and ability to engage new users. This can be done in many ways. The most common way is to use existing scales. These scales are usually widely used and tested in user experience research, so it can be concluded that using existing scales is the best way to assess new systems on user experience. The scales that were used in this user test were the AttrakDiff and the System Darkness Scale for quantitative results, and the System Usability Scale, the System Trust Scale and the Software Usability Measurement Inventory were used to formulate interview questions for the qualitative result.

The method for the case study was not a method that is widely used in user experience research. However, the researcher chose this method as the main goal of the research was to test the influence of the guidelines on a local community platform. Other methods that could have been chosen were, for example, first conducting a pre-study using an existing platform and establishing the guidelines

based on this pre-study. However, then the guidelines are based on the issues that one platform had and might not be generalisable to all local community platforms. Another method that could have been chosen was after establishing the guidelines, creating a local community platform from scratch. However, then it would have nothing to compare to which makes it more difficult to conclude if the guidelines made an impact. And thus, it can be concluded that this method of comparing a baseline version to an iterated version was the most suitable for this study. This answers the second sub-question.

Factors for Creating an Attractive Local Community Platform

The third sub-question that was given in chapter 1 was *"What are the key factors that influence users to adopt a local community platform?"* This question could be answered based on the literature review and the case study. From reviewing the results of the case study, especially the qualitative results, and the literature review, it became clear that there are three main factors that contribute to the adoption of a local community platform. However, since the LocalforLocal platform was only a prototype, the experiences and opinions that participants had were hypothetical. So it cannot be said with certainty that these factors guarantee the adoption of a platform. They do, however, contribute to the adoption of a local community platform.

Social support plays an important part in a strong community. A local community platform lowers the threshold for asking for help and helping others. For many people it could be difficult to find help with small tasks, such as walking a dog. So, making a platform that makes it easy for people to post their help requests and making it easy to respond to these help requests, community members feel more socially supported and thus would use the platform more often.

Another factor that plays a crucial role is the local currency. By introducing the local currency as a reward for helping others, this creates an incentive. This incentive makes it attractive for members of a community to use the platform. Additionally, what makes the local currency even more attractive is that it is only spendable in local businesses, since participants mentioned that they would like to buy locally more often. The local currency makes it more attractive to buy locally and the local businesses benefit from it since they can convert the local currency to the national currency. This increases financial development which makes it also attractive for local businesses to use adopt the local currency. So, introducing a local currency on the platform is a key factor for the users to adopt the platform.

Finally, building trust in a community is important. Members of a trusted community are more willing to share their time and resources with the rest of the community. When users of the platform can create a trusted network of community members, they feel more inclined to ask for help and offer their help in return. It is thus especially important that a local community platform can create a safe space for meeting new people in a community and ensure that the platform and its users can be trusted.

There are other, smaller factors that contribute to the adoption of a local community platform, but these three factors are the most important factors. This answers the third sub-question.

Enhancing User Experience by Incorporating Essential Features

The fourth sub-question that can be found in chapter 1 was *"Which features should be included in a local community platform to enhance user experience?"* There are many features in a local community platform, which makes it difficult to answer this question. There are many basic features that are needed so that the platform lives up to its purpose, like creating a help request. However, there are more features that are less self-evident, but have proven to being essential.

An issue that was mentioned during both the baseline study as well as the iteration study was trust in other users. In general, users of the platform want to trust other users, however, they need assurance that other users are trustworthy. For example, before you let someone into your home, you want to chat with this person first, or if you need someone to walk your dog, you would more likely pick someone that you know has experience with dogs over someone that has never walked a dog before. So, a feature that proved to be important to users is being able to chat with other users and being able to see a user profile. The chat was implemented in the iterated version of the LocalforLocal platform, however, the user profiles were not yet implemented.

Adding appropriate shortcuts to a local community platform improves usability, however, user do not notice what shortcuts they use and need. For example, during the baseline study, participants said that the wallet shortcut was unnecessary, so this shortcut was removed. However, during the iteration study, participants mentioned that they would like a shortcut to the wallet. So this shows that users often do not notice what shortcuts they use, until they are removed. Thus making it necessary to research which shortcuts need to be added to the platform to increase usability.

Inclusivity features are essential for local community platforms. Especially since these platforms are meant to be able to be used by all members of a community, a local community platform needs to facilitate this. Inclusivity features include changing font sizes, being colourblind-friendly, read-aloud compatible and include different languages. And to even go a step further to make the platform more accessible, a tutorial should be added for user with less experience with technology. The LocalforLocal platform had some of these features, such as changing the font size and using a colourblind-friendly colour palette. An inclusivity feature that was not yet implemented was including multiple languages.

These features are not the only features that a local community platform should have, however, these three features are the most important to make the platform trustworthy, usable, and inclusive. By including these features the user experience of the local community platform is enhanced and this answers the fourth sub-question.

7.1.2 A Set of Guidelines for Designing Local Community Platforms

The main research question of this study was *"What are guidelines for designing a local community platform that makes the local community stronger?"* The guide-

lines that were established in chapter 3 were based on literature. These guidelines were thus, in theory, appropriate guidelines for designing local community platforms. However, theory only is not enough. The guidelines needed to be tested in practice. After the guidelines were established, they were tested by doing a case study. In this case study the LocalforLocal platform was first tested without making changes, this formed a baseline measurement with both qualitative and quantitative results. Then the guidelines were applied to the platform and the same test was conducted again with different participants. This formed an iteration measurement. The qualitative and quantitative results were then compared to see if there were statistically significant differences in user experience.

For both the baseline study as well as the iteration study, participants had to execute five tasks using the platform. After doing a task, the participant had to indicate if they thought the task went well, if they had some difficulties or if they were unable to complete the task. The task results for both the baseline study and the iteration study can be seen in figure 6.1. What is interesting to see when looking at the results is that for all tasks except for task 1, the iterated version of the platform caused less difficulties than the baseline version. For task 1, however, seven participants had difficulties with completing the task using the iterated version while during the baseline study only two participants had difficulties and one participant was unable to complete the task. During task 1 participants had to see how many tokens they had in their wallet. The difference in performance was quite big. When looking at what changed between the baseline version of the platform and the iterated version it became clear that this decrease in usability was due to the shortcuts. The qualitative results from the baseline study show that participants thought that the 'wallet' shortcut in the top left corner of the platform, see for example figure 5.3, was superfluous. Thus, this shortcut was removed. During the iteration study, however, participants mentioned that they would like to have a faster way of seeing their wallet, thus indicating the need for a shortcut. By removing the shortcut to the wallet, the usability had become worse, so to increase the usability this shortcut must be added again. From this it can be concluded that users often do not know what shortcuts they need, and perhaps that the best shortcuts are the ones users do not even notice they use. This is in accordance with UI literature. For example, McKay (2013) states that all basic shortcuts need to be intuitive and well thought out to enhance usability and reduce the mental load for users (McKay, 2013).

During the baseline study, in total, five participants indicated that they could not finish the task. During the iteration study there was only one participant that could not finish a task, and that participant indicated that this was due to a malfunction with the survey, not the platform. This means that all participants were able to execute the tasks using the iterated version of the platform. From this it can be concluded that, even though some participants still had difficulties, the iterated version of the platform participants performed better on task performance than the baseline version. This indicates that, when looking at task performance, the guidelines made a positive difference and thus are appropriate for designing local community platforms.

The AttrakDiff survey was used to measure usability and engagement. The results of the AttrakDiff survey for both the baseline study as well as the iteration

study can be seen in figure 6.2. In the figure it can be seen that for 25 of the 28 word-pairs the iterated version scored better than the baseline version. Also, when looking at the mean scores of the four AttrakDiff groups, the iterated version had a higher mean than the baseline version for all four groups, see figure 6.3. To see if this difference was statistically significant, a t-test has been conducted for each group, see table 6.1. For one of the four groups, Attractiveness, the iterated version scored significantly higher. For the Hedonic Quality – Identity group, the difference was almost significant. For the last two groups the difference was not significant. This shows that the iterated version of the platform was significantly more attractive and nearly significantly more pleasant and presentable than the baseline version. And even though the difference for the Pragmatic Quality and Hedonic Quality – Stimulation groups was not significant, the mean scores of the iterated version were still higher than the baseline version so the changes made while following the guidelines still had a positive impact. From this it can be concluded that based on the results of the AttrakDiff survey the guidelines had a positive impact on the usability and engagement of the platform.

The System Darkness Scale was used to ensure that the LocalforLocal platform does not have dark patterns. The mean scores for the SDS results of the baseline study as well as the iteration study were low. The scores were remarkably close together, with the score for the iterated version being slightly lower. After testing for significance, it became clear that there was no statistical difference between the SDS scores of the baseline study and the iteration study. This means that both versions of the platform do not have dark patterns. The results of the SDS showed that the guidelines safeguarded the lack of dark patterns.

The qualitative results from the baseline study were compared to the iteration study. The first thing to notice was that during the interviews in the baseline study, participants had more to say than in the iteration study. During the iteration study interviews, the answers that participants gave were quite short and positive, for example participants answered most questions with a simple 'yes' or 'no'. During the baseline study, participants were less positive and thus had more to say about what issues they faced, and what could be improved. This shows that the iterated version of the LocalforLocal platform was perceived more positively than the baseline version. Another aspect that was mentioned during the iteration study but not during the baseline study was user profiles. Participants mentioned that it would be nice to see a profile of other users where it displays how many and what kind of help requests the user has done before. Finally, it was mentioned during the iteration study that it would be good to add a tutorial for people with less experience with technology. This was not mentioned during the baseline study. This shows that the iterated version of the LocalforLocal platform still has room for improvement, but that during the iteration study participants had more room to focus on specific details since the biggest issues were removed when the guidelines were applied. So from this it can be concluded that participants had a more positive experience with the platform after the guidelines were applied.

When looking at the results from the tasks, the AttrakDiff survey, and the qualitative results, it can be seen that the guidelines had a positive effect on the user experience of the LocalforLocal platform. The System Darkness Scale did not show any changes in score, so the (lack of) dark patterns did not change. Based on all the

results it can be concluded that applying the guidelines to the LocalforLocal platform improved user experience. The answers to the sub-questions also showed all aspects of what is needed to ensure that local community platforms make the community stronger. Thus, it can be concluded that the guidelines that were established in chapter 3 are appropriate guidelines for designing local community platforms that make the community stronger based on relevant literature and in practice.

7.2 Limitations of the Research and Recommendations for Future Work

The research did have some limitations. These are discussed in this section as well as recommendations for future work.

Firstly, the method of the user test had some limitations. Even though the overall method was good since it purely focussed on the effects of the guidelines on the platform, there were some small issues with this method. The platform was a high-fidelity prototype version, which did not lead to issues, but because of this prototype the platform was only usable on a computer. The platform is supposed to be a mobile platform. This meant that the participants had to switch between the online survey and the platform tabs on a computer when doing the user test. This could have made the user test and the use of the platform less easy as compared to using the platform on a mobile device.

Secondly, due to time constraints the participants that were recruited for the baseline study and iteration study were not a representative group of participants. Even though the participants that were gathered had a wide range of ages and experience with technology, the study must be conducted again with a bigger population sample while making sure every age group and level of technological experience is well represented. The elderly, for example, are underrepresented. This could also be due to the nature of the user test. Elderly that do not have much experience with computers might have had too many difficulties with executing the user test and thus were unable to complete it. This shows a need for a user test that is elderly friendly to ensure that their insights and opinions are gathered when evaluating the platform.

Furthermore, the participants were gathered through purposive sampling as this was needed to make sure there was a wide variety of age groups. However, there are limitations with purposive sampling. Since the researcher selected the participants, this meant that the participant could have some kind of relation to the researcher. This could mean that the participants were more likely to give positive results and be less critical of the platform.

Additionally, the guidelines were only tested with one platform. This does not mean that they are generalisable to every local community platform and would improve every platform. Thus, a recommendation for future work is executing the user test again with a different platform and see if there are similar results.

The final limitation was that the platform was only tested hypothetically. Participants were given a scenario and were asked to imagine being in this scenario. However, their experiences could be different when they are using the platform

in real life. So, a recommendation for future works is to test a local community platform further for user experience, by doing a study where users really use a working platform and at the end of a pre-specified time period are asked about their experiences. This way their experiences and opinions are not hypothetical.

A recommendation for future works is using the method more often, also for different types of guidelines. The method that was used in this study is not widely used, so if the method is used more often and shows consistent results, it could become a standard method for developing and testing design guidelines.

Furthermore, in future work, the guidelines that this research produced can form a valid base for developing future local community platforms that are user friendly for all user groups in a community. From the literature review it became clear why strong local communities are important and the guidelines can have a big impact on the success of local community platforms. A local community platform is not just an online community platform, but it facilitates the creation of connections in offline settings.

Chapter 8

Conclusion

The goal of this research was to establish a set of guidelines for designing local community platforms. Local community platforms bring many social, financial, and economic benefits to a community. However, creating a platform that is accessible and usable for all members of a community brought some challenges. The guidelines that this research established tried to overcome these challenges.

To reach this goal, first a literature review was done to give background information about local community platforms and to provide a foundation to build upon. Then the guidelines were established by conducting a systematic literature review, meaning that the guidelines were backed up by existing literature. The guidelines also needed to be tested in practice, so a case study was conducted.

In this case study an existing local community platform called LocalforLocal was used to do user testing. First the user test was conducted using the platform in its current state to form a baseline measurement with both qualitative as well as quantitative results. Then the LocalforLocal platform was iterated on by applying the guidelines. Consequently, the user test was conducted again to form an iteration measurement. The results from both user tests were then compared to see if applying the guidelines to the platform increased usability and user experience.

The results of the baseline study and the iteration study showed that overall the usability and user experience improved. The results of the tasks, the surveys and the qualitative results showed that after applying the guidelines to the platform, the platform was easier to use, more attractive and engaging, and that the overall user experience improved. This showed that the guidelines are appropriate for designing local community platforms that make the local community stronger. Recommendations for future work include recreating the case study with a different local community platform. Additionally, a longer and more in-depth study is recommended to evaluate the guidelines is a real-life setting. This helps toward validating the guidelines even further, however, this research shows that the guidelines improve user experience. By following the five design guidelines, local community platforms can be designed in a way that actively helps toward building strong local communities.

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Appendix A

User Test

A.1 Informed Consent Form

Dear participant,

Thank you for participating in my research.

The goal of my research is testing the user experience of the local community platform called LocalforLocal. This platform brings residents of a local community closer together.

The LocalforLocal platform has a digital wallet for local tokens. You can earn these tokens by helping others, and then you can spend these tokens at local stores. For example, you walk your neighbours dog and for that you earn a certain amount of tokens. Later that day you go to the bakery and using the tokens you buy a bread. This way you strengthen the local community and economy.

The platform LocalforLocal must be easy to use. This is why I need your opinion and experiences with this platform. This user test consists of 5 task that you can execute using the platform and a short survey. In total this takes approximately 15 minutes. The best way to do this user test is using a laptop or computer.

This user test is not meant to test your skills, but the performance of the platform. This is why I encourage you to answer as honestly as possible, even when something did not go well. Your answers are saved anonymously and thus cannot be traced back to you.

Kind regards,

Anna van der Linden

If you have questions/comments about this user test you can e-mail them to: a.m.vanderlinden@students.uu.nl

A.2 Demographic questions

The demographic questions that were asked on the survey were:

1. What is your gender?
   Male
   Female
   Non-binary
   Other/prefer not to say

2. What is your age?

3. How would you rate your experience with digital technology?
   Little experience
   Average experience
   A lot of experience

A.3   Tasks

There were five tasks that the participant had to execute using the platform:

1. When you open the platform you see the homepage. Now look up how many tokens you have in your wallet.

2. You want to post an advertisement because you need someone to look after your dog Max. Try to make a post.

3. You are at Bakery Barry to buy a loaf of bread and you want to buy the bread with tokens. Look up Bakery Barry in the platform and do all the steps to do a transaction.

4. In settings, try to change your privacy settings.

5. Look at the posts that other people posted. Read the description at the post 'looking after a house', and respond to this post.

After each task the participant had to indicate how the task went:

- *The task went well.*

- *I had some difficulties.*

- *I was unable to complete the task.*

If the participant indicated that they had difficulties or were unable to complete the task, they were asked to briefly describe what went wrong.

A.4 AttrakDiff

The word groups of the AttrakDiff questionnaire in the order they appear in the questionnaire:

	1	2	3	4	5	6	7	
Human*	○	○	○	○	○	○	○	Technical
Isolating	○	○	○	○	○	○	○	Connective
Pleasant*	○	○	○	○	○	○	○	Unpleasant
Inventive*	○	○	○	○	○	○	○	Conventional
Simple*	○	○	○	○	○	○	○	Complicated
Professional*	○	○	○	○	○	○	○	Unprofessional
Ugly	○	○	○	○	○	○	○	Attractive
Practical*	○	○	○	○	○	○	○	Impractical
Likeable*	○	○	○	○	○	○	○	Disagreeable
Cumbersome	○	○	○	○	○	○	○	Straightforward
Stylish*	○	○	○	○	○	○	○	Tacky
Predictable*	○	○	○	○	○	○	○	Unpredictable
Cheap	○	○	○	○	○	○	○	Premium
Alienating	○	○	○	○	○	○	○	Integrating
Brings me closer*	○	○	○	○	○	○	○	Separates me
Unpresentable	○	○	○	○	○	○	○	Presentable
Rejecting	○	○	○	○	○	○	○	Inviting
Unimaginative	○	○	○	○	○	○	○	Creative
Good*	○	○	○	○	○	○	○	Bad
Confusing	○	○	○	○	○	○	○	Clearly structured
Repelling	○	○	○	○	○	○	○	Appealing
Bold*	○	○	○	○	○	○	○	Cautious
Innovative*	○	○	○	○	○	○	○	Conservative
Dull	○	○	○	○	○	○	○	Captivating
Undemanding	○	○	○	○	○	○	○	Challenging
Motivating*	○	○	○	○	○	○	○	Discouraging
Novel*	○	○	○	○	○	○	○	Ordinary
Unruly	○	○	○	○	○	○	○	Manageable

The score of each word group with a * has to be reversed (for example, a score of 2 becomes a score of 6)

A.5 System Darkness Scale

The System Darkness Scale consists of five questions. Each question is answered on a 5-point Likert scale. The five questions are:

1. The system tricked me into performing certain actions I did not intend to do.

2. The system performed certain actions I was not aware of.

3. The system pushed me into spending more money than I originally anticipated.

4. The system performed actions without my consent.

5. I felt deceived/misled by the system.

A.6 Interview Questions

There were ten questions that were asked during the interview:

1. How would you describe your overall experience with the platform?

2. How would you describe your overall experience with the platform?

3. What would you add to or change about the platform so that you would use the platform more often?

4. Did you think the platform is complex?

5. Do you think that most people would learn how to use this platform very quickly?

6. Did you find the tasks easy to execute?

7. Was there anything that was confusing about the platform?

8. With this platform you can make purchases and get into contact with other users, would you feel safe while doing that?

9. If we take a look at the platform, do you understand what all the icons mean?

10. Is there anything missing from the platform?

11. Would you recommend this platform to other people?

12. What did you think about the feedback that the platform gave? (Think about things like error messages, confirmation messages, etc.)

Appendix B

Interface of the existing LocalforLocal Platform

A collection of screens from the baseline version of the LocalforLocal platform.
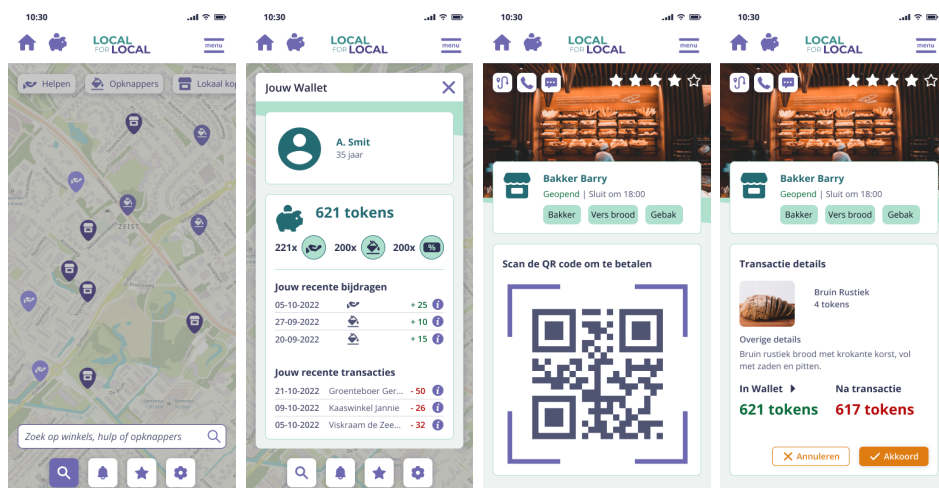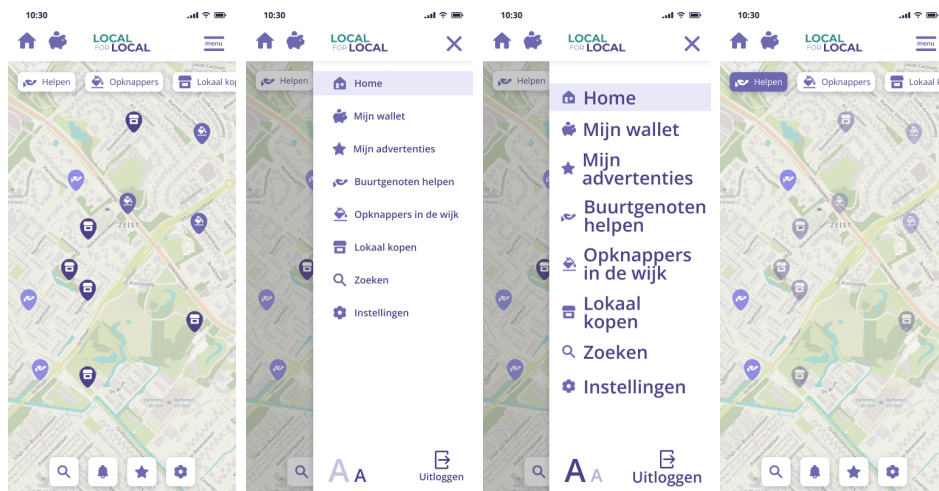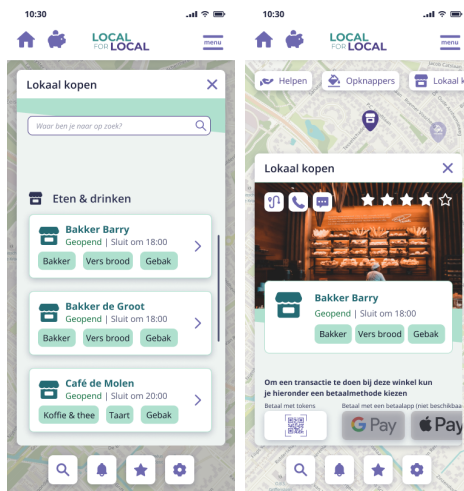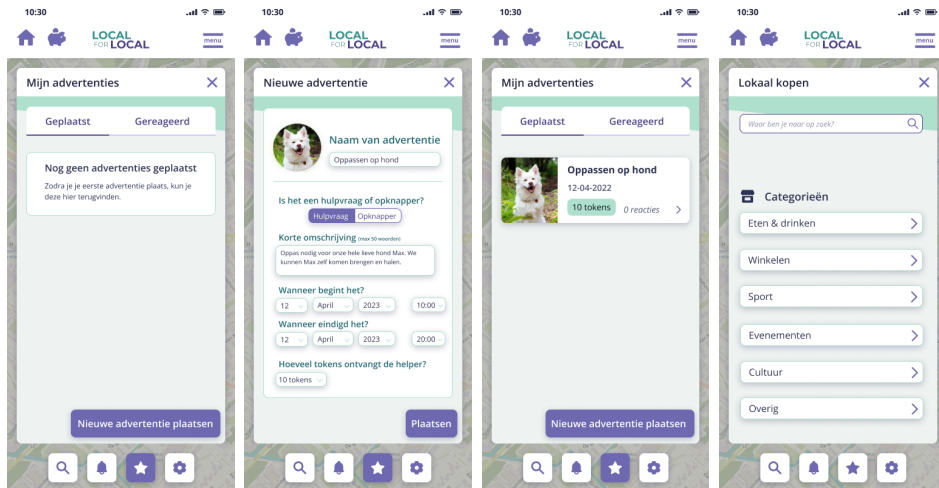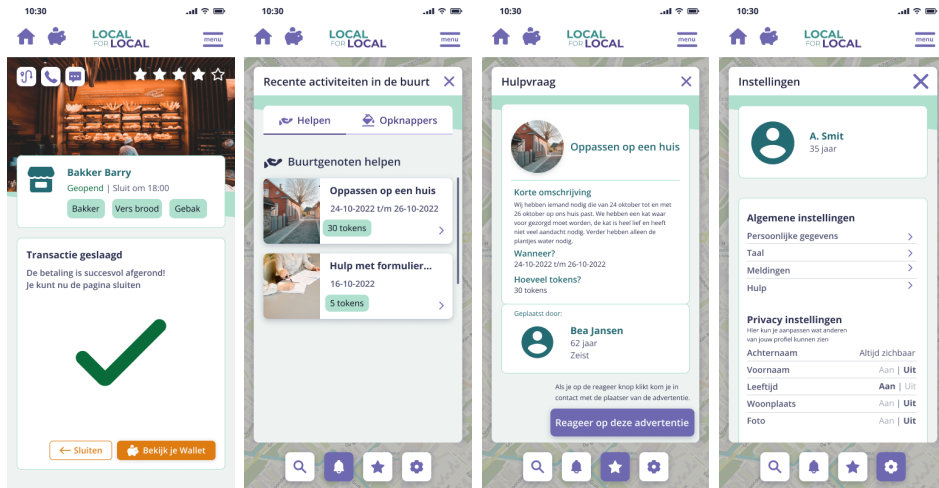
Appendix C

Interface of the iterated version of the LocalforLocal Platform

A collection of screens from the iterated version of the LocalforLocal platform.