Designing for Digital Inclusion: Iterative Enhancement of a Process Guidance User Interface for Senior Citizens

Research Paper

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Abstract. As digital transformation reshapes business processes, the challenge for senior citizens grows as they continue to encounter barriers to digital participation. This study explores an approach to combining well-researched design guidelines with a process guidance to reduce those barriers. By employing the Design Science Research Methodology (DSRM), a prototype of a travel booking website was developed and iteratively refined through heuristic evaluation. The findings confirm the beneficial effects of a structured process guidance for senior citizens and demonstrate the need for further research to improve the inclusion of seniors in digital self-service business processes.

Keywords: Usability for Seniors, Process Guidance, Digital Accessibility

1 Introduction

Digital transformation is increasingly spreading to all areas of life. Proff et al. (2021) highlight that numerous business processes, from grocery shopping to booking medical appointments and travel arrangements, are affected by digital transformation. Online transactions have become ubiquitous, as many retailers are having to rely on an online presence to survive (Bitkom Research, 2023). This trend will continue and accelerate at an increasing rate (Eurostat, 2023). While the younger population engages with technology from an early age, these innovations often pose considerable challenges for the older generation (Broady et al., 2010). According to Chu et al. (2022), these challenges have not only led to technological disadvantages but also social disadvantages among older adults.

During the COVID-19 pandemic, it was effortless for younger people to arrange vaccination appointments or order essential medicines online, while the older population often faced challenges. This particularly affected individuals who lacked access to mobile devices or the internet, possessed insufficient technological proficiency, or did not have friends or relatives to assist them (Lee, 2024). However, some older adults possess prior experience with technology due to their work life.

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Despite this, most of the aging population has too little practice in using computers (Mitzner et al., 2010). Given that the population of individuals aged 60 and above is growing steadily (Statistics Austria, 2023), their digital inclusion is imperative.

The relative growth of the older generation and the digital transformation are largely developing independently of each other and necessitate greater accessibility for digital products (Kulik et al., 2014; Streicher, 2020). Access to those technologies therefore plays a decisive role in the social integration and personal independence of senior citizens (Hsieh et al., 2008). According to Mannheim et al. (2019), it is also crucial for companies that are shifting their business processes online to examine which adaptations are necessary to maximize profitability. It would be a considerable advantage if they could continuously expand their customer base to include the growing population of senior citizens.

The older generation not only has reductions in sensory abilities that make it necessary to adapt the design of the web portals (McLaughlin & Pak, 2020), but also lack cognitive abilities, which are necessary for orientation within a process (Morana et al., 2019). Since these capabilities deteriorate with age, they therefore require special attention (Newell et al., 2006; Pak et al., 2008; Park et al., 2002).

Instructions within forms and the overall guidance throughout the business process must consequently be adapted for the older generation. Research shows that users benefit from process guidance when executing unfamiliar processes (Morana et al., 2019). However, this line of research was initially not geared towards the needs of the older generation but rather aimed at supporting employees in corporate processes (Morana et al., 2013; 2016; 2019). Research on process guidance for seniors is limited, presenting a clear research gap. Our study addresses this by exploring: “How can senior citizens benefit from a tailored process guidance in self-service processes?”. In this paper, we therefore develop a new design artifact towards improving process guidance for older adults.

To validate the resulting graphical user interface, it was subjected to three rounds of heuristic evaluation according to Nielsen and Molich (1990). The design artifact was iteratively improved, resulting in higher user satisfaction as well as shorter process completion times. This paper contributes the age-aware design of a process guidance system to the body of knowledge. It furthermore demonstrates the effectiveness of a process guidance system including older adults in digital self-service processes and thereby contributes to the creation of a more inclusive digital world.

2 Background

2.1 Benefits and Limitations of Self-service Processes

In the service industry, customer interaction is a fundamental determinant of customer satisfaction. Driven by technological advancements and economic pressures, many companies are increasingly replacing face-to-face service with self-service technologies as a means of reducing operational costs (Leek et al., 2003). By assigning process activities to customers through self-service mechanisms, individuals are

empowered to independently manage a substantial portion of the business process. These self-service processes span a wide range of activities, including online banking, grocery shopping, and check-in/out procedures at hotel facilities (Meuter et al., 2005).

Modern business practices offer 24/7 online access, eliminating the need for physical presence and traditional opening hours, enhancing convenience. This leads to cost reductions for businesses by eliminating the necessity of maintaining physical retail locations and employing sales personnel across multiple regions. For customers, the reduction in costs is equally notable, as they no longer need to incur expenses for transportation to visit a store or agency (Castro et al., 2010). Moreover, self-service processes promote digital inclusion, offering a solution for individuals with limited mobility or psychological conditions who may find it challenging to leave their homes for routine tasks (Manzoor & Vimarlund, 2019; Mervyn et al., 2014; Reisdorf & Rhinesmith, 2020).

Despite these advantages, there are several drawbacks that must be considered. Self-service terminals – typically unsupervised, walk-up devices placed within retail spaces – may pose challenges for certain groups, such as individuals with disabilities or older adults. These terminals are often difficult to operate and read, lacking the interactive qualities of human assistance. For instance, few terminals are equipped with Braille displays, rendering them inaccessible to blind users (Petrie et al., 2014).

2.2 Process Guidance

An essential component for the successful completion of a business process is process management and/or the inclusion of a process management system (Morana et al., 2019). This involves not only structuring and monitoring the business process but also providing users with the necessary support to navigate and execute processes effectively. Morana et al. (2017) describe process guidance as an assistance for the user. It offers the acting person instructions and/or supports them in the execution of their activities. In certain situations, process guidance can present detailed information on the business case at hand, which can help with decision-making. Therefore, a graphical user interface for running business processes should integrate this form of assistance to provide support. Morana et al. (2016) studied a large company integrating process management into an IT ticketing system, featuring (1) ticket history visualization, (2) a list of upcoming steps, and (3) detailed information on each step. With the help of the process management system, an increase in employee satisfaction and an improvement in ticket processing times were observed. The users positively highlighted the visualization of the necessary process steps. Prior to the introduction, it was observed that employees who had little experience in handling internal support processes were less satisfied and slower to complete service requests.

This study by Morana et al. (2016) was carried out within the professional world. Since it was conducted within a company, the age group over 60 was almost completely excluded from the study. Further studies demonstrate that a process guidance system leads to higher satisfaction and better completion rate among younger test subjects (Morana et al., 2016; Morana et al., 2019; Reimer et al., 1998). However, as humans age, they experience changes in their cognitive abilities (Stein et al., 2012). The

literature (Chen & Schulz, 2016; Tams et al., 2018) shows that older individuals have a higher drop-out rate when performing complex tasks on any digital device. With the increasing digitalization of all areas of life, graphical user interfaces must be adapted to the needs of senior citizens. Our assumption therefore is that older people can also benefit from process guidance adapted to their needs.

3 Method

3.1 Design Science Research Methodology

In this study, the research was conducted by applying the design science research approach (Hevner et al., 2004) according to the methodology of Peffers et al. (2007). The model proposed by Peffers et al. (2007) supports iterations through the necessary steps in the preferred order and is closely aligned with common software development processes. In practice, its application resembles the procedural structure of a typical software project (Venable et al., 2017). The steps (1) Identify Problem & Motivate and (2) Define Objectives of a Solution are addressed in the introduction of this paper. The (3) Design & Development phase, in which we build upon existing literature to develop our design artifact, is covered in chapter 4. Steps (4) Demonstration and (5) Evaluation are conducted through a heuristic evaluation in chapter 5. Finally, as part of (6), the Communication phase, we present and discuss the findings in chapters 5 and 6.

3.2 Heuristic Evaluation

The heuristic evaluation according to Nielsen and Molich (1990) was used to evaluate the design artifact. This method represents an efficient way of assessing and identifying potential usability problems. Nielsen and Molich (1990) suggest that a heuristic evaluation can yield meaningful results with as few as 3 to 5 participants, as most usability issues tend to recur across users, making additional testers less likely to uncover new problems. User interfaces and interactive systems are systematically evaluated based on ten predefined principles, so-called heuristics. The ten heuristics are as follows:

(1) *Visibility of the system status.* The system should keep the user informed about what is going on.

(2) *Match between the system and the real world.* The system should speak the language of the user through words and phrases that are familiar rather than technical terms.

(3) *User control and freedom.* Users often need to correct an error or quit an action that they started by mistake. The system should present the user with a clear exit action.

(4) *Consistency and standards.* Users should not have to worry whether different words or actions mean the same thing within the application. Learnability should be improved, so it is necessary to stick to platform conventions.

(5) *Error prevention.* It is vital to have good error messages. Further it is even better to design carefully to prevent problems from occurring in the first place.

(6) *Recognition rather than recall.* Users should not need to recall information from one part of the interface to another. Reduce the user's cognitive load by keeping elements, actions, and options visible.

(7) *Flexibility and efficiency of use.* Shortcuts, hidden from novices, can speed up interactions for experts. Allow customization of frequent actions.

(8) *Aesthetic and minimalist design.* Interfaces should display only relevant information, as excess data reduces clarity.

(9) *Help users recognize, diagnose and recover from errors.* Error messages should be clear, specific, and provide solutions without error codes.

(10) *Help and documentation.* Ideally, the system should be self-explanatory, but documentation may be needed for guidance.

3.3 Demographic

The evaluation involved thirteen participants recruited from the researchers' personal networks. Among them, two resided in urban areas. Consistent with the conventional definition of older adults (Orimo et al., 2006), an age criterion of 65 years or older was applied; participant ages ranged from 65 to 85 years. No prerequisite computer skills were required, and participants exhibited a wide range of digital literacy levels. The sample exhibited a slight male predominance (eight males). Only one participant possessed an academic background, while the remainder had not completed secondary education. The 13 participants were divided into three test rounds. To reduce the complexity of the study title, the subjects were informed that the "user-friendliness of travel portals" would be evaluated.

3.4 Test Procedure

The evaluations were carried out at each participant's place of residence. To ensure a comparable database, the same procedure and device were used for each test person. A notebook with an external keyboard and mouse was the designated testing device. Content-related assistance could not be provided to guarantee the validity of the data. Each participant was instructed to independently evaluate the presented screens according to the ten heuristics, using a written questionnaire. In addition to the written evaluations, the sessions were monitored by the supervisor, and all observations, were recorded in writing. If participants had difficulties interpreting the heuristics, the supervisor provided explanations. Pauses or conversations resulting from explanations of heuristics were excluded from the individual execution times. After the evaluation, participants self-assessed their internet and computer skills with the following questions: (1) How often do you use a computer? (2) How would you rate your PC skills? (3) How often do you use the Internet? Although a control group could have established a baseline, its absence is justified by the study's iterative design. Earlier rounds served as reference points, with each cycle building on insights from the last to support continuous improvement.

4 Design

4.1 Underlying Business Process

The business process of booking travel through an online portal was selected for this study. This reflects a familiar offline activity increasingly shifting online. A study by Näsi et al. (2011) found travel-related content to be a key use case for Finnish seniors using the internet. Users started by entering their travel details (destination, departure point, start/return dates, number of people traveling). Once the data had been entered, it was simulated to be checked by the travel agency for available contingents. To increase the complexity of the business process, users received feedback that no flight quotas were available for their selected return date. As a result, individuals had to return to the first interface screen to adjust their travel data. Once the return date had been changed, the data was again checked by the travel agency and the users were presented with an overview of their entered data including a button with which they could accept the travel conditions.

4.2 Implications for Older Adults in Business Processes

Older adults have different backgrounds and varying levels of knowledge regarding digital technologies. In addition to individual experiences with technology, various levels of acceptance of unfamiliar technology are a key factor. Research suggests that men and younger seniors often have a higher level of acceptance of technology than women and older seniors (Ferizaj et al., 2023). Age-related limitations make it even more difficult for the older generation to use technology (Harris et al., 2022). Over the years, the aging process results in a wide range of declines in human beings. Physical as well as mental deterioration are matters of concern. Those abilities should not be viewed as distinct domains, as they impact each other. Cognitive processing of the graphical user interface is based on unimpaired visual perception of the information.

Motor Impairments
The basis of the human body's movement lies in its motor skills. These include strength, endurance, speed, agility and coordination. To a certain extent, these are innate and can develop to varying degrees. Czaja et al. (2019) demonstrate that motor impairments in older people place special demands on ergonomic interface design. From the age of 60, there is an incipient reduction in muscle strength. This, combined with the onset of arthritis, has a major impact on the fine motor skills of senior citizens. It becomes increasingly difficult to move the mouse and operate a keyboard (Dodd et al., 2017).

Visual Impairments
Studies (McLaughlin & Pak, 2020; Sun et al., 1988) show that the earliest signs of age-related visual decline are difficulties with near focus, or farsightedness, caused by lens stiffening, which reduces the ability to focus on close objects. In addition, the pupil becomes smaller, reducing the amount of light the eye can absorb. Therefore, clear vision requires more light (Pirkl, 1994). McLaughlin and Pak (2020) found that as the

lens yellows and becomes opaquer with age, color discrimination declines, leading to a yellowish tint in perception and difficulty distinguishing shades of blue. The choice of font, font size and line spacing therefore has a significant impact on the legibility of information within the graphical user interface. Older and more recent studies (Hanson & Crayne, 2005; Hou et al., 2022; McLaughlin & Pak, 2020) confirm that a sans serif font offers significant advantages over other typographies.

Cognitive Decline

The perception of the environment, the processing of events, and the actions based on information are attributed to cognitive abilities (Kiely, 2014). These include (McLaughlin & Pak, 2020) (1) working memory, (2) spatial skills, and (3) perception speed. These three categories are of great importance for perceiving, understanding and acting within graphical user interfaces in business processes (Morana et al., 2019). These elements form the basis for cognition and enable people to perceive their environment and gain knowledge and experience (McLaughlin & Pak, 2020).

Given these age-related factors, adapting graphical user interfaces becomes essential. The literature on designing graphical user interfaces for senior citizens is extensive. An analysis of 16 articles was conducted, from which the following design guidelines were derived:

- *Reduction of complexity*
  Use a clear, logical structure with grouped content and avoid complex layouts. Input fields should be large and easily recognizable (Aguirre & Abadia, 2017; Boot et al., 2021; Czaja et al., 2019; Díaz-Bossini & Moreno, 2014; Farage et al., 2012; Hart et al., 2008; Hawthorn, 2000; Hussain et al., 2018; Johnson & Kent, 2007; Lindberg & Troyer, 2021; McLaughlin & Pak, 2020; Newell et al., 2006; Rigou et al., 2019).
- *Text size and readability*
  Larger fonts are very crucial for senior citizens. Additionally, the background and font colors should have a high level of contrast (Aguirre & Abadia, 2017; Boot et al., 2021; Chirayus & Nanthaamornphong, 2019; Czaja et al., 2019; Díaz-Bossini & Moreno, 2014; Elguera Paez & Del Zapata Río, 2019; Farage et al., 2012; Finn & Johnson, 2013; Hart et al., 2008; Holzinger & Errath, 2007; Johnson & Kent, 2007; Lindberg & Troyer, 2021; McLaughlin & Pak, 2020; Newell et al., 2006; Rigou et al., 2019).
- *Consistency of information and actions*
  User interface elements should maintain consistent positions and behavior across all sub views, allowing users to apply learned interaction patterns throughout the application (Aguirre & Abadia, 2017; Boot et al., 2021; Czaja et al., 2019; Díaz-Bossini & Moreno, 2014; Farage et al., 2012; Hart et al., 2008; Hawthorn, 2000; Holzinger & Errath, 2007; Hussain et al., 2018; Johnson & Kent, 2007; Lindberg & Troyer, 2021; McLaughlin & Pak, 2020; Rigou et al., 2019).
- *Feedback*
  The senior citizens should be given clear feedback promptly after each completed measure (Aguirre & Abadia, 2017; Boot et al., 2021; Czaja et al., 2019; Díaz-Bossini & Moreno, 2014; Hart et al., 2008; Hussain et al., 2018; Johnson & Kent, 2007;

Lindberg & Troyer, 2021; McLaughlin & Pak, 2020; Newell et al., 2006; Rigou et al., 2019).

4.3 Meta Requirements

Building on the implications identified in the previous chapter, we now derive the corresponding meta-requirements.

MR-1: *Simple representation of the overall process*. Standard notations like Business Process Model and Notation (BPMN) benefit experienced users but can confuse older adults, making simplified representations essential to reduce complexity (McLaughlin & Pak, 2020).

MR-2: *Clear identification of the current step in the overall process*. To enhance understanding, the full process should be visible, with clear indication of the current step and upcoming actions – further reducing complexity (Newell et al., 2006).

MR-3: *Versatile operation.* Due to the limitations of the motor skills of senior citizens (Dodd et al., 2017), there must be several options for operating the graphical user interface.

MR-4: *Consistent design and operation.* Control and layout should remain consistent across all views, enabling users to apply learned behavior. This ensures stable presentation of information and actions (Czaja et al., 2019; McLaughlin & Pak, 2020).

MR-5: *Reduction of working memory load.* Due to the cognitive decline of senior citizens, it is necessary to reduce the strain on all cognitive abilities. Ensuring a reduction of the load on working memory, this follows from earlier identified implications (Morana et al., 2017).

MR-6: *Avoiding similar icons and colors.* Older adults often struggle to differentiate similar graphics due to visual acuity changes, so similar icons and colors should be avoided (Czaja et al., 2019; Johnson & Kent, 2007).

MR-7: *High contrast in background and font.* There should be a high contrast between the background and the font to ensure clear legibility for users (Díaz-Bossini & Moreno, 2014).

MR-8: *Adequate font size and typeface.* For improved readability, a sans serif and larger font is recommended (Hart et al., 2008).

4.4 Design Principles

Based on the meta-requirements, the following design principles have been identified.

DP-1: *Senior-friendly design of the entire graphical user interface.* This design principle is derived from the meta requirements 6, 7, and 8.

DP-2: *Graphical representation of the business process.* As required by meta requirements 1 and 2, this design principle improves overall understanding of the process.

DP-3: *Reduction of complexity across the graphical user interface.* This falls in line with the meta requirements 5 and 3.

DP-4: *Senior-friendly process management with contextual help*. Based on meta requirement 4, ensuring consistency and user support during execution.

4.5 Design Artifact

The resulting graphical user interface was divided into three sections. The left-hand area contained a graphical representation of the overall process, while the center area was dedicated to user interactions, such as booking travel or downloading tickets. The right column offered various help options for users.

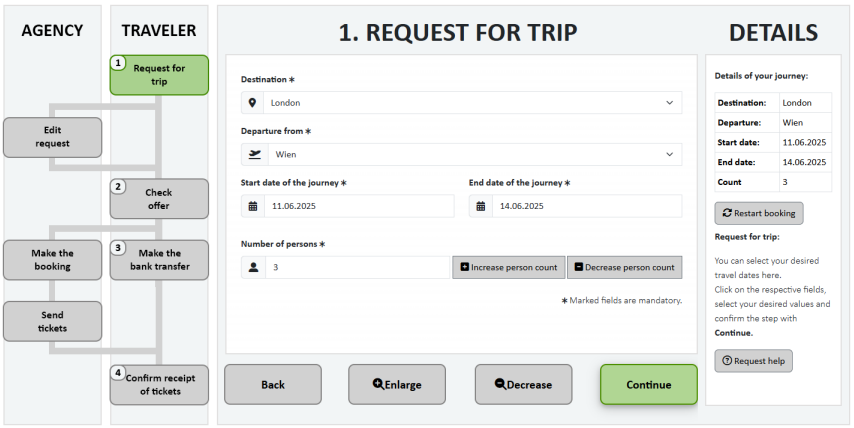

Figure 1. Final design artifact

5 Evaluation

5.1 Findings

The initial evaluation identified several heuristic violations and a lack of familiarity with standard user interface components such as date pickers. As contextual help was neither utilized nor deemed necessary by participants, it was removed. Instead, help instructions were directly integrated in the interface, and entered travel data was persistently displayed to reduce cognitive load. Additionally, an intermediate step was introduced to improve layout clarity. The second evaluation cycle showed a reduction in heuristic violations, with the addition of process steps visually marked by green checkmarks to indicate their status. By the final evaluation, only minor visual adjustments were made, and participant feedback indicated a thorough understanding of the process.

The following table provides an overview of the individual evaluation sessions, including the corresponding evaluation rounds, execution times (in minutes, seconds, and total seconds as *Time_s*), participants' self-assessed levels of digital literacy, and their respective ages.

Table 1. Execution times per test run

Evaluation #	Round	Execution time	Time_s	Digital Literacy	Age
#1	1	09:33	573	Very poor	67
#2	1	09:36	576	Average	65
#3	1	09:42	582	Average	67
#4	1	08:27	507	Average	66
#5	2	10:41	641	Average	72
#6	2	07:03	423	Poor	65
#7	2	07:21	441	Average	83
#8	3	06:57	417	Average	68
#9	3	07:46	466	Very poor	68
#10	3	06:13	373	Poor	78
#11	3	06:43	403	Very poor	85
#12	3	04:52	292	Average	69
#13	3	05:14	314	Average	68

Across the three evaluation rounds, average execution times decreased, indicating a general improvement in performance over the course of the iterations. An additional exploratory Kruskal-Wallis Test (Kruskal & Wallis, 1952) ($H = 7.747$, $df = 2$, $p = 0.021$) indicates significant differences among the three groups. Pairwise comparison shows a notable improvement from group 1 to group 3 ($p = 0.024$), suggesting the third iteration enhanced the design. Figure 2 shows the iterative refinement of the process visualization as an example of the improvements achieved over the three iterations.

Figure 2. Example of improvements: Visualization of iterative refinement

6 Discussion and Conclusion

6.1 Summary of Results

A continuous improvement in the performance of the seniors in using the graphical user interface could be observed. This was also demonstrated by comparing the participants'

execution time from the testing cycles. The monitoring of each evaluation round showed that the operation of the system was continually made easier for the test participants. The user interface adaptations significantly improved certain situations that posed a hurdle for seniors in previous iterations. Especially in the last round of the evaluation, the simple design of the graphical user interface was positively emphasized by many test subjects. The reduction to the most necessary elements was also emphasized by many participants in the final discussion. Contrary to the existing literature (Morana et al., 2019), comments from individual test subjects were recorded that questioned parts of the visualization of the business process. The removal of process steps that do not fall within the user's area of responsibility was considered. However, one could argue that these requests stem from the test subjects' familiarity with similar business processes. If this was a process completely unheard of to senior citizens, it can be assumed that the visualization of the entire scope would certainly be necessary to understand the operation. Further studies with a business process completely unknown to the participants would be required to confirm this assumption. In summary, the final interviews confirmed the assumption that senior citizens benefit from process visualization. The process guidance throughout the entire business process and the instructions within the individual sub-views were highly rated by the participants. Simplified interaction with the interface and the wide range of available options for operating the elements were confirmed as facilitating factors in the observations and discussions with the participants. In line with the Technology Acceptance Model (Davis, 1989), it is essential that senior citizens perceive the design artefact as useful. This was confirmed in the interviews, where participants consistently described the artefact as highly beneficial. Moreover, the model emphasizes that perceived ease of use significantly influences acceptance. In this context, the improved execution times observed across the evaluation rounds serve as an additional indicator of reduced cognitive load, further supporting the artefact's usability (Agarwal & Venkatesh, 2002). From a socio-technical systems perspective (Cummings & Srivastva, 1977; Sarker et al., 2019), the effective use (Burton-Jones & Straub, 2006) of the artifact depends not only on its technical functionality but also on how well it caters to diverse users' characteristics and social context.

6.2 Implications for Research

The proposition by Morana et al. (2019) that users benefit from visualization and process guidance could therefore also be confirmed for the older generation. With respect to the identified research gap, the graphical user interface and the visualization of the business process were adapted to the needs of senior citizens. These adaptations proved to be valuable during the evaluation. Future research could therefore investigate possible process guidance adaptations for digitally disadvantaged user groups such as neurodivergent people. The challenges related to the use of defined standards were particularly evident with the date picker. Despite numerous tests and experiments on date field inputs and possible alternatives, none of the alternatives proved to be more intuitive or easier to use upon reviewing the existing literature. This is largely due to the format of the input option, which resembles a traditional calendar – an interface

familiar to many senior citizens. However, despite the provided information fields and instructions, participants still faced difficulties using the date picker. This demonstrates the need for further usability research to explore potential alternatives.

6.3 Implication for Practice

The experience reports of the senior citizens revealed a clear need to adapt graphical user interfaces in the tourism industry. Many noted that the majority of online portals are too complex and confusing. Travel providers may want to consider addressing the needs of the growing older generation, as neglecting them may result in a loss of bookings. However, this conclusion is not limited to the tourism industry, as any business can benefit from an expanded customer base. Apart from the monetary benefits, the moral reasons for fair inclusion should also be a driving force.

6.4 Limitations

The number of individuals tested within this exploratory study is relatively small and limits the generalizability of the findings. However, digital literacy varied noticeably across all three test groups, providing valuable insights despite the limited sample size. Nevertheless, as Nielsen and Molich (1990) point out, heuristic evaluation can yield valuable results even with a small number of participants, as participants engage with the system in a thorough and systematic way. Acknowledging the lack of a control group, although such a group could have established a baseline, its absence is justified by the study's iterative design. To gain more comprehensive and far-reaching insights, a study with a larger number of participants could be conducted. The design artifact used in this study does not cover all business cases of a travel booking website. Only an exemplary, albeit central, use case was covered by this research. To investigate the needs of senior citizens in their entirety, it would nevertheless be necessary to extend this study to several related business processes within an entire travel portal.

6.5 Outlook

Based on our exploratory study, we can conclude that adapting a process guidance, especially its graphical user interface, to the needs of senior citizens is a useful development. Established usability guidelines have been shown to have a positive effect, and this study further confirms that process guidance and visualizing the business process also yield similar benefits. Technological development will continue to advance, consequently, it is essential that research into usability requirements and process guidance for the older generation is also driven forward. Even though the digital transformation is reaching an increasing number of age groups, there is an ongoing need for research due to continuous innovation. As proposed by Mead and Fisk (1998), the lack of computer experience is not a phenomenon that will fade out with the older generation. New technologies will continue to arise, and the age-appropriate design of business process-supporting technologies is therefore an indispensable branch of research.

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