Summary

The impact of socioeconomic position (SEP) —encompassing income, education level, and occupation—on health is clear. Chronic illnesses such as heart disease, diabetes, and obesity disproportionately affect those in lower socioeconomic groups, leading to prolonged healthcare needs that burden both individuals and society.

Although healthy lifestyle behaviors like regular physical activity and a balanced diet are crucial for disease prevention, research consistently shows that these behaviors are less prevalent among lower socioeconomic groups. As the costs of managing chronic illnesses rise, eHealth interventions have emerged as a potential solution. However, these interventions often require digital skills and proactive health attitudes that are not universally available across all socioeconomic levels. Too often, eHealth solutions are developed with a one-size-fits-all approach, catering primarily to the high health-literate and motivated, inadvertently widening the health gap instead of narrowing it.

Bottom-up, participatory approaches offer a transformative outlook on tailoring eHealth interventions to the unique needs, skills, and preferences of individuals with a low SEP by involving them directly in the design process. Yet, professionals often encounter hurdles such as low health literacy and cultural disparities when engaging these groups. While the scientific community is gaining insights into these barriers, actionable guidance remains scarce. Thus, there is an urgent call for a comprehensive tool integrating known barriers and facilitators to steer the equitable design of eHealth interventions for individuals with a low SEP. This dissertation presents the development of such a tool for professionals. It unfolds across three key sections: Part A delves into knowledge inquiry, Part B focuses on tool development, and Part C illustrates its application in a real-world setting.

Part A: Knowledge Inquiry

In this part of the dissertation, we delve into the critical knowledge gaps: why eHealth interventions often fall short for individuals with a low SEP, and how participatory design could be leveraged to engage this group in the design process.

In Chapter 2, we delve into the attitudes of individuals with a low SEP toward health, healthcare, and eHealth, to better understand their reasons for (not) engaging in health-promoting activities and eHealth interventions. Rather than observing from a distance, we embraced a community-based participatory research approach, actively involving the target group in the process. Through this collaborative effort, we uncovered nine

distinct profiles representing different attitudes towards health, healthcare, and eHealth. These profiles converge into two overarching attitudes: the "Optimistically Engaged," who are generally positive about health, healthcare, and eHealth, and the "Doubtfully Disadvantaged," who struggle with barriers and have low confidence in managing health and navigating the healthcare system. Our findings challenge the assumption that individuals with lower SEP are uniformly unwilling to adopt healthy behavior and engage with eHealth interventions. Instead, we found a rich diversity of attitudes within this group, with the majority displaying a genuine willingness to embrace health-promoting activities and eHealth interventions. This suggests that the issue may lie less in the unwillingness of the target demographic and more in the design of eHealth interventions themselves.

Chapter 3 builds upon our earlier findings regarding the importance of designing eHealth solutions to diverse needs, by exploring how to reach this through participatory design. We present a case study where participatory design methods were specifically applied to develop an eHealth intervention: a smart inhaler to improve medication adherence among asthma patients. This study paid particular attention to individuals with low health literacy, a characteristic often associated with a low SEP, which can be a significant barrier to participation in research and design processes. We focused on three participatory design methods: co-constructing stories, experience prototype exhibition, and video prototype evaluation. We found participatory design activities effectively engaged participants, deepening the understanding of motivations and preferences. The chapter presents the potential and implications of these methods in effectively engaging and designing for and with the target group.

Part B: Development of the Knowledge Tool

In this part, in Chapter 4, the dissertation delves into the development of our knowledge tool, merging insights from the studies in Part A and the research of Isra Al-Dhahir, a fellow PhD candidate. Our approach, thus far mainly bottom-up, involved direct collaboration with the target group and a hands-on case study. However, to ensure comprehensive understanding, Isra's work offered a top-down perspective based on existing literature and common barriers and facilitators identified by professionals. This chapter focuses on merging both perspectives to create the Inclusive eHealth Guide (IeG): a practical tool for professionals to design for eHealth equity. Through a participatory approach, we identified 16 requirements for the tool's design and integrated them into the first version of the IeG.

Part C: Application Cycle

During the application cycle, we delved into the practical application of the IeG within a specific real-world scenario: The development of a tailored eHealth intervention for people with a low SEP in the context of cardiac rehabilitation (CR). Chapter 5 presents the design process of this intervention in which we identified the need of patients with a low SEP to feel more certain and guided during their waiting period preceding CR. In response, we developed a tailored eHealth intervention, together with the target group, to address this need. Implementing the guide during this project yielded four key lessons learned that could guide future designers in similar case-specific applications of the IeG: the need for resource management, the value of participatory methods, and the importance of personalization and simplicity in eHealth design.

In Chapter 6, we evaluated the feasibility and effects on certainty and guidance of the developed intervention among people with a low SEP. Results show the potential of the intervention and the IeG. The intervention demonstrated good adherence and acceptance among participants. Despite the quantitative data showing no improvements in certainty and guidance, qualitative insights suggest that the intervention may offer benefits in these areas. The results show that the application of the IeG could lead to the development of interventions that are both adhered to and accepted by people with a low SEP, posing it as a valuable resource for professionals designing equitable eHealth interventions.

Conclusion

This dissertation contributes to narrowing the health gap by developing and applying the IeG, a practical tool for designing equitable eHealth interventions. We identified diverse subgroups within low SEP, each with specific needs. There are the optimistically engaged who could benefit most from a blended system that maintains and emphasizes the personal connection with healthcare providers. The doubtfully disadvantaged have a lot to gain from eHealth and can be supported through simplifying medical content, ensuring good usability, and fostering a sense of achievement and control. Additionally, there is the complexly challenged group, which is the most difficult to reach through eHealth, and could benefit more from the integration of socio-economic and community support programs. Furthermore, our findings underscore the importance of bridging theoretical knowledge with practical application, exemplified by the IeG and our practical case study. Finally, this dissertation has shed light on some important implications for design and design processes. Regarding the design process, we can confirm that participatory

design is a valuable approach to developing equitable eHealth interventions, but we should be mindful of allocating sufficient resources. Concerning the design itself, we found there needs to be more emphasis on personalized and engaging interventions. By addressing these factors, we can pave the way for eHealth equity, ultimately contributing to narrowing the health gap through eHealth solutions rather than despite them.