

PROBLEM STATEMENT:

Phase I: Understand the User and the User's Problems: The first phase reviewed the characteristics of patients consulting psychological assistants to the general practitioner (PAGPs) with mental health or lifestyle problems in family medicine and on the current use of eHealth in the diagnosis and treatment of these patients. According to the literature scan, eHealth is used in family medicine to reach remote patients, to enhance user-friendliness, to improve the accessibility of care, and to stimulate patient' empowerment and independence of health care professionals. Patients from remote regions and patients who are less mobile or have a hearing disability can be reached relatively effortlessly via the internet. eHealth allows health care professionals to tune into the world of the patient. Furthermore, it can be tailored to the individual's needs and communication can be focused. In addition, the patients' anonymity can be maintained. However, the challenge is to engage patients and keep them engaged for a longer time period. Therefore, content needs to be interesting, interactive and updated regularly. Using social media, gaming elements and technology to enhance privacy and external clinical services are still opportunities that need further investigation. Patients expressed their concerns about the storage and processing of their data, and both patients and health care professionals worry about the reliability and trustworthiness of the content and the devices used. Consequently, health care professionals were hesitant about using eHealth during patient contact due to the technological advancements of the devices. In addition, several individual characteristics also play a role in the acceptance of the use of eHealth in family medicine. For health care professionals, only gender played a role in the use of eHealth meaning that eHealth was more often used by male health care professionals compared to female health care professionals. However, age and educational level contributed to the use of eHealth for patients meaning that young and high educated patients made more use of eHealth than elderly and educationally disadvantaged patients. In the present study, the patients had psychosocial problems ranging from symptoms such as sleep and self-esteem problems to disorders such as anxiety and depressive disorders. According to the PAGPs, the most common problems were anxiety and panic disorders, burnout, depressive disorders, sleep problems and self-esteem. They reported that moment to moment assessment might be useful to clarify complaints in patients with vague symptoms. eHealth modules² were already used on a small scale by the PAGPs. Applications were implemented for diagnostic, psycho-educative and intervention purposes.

Phase II: Explore New Ideas and Representations: The second phase targeted the content and functionalities of the current HCS application and web-based reporting tool and took into account suggestions for improvement from the PAGPs. Based on the prioritization of the suggested improvement areas, reviewed by the interprofessional project group, a medium fidelity prototype was developed. Empathy mapping provided insight into what a patient with a lifestyle problem (i.e., emotion regulation problems, disordered eating behaviour, reduce alcohol use and stress related problems) would say, think, do and feel during a first consultation with a PAGP. One example was a woman with overweight who feels down and unattractive. She thinks: "I will never lose weight. I better don't say that I also experience regular eating binges. The PAGP is rather slim." She only drinks water, runs four times a week, does not eat pie anymore and cancels birthday parties. She says that she wants to lose 25 kilos in 6 months. She is really motivated and asks the PAGP to help her achieve her goal. When comparing these ideas with the current content of the application, information that a patient is willing to share either explicit or implicit was mainly covered by the beep, morning and evening questionnaires. Suggestions for improvement included the incorporation of clear and concise items; the space to add personal items; the opportunity to silence the beep questionnaire for a certain time span; and this all within an intuitive and easy-to-use tool with a visual feedback mechanism, preferably within the application. Moderated user testing yielded feedback on the web-based reporting tool. In an interactive setting, the PAGPs asked to clarify how to read (e.g., the meaning of different line graphs, symbols, colours and values), interpret [e.g., single, alone, alone at home) values, over various time spans] and explain (e.g., all the information to patients, within a short consultation) the web-based reporting tool. For patients to be encouraged and stay motivated, adequate instructions with a focus on both vulnerabilities and strengths in their daily life in line with the concept of positive health were proposed as important references during the implementation. Concerns were raised that less educated or skilled patients would have trouble understanding the web-based reporting tool. For that reason, suggestions for the redesign included one average line for all items, the use of smiley faces, the use of pie charts instead of line charts, and more descriptive information about the meaning of values on the axes of the charts. After all, the PAGPs also agreed that the HCS was insufficiently used to really be able to assess before redesigning. "The web-based reporting tool can be super clear in the end, at least if this content and these functionalities stay and eventually it should be fine-tuned once.

Phase III: Materialize the New Ideas and Representations: The third phase assessed the usability and feasibility of the optimized version of the HCS application and web based reporting tool for daily clinical practice by PAGPs. The results were structured according to the five constructs of the Consolidated Framework for Implementation Research intervention characteristics, outer setting, inner setting, individual characteristics and process. **Intervention Characteristics** The first domain of CFIR is related to key attributes of the innovation in this case the HCS application and web based reporting tool and includes for instance the advantage of the intervention compared to an alternative, the complexity of the intervention or the ability to test the intervention on a small scale. The PAGPs had difficulties applying the newly developed prototype HCS in daily clinical practice. Consequently, they barely used it during their consultations with patients. According to database logs, only 15 patients signed up for the HCS during the 4-month pilot period. This was confirmed during the three weekly telephone conversations. The HCS proved to be too complex and disruptive for the highly structured and time-limited work processes in family medicine. As a consequence, effects as well as disadvantages of the tool were not evident. Due to the minimalistic implementation, the focus group and the interviews could not confirm that the HCS contributed to more in-depth consultations or more insight into the contextual variation of mental states functional analysis by PAGPs and patients. The PAGPs lack the knowledge and skills to use the HCS as a tool to support their functional analysis. Furthermore, the web-based reporting tool was insufficiently intuitive.