Burns Open 11 (2025) 100409

Contents lists available at ScienceDirect

Burns Open

journal homepage: www.sciencedirect.com/journal/burns-open

Optimizing the user-experience (UX) and –interface (UI) of a mHealth application to aid recovery from burn injury (BurnCORE) through a user-centered design approach

Barclay T. Stewart [a,*], Kyler Menge [b], T.Varugis Kurien [c], Caitlin Orton [d], Rebecca Estrada [e], Gretchen Carrougher [d], Callie Thompson [f], Gary Hsieh [b], Tam N. Pham [a]

[a] UW Medicine Regional Burn Center, University of Washington, Seattle, WA, USA
[b] Human Centered Design and Engineering, University of Washington, Seattle, WA, USA
[c] Consultant to UW Medicine Regional Burn Center, University of Washington, Seattle, WA, USA
[d] Northwest Regional Burn Model System, University of Washington, Seattle, WA, USA
[e] User Experience Designer, UW Medicine Regional Burn Center, USA
[f] University of Utah, Salt Lake City, UT, USA

ARTICLE INFO

Keywords:
Mhealth
Burn
App development
User-centered design
UX
UI

ABSTRACT

Anticipatory guidance delivered via a mobile application (app) can support people with burn injury during the early recovery period. We sought to create a prototype app (Burn Connect and Recover – BurnCORE) to complement care provided at burn centers and serve as a transition to the burn survivorship community. We employed a user-centered design (UCD) approach in collaboration with a diverse group of burn care and technology stakeholders (e.g., patients, carers, clinicians, software engineers) to determine key content, functions, and interface preferences. UCD is an iterative design process where a multi-disciplinary team of application designers receive feedback from future end-users to improve understanding of user requirements, optimal features of user experience (UX), and user-app interface considerations (UI). We performed UCD according to its phases: Phase I–community advisory for foundational inspiration; Phase II–cognitive interviews with patients, their carers, and clinicians to determine key content and features; and Phase III–iterative co-design with stakeholders using low-fidelity prototypes. Participants in Phase I suggested that we focus on key gaps in knowledge of the timeline and domains of burn recovery, strategies to promote self-agency and motivation, eliminating barriers to using burn-specific resources, and select issues that aimed to improve UX. Stakeholders recommended several major application features: understanding the initial burn experience, visualizing recovery, and habituation of daily/weekly tasks. Examples of iterative stakeholder feedback include addition of recovery performance tracking, monitored community chat functions, and better ways to visualize recovery over time. UCD allowed us to confirm important burn recovery domains, define valuable features, and elicit from stakeholders key UX/UI features to optimize app engagement.

1. Introduction

After burn injury, people often experience pain, anxiety, depression, stress symptoms and difficulties with body image, community integration and return to work.[1–5] However, assistance in recovery through anticipatory guidance and development of self-agency is beneficial and can improve outcomes.[6] Although comprehensive burn centers, survivorship networks, and advocacy groups collectively have resources to optimize patients' recoveries, these resources are not always coordinated or conveniently accessible on-demand. Mobile health (*mHealth*) applications have emerged as an effective means for both managing health and administering health interventions [7–12], and recent research also signals that mHealth is an acceptable medium for people with burn injury and applications have begun to fill this gap [13,14].

Although thousands of mHealth apps have been brought to market [7], the continued usage rate of such apps is disappointing [8,15] with a significant proportion (45.7 %) experiencing abandonment during

* Corresponding author.
E-mail address: barclays@uw.edu (B.T. Stewart).

https://doi.org/10.1016/j.burnso.2025.100409
Received 3 December 2024; Received in revised form 28 February 2025; Accepted 16 May 2025
Available online 13 June 2025

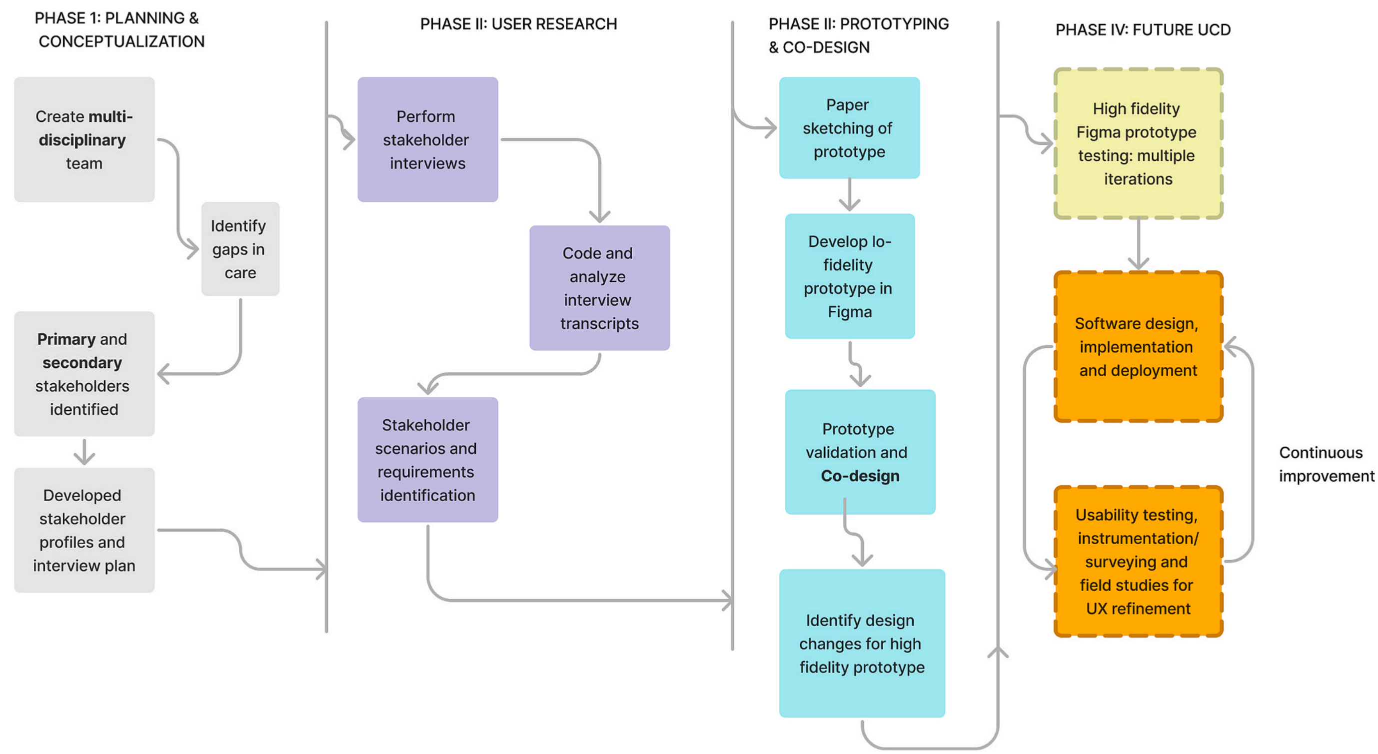

Fig. 1. Phases of user-centered design (UCD).

targeted use periods[8]. To fully realize the potential of mHealth, ensuring continuing app engagement is critical. To address the issue of app engagement, an evidence-based specific technique from the discipline of Human-Computer Interaction (HCI) called User Centered Design (UCD) [16–18] can be utilized. UCD is an iterative design process where a multi-disciplinary team of platform designers iteratively receive feedback from users to improve understanding of user and task requirements, optimal features of user experience (UX), and key user-app interface considerations (UI). UCD design iterations involve usability interviews and exercises with between 3–5 users each and low-fidelity UX prototypes – 80 % of UX problems and actionable feedback are identified by the first four participants [19]. Therefore, each design iteration is efficient and cost-effective. However, the increase in usability and likely user engagement per iteration can be very high [16]. As an important note, major UX changes often require significant software changes. Software changes are expensive; locking down optimal UX features for maximizing engagement using the UCD process is much more cost effective than performing multiple software iterations. UCD significantly increases user engagement and positive outcomes in mHealth apps [9–11]. For example, McCurdie et. al [9] report a 49.6 % increase in the frequency of blood glucose measurements with a UX-optimized app relative to an unoptimized app. Similar findings from optimization of a weight loss management app suggest that improvements in health can be gained when UCD is used early in the development of mHealth technology [11].

To the best of our knowledge, design methodologies based on existing HCI methods, and UCD in particular, have not been used to design a highly engaging app to facilitate improved recovery after burn injury. To address this gap, we used UCD to inform essential content, feasible UX paradigms, key design elements, and desired functions of a mHealth app we have termed Burn Connect and Recover (Burn CORE). By doing so, our findings might serve as the foundational step toward the development of a highly engaging app that enhances self-agency and recovery after burn injury.

2. Methods

This work followed core tenets of UCD (Fig. 1) [17]. The UCD process focuses on integration of potential app users as expert collaborators with lived experience, soliciting of key requirements, and frequent, iterative validation of findings and prototypes to validate and improve UX design. The UCD process we followed is standard in the HCI community [19,20] and the specific UCD steps and methods we employed are outlined below. The project was approved by the University of Washington Institutional Review Board Human Subjects Division. All stakeholders provided informed consent prior to participation.

2.1. Phase I: Planning and conceptualization

Our first step in this process involved soliciting advice from the Consumer Advisory Board (CAB) of our regional burn center. The CAB consists of more than 20 people living with burn injury, parents, caregivers, experts in burn care from multiple disciplines, employers, labor and industry representatives, and patient advocates. The CAB suggested that we focus our efforts on making burn recovery and rehabilitation information more centralized and user-friendly for our diverse population. In response, we convened an inter-disciplinary team consisting of burn clinicians, a burn survivor and experienced software engineer, and researchers from our Department of Human Centered Design and Engineering. We used existing research and resources from the Burn Model System, Model System Knowledge Translation Center, and other groups (e.g., American Burn Association, Phoenix Society for Burn Survivors) that focused on understanding the lived experience of patients with burn injury and their carers to design a semi-structured interview guide to understand key content and features of a burn recovery app (Supplementary Material).

2.2. Phase II: User research

Semi-structured interviews are essential to UCD and were used to gather information about the aforementioned topics and allowed

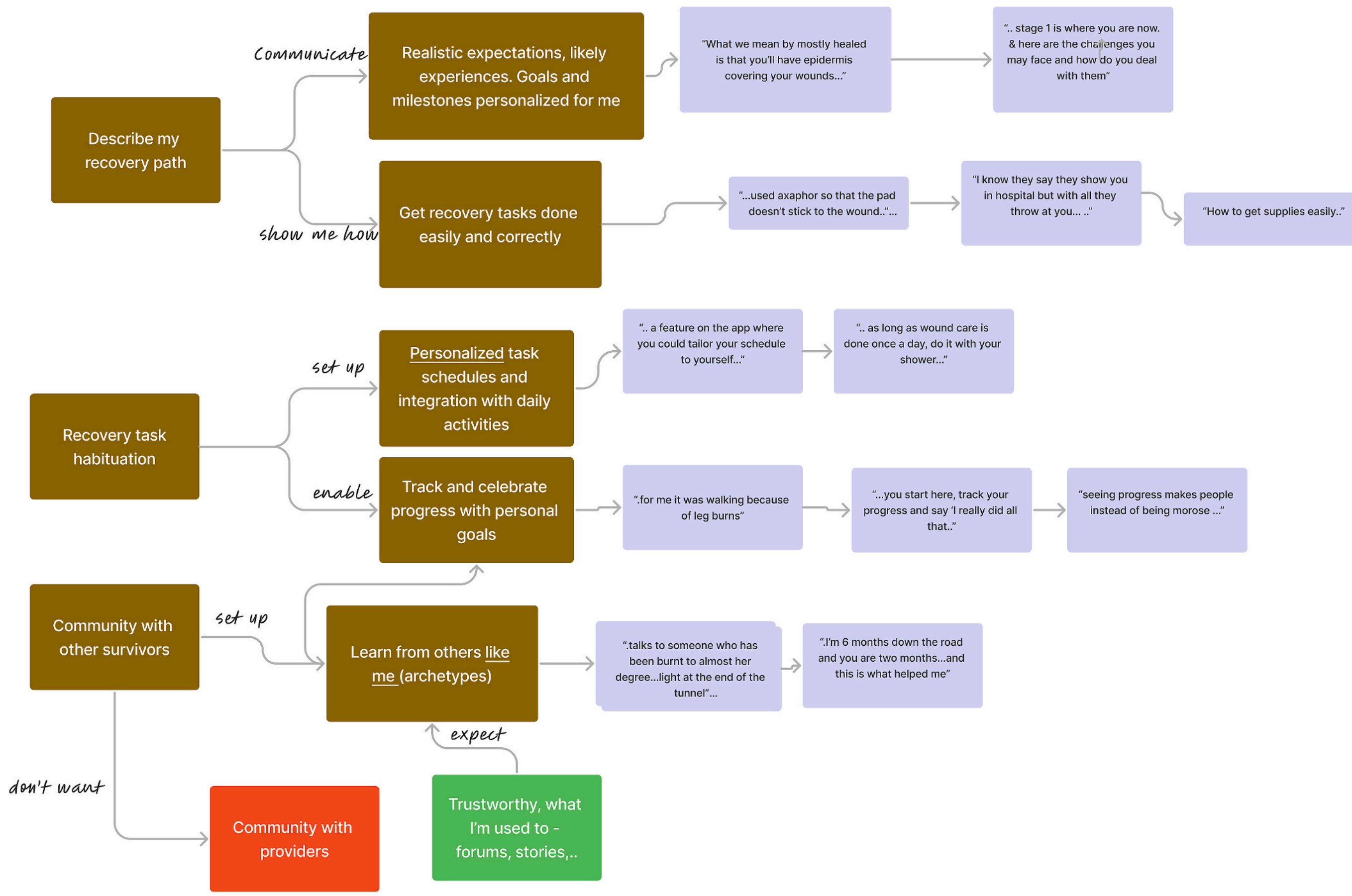

Fig. 2. Key user-experience (UX) functions of BurnCORE recommended by stakeholders.

exploration when new themes emerge [19–22]. UX development and usability testing in UCD generally does not involve more than 4–5 users each round [23,24].

We performed and transcribed interviews with patients, carers and burn providers. Transcribed interview data were coded using Dedoose (http://dedoose.com). Codes were identified by two coders working independently followed by a reconciliation process with an additional arbiter. Excerpts were grouped by code and themes were identified [21]. Themes were grouped into functional blocks based on semantic similarity. Major functional blocks were grouped into three categories (medium, large, extra-large) by the number of excerpts for importance ranking. The extra-large and large blocks represented major app UX and UI features to be initially designed. Relations between major functional blocks were made explicit to link different pieces of UX functionality together in the design of an app. The relationships and functional blocks (of themes) directed the development of a UX prototype in the next step of the UCD process.

2.3. Phase III: Prototyping and co-design

The functional blocks identified in Phase II were used to create the initial UX prototype using the Figma UX prototyping tool (https://figma.com) We used this UX prototype to drive iterative guided and interactive discussions with the same groups of stakeholders as above. We used co-design methods [25–29] that involve stakeholders actively experimenting with the UX design, proposing UX design changes to the prototype, and identifying missing features [30]. The feedback was grouped into four categories:

a. Important to stakeholders and works as designed;
b. Important but needs re-design;
c. Important but missed in the prototype; and
d. Not a user requirement.

2.4. Phase IV: Future UCD

The feedback from co-design sessions was used to create iterative prototypes that were again evaluated by the same stakeholder groups until no further changes were recommended. The final prototype is ready to be developed into a high-fidelity UX prototype that can be used to confirm UX design in preparation for app coding and usability testing.

3. Results

We discuss the results within accordance with the UCD phases outlined above. Given the density of information gathered during the UCD process, examples are presented to illustrate key findings.

3.1. Phase I: Planning and conceptualization

Discussions with the CAB via three sessions were used to develop and optimize the interview guide to be used in Phase II (Supplementary Material). The interview guide focused on key gaps in knowledge of the phases and domains of burn recovery, identifying strategies to promote self-agency, soliciting barriers to finding and using burn-specific resources, and other questions that aimed to explore technology utilization, motivators for recovery, and strategies to improve user-app engagement (e.g., density of notifications, recovery goal setting and progress tracking, interface with burn centers).

Table 1
Key findings from user-centered design (UCD) interviews for BurnCORE.

UX function	Participant Feedback	Example in BurnCORE
Description of my recovery path	Patients wanted to visualize the temporal path of recovery in multiple domains.	Recovery timelines showing experiences and recovery tasks in multiple domains.
	Patients viewed recovery tasks within domains such as wound care as being on recovery paths and wanted clear, concise, and visual instruction to perform tasks.	
	As outpatients, access to materials (e.g., wound care supplies) was identified as a problem since they did not know where to get such materials locally.	Resources and purchasing links to recovery materials.
	Realistic expectations for recovery were viewed as important by providers (e.g., expectations of wound, graft, and scar appearance).	Resources and images to help patients establish realistic expectations for recovery.
	Visualizing recovery paths and both healthy and unhealthy trajectories was found to be an important UX function.	Images of patient recovery paths with both healthy and unhealthy trajectories.
	Trustworthiness and patient comprehensibility of information/tasks was viewed as especially important with strong patient preferences for image and video over text.	Clinician-generated and/or vetted videos and images to accompany text information.
Recovery Task Habituation	Patients and providers both identified the need for becoming habituated to performing recovery tasks.	Stepwise recovery tasks tutorials with images and short instructional videos.
	Personal and survivor persona specific goals and progress tracking were recommended to motivate task performance.	Recovery goal and progress tracking in multiple domains.
	Celebrating progress towards such goals was very motivating.	Encouraging messages for recovery progress and goal achievement.
	The ability to dovetail recovery tasks and everyday tasks that patients already do to minimize task overload and promote habituation was considered critical by providers.	Tips and strategies to integrate recovery tasks and everyday tasks.
	The ability to set personal schedules and reminders for recovery tasks was considered important by both providers and patients.	Recovery task schedules and reminders.
Community with survivors	Patients wanted community with other people with burn injury and showed a distinct preference for community with people of similar survivor personas (e.g., relatively similar in age, employment, injury pattern).	Integrated burn survivor community forums and survivor testimonials for various etiologies and patient demographics.
	Patients did not want providers to be part of this community, preferring to use existing electronic health record system-based mechanisms for provider communication.	
	Streamline transition from local, monitored forums to the broader burn survivorship community forums once acute injury has been managed (e.g., The Pheonix Society for Burn Survivors).	

3.2. Phase II: User research

We performed interviews with six patients, three carers, and six burn providers (e.g., surgeons, therapist, nurse, psychologist, vocational rehabilitation counselor) that resulted in 13 h of transcribed text interviews. Transcribed interview data were coded to yield 711 excerpts and 70 codes with 6 major codes. Thematic analysis yielded three blocks of UX functions representing major app features (Fig. 2). Table 1 summarizes the key findings.

3.3. Phase III: Prototyping and co-design

We developed a low-fidelity prototype in Figma to demonstrate five primary app functions: recovery timelines, task tutorials, daily dashboard, progress tracking, and community forums. The goal of this prototype was to convey the general functionality and layout of features to aid in further ideation during co-design interviews. Some screenshots from the UX prototype used to drive co-design are shown in Figs. 3 to 8. Illustrative features and iterations are also described:

1) **Initial experience:** When the app first starts, the initial screen (Fig. 3a) provides general information about first aid for burns and directs the patient to the nearest emergency unit or burn center. The reason for burn center referral is that without knowing what survivor persona the patient falls into, the app cannot display the most relevant UX. Furthermore, being evaluated at a burn center and then referred to BurnCORE was said to provide an important facet of trust used toward the app and exploration of a 'burn survivor' persona.
2) **Visualizing recovery**: Visualizing recovery was an important theme identified by stakeholders and the app presents experiences that patients are likely to face in *the temporal course* of physical, mental, and psychosocial recovery (Fig. 3b) and when they wish to return to school or work (Fig. 4). The physical recovery UX shows the experiences for the sample persona.
   a) Stars identify recovery tasks (e.g., wound care, stretching regimen). Clicking on a star brings up UX to schedule and complete the task (not shown).
   b) The time to expected re-epithelization for the sample survivor persona is about 2–4 weeks and this is indicated by fading out the experience when no longer relevant.
   c) A new (related) domain (e.g., itch, scar) will appear when appropriate along the wound care UX when appropriate (e.g., during re-epithelialization, after wound closure). This allows the UX to seamlessly weave together different but relevant domains and associated tasks.
3) **Habituation**: Tasks such as appointments, are displayed on the UX (Fig. 3c). Since stakeholders recommended the capability of enabling recovery task habituation, recovery tasks also appear on the 'tasks' page of the app, which becomes the default page once recovery tasks are scheduled (Fig. 4a). A daily activity schedule with reminders is shown in Fig. 4b. Some scheduled tasks are automatically activated, based on dependencies, such as taking pain medication or learning about non-pharmacological pain management techniques before wound care tasks.
4) **Community**: Fig. 4c shows a prototype of online forums. As in other forums, some curated posts are at the top based on specific topics [e.g., selected tips on return to work (RTW) and links to state-specific RTW resources]. Stakeholders preferred local, monitored forums if possible focused on topics related to recovery from and adaptations to living with acute injury. Additionally, stakeholders recommended a streamlined process to transition from local, monitored forums to the broader burn survivorship community forums once acute injury is managed (e.g., The Phoenix Society for Burn Survivors, TPSBS) and local peer support groups (e.g., Phoenix SOAR Programs and others) via a direct link.

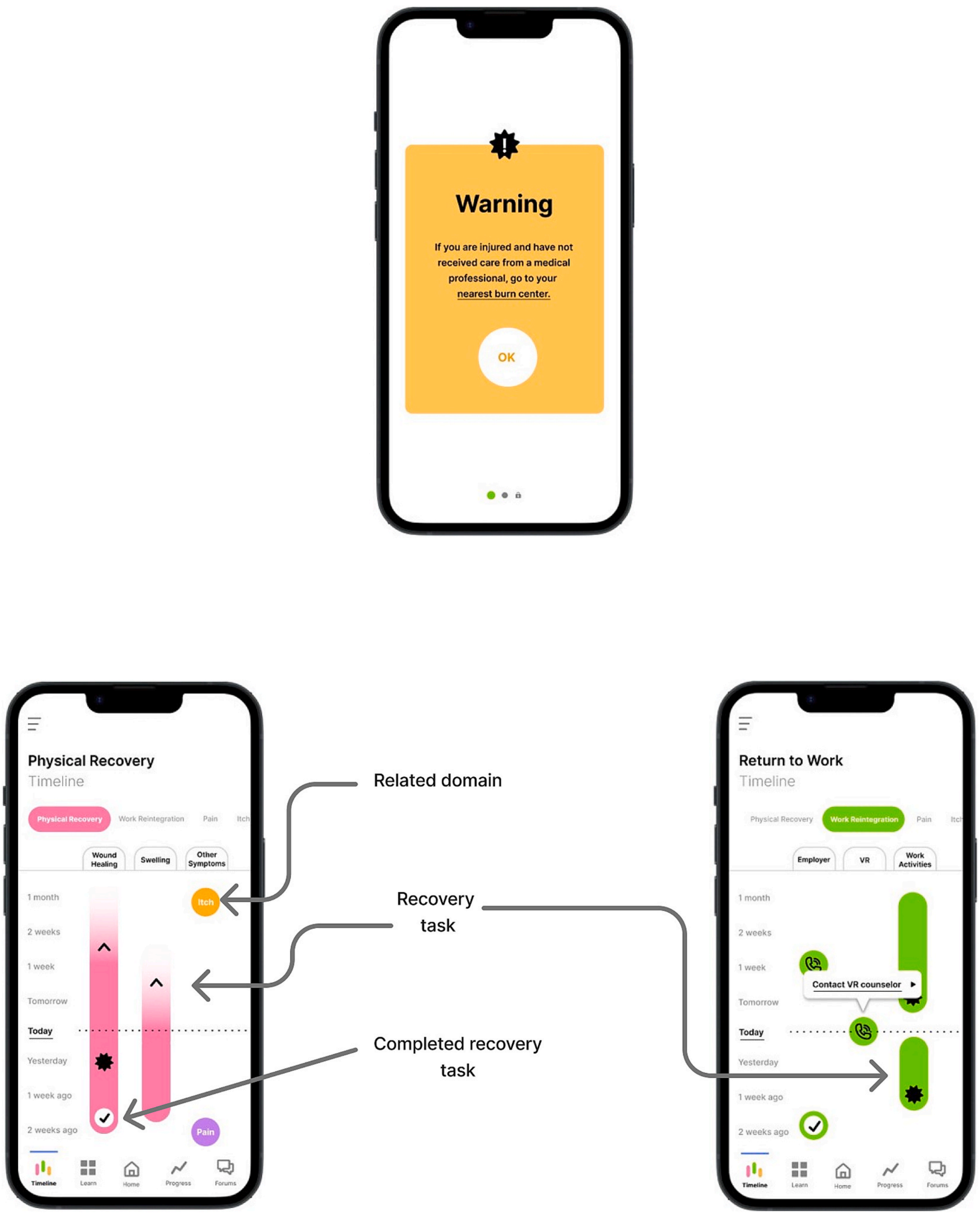

Fig. 3. Example screen shots from BurnCORE low-fidelity prototype that illustrate key user-experience (UX) features.

Over 7 h of interviews were conducted with an additional three providers and five patients during the co-design sessions of Phase III. [24] We grouped the feedback into four categories to inform the development of a high-fidelity UX prototype. Table 2 is a summary of illustrative findings. Co-design resulted in the identification of several new functions described in Table 3.

4. Discussion

Uncertainty after burn injury can be partially remedied by accessible information and engagement in recovery can be developed through education and motivation via optimal UX in a mHealth app. Although there is an abundant amount of high-quality online information that describes burn injury and its sequelae, most content is generic and contains no personalized anticipatory guidance, motivation, or performance tracking. Therefore, we posited that the existing resources are of limited utility. We employed UCD combined with co-design methods [25–29] to develop a mHealth app prototype that guides the burn-injured patient through early recovery. We followed the four established phases of UCD, namely planning and conceptualization, user research, co-design and prototyping, and future UCD [16–20]. In phase I, we identified important burn recovery domains and designed the interview guides for UCD from consultation with our CAB, UCD researchers, people with lived experiences and a software engineer. Phase II confirmed the recovery domains and identified important UX components. In Phase III, co-design and iterative prototyping sessions tested potential visualization tools, their utility, accessibility, and usability. These sessions generated valuable information on needed changes to the prototype. By doing so, the BurnCORE app prototype is ready for coding a high-fidelity prototype with the potential to markedly improve anticipatory guidance and self-agency in the recovery of burn-injured patients.

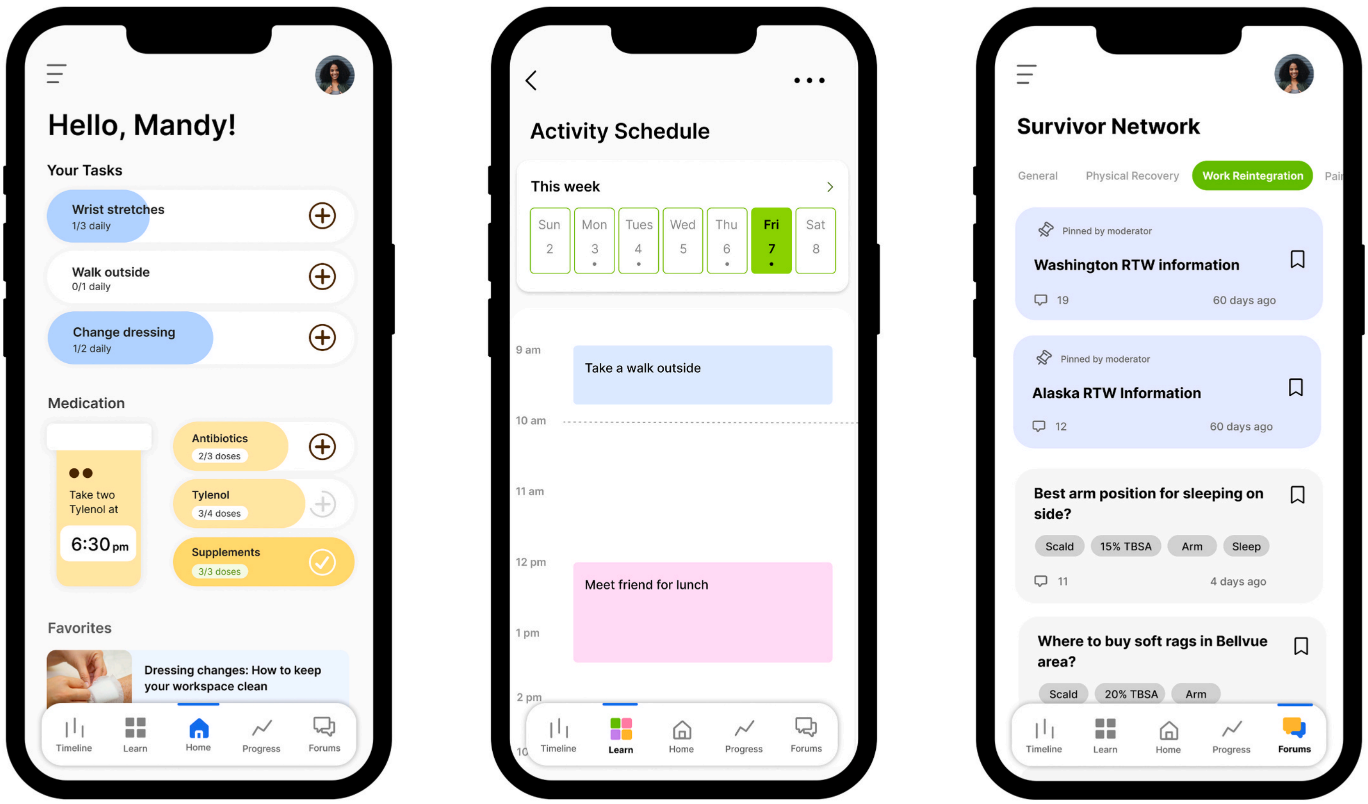

Fig. 4. Additional example screen shots from BurnCORE low-fidelity prototype that illustrate key user-experience (UX) features.

Table 2
Findings from iterative co-design sessions using low-fidelity prototypes of BurnCORE.

Category	UX functional areas	Prototype changes
Important – works as prototyped	Recovery experience visualization	Refine timeline scrolling, micro interactions and color palette
	App functionality should be present from day 0, not just outpatient	Expand task scheduling interface
	Home page with sc---hedules and critical notifications	
	Home page with sc---hedules and critical notifications	Expand task scheduling interface
Important – redesign needed	Forum experience should not include common social media	Integrated and secure forums
	Progress tracking was too complex and did not dovetail with personal goals	Simplified progress tracking visualizations

This work builds on the foundational work by Abrams and colleagues who demonstrated acceptability and feasibility of using mHealth to support burn care coordination and basic recovery education. Their app, "The Bridge," was a groundbreaking advance in the burn community and was specifically developed to support patients being discharged from regional burn centers during their next 90 days. "The Bridge" contains core content aligned with the bio-psycho-social model of health and collects patient data in multiple domains on a HIPAA-compliant mainframe [13,14] to support post-discharge care. Evaluations of how the app changed engagement in rehabilitation or self-agency, app abandonment rates, or its impact on health and function have not yet been reported. We aimed to advance this work by prioritizing patient engagement, personalization, and user-centered motivations as key success criteria. We used UCD to drive usability and engagement at every stage in the design process. Additionally, UCD can maximize health literacy and improve health equity by using patient personas and aligning relevant information and tasks along the temporal course of patient recovery. Prior work has shown that providing health education using this "just in time" approach simplifies the consumption of recovery information by patients and strengthens engagement, accessibility, and effectiveness in motivating users [16–18]. In our case, UCD allowed us to explore UX design more completely and in tandem with patients at very low cost and eliminate the late-stage re-design of UX features that lead to disengagement. Finally, making major UX changes after launch is extremely expensive since it requires extensive software re-design and re-testing. Thus, in addition to other benefits, UCD is a very cost-effective technique for designing a more engaging online recovery platform.

Our prototype also learned from the growing number of apps that support patients navigating other illnesses and injuries. There were lessons learned from both chronic conditions and surgical interventions. For instance, in the Power to the Patient (P2P) heart failure project (Indianapolis, IN) [31,32], the researchers used distinct patient personas to formulate patient requirements and care expectations. We adopted a similar approach during our Phase 1. Our personas permitted us to predict specific challenges based on common sociodemographic features and injury patterns. For example, younger patients with injuries to the face and hands may deal with significant swelling that requires active movement and compression. The platform can notify the user to expect this swelling and provide instructions on how to mitigate it (recovery tasks). Another example is that of working people who could benefit from timed prompting and evidence-based milestone assessment for returning to work. We intentionally drafted survivor personas with diverse backgrounds, gender and circumstances, and tried to anticipate issues of access to care and follow-up. Admittedly, online access is by itself an equity challenge for vulnerable individuals; however, even clinic-based access to the app can be used to improve self-agency during recovery among apps with very intuitive UX [33,34]. Surgical preparation and recovery apps such as RECOVER-E for total hip and knee joint

Table 3
Additional features and user-experience (UX) recommended by stakeholders during co-design sessions with low-fidelity prototypes of BurnCORE.

Feature	Participant Feedback	Example in BurnCORE
Day 0 app introduction	Full app functionality should be present from day 0 (at the burn center) rather than unfolding over time. Idle time (e.g., clinic waiting periods) was viewed as an opportunity to increase app engagement and set up the app correctly (e.g., get recovery tasks and schedules configured while under the immediate care and direction of a burn center).	Earlier introduction and onboarding of BurnCORE upon admission to the clinic.
Privacy in community forums	Participants uniformly voiced that forums need to be trustworthy. Someone who has access to the forum must be a person living with a burn injury since patients seek to interact with similar 'survivor' personas. However, to protect patient privacy, partial anonymity is also desirable.	Process for authenticating new users to provide pseudonymity for the user while ensuring specific attributes such as 'survivor' personas are accurate. Links to local or larger peer support and survivorship networks.
Chronologically ordered experiences	Grouping health information according to when experiences (such as physical symptoms) would manifest made consumption of information easier based on a learn- as-you-go model.	Ensure that experiences in common domains (mental/ physical/social) are organized on a timeline according to the start/end of each experience.
Simplified recovery progress report	Lastly, both patients and providers agreed that progress tracking could be distilled into a brief report to facilitate more efficient and focused future clinic visits or alert patients to seek re-evaluation when progress is insufficient or not 'on-track'.	Simplified, exportable recovery progress reports.

replacement (Bielefield University, Germany) informed us on parallels with preoperative teaching, postoperative progress tracking, and motivational cues [35]. In the burn field, there is a major opportunity to inform the user on preoperative indications and options for skin resurfacing. Postoperatively, the app can use recovery tasks to guide patients through the care for recipient and donor sites, increasing activities to return the affected body areas to pre-injury function, weaning from pain medications, and screening for psychosocial challenges.

We note there are limitations to the current prototype and our methods. Perhaps, the most important limitation is the scope of BurnCORE. Restricting full platform access to patients who had been seen at a burn center (i.e., subset of all acute burns) is very intentional. BurnCORE aims to augment and not be a substitute for care received at a comprehensive burn center. Specifically, we were concerned that acutely injured patients may access the tool instead of seeking initial burn center-based care. The second scope restriction is the duration of engagement. Recovery within the first month has sufficient commonality to permit the design of an app that addresses common physical, psychosocial and return to school and work features. Prior work has demonstrated that recovery trajectories would significantly diverge and limit the utility of and engagement with BurnCORE [36]. Individuals whose trajectory deviates from an optimal course after one month merits further in-person care at a burn center. However, addition of multiple and dynamically evolving application personas can support those with differing recovery trajectories and identify those who are significant outliers to better allocate recovery and rehabilaition services to those most in need. This methodology has already been trialed with the National Institute of Disability, Independent Living, and Rehabilitation Research-funded multicenter Burn Model System program. Participants are given serial reports of their responses to patient-reported outcome measures in comparison with their matched peers. This has been reported to facilitate awareness of their recovery trajectory and its relation to others with similar injuries, augment motivation and engagement in rehabilitation, and serve as a nidus for conversations with their burn care team. Data inputted by the user and collected via BurnCORE can be used to benchmark and plan recovery trajectories for increasingly specific personas. Further, use of artificial intelligence technologies such as personalization engines, reinforcement learning, federated learning, and transformer models can add significant personalization of the app to be most optimized to gain useful engagement from a particular person with burn injury. Next, there will be much to learn about disengagement, potential sources of dissatisfaction from users, and sustainability issues with platform. Useful data garnered from the initial version will undoubtedly allow us to think about scope expansion. Generalizability is another important limitation. BurnCORE is configured with well-established burn recovery domains, and these were confirmed by our stakeholders' interviews. Nevertheless, there may be important blind spots as it is designed to work conjunction with a burn center. For instance, practice variations, such as wound care, use of specific self-guided mindfulness interventions, and pain management protocols at other burn centers may differ. Much of these limitations will be addressed with larger scale testing and data collection via the app on feature utilization, engagement, and correlates with both negative and positive recovery trajectories.

We followed UCD principles to create a prototype burn recovery-specific mHealth app. UCD and iterative co-design sessions allowed us to confirm important burn recovery domains, define valuable features, and elicit from stakeholders key UX and UI features to optimize app engagement. In addition to demonstrating the process that led to BurnCORE's readiness for development of a high-fidelity prototype, this report may inform the development of other injury- and illness-related recovery mHealth apps using UCD principles.

Next steps in BurnCORE development and evaluation include high-fidelity prototype testing using UCD, programming and maintenance of the app for use at pilot burn centers, and evaluation of user-app engagement and abandonment (e.g., bounce and churn rates, session durations, drop-off points in user flows, feature usage metrics). After, we plan to perform a multicenter randomized controlled trial of BurnCORE's impact on users' self-agency, multi-domain recovery trajectories, and user-specific goals leveraging the Burn Model System and its National Data and Statistical Center research infrastructure.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

None.

Funding

The contents of this manuscript were developed under a grant from the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR grant numbers 90DPBU0005). NIDILRR is a Center within the Administration for Community Living (ACL), Department of Health and Human Services (HHS). The contents of this manuscript do not necessarily represent the policy of NIDILRR, ACL, HHS, and you should not assume endorsement by the Federal

Government.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.burnso.2025.100409.

References

[1] Wiechman SA, McMullen K, Carrougher GJ, Fauerbach JA, Ryan CM, Herndon DN, et al. Reasons for Distress Among Burn Survivors at 6, 12, and 24 Months Postdischarge: A Burn Injury Model System Investigation. Arch Phys Med Rehabil 2018;99:1311–7. https://doi.org/10.1016/j.apmr.2017.11.007.

[2] Corry N, Pruzinsky T, Rumsey N. Quality of life and psychosocial adjustment to burn injury: social functioning, body image, and health policy perspectives. Int Rev Psychiatry Abingdon Engl 2009;21:539–48. https://doi.org/10.3109/09540260903343901.

[3] Edwards RR, Smith MT, Klick B, Magyar-Russell G, Haythornthwaite JA, Holavanahalli R, et al. Symptoms of depression and anxiety as unique predictors of pain-related outcomes following burn injury. Ann Behav Med Publ Soc Behav Med 2007;34:313–22. https://doi.org/10.1007/BF02874556.

[4] Pham TN, Goldstein R, Carrougher GJ, Gibran NS, Goverman J, Esselman PC, et al. The impact of discharge contracture on return to work after burn injury: A Burn Model System investigation. Burns J Int Soc Burn Inj 2020;46:539–45. https://doi.org/10.1016/j.burns.2020.02.001.

[5] Duchin ER, Moore M, Carrougher GJ, Min EK, Gordon DB, Stewart BT, et al. Burn patients' pain experiences and perceptions. Burns J Int Soc Burn Inj 2021;47:1627–34. https://doi.org/10.1016/j.burns.2021.01.010.

[6] Brewin MP, Homer SJ. The lived experience and quality of life with burn scarring—The results from a large-scale online survey. Burns 2018;44:1801–10. https://doi.org/10.1016/j.burns.2018.04.007.

[7] Xu W, Liu Y. mHealthApps: A Repository and Database of Mobile Health Apps. JMIR MHealth UHealth 2015;3:e28.

[8] Kayyali R, Peletidi A, Ismail M, Hashim Z, Bandeira P, Bonnah J. Awareness and Use of mHealth Apps: A Study from England. Pharmacy 2017;5:33. https://doi.org/10.3390/pharmacy5020033.

[9] McCurdie T, Taneva S, Casselman M, Yeung M, McDaniel C, Ho W, et al. *mHealth Consumer Apps* : The Case for User-Centered Design. Biomed Instrum Technol 2012;46:49–56. https://doi.org/10.2345/0899-8205-46.s2.49.

[10] Tsai CC, Lee G, Raab F, Norman GJ, Sohn T, Griswold WG, et al. Usability and Feasibility of PmEB: A Mobile Phone Application for Monitoring Real Time Caloric Balance. Mob Netw Appl 2007;12:173–84. https://doi.org/10.1007/s11036-007-0014-4.

[11] McDaniel JG. The user-centered approach in the development of a complex hospital-at-home intervention. Adv Inf Technol Commun Health 2009;143:328.

[12] Verhoeven F, Tanja-Dijkstra K, Nijland N, Eysenbach G, van Gemert-Pijnen L. Asynchronous and synchronous teleconsultation for diabetes care: a systematic literature review. J Diabetes Sci Technol 2010;4:666–84. https://doi.org/10.1177/193229681000400323.

[13] Abrams TE, Lloyd AA, Elzey LE, Hickerson WL. The Bridge: A mobile application for burn patients. Burns 2019;45:699–704. https://doi.org/10.1016/j.burns.2018.09.028.

[14] Abrams TE, Li X, Wyatt TH, Staples CI, Coe DP, Hickerson WL. Strengthening Recovery: A Burn Injury-Focused Mobile App to Improve Outcomes. Health Soc Work 2019:hlz018. doi: 10.1093/hsw/hlz018.

[15] Perez S. Nearly 1 in 4 People Abandon Mobile Apps After Only One Use. Nearly 1 4 People Abandon Mob Apps One Use 2019. https://techcrunch.com/2016/05/31/nearly-1-in-4-people-abandon-mobile-apps-after-only-one-use/ (accessed October 23, 2023).

[16] Nielsen J. Parallel & Iterative Design + Competitive Testing = High Usability. Parallel Iterative Des Compet Test High Usability 2011. https://www.nngroup.com/articles/parallel-and-iterative-design/ (accessed October 22, 2023).

[17] Norman DA. The design of everyday things. Rev. and. expanded edition. Cambridge (Mass.): MIT press; 2013.

[18] Interaction Design Foundation. User Centered Design 2019. https://www.interaction-design.org/literature/topics/ user-centered-design (accessed June 16, 2019).

[19] Vredenburg K, Mao J-Y, Smith PW, Carey T. A survey of user-centered design practice. Proc. SIGCHI Conf. Hum. Factors Comput. Syst., Minneapolis Minnesota USA: ACM; 2002, p. 471–8. doi: 10.1145/503376.503460.

[20] Gunther R, Janis J, Butler S. The UCD Decision Matrix: How, When, and Where to Sell User-Centered Design into the Development Cycle. UCD Decis Matrix Sell User-Centered Des Dev Cycle 2001. http://www.ovostudios.com/upa2001/ (accessed October 23, 2023).

[21] Clarke V, Braun V. Thematic Analysis. In: Teo T, editor. Encycl. Crit. Psychol., New York, NY: Springer New York; 2014, p. 1947–52. doi: 10.1007/978-1-4614-5583-7_311.

[22] Wilson C. Interview techniques for UX practitioners: a user-centered design method. Amsterdam Boston: Morgan Kaufmann; 2014.

[23] Nielsen J. How Many Test Users in a Usability Study? Many Test Users Usability Study 2012. https://www.nngroup.com/articles/how-many-test-users/ (accessed October 24, 2023).

[24] Sova DH, Nielsen J. "234 tips and tricks for recruiting users as participants in usability studies. B Nielsen 234 Tips Tricks Recruit Users Particip Usability Stud 2023. http://www. nngroup. com/reports/tips/recruiting/234_recruiting_tips. pdf (accessed October 23, 2023).

[25] Donetto S, Pierri P, Tsianakas V, Robert G. Experience-based Co-design and Healthcare Improvement: Realizing Participatory Design in the Public Sector. Des J 2015;18:227–48. https://doi.org/10.2752/175630615X14212498964312.

[26] Sanders E-B-N, Stappers PJ. Co-creation and the new landscapes of design. CoDesign 2008;4:5–18. https://doi.org/10.1080/15710880701875068.

[27] Noorbergen TJ, Adam MTP, Roxburgh M, Teubner T. Co-design in mHealth Systems Development: Insights From a Systematic Literature Review. AIS Trans Hum-Comput Interact 2021;13:175–205. https://doi.org/10.17705/1thci.00147.

[28] Tremblay M, Hamel C, Viau-Guay A, Giroux D. User Experience of the Co-design Research Approach in eHealth: Activity Analysis With the Course-of-Action Framework. JMIR Hum Factors 2022;9:e35577. https://doi.org/10.2196/35577.

[29] Nesbitt K, Beleigoli A, Du H, Tirimacco R, Clark RA. User Experience (UX) Design as a co-design methodology: lessons learned during the development of a web-based portal for cardiac rehabilitation. Eur J Cardiovasc Nurs 2022;21:178–83. https://doi.org/10.1093/eurjcn/zvab127.

[30] Brewer LC, Fortuna KL, Jones C, Walker R, Hayes SN, Patten CA, et al. Back to the Future: Achieving Health Equity Through Health Informatics and Digital Health. JMIR MHealth UHealth 2020;8:e14512. https://doi.org/10.2196/14512.

[31] Holden RJ, Bolchini D, Mirro MJ, Toscos T. Power to the patient: Design and Test of Closed-Loop Interactive IT for Geriatric Heart Failure Self-Care. IUPUI 2019.

[32] Holden RJ, Joshi P, Rao K, Varrier A, Daley CN, Bolchini D, et al. Modeling Personas for Older Adults with Heart Failure. Proc Hum Factors Ergon Soc Annu Meet 2018;62:1072–6. https://doi.org/10.1177/1541931218621246.

[33] Trivedi N, Patel V, Johnson C, Chou W-Y-S. Barriers to accessing online medical records in the United States. Am J Manag Care 2021;27:33–40. https://doi.org/10.37765/ajmc.2021.88575.

[34] Chang E, Blondon K, Lyles CR, Jordan L, Ralston JD. Racial/ethnic variation in devices used to access patient portals. Am J Manag Care 2018;24:e1–8.

[35] Stauber A, Schüßler N, Palmdorf S, Schürholz N, Bruns D, Osterbrink J, et al. RECOVER-E – a mobile app for patients undergoing total knee or hip replacement: study protocol. BMC Musculoskelet Disord 2020;21:71. https://doi.org/10.1186/s12891-020-3090-2.

[36] Wiechman SA, Amtmann D, Bocell FD, McMullen KA, Schneider JC, Rosenberg L, et al. Trajectories of physical health-related quality of life among adults living with burn injuries: A burn model system national database investigation to improve early intervention and rehabilitation service delivery. Rehabil Psychol 2023;68:313–23. https://doi.org/10.1037/rep0000508.