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THE ROLE OF USER REVIEWS IN OPTIMISING DIGITAL HEALTH APPLICATIONS

Abstract

Digital applications for health represent significant potential for solving modern health challenges. Despite an increasing number of people using instructions provided by digital health apps, the level of adherence remains low, which adversely affects the overall effectiveness of these apps. Research dealing with the root causes of such low engagement is insufficiently represented, even though user experience is an important factor in the acceptance of these applications. Analysing user reviews of digital health apps can provide insight into user experiences, including features that users rated as positive or lacking, thereby guiding future app development and improvements. The goal of the research is to analyse user feedback on publicly available health applications in order to identify their strengths and weaknesses and determine guidelines for their improvement. To better understand what users value in digital health apps, reviews from 102 health applications available on the Apple App Store and Google Play were analysed, using both thematic and sentiment analysis. The findings reveal several key factors that users consistently appreciate—apps that are easy to use, offer customisable features, include motivational tools, and provide responsive customer support tend to receive positive feedback. Conversely, users often stop using health apps when they encounter poor usability, technical glitches, unhelpful support, or concerns about how their personal data is handled. These issues not only affect user satisfaction but can also significantly impact long-term engagement with digital health tools.

Keywords: usability issues, personalisation, thematic analysis, sentiment analysis, user experience

Introduction

Digital health applications (DHAs) have become indispensable in today's healthcare sector. They help people manage chronic conditions, keep track of their fitness, support their mental well-being and provide remote consultation services. These tools are gradually becoming a part of everyone's everyday life. Digital health tools are providing new ways to spread healthcare more widely, to make it more tailored to people, and to make it more fun (Abernethy et al., 2022). Smartphones and other wireless devices, in particular, have emerged as effective media for delivering health interventions because they are ubiquitous, always at hand, and capable of doing complex tasks in the form of processing large amounts of data, providing users with real-time feedback and sharing data safely with health care providers or researchers. Users' interaction with these apps, which extend to mobile and web platforms, and the level of their satisfaction with these interactions, have become crucial aspects for the apps to leave an impact on the healthcare industry. Nevertheless, a large number of health-related apps are still encountering difficulties in retaining users or fulfilling the health benefits that they have promised (Cheng-Kai et al., 2025; Giebel et al., 2023; Kayyali et al., 2017). The origin of the problem is often in poor user experience caused by confusing interfaces, a lack of personalisation, or a failure to meet the users' needs. User reviews, that is, comments and ratings that people allocate on app stores and online platforms, are a valuable but often ignored source of real user experience. Usually, these reviews are considered as means for marketing or popularity measurement; however, new facts indicate that they reveal much more. They can act as a catalyst for developers to elevate app design, detect technical problems, and gain insights into users' favourite features (Pagano and Maalej, 2013). One way to get the most out of user feedback sources and to address the gap between developers' creations, recommendations of health workers, and actual users' needs is through systematic and thorough analysis of this feedback, which can lead to better design of digital health applications. Therefore, the scope of this study is the user experience of DHAs, analysed through reviews to find patterns of (di)satisfaction. The road map of the study moves from a clear explanation of the problem that has been identified, users not engaging with digital health applications, to levels of the study, such as the literature review, combined thematic-sentiment analysis of user reviews, presentation of results on factors of satisfaction and dissatisfaction, and finally, the recommendations and the future research directions.

Previous research

Users' ratings and reviews of the publicly available health apps identify a number of sentiments and themes that represent the positive and negative aspects of these apps. Use cases are written as storyboards of users' experiences with the app, where usability, functionality and personal gains of being an app user are clearly written down. These are important considerations for developers who want to develop apps with great design and user involvement. Key themes of user reviews focus on the following items. One of them is usability and performance, as users often comment on how easy health apps are to use and function. The users claim an easy-to-use interface and smooth navigation, that is, user-friendliness (Alqahtani and Orji, 2020) as positive aspects while the negative ones can be summed up as the app crashes and takes away all the data (Camacho-Rivera et al., 2020). Further topics in user feedback relate to personalisation and engagement. Personalisation features, such as tailored guidance and goal setting, are appreciated by users as they enhance engagement and motivation (Rawlings and Kufuor, 2025; Peng et al., 2016). Apps that offer interactive and engaging exercises are particularly well-received. Privacy and necessity for inclusive design are also topics of interest (Omaghomi et al, 2024). Concerns about privacy and data security are prevalent (Zych et al., 2024), with users valuing apps that ensure confidentiality and secure data handling (Malik et al, 2022). Users often mention the importance of app performance, with high ratings associated with reliable and consistent app behaviour (Funnell et al., 2022; Camacho-Rivera et al., 2020). In Germany, digital health apps that are regulated (DiGAs) receive more positive reviews than those that are not regulated, with the favourable user experiences being attributed to good customer service and personalisation. Nevertheless, issues like software errors and registration procedures still present barriers that have to be overcome (Uncovska et al., 2023).

Regarding sentiments expressed by users, they can be classified mostly as positive or negative ones. Many users express satisfaction with apps that improve their health management, citing benefits such as increased awareness and progress tracking (Peng et al., 2016; Funnell et al., 2022). Criticisms often focus on technical shortcomings, such as poor functionality and lack of interoperability, which can lead to app discontinuation (Funnell et al., 2022; Polhemus et al, 2022).

A scoping review that was published recently (Ghosh et al., 2024) has identified app components that are most likely to make the users more engaged with the app. The components

included personalised feedback, visualisation of data, reminders, educational data and features like self-monitoring and goal-setting. These apps hold great promise for tackling some of today's most pressing healthcare challenges. Yet, even as more people turn to digital health apps for guidance and support, many struggle to stick with them, and studies regarding digital health adoption from a persuasive standpoint are still scarce, resulting in a lack of comprehension about how to successfully engage users over an extended period (Mohd et al, 2025; Sarkar et al., 2016). Low adherence rates are a common issue, and they can seriously limit the effectiveness of even the most well-designed apps. Despite this, there is still a lack of understanding of why users disengage. While some research points to user experience as a key factor in adoption and continued use (Mohd et al., 2025), this area remains underexplored and deserves more attention.

Analysing user reviews of digital health apps can provide insights into user experiences, including features that users rated as positive or lacking, thereby guiding future app development and improvements. In this way, by adopting such a proactive approach, app quality and usage can increase to a level that may have a positive impact on people's health and their quality of life (Haggag, 2022). The aim of this study was to analyse user feedback on publicly available health apps to identify their strengths and weaknesses as well as to identify directions for their improvement.

Methodology

Related research questions were:

1. What factors of digital health applications (DHAs) contribute most to user satisfaction, as reflected in app store reviews?
2. What are the most common sources of user dissatisfaction with DHAs?
3. Are there differences in user satisfaction between free and paid DHAs?
4. How can systematic analysis of user reviews inform the user-centred design of future DHAs?

The study analysed user reviews collected during August and September 2024 from global app stores, providing an international and cross-sectional perspective on digital health application use. The sample was purposefully selected to include the most popular digital health apps across major platforms in order to maximise the representativeness of user

feedback. The sample consisted of 102 top-downloaded digital health applications selected from both the Apple App Store and Google Play Store. These apps were selected because they represent the most commonly used digital health tools by the general public, thus constituting a rich and relevant source of user reviews. The data collected included review text and star ratings. User reviews were also obtained using the Heedzy web service that collects reviews of all iOS and Android applications. To analyse user reviews, a thematic analysis of reviews was conducted. Thematic analysis was chosen because it allows for the analysis of a large data set in a systematic way that helps in interpreting patterns in the text while taking into account the context. Inductive coding was used to reveal common themes and categories, and qualitative thematic analysis was used so that the data obtained could be systematically analysed and reported. Specifically, Braun and Clarke's (2007) six-stage framework for conducting thematic analysis was followed: (1) familiarising with the data, (2) generating initial codes, (3) searching for themes, (4) defining themes, (5) reviewing themes, and (6) recording the results. Open coding was used, meaning that codes were not predefined. Therefore, codes were expanded, developed, and modified during the coding process as new themes emerged. The sentiment of each review was classified as positive, negative or neutral. Themes were mapped to sentiment scores to understand emotional tone per topic. Software MAXQDA was used for qualitative data analysis.

Results and discussion

Thematic analysis revealed several major categories and subcategories out of user reviews that are related to general information, usability and functionality, motivation and responsibility, support and service, health and fitness results and promises of value. Table 1 summarises the results of the thematic and sentiment analysis in terms of positive user reviews.

Category	*Subcategory*	*Description*
General	Health and well-being	Many users appreciate the app because it helps them make healthy decisions, for example when it comes to tracking food and ingredients.
	Ease of use	Users prefer the simplicity, educational value, and practicality of the app in everyday life.
	Exercise and fitness	Many users report improved physical health and consistent exercise thanks to the app's structured plans and progress tracking.
Usability and functionality	User-friendly interface	Elegant design and ease of navigation.

	AI- driven features	Users appreciate AI-driven features like food tracking, heart rate monitoring, and sleep analysis, which contribute to improved health.
	Customisable features	Many users appreciate the customisation options, including workout plans, task reminders, and personalised health insights.
Motivation and responsibility	Motivational features	Tracking progress, setting personal goals, and the ability to share results with friends provide motivation for many users.
	Productivity improvements	The app is useful for organising routines and improving daily productivity
Support and service	Customer support	The app's customer service is often praised for its responsiveness and helpfulness.
	One-time payment model	Many users appreciate apps with a one-time purchase model without a subscription.
Health and fitness results	Improving health conditions	Users report significant benefits, such as weight loss, improved mobility, and better sleep quality, attributing their success to the app's features.
	Holistic support	Apps that support mental health, such as goal setting and stress reduction features, are also receiving positive feedback for improving users' well-being.

Table 1. Positive user reviews

Table 2 summarises the results of thematic and sentiment analysis in terms of negative user reviews.

Category	*Subcategory*	*Description*
General	Deceptive features and scams	Some users negatively rate the app for misleading advertising and deceptive pricing practices.
	Technical problems	Common issues include bugs, crashes, syncing, and app functionality issues.
	False advertising	Complaints about inaccurate product recommendations and misleading claims about features, such as health tracking.
	Privacy concerns	Users are concerned about privacy, especially regarding excessive data collection and subscription handling.
Usability and functionality	Navigation and UI/UX issues	Poor navigation, outdated design, and cluttered interfaces frustrate users.
	Feature limitations	Apps lack key features (e.g. barcode scanning, workout options), leading to user dissatisfaction.
	Errors and crashes	Constant bugs and crashes across devices and platforms reduce overall usability.
	Security and accessibility issues	There are common concerns about rigid password systems, inability to use certain features, and poor device integration.
Customer service	Unresponsive support	Users often complain about slow or unhelpful customer service.
	Cancellation problems	Many users reported issues with unsubscribing and recurring charges.
False promises of value	Unrealistic rewards	In some apps, users accumulate points that cannot be easily redeemed, which leads to frustration.
	Incorrect data	Apps sometimes provide inaccurate health or fitness data, which contributes to a lack of trust.

Table 2. Negative user reviews.

Star ratings of free and paid applications were tested for differences. The result of independent samples t-tests shows that there was no significant difference in the ratings of free and paid applications ($p = 0.369$) on the level of significance of five percent, with free applications ($n = 71$) receiving an average rating of 4.466, while paid applications ($n = 31$) received an average rating of 4.403 (Table 3).

	T-tests; Grouping: Var 1 Group 1: Free Group 2: Paid						
Variable	Mean Free	Mean Paid	t-value	df	P	Valid N Free	Valid N Paid
App score	4.466197	4.403226	0.900651	100	0.369338	71	31

Table 3. Differences in star ratings of free and paid digital health applications

The findings indicate that users place a high importance on applications that are user-friendly and possess a well-structured user interface (UI). Users tend to favour applications that provide a diverse range of features, functionalities, and customizable content, which increases the likelihood of prolonged usage. Furthermore, users greatly appreciate applications that offer customizable options, enabling them to modify certain aspects of the app's features. Conversely, inadequate usability was identified as the primary reason for users discontinuing an app. Additionally, deficiencies in variety, personalisation, customer support, trust, and security contributed to user dissatisfaction with applications.

Although user opinions about health apps are quite positive in general, there are significant points to be improved. If these technical limitations and the general lack of personalisation are addressed, it can greatly increase user satisfaction and of course, app retention. Moreover, enforcing strong privacy protections can mitigate user apprehension and trust. These findings highlight the significance of ongoing app assessment and design to best accommodate a range of user requirements.

Conclusion

This research highlights the value of user feedback in better understanding and improving the functions, usability, and efficacy of digital health apps. Using thematic and sentiment analysis of reviews from 102 top downloaded health apps, the drivers of user satisfaction and dissatisfaction were identified. Intuitive design, wide-ranging customisation features,

motivational tools, and responsive customer service are consistently appreciated by users. However, there are also technical problems, usability issues, a lack of personalisation, and data privacy concerns that are important obstacles for sustained use. These findings suggest a need for developers and healthcare professionals to effectively implement user feedback into the app development process. This will allow them to develop tools that are more intuitive, reliable and user-centric, and closer to the actual requirements and expectations of end users. In addition, building and promoting transparency about how data is used, along with providing robust privacy protections, can help to nurture trust, which is crucial for continued use of digital health solutions.

Still, there are several open questions after these insights. For instance, how different are user expectations for the various groups, cultural contexts, and health conditions, or how deeply are socio-economic factors determining the perception of value and usability of DHAs? This research sustains the argument that user-centered design, based on thoroughly processed feedback, is required for the long-lasting success of DHAs. Through the description of both good and poor user experiences, user reviews uncover the recurring themes that are vital for understanding how users accept and continue using the technology. There are several limitations of the study. The first limitation is that only the most downloaded applications were included in the sample, which could imply that the findings might be more reflective of the commercial success of the apps, neglecting potentially high-quality ones. Secondly, the work was confined merely to reviews in English, which reduces the extent to which the results can be generalised to different cultures, and the study design was cross-sectional**.** Furthermore, user opinions are fundamentally self-expressed, free-form, and at times partial since they may present temporary instead of typical user experiences.

Future research should address these limitations by combining the analysis of reviews with the detailed interviews or surveys to confirm the results and obtain more impartial views. For future research, it would be of interest to study user feedback across different demographic and health condition groups, and to carry out studies over a long period of time to explore how the feedback of users and engagement with the application change over time.

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ULOGA POVRATNIH INFORMACIJA KORISNIKA U OPTIMIZACIJI DIGITALNIH APLIKACIJA ZA ZDRAVLJE

Sažetak

Digitalne aplikacije za zdravlje predstavljaju značajan potencijal za rješavanje suvremenih zdravstvenih izazova. Unatoč sve većem broju osoba koje koriste upute koje im daju mobilne aplikacije za zdravlje, razina pridržavanja istima i dalje je niska što nepovoljno utječe na ukupnu učinkovitost tih aplikacija. Istraživanja koja se bave temeljnim uzrocima ovakve niske angažiranosti nedostatno su zastupljena, iako je korisničko iskustvo važan čimbenik u prihvaćanju tih aplikacija.

Analiza korisničkih recenzija mobilnih aplikacija za zdravlje može pružiti uvid u korisnička iskustva, uključujući značajke koje su korisnici ocijenili pozitivnim ili im pak nedostaju, čime se usmjerava budući razvoj i poboljšanja aplikacija. Cilj je istraživanja analizirati povratne informacije korisnika o javno dostupnim aplikacijama za zdravlje kako bi se identificirale njihove prednosti i nedostaci te utvrdile smjernice za njihovo poboljšanje. Analizirane su recenzije korisnika 102 aplikacije za zdravlje iz Apple App Storea i Google Playa primjenom tematske analize i analize sentimenta. Rezultati pokazuju da korisnici preferiraju jednostavnost korištenja aplikacija, prilagodljive značajke, motivacijske elemente i kvalitetnu korisničku podršku. S druge strane, neadekvatna upotrebljivost, tehnički nedostatci, neodgovarajuća korisnička podrška te zabrinutost oko sigurnosti i privatnosti podataka najčešći su razlozi odustajanja korisnika od korištenja aplikacija za zdravlje.

Ključne riječi: upotrebljivost, personalizacija, tematska analiza, analiza sentimenta, korisničko iskustvo