User study

To evaluate the usability and user experience of the health monitoring toolkit, a structured user study was conducted. Participants were asked to complete a series of typical tasks using the app and then respond to a questionnaire covering various aspects of usability, clarity, and usefulness. Each question was rated on a 5-point Likert scale. The goal of the study was to assess how intuitive, informative, and engaging the app is for end-users, and to identify areas for improvement.

A total of 5 participants (e.g., students, researchers) took part in the study. The participant group consisted of 4 males and a female between 22 and 24 years old. Most had limited prior experience with stress monitoring apps, allowing for a representative evaluation of ease of use from a general user perspective.

Result

Participants had a positive overall impression of the onboarding experience of the app. Device pairing was rated 3.6, reflecting an easy experience, while creating and selecting profiles was slightly less intuitive (3.4). Some participants were puzzled by the new user and existing user login screens being the same. Initiating a measurement was rated 3.8, reflecting that the majority of participants found it quite easy.

The clarity of the app was universally received, and the display of measurement results rated 4.6. Graphic elements like gauges and progress indicators hit 4.4, and the color-coded system scored an optimal 5.0 as proof of how effectively it assists users in interpreting their physiological values. The text content within the app was helpful (3.7), though one participant noted, however, that the quantity of the information could be viewed as excessive. But it did enhance the understanding of and working of the stress level indicator with a score of 4.4.

Graphical display of data was favored by participants over tables, with graphs receiving 4.4 for usability in monitoring trends. Most were unaware, however, that the "last 30 day" filter graph was touchable or scrollable and therefore gave incorrect min/max readings. Min/max rows in the table were rated lower (2.6), suggesting that this form of data presentation may be confusing or meaningless to users.

The history function itself was considered moderately (3.6) easy to access, while filtering by date range was perceived as intuitive (4.4).

Participants indicated gauge settings were easy to use (4.8) but were neutral in perceived usefulness (3.0), indicating a need to more clearly explain the benefits they may offer (e.g. indicating the acceptable range for the values for yourself).

Overall, the application was considered easy to use (3.6), with good functional integration (4.2) and minimal complexity (2.0). The application had minimal technical assistance dependency (1.4), and the majority of the participants believed that it could easily be accessed by novices (3.8). Nevertheless, the drive to utilize the application on a daily basis was inadequate (2.6), which indicates perceived long-term value deficiency. Confidence in the application was moderate (3.2), and prerequisite knowledge needed was minimal (1.8), indicating an easy learning process.

Discussion

The user study provides insightful findings regarding the usability and user experience of the health monitoring app. The subjects scored the readability of result visualizations high (4.6), together with the utility of visualizations (4.4) and the use of color coding (5.0), which suggests that the app successfully conveys information related to stress.

Although device pairing (3.6) and profile setup (3.4) scores indicate the app is relatively intuitive overall, there is some room for improvement in the onboarding experience, possibly through additional instructional content or visual prompts.

The presentation of historical data was received with mixed reviews; the graphical presentation was preferred, but the minimum and maximum data rows in the table (2.6) were deemed unnecessary or confusing. Altering or eliminating this feature could enhance user satisfaction. Furthermore, more intuitive indicators for scrollable or touch-sensitive graphs are necessary.

The gauge settings were rated highly for both tunability and accessibility (4.8), yet were neutral in perceived usefulness (3.0), indicating a lack of sufficient in-app explanation or examples of its usefulness.

Although ease of use and low complexity were rated positively, future use intention of the app was extremely low (2.6). The disparity implies that although the application is technically sound and easy to use, its value proposition or engagement model may have to be enhanced (e.g. by features like goal tracking).

The low scores for "required technical assistance" (1.4) and "required prior knowledge" (1.8) indicate that the application is within the reach of the majority of users, a crucial prerequisite for mass utilization, particularly by amateur users.

Enhancing the positioning of the measurement buttons (e.g. not as options under another button) or renaming the 'Start Measurement' button would significantly increase usability.

Aside from the software, the entire health measurement toolkit, as a portable sensor and mobile app, is an affordable and accessible solution for non-invasive health monitoring. The physical product has potential application in work or school environments where there is limited access to inexpensive and interpretable tools for mental health screening. With additional refinement and streamlined onboarding processes, the toolkit would be poised to facilitate preventive mental health initiatives, biofeedback training, or ongoing wellness tracking in multiple environments.