

# From Reflection to Action: Enhancing Workplace Well-Being Through Digital Solutions

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Despite the widely acknowledged importance of well-being, our well-being can regularly be under pressure from external sources. Work is often attributed as a source of stress and dissatisfaction, so, unsurprisingly, extensive efforts are made to measure and improve our well-being in this context. This paper examines opportunities to better design supportive digital solutions through two complementary studies. In the first study, we present a longitudinal assessment of a well-being-focused self-report application deployed in two organizations. Through an analysis of one year of application usage across 219 users, we find both established and novel patterns of application usage and well-being evaluation. While prior work has highlighted substantial dropout rates and daily well-being fluctuations that peak in the morning and early evening, our results highlight that substantial breaks in usage are common, suggesting that users choose to engage with well-being applications mainly when they need them. In the second study, we expand on the topic of well-being reflection at work and the use of technology for this purpose. Through a survey involving 100 participants, we identify current practices in increasing well-being at work, obstacles to sharing and discussing mental well-being states, opportunities for digital well-being solutions and reflections on transparency and communication. Our combined results highlight opportunities for HCI research and practice to address the ongoing challenges of maintaining well-being in today's work environments.

## RESEARCH HIGHLIGHTS

- Analysis of over one year of well-being application usage among 219 employees showed both both established and new patterns in the use of well-being apps, including substantial breaks in application usage.
- A follow-up survey of 100 employees identified current practices in increasing well-being at work as well opportunities and challenges for digital well-being solutions.
- We provide three recommendations for design of well-being technology, focusing on anonymity and autonomy, distinguishing between data input and reflection, and to support data-driven reflection on an organisational level.

**Keywords:** *well-being; mental health; self-report; reflection; workplace; work*

## 1 Introduction

Good well-being is key to a fulfilling human life. In her book *The Writing Life*, Annie Dillard notes: 'How we spend our days is, of course, how we spend our lives.' Given the amount of time people spend at work, it is critically important to assess and improve their well-being there. The Human-Computer Interaction (HCI) community has consequently become extensively interested in the aspects of digital technology impacting positive and negative well-being inside and outside the workplace (Smith *et al.*, 2022). Prior work has, for example, studied the impact of digital communication (Bordi *et al.*, 2018) and information ergonomics (Franssila *et al.*, 2016), email as a source of stress (Barley *et al.*, 2011), smartphone use during work (Derks *et al.*, 2015), how wearable digital activity trackers impact employee well-being (Glance *et al.*, 2016) but also their privacy (Chowdhary *et al.*, 2023) and how different types of employees react to wearable technologies (Mettler & Wulf, 2019).

These and other HCI studies highlight that digital technologies can affect well-being and raise concerns about topics such

as privacy and technology overload. However, the perception of employees towards the use of digital technology to reflect on well-being at work remains largely unexplored. Such well-being reflections, whether through passive self-tracking or active self-report, introduce a range of questions. These include the aforementioned privacy aspect, the perceived value of such practices and employees' autonomy in deciding whether to employ such methods. A deeper understanding of these challenges helps inform the design of future well-being reflection technologies.

In this article, we present two studies. Firstly, we revisit the results from a longitudinal workplace deployment in which workers self-reported their well-being for an entire year. This study assesses employee behaviour in usage and well-being reflection through assessment of self-report log data. As a real-world deployment, this study provides longitudinal insights into (dis)continued usage of a self-report application in a realistic setting. Secondly, we complement these longitudinal deployment

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results by conducting a deeper investigation into people's current practices and preferences for communicating their state of well-being at work. Presenting the results of an online questionnaire with 100 workers, we contribute new insights into how people reflect on their well-being, what different digital methods their employers are offering and, critically for HCI research, what kind of digital means they would want to see in the future to improve their well-being at work.

Based on the synthesis of our findings from both studies, our contributions are as follows:

- (i) *Key Findings*: Employees benefit from well-being reflection tools, but engagement decreases over time unless users see immediate value. Digital tools for well-being reflection must be privacy-conscious and provide value through actionable insights, not just data collection. Employees are interested in tools that help them manage the boundary between work and home life, especially in remote or hybrid settings.
- (ii) *Implications*: We suggest there is a critical need for well-being tools that align with users' expectations for privacy and utility, emphasizing the importance of design that supports user autonomy and confidentiality. Employers should consider the broader impacts of well-being tools, including potential resistance or momentary non-use if tools are perceived as intrusive or ineffective. The design of well-being tools must consider diverse work environments and individual differences in well-being needs and perceptions.
- (iii) *Opportunities*: We suggest developing digital well-being tools that adapt to user feedback, with changing conditions potentially improving engagement and effectiveness. In line with this, we discuss methodological approaches that could offer more meaningful tracking for people through flexible data-tracking design initiatives.

## 2 Related work

A recent review by [Sanches \(2019\)](#) highlights the increasing interest in the study and support of affective health within the HCI community. Workshops concerning mental health and well-being, for example, at DIS 2020 ([Sas et al., 2020](#)), highlight that many questions about the methods and tools to study well-being are still unanswered. We motivate our work and analysis by building on prior work focused on subjective well-being measurement and understanding as the research goal and longitudinal research as a method of data collection.

### 2.1 Methodological Challenges in Longitudinal Well-Being Studies

The HCI community has long shown an interest in studying user experience and other aspects of interaction with technology over longer periods of time. Wilson highlights the challenges often encountered in longitudinal research, '*Longitudinal studies, which involve repeated sessions spread out over multiple days [...] are expensive and time-consuming. As a result, many interactive sensing-based systems come with few convincing quantitative user studies that prove their utility.*' ([Wilson, 2009](#)). One of the earliest reviews of longitudinal HCI research analysed the research methods employed in the mobile HCI community ([Kjeldskov & Paay, 2012](#)). Among the 144 published research papers considered, 79% used some form of field study for validation. However, Kjeldskov et al. comment that these studies lack the depth and duration to provide an accurate picture of mobile devices and their relationships to real-world

scenarios. A recent review of longitudinal studies published at CHI found only 56 studies that extend over one month in duration ([Kjærup et al., 2021](#)).

Several studies have tried to overcome the challenges of conducting longitudinal studies by using self-tracking experience data for well-being research. For example, [Isaacs et al. \(2013\)](#) demonstrate a smartphone application called *Echo*, which supports technology-mediated reflection, studying usage for durations of one month and four years. Using the data from the initial month, Issac et al. showed that reflections improved actions and lessons learnt for future behaviour. Using data collected over four years, the researchers discovered new insights, including the surprising attenuation of affect bias (i.e. observing that negative emotions associated with past reflective moments faded quicker than positive emotions). The 'Tesseract Project' is another recent example of a longitudinal study with data collection covering up to one year ([Mattingly et al., 2019](#)). In this project, participants' use of social media was logged and stored by the researchers to obtain insights into workplace performance—allowing for fully passive participation by the study participants. The authors state that the high retention rates of the study (95% of participants are still enrolled over halfway through the study duration) are due to strict privacy efforts, compensation schemes, the unobtrusive nature of the data collection and the perceived potential value of the study outcomes for the participants ([Mattingly et al., 2019](#)). In contrast to the passive collection of data found in the Tesseract Project, we are specifically interested in measuring the subjective well-being of individuals in work, which, by definition, requires collecting active data contributions. Active data contributions allow for the collection of insights into the participants' experiences, thoughts and feelings in a way that is not possible to capture through researcher observation, wearable data collection or passive monitoring. These studies apply methods such as experience sampling ([Larson & Csikszentmihalyi, 2014](#), [Berkel et al., 2017](#)) or diary study, but similar data capture is also seen in consumer applications in the domain of quantified self. Furthermore, the literature suggests that the moment of reflection generated by active tracking can provide benefits: prompting the individual to more clearly attend to and evaluate their in-work experiences, leading to the potential for performance-improving and self-corrective behaviour off the back of immediate insight generated by the act of reflection itself ([Schön, 2017](#)).

One prominent example of such a study is the 'StudentLife' study ([Wang et al., 2014](#)). In this study, a total of 48 participants regularly reported on various aspects of their lives (including dimensions of experienced well-being) over ten weeks. Combined with passive sensing on mobile devices, the researchers uncover several correlations between the active and passive sensing data. For example, sleep duration, conversation frequency and co-location with others all correlate significantly with the PHQ-9 depression scale. Furthermore, the authors highlight how the active data contributions on participant mood and other variables provide insight into a trend among participants, with positive affect and low stress levels at the start of the semester followed by increased stress and a drop in positive affect towards the end of the semester due to increased workload ([Wang et al., 2014](#)). Such insights can only be uncovered through deployments that cover an extensive period. Another example is found in work by [Fritz et al. \(2014\)](#), who studied the long-term usage of activity-tracking devices in the context of exercise. Through a study involving 30 participants, the researchers investigated usage behaviour across periods ranging from 3 to 54 months. Results highlighted how obtaining a long streak of tracking exercise positively affected participants'

experienced well-being and acted as an accountability tool in completing exercises and earning digital rewards through gamification.

Finally, within the domain of digital health Yeager et al. (2018) present a two-week study of an internet intervention for trauma recovery. While the intervention was found to be effective across a two-week period, the researchers highlight the absence of longitudinal studies as a limiting factor in designing and evaluating the effect of self-guided intervention during patient relapse.

Within the broader HCI community, various researchers have explicitly expressed the need for longitudinal studies, arguing that short deployments do not provide insight into long-term engagement, data patterns and real-world outcomes, while possibly concealing a novelty effect that drives the initial engagement with new technologies (Grudin, 1988, Karapanos et al., 2009). Following this call for more longitudinal studies and deeper insights into the drivers of technology usage and patterns in user-reported data over time (Karapanos et al., 2009, Kjærup et al., 2021), we set out to analyse usage behaviour and user subjective (experienced) well-being data as collected by a self-report application deployed in a real-world context. The insights created from these deployments can significantly improve our understanding of obstacles to the long-term use of technology. This will inform design decisions by HCI researchers and practitioners and improve the long-term use of technologies.

## 2.2 Self-tracking Applications

Self-tracking, the process of *‘turning everyday experience into data’* (Neff & Nafus, 2016), has expanded from physical activity tracking (e.g. step counters) towards the goal of capturing and presenting a holistic overview of a person’s physical condition, mental state or overall well-being. Those using Quantified Self applications primarily use self-tracking to gain knowledge about themselves, such as their behaviours, affect patterns and habits, which allows them to derive meaningful insights to incorporate positive changes (Choe et al., 2014, Berkel et al., 2015). Schön distinguishes between ‘reflection in action’, which takes place during the activity, and ‘reflection on action’, which occurs after the activity with the user analysing the captured data (Schön, 2017). With reference to the domain of HCI, self-report applications typically focus on ‘reflection on action’ by providing users with the possibility to observe changes over time. Based on an analysis of activity trackers and 22 interviews, Epstein et al. (2015) describe a model highlighting the various steps people go through when self-tracking. These steps include the actual decision to track information and their selection of a suitable tool, followed by the tracking and acting—which includes data collection, integration and reflection. Finally, users may lapse data collection and potentially resume the self-tracking.

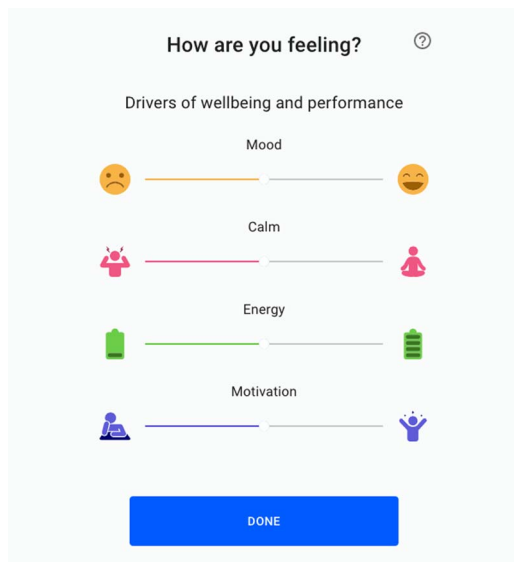
Effectively balancing the numerous tasks we face in our daily lives is crucial for general well-being. Setting routines is a common and effective well-being practice, providing a structured framework (Blagoev et al., 2023). Such routines contribute to a sense of satisfaction. However, people often question their productivity when they lack feedback on factors such as time spent and task involvement. To enhance the feedback cycle, researchers and technology designers frequently emphasize reflection as a personalized means of interpreting user-generated data. Self-reflection proves to be valuable in supporting routines by raising awareness and awareness of task achievement. Following a growing interest in reflection within the HCI community, Fleck and

Fitzpatrick present a framework to support the design of technology that supports reflection (Fleck & Fitzpatrick, 2010). Synthesizing existing literature, the authors highlight five different ‘levels of reflection’, each building on the prior level and corresponding to a deeper understanding. The five described levels are: ‘revisiting’, ‘reflective description’, ‘dialogic reflection’, ‘transformative reflection’ and ‘critical reflection’. Bentvelzen et al. (2022) build on this work through a structured literature review and an analysis of app reviews and provide four design resources for supporting end-user reflection. These include ‘temporal perspective’, where time plays a large role in supporting reflection; ‘conversation’, in which reflection happens through discussion with others or technology; ‘comparison’, in which a current status is compared to a desired status; and finally ‘discovery’, in which users are supported to see data in a new perspective.

Whether as a study participant or to collect data for one’s own interests, adherence to self-tracking is a widely recognized challenge. Several papers provide suggestions to reduce end-user strain in logging data, with the goal of reducing dropout rates. For example, Zhang et al. (2016) present ‘unlock journaling’, in which users can log mood data while unlocking their smartphone. An evaluation of this system highlights that the presented technique of unlock journaling was experienced as less intrusive than a traditional notification-driven approach while resulting in a higher frequency of data journaling. A recent study by Cherubini et al. (2020) on daily step counts showed a detrimental effect on long-term engagement after notification frequency and monetary compensation were increased, as participants’ intrinsic motivation decreased as a result. Another method of integrating self-tracking into everyday life can rely on the principle of affordances (properties of objects which show users the actions they can take) that users have developed during their lifetime to make the data acquisition seamless. Rapp and Cena suggest that everyday physical objects (e.g. bracelets, t-shirts) are highly suitable for self-tracking as they integrate easily into the day-to-day activities of the wearer (Rapp & Cena, 2015). Kim et al. present a self-tracking application that allows users to more easily interact with visualizations of their self-tracking data in order to make the collection of data itself more meaningful (Kim et al., 2021).

Since most affect tracking applications are focused on the individual, the study of affect tracking at a group level has been relatively sparse. A notable exception to this research gap is the work by Rivera-Pelayo et al. (2017). In their study, the authors collaboratively engaged with call centres to assess whether mood self-tracking can improve work performance, emotional awareness and team communication. The authors conducted a four-week study in which participants collected mood data through a desktop application. Rivera-Pelayo et al. identify that participants generally had a positive attitude towards using the application, primarily based on the hope that interpretation of the data by the user’s management will improve the working conditions.

Among the spectrum of self-tracking applications, long-term usage is a particularly common problem. Blandford, in discussing the challenges and opportunities in HCI for health and well-being, suggests that meaningful steps forward can be made by collaborating with technology developers in evaluating technologies (Blandford, 2019). Such an approach can empower users to reflect on their data and eventually improve data quality and reduce user effort to acquire self-tracking data (Meyer et al., 2014). In this paper, we set out to do precisely this. Through a collaboration with a well-being measurement start-up, we generate a year-long stream of data comprised of individual subjective well-being self-reports as well as usage data. This allows us to expand the HCI



**FIGURE 1.** Self-report component of the application.

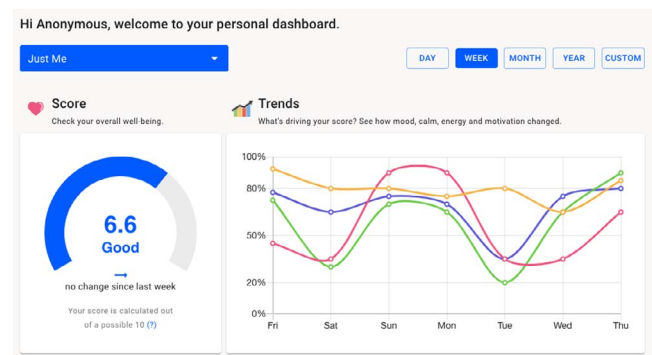
literature with a substantially longer-than-average study length, from which we derive novel insights into patterns in individual well-being as well as into the patterns and drivers of long-term user adherence to self-report applications. Furthermore, we seek to obtain a deeper understanding of perceptions of well-being reflection at work and the possible role of HCI research and practice to contribute to this practice.

### 3 Study 1

In this first study, we analyse data on employee well-being reflection practices supported through an online application. Through this analysis, we seek to understand the obstacles and habits of employing current digital solutions to track workplace well-being.

#### 3.1 Method

Our analysis is based on a collaboration with *Levell*. *Levell* offers an application for regular assessments of experienced affective well-being across a company by enabling individual employees to report their experienced well-being, showing individual employees their own data and insights and offering aggregate team- and company-level insights through shared dashboards. Users of the application can report their well-being levels (detailed below, see Fig. 1), anonymously capture and share specific 'blockers' that may stagnate their progress at work or anonymously share ideas with their team or company management (Fig. 2). Blockers can represent a variety of issues that can arise at a workplace or in an individual's personal life, such as work relationships (e.g. difficulties in interacting with management), work environment (e.g. interruptions, air quality) or struggles with health, sleep or exercise. In this analysis we focus on engagement with the application to actively input self-reports, the reported well-being and blockers data itself, as well as a potential moderator of short and long-term usage. *Levell* offers the same features through both a mobile and web-based application that allow for the exact same data collection input. However, given the recent release of the mobile application, the large majority of the collected data originates from web-based input. We therefore solely focus on the analysis of data from the web-based application.



**FIGURE 2.** Dashboard, displaying changes in self-reported well-being values over time (day, week, month, year).

#### 3.1.1 Participant Recruitment

The target population for our study was the entire population of two organizations, including all employees, managers and leadership of the firms. All participants were sent email-based invitations inviting them to sign up, along with contextual information as to the purpose and potential benefit for them, along with information designed to inform individuals of how their data would or would not be used, and the expected time-cost of the self-report 'check-in'. The sample assessed in this paper reflects the characteristics of the individuals who received the email and decided to download and subsequently use the application at least once.

We introduced the application to each organization through a predesigned roll-out process. This process started with a kick-off and introduction for the leadership team, followed by the individuals in each team, consisting of specific training on the overarching problem (i.e. poor or varied employee well-being that impacts performance at work), the application's well-being measurement concept, the features of the application and how the data would be analysed and used. Emphasis was placed on the collective and participatory nature of the well-being tracking for the joint benefit of both individuals and the group. Furthermore, we highlighted the fact that the individual user was in control of how their data was shared, something reinforced by the users' ability to see their data aggregates on the team and company dashboards. In all cases it was stressed to users that participation was voluntary, and they were free to cease usage if they wished to do so. In addition, in both Organizations A and B, team leaders and company leaders were trained to use the dashboards to identify how well-being has changed, respond to blockers submitted by employees within the application and use the data and insights to inform their organizational strategies.

Participants were not instructed or required to complete any minimum number of self-reports and were not compensated for their participation, thus limiting the bias that could come from extrinsic incentives or a sense of obligation. Within the application, participants could provide either a personal well-being check-in, one or multiple blockers or a combination of both.

#### 3.1.2 Participant anonymity

Our approach to participant anonymity was developed in consultation with early platform users during beta tests (prior to the study period). Due to the anonymous nature of the platform's data collection and data use, individuals were not asked to provide information about their age, gender, work experience, prior use of well-being tracking or technology, self-efficacy, organizational

roles or other personal information. Further, the leaders of the organizations in which the application is deployed were kept unaware of which individuals use or do not use the application. Critically, team dashboards were accessible to both team leaders as well as all members of the team. By opening up the team dashboards to every member of the team, we sought to head-on address issues and concerns with anonymity. By viewing the dashboards themselves, individuals could see what was meant by the analysis of the team data and presentation ‘on average and in aggregate’, and also see where their blockers and ideas feedback appeared, and therefore make their own judgement about whether the structure of these features in the app afforded them sufficient flexibility in anonymity. Our study aligns with our University’s regulation on research ethics and data management.

### 3.1.3 Dataset

The specific variables represented in the dataset are as follows;

- **Well-being check-ins.** Self-reported experiences on the four dimensions ‘Mood’, ‘Calm’, ‘Energy’ and ‘Motivation’, as captured through four horizontal sliders in response to the question ‘How are you feeling?’. The interface allows the user to independently capture positive versus negative states, with a single line capturing the conjoin of a 0–50 positive affect scale (neutral to the right) and a 0–50 negative affect scale (neutral to the left). For all sliders, the default position is in the middle ‘neutral’ state.
- **Blockers.** Self-reported issues negatively impacting well-being. Categorized as either personal or work-related.
- **Timestamp of self-reports.** For each self-report on well-being or blockers, a timestamp is recorded. Reporting of well-being check-ins and blockers can be completed independently from one another.
- **Reminder notification configuration.** The application offers users the ability to send up to one reminder email per day at a time point set by the user. The email consists of one question ‘How did it go today?’ and suggest to ‘check in’, which takes the user directly to the self-report screen in the application. Further, users are able to select the days at which they receive a reminder—ranging anywhere from zero (no reminders at all) to seven days.

To allow for a longitudinal analysis of the presented results, we exclude any user whose account was created less than one year before the last available data dump (July 2021). Following this exclusion criteria, we conduct our analysis on the first year of application usage of the remaining 219 individual users.

## 3.2 Results

Our analysis focuses on an assessment on an analysis of long-term usage behaviour, a review of the self-reported well-being check-ins and blockers and an investigation into user preferences into reminder notifications and their effect on completed self-reports. To ensure comparability in our analysis, we solely consider the first year of data that we have available for each user. As our dataset consists of users that commence using the application at different times, we ensure a relative calculation of usage duration (i.e. we consider a user’s first day of use as the starting point of application usage). This analysed dataset consists of a total of 2968 completed check-ins and 515 blockers. The data are provided by a total of 219 unique users, 192 of whom work at Organization A and 27 users who work at Organization B.

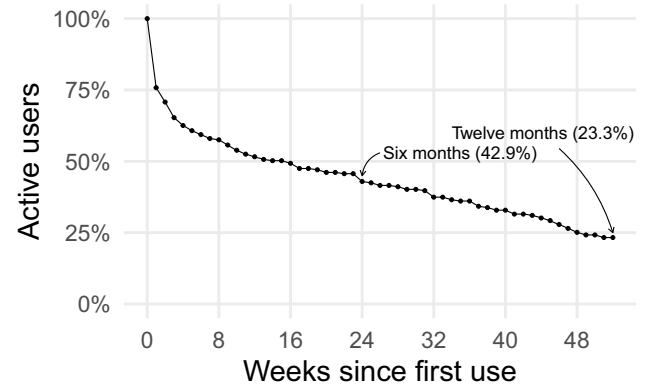


FIGURE 3. Overall drop-off of rate across a one-year period.

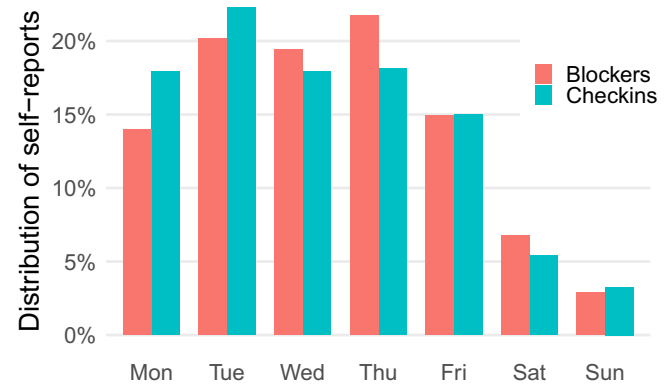


FIGURE 4. Distribution of check-ins and blockers across the week.

### 3.2.1 Application Usage

We first present the overall drop-off rate among users over a one-year period in Fig. 3. Here, we define the drop-off week as the last week in which a check-in (i.e. a full well-being report) is provided following their initial check-in. Overall, we find the steepest drop-off of users within the first week of usage (dropping 24.2% of users). A total of 43 users, 19.6%, only provide one check-in. The number of users dropping out increases throughout the year, with the increase in dropouts becoming more gradual following the initial month. The distribution of the users’ check-ins over time is shown in Fig. 4 (day of the week) and Fig. 9 (time of day). The fact that most check-ins are on weekdays rather than weekends reflects the strong focus of the application on the workplace context. Assessing the time of check-in, we observe that most users check in at the end of their (work)day or later in the evening.

We furthermore assess whether and how usage of the application changes over time. Figure 5 shows the average number of check-ins made and blockers reported among active users of the application per week. This highlights that the average number of weekly check-ins decreases rapidly from an average of 1.7 in the first week of use to 1.0 in one month of usage, after which the decrease slows down and stabilizes around 0.3 check-ins per week. The visualization of Fig. 5 furthermore highlights that the most long-term users (over 40 weeks of use) provide a higher average of check-ins per week, hovering around 0.75.

To better understand usage differences between short-term and long-term users of the application, we divide users into quartiles based on their dropout week. We report these characteristics in Table 1. Our overview of these usage characteristics highlights that users belonging to Q4 (those with the longest usage duration)

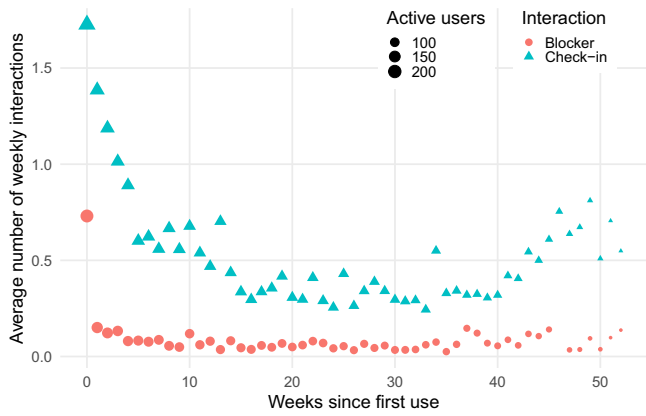


FIGURE 5. Average number of interactions among active users.

TABLE 1. Usage characteristics as grouped by quartiles of usage duration. Median break in days.

Quartile	Weeks till dropout	Avg no. check-ins	Median break
Q1	0-0	1.4 (SD = 0.6)	0
Q2	0-10	5.9 (SD = 4.7)	4.5
Q3	11-41	17.1 (SD = 14.5)	13.7
Q4	43-52 <sub>z</sub>	30.1 (SD = 32.7)	21.1
All	0-52 <sub>z</sub>	13.6 (SD = 21.0)	6.5

not only have the longest usage duration but also provide the highest number of check-ins (an average of 30 check-ins over the analysed usage duration). The information on median breaks among users (i.e. days in-between two provided self-reports) highlights that extended breaks in the usage of the application are common. Users with the longest usage duration have a median break in usage duration of three weeks.

Breaks in application usage may be indicative of a user quitting an application. Being able to predict which user will return to an application would be worthwhile information for application developers, as users can be reminded or incentivized to continue their usage of an application. Therefore, we next assess whether a relationship exists between gaps in usage duration and a user’s final application usage. Figure 6 shows the distribution of usage gaps in the days leading up to a subsequent usage of the application (i.e. non-final application usage) or the final usage of the application. We find a median value of a two-day break for a check-in that is eventually followed by a next check-in. For a check-in which is not followed by any further usage (i.e. the final check-in), we find a median break in the usage of five days leading up to this final check-in. A Mann Whitney U (non-parametric equivalent to the two sample t-test) indicates that the distributions between the two groups differed significantly (Mann-Whitney U = 248312, n1 = 2749, n2 = 219, p < 0.01 two-tailed). As indicated in Fig. 6, after a break in participant usage of eight days, the likelihood of the participant quitting usage of the application is larger than future usage of the application.

### 3.2.2 Well-being and Challenges

On each check-in, users reported their mood, calmness, energy and motivation levels on a scale from 50-50 (see Fig. 1), translated in this paper to 0-100 for analysis and reporting purposes. Assessing fluctuations in participant well-being, we identify the start of the working day (08:00-12:00) and end of the working day

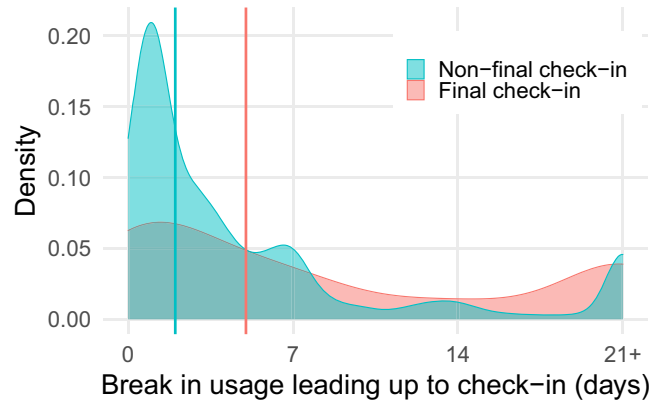


FIGURE 6. Gaps in usage prior to non-final and final check-ins. Vertical lines indicate median breaks in usage.

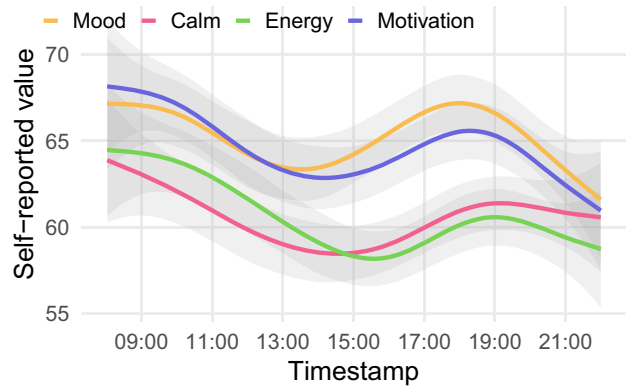


FIGURE 7. Fluctuations in well-being values throughout the day.

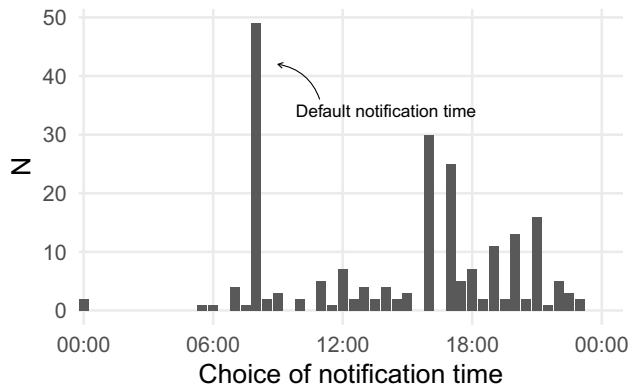
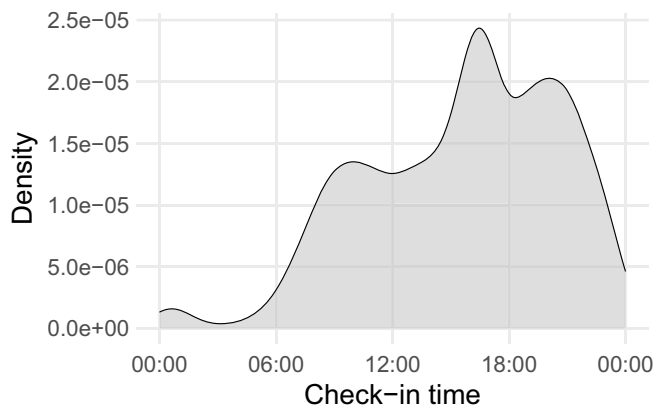


FIGURE 8. Distribution of preferred reminder time.

(16:00-18:00) as the timeslots with the most positive well-being check-ins reported. Well-being check-ins are consistently lowest in the early afternoon (13:00-15:00) and dip again toward the late evening (19:00-22:00).

Next, we analyse the blockers reported by application users. Across the dataset, 515 blockers were reported. On average, users report one blocker for every 5.8 well-being reports. Assessed by category, roughly 60% of the blockers are work-related blockers (314, of which 180 on work and resources and 70 on work processes, among smaller categories) and 40% of blockers are of personal nature (201 blockers). Figure 4 shows the frequency of blockers per day of the week. Unsurprisingly, and in line with the well-being reports, we find that users are reporting the fewest



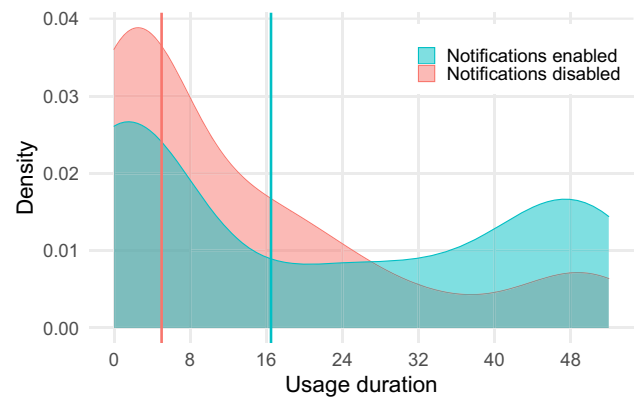
**FIGURE 9.** Distribution of check-in times across time of day.

number of blockers on the weekends. Across the working days, we find the least number of blockers to be reported on Monday.

### 3.2.3 Reminder Notifications

As a final element of analysis, we assess user preferences towards reminder notifications and their effect on completed self-reports. The application provides users the opportunity to change the default notification schedule, which is set to trigger at 08:00 at every workday (Mon–Fri). Our dataset contains information solely on the user’s final configuration, i.e. any changes throughout use are not considered in this description. The majority of users change away from the default time of notification (77.6%). However, significantly fewer users change the default days of notification (37.0%). In changing the reminder notification time, participants primarily shift to a later time in the day, either towards the end of the working day or later in the evening (see Fig. 8 for an overview). In their preference of notification days, next to the default option of Mon–Fri (63.0%), the most popular option is to disable notifications altogether (23.3%), followed by a long tail of combinations with fewer notification days. Contrasting the time at which reminder notifications arrive (Fig. 8) with the time of check-ins being completed (Fig. 9), we observe a temporal correlation between the reminders and the actual check-ins—especially when disregarding the default reminder time.

Perhaps the most critical in terms of reminder notifications is whether they help in the collection of self-report data. Our dataset allows us to assess both whether users without notifications provide fewer self-reports, and whether they are more prone to stop using the application altogether. We calculate the average number of submitted self-reports among those with notifications enabled and those with notifications disabled. Users with notifications enabled completed an average of 13.4 self-reports, with users without notifications completing an average of 14.1 self-reports. A *t*-test did not find a significant difference between these two groups ( $t(106.39) = 0.234, p = 0.815$ ). In terms of usage duration, we find a significant difference between those with notifications enabled (average of 21.3 weeks of active usage) as compared to those with notifications disabled (an average of 13.1 weeks),  $t(106.58) = 2.957, p = 0.004$ . We visualize this difference in Fig. 10. While this highlights that participants with notifications enabled make use of the application for a significantly longer period of time, we are unable to establish a causal relationship (i.e. reminder notifications could lead to sustained usage, or those that disabled notifications were simply less interested from the beginning and therefore disabled notifications early on).



**FIGURE 10.** Distribution of usage duration as split between those with notifications disabled and enabled.

## 4 Study 2

In Study 2, we seek to expand our understanding of people’s current well-being reflection practices and their perceptions of using technology for this activity. Critically, and in contrast to Study 1, we sought to hear from people from various companies and backgrounds to capture the diversity of experiences around this topic. This understanding seeks to inform concrete actions to inform the design of digital well-being reflection solutions. The data underlying this study are available on Zenodo, at <https://zenodo.org/doi/10.5281/zenodo.12912901>.

### 4.1 Method

We developed a three-part survey. The first part of the survey focuses on participant perceptions of the importance of well-being at work, their interest in and ability to reflect on their well-being, both by themselves and with others, and actions that either they or their organization has taken to improve their well-being at work. The questions consist of a combination of interval and open-ended questions. Examples of questions included are: ‘How interested are you in reflecting on your well-being while at work? (scale 0–10)’ and ‘What are the most significant actions that YOU have introduced yourself to increase your well-being at work, if any? (open textfield)’.

For the second part of the survey, we asked participants’ specific reflections on the use and role of technology in relation to well-being reflection at work. Through three open-ended items, we aimed to find out what technologies people currently use for well-being reflection, what technologies they could envision their organization employing for such reflection, and finally, their opinions on how technology could be used specifically for communicating well-being matters inside the organization and for transparency purposes.

The third part of the survey measured participants’ well-being status using the established Short Warwick-Edinburgh Mental Wellbeing Scale (SWEMWBS) (Tennant et al., 2007). Please see (Tennant et al., 2007) for a full overview of the scale’s items.

### 4.2 Participants

We recruited participants from Prolific, a frequently used recruitment platform for human subject experiments shown to yield high-quality data (Douglas et al., 2023). All participants were compensated for their participation at a rate of £12.12 per hour. To ensure data quality, we ensured that participants could complete the survey only once and limited participation to individuals with

at least 100 prior tasks completed on the platform, with a minimum of 95% acceptance rate. Prolific provides the participants' basic demographic information, such as current country of residence, age and gender. All questions were mandatory to be completed before participants could proceed.

### 4.3 Pilot Study

To test the questionnaire setup and the pipeline from Prolific to compensating payments, we first obtained responses from 20 participants. This helped us tweak the final pre-screening settings in Prolific and ensure everything worked as intended. Following the pilot study, we launched the questionnaire to 100 people.

### 4.4 Results

We obtained 100 responses to our survey. Our sample consisted of 46 women, 53 men and 1 participant who preferred not to disclose their gender. Our participants ranged in age from 19 to 71 years, with an average age of 39.08 (SD = 11.87). Participants' mean well-being score on the SWEMWBS was 22.36 (SD = 4.84), approximating the Population Norms in Health Survey mean score of 23.60, as obtained in a large-scale study in England in 2011 (Fat et al., 2017).

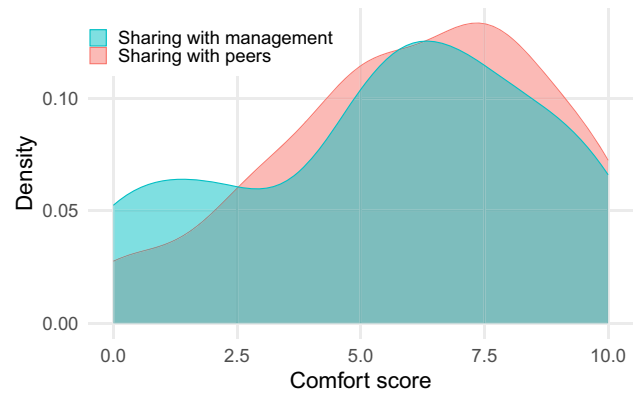
Our participants, by and large, underscored the importance of well-being at work, with an average score of 8.53 (SD = 1.37) out of 10. When asked about their interest in reflecting on well-being at work, most participants expressed a high interest, with an average score of 7.27 (SD = 2.56) out of 10. The Pearson's product-moment correlation between participants' perceived importance of well-being at work and their interest in reflecting on well-being is positive, statistically significant and very large ( $r = 0.55$ , 95% CI [0.39, 0.67],  $t(98) = 6.47$ ,  $p < .001$ ).

When asked about the frequency of reflecting on their well-being while at work, 34% of participants indicated they reflect on their well-being 'most days' ( $N = 34$ ). 6% of participants reflect 'multiple times a day', 19% reflect 'more than once a week', 23% about 'once a week' and 15% 'less than once a week'. Finally, 3% of participants indicated to 'never' reflect on their well-being while at work.

Our participants report a lower frequency of discussing these well-being reflections with either their direct colleagues or managers at the workplace: a total of 19% reported 'never' doing this, 35% 'less than once a week', 23% 'about once a week'. A total share of 14% of respondents discuss their well-being with their colleagues at work 'more than once a week', 7% 'most days' and finally 2% discuss their well-being status 'multiple times a day'. A Spearman's rank correlation coefficient between participants' frequency of self-reflection and frequency of sharing their well-being reflections with others is positive, statistically significant and very large ( $\rho = 0.49$ ,  $S = 85324.63$ ,  $p < .001$ ).

Finally, we assess participants' willingness to share information about their well-being with their peers inside the company and their managers or supervisors. On a 10-point scale, our participants reported an average score of 6.02 (SD = 2.73) for sharing with their peers and 5.51 (SD = 3.08) when sharing with their superiors. We visualize the distribution of these responses in Fig. 11.

We next present our thematic analysis of participants' open-ended responses to our survey. We employed an inductive approach, refraining from applying a pre-established framework or preconceived notions to obtain a broader understanding of personal and technological challenges on employee perceptions of well-being reflection at work. Our process consisted of a shared online notebook in which we collected all participant



**FIGURE 11.** Distribution of participant comfort with sharing their well-being state at work, as split by sharing with peers and sharing with management.

responses and iteratively assigned labels and thematic groupings. Our results are presented along four themes: existing practices towards increasing well-being at work, obstacles to discussing mental well-being at work, digital opportunities to either improve well-being or increase the sharing of well-being information and reflections on transparency and communication.

#### 4.4.1 Existing Practices

Our participants are already taking a number of steps to increase their well-being at work. Here, participants' comments reflect typical activities such as 'taking short breaks at work' (P98, Male, 22), 'take 5 minutes to breathe in and out, and hyperfocus on the situation at hand.' (P71, Female, 28) and 'setting boundaries relating to my working hours and workload' (P66, Female, 43). Only a few participants point to specific tools or systems that they employ to maintain or increase their well-being. An example of this is found in the comments by P91 (Female, 57), who uses a diary to track successes for later reflection: 'Keeping a diary so I can feel that I am achieving more than I am giving myself credit for—both at home and at work.'

Many participants also point to the social aspect of well-being in the workplace. This includes the ability to contact those who can help, as for example stated by P97 (Female, 50): 'Trying to manage my work better in general. Knowing when I need to ask for help is a big deal, and knowing who to ask for help too!', as well as simply working towards a social atmosphere at work: 'comfortable workspace and making friends with co-workers, going on nights out and meals with them' (P86, Female, 44).

In addition to practices introduced or carried out by employees, we asked participants to reflect on well-being practices introduced by their companies. Here, participants listed a range of concrete examples of policies, events or activities that their respective employers had introduced, with some participants even pointing to a multitude of activities: 'Some of the significant actions introduced by my organization to improve my well-being at work include implementing flexible work arrangements, such as flexible hours, to promote my work-life balance as well as providing wellness programs such as mindfulness sessions or gym activities to support my physical and mental health.' (P100, Male, 30). Broadly speaking, the responses showcase a combination of increasing staff awareness of well-being and mental health and concrete actions for employees to engage in well-being-related activities.

In terms of awareness, participants point to emails, group sessions and other communication tools that support employee



reflection. For example, P96 (Male, 45) states that: 'We have introduced well-being days for anyone who feels burnt out or not feeling the best mentally. We also have a wellness board that is full of useful information that the team can gain from.' A careful assessment of participant responses shows that while many employers communicate or even provide tools to engage with well-being tasks, it remains the employees' responsibility to engage with these activities: 'Our company has emails to remind that self-care is important and individual activities a person can do on their own time to engage in self-care.' (P79, Female, 39).

A minority reported that their current employer does not have existing well-being practices. However, this is not to say that all those whose employer actively engaged with their well-being were pleased with these efforts. Participants also expressed frustrations with their company's well-being efforts, pointing to policies that are not followed, e.g. 'They introduced meeting free Fridays, which everyone ignores.' (P13, Female, 48) or an experienced lack of care by their organization as a whole despite efforts by individual leaders; 'I've lucked out with a good team manager, but the company overall does little.' (P48, Male, 24).

#### 4.4.2 Obstacles to sharing mental well-being state at work

Most participants listed one or multiple barriers to sharing their mental well-being status at work. These ranged from personal inhibitions towards sharing such personal information to more serious concerns of repercussions.

Many participants expressed a feeling of embarrassment in discussing their well-being with their colleagues, regardless of whether this concerned direct peers or leadership. Participants stated concerns even if they did not believe colleagues would respond negatively to sharing. For example, P44 (Female, 25) states, 'I have problems sharing how I feel in general, and I would feel weird telling my boss/co-workers, etc. because it's awkward.'

A common fear among participants was the risk of repercussions when sharing negative mental well-being updates with their peers. In particular, fears of being seen as inadequate or unsuitable for the job by management were strong barriers in our sample. 'I would be concerned that if I was not doing well, that I would be judged or shamed by my manager/superiors, and that they may be worried about my productivity' (P55, Female, 24) and 'I get scared that it may come across more of a big deal than it actually is and it means I need to take time off.' (P2, Female, 25). A common element in these reflections was the comparison to peers who might be in a better mental position. For example, P10 (Female, 25) states that 'The perception that you don't want to do as much as other team members because you prioritize mental health'.

Practical issues were also mentioned as barriers to initiating discussions around employee well-being. Here, the lack of time was a recurring issue. 'Time to share would be problematic as the job is extremely busy.' (P06, Male, 46). Furthermore, participants also mentioned the role of employees, especially those with a senior role in their organization. Due to their position, these participants expressed concerns about sharing their personal situation with their subordinates: 'I'm in a leadership role, so it's not always appropriate to share downwards, and it's extra effort to reach out to a superior outside of my regular team.' (P17, Female, 28).

Not all participants experienced such obstacles to sharing their well-being status while at work. These participants, albeit few, occasionally point to established institutions at their place of work. For example, P35 (Female, 37) states 'None [barriers], our well-being coordinator is approachable'.

#### 4.4.3 Digital well-being opportunities

Our participants perceived well-being reporting as a complex concept; some considered it taboo or preferred to report anonymously. Many of their organizations have systems in place for discussing well-being. Still, numerous improvement ideas were suggested to tackle their problems and address concerns about sharing their well-being at work. One participant suggested, 'Using an anonymous submission system for discussing well-being within the workplace may help people voice concerns while remaining anonymous' (P52, Male, 23). However, a minority emphasized transparency in well-being reporting: 'Increase transparency with anonymous feedback platforms, data dashboards, improve well-being communication with targeted channels, personalized content' (P18, Female, 51).

Various technological interventions were proposed, focusing on monitoring physiological metrics through sensor data. For example, a participant suggested, 'Wearable devices like fitness trackers and smartwatches can be used to promote well-being in organizations. Providing these devices as part of wellness programs can encourage employees to prioritize their health. With features like step tracking, heart rate monitoring and reminders, these devices help employees stay active and maintain healthy habits throughout the workday, fostering a culture of well-being in the organization' (P100, Male, 30).

A common thread in the sample was the potential impact of mindfulness-promoting wellness applications, including time management, relaxation techniques with music and meditation and reminders to move during the day. A participant expressed this idea as 'health apps to track your routines—to make sure you are following a healthy work-life balance' (P11, Female, 42).

Another important thread focused on how technology could support working from home to better balance daily life. Although suggestions leaned toward systemic interventions beyond technology, such as flexible working hours, participants desired organizational support for well-being when working from home. This included self-reflection and communication tools to manage stress, as mentioned by one participant: 'Something that could help reduce stress and workloads could be good—when we're busy, we could ask for extra help, and when we've not got much to do, we could help other people or teams out' (P97, Female, 50).

#### 4.4.4 Transparency and communication

Participants consistently highlighted the importance of anonymity in feedback systems, emphasizing the role of anonymity in encouraging honesty and openness. One participant suggested, 'anonymous feedback apps so no one loses their job' (P46, Female, 34). This sentiment was echoed in suggestions for periodic anonymous submission of well-being data, allowing companies to track overall employee well-being trends. As one participant noted, 'Maybe a system where we could anonymously submit our well-being every so often so that the company could at least track overall employee wellbeing' (P19, Male, 45).

The collective monitoring of team well-being emerged as a crucial aspect. Participants recommended systems for anonymously providing feedback on team well-being, enabling proactive measures in response to changes. As one participant highlighted, 'Monitor and anonymously provide feedback on team wellbeing' (P41, Male, 40).

Technology, particularly platforms such as Google Docs, was seen as a facilitator for emotional expression. Participants envisioned systems where individuals could 'comment on how they are feeling either anonymously or not' (P6, Male, 46). Another

participant suggested ‘perhaps an anonymous system where we can share how we are feeling at work’ (P76, Female, 22), again emphasizing the importance of choice in anonymity. Discussion forums were also proposed, where feelings could be shared anonymously or openly, fostering a culture of mutual support. A participant suggested, ‘We all can discuss in a meeting the comments and how everyone is feeling in order to be proactive moving forward to benefit staffs mental wellbeing’ (P76, Female, 22). Finally, participants suggested using calendar tools to schedule focus time, breaks and work finish times. As a participant stated, ‘As previously mentioned, we can use our calendars to schedule focus time, breaks, and finish work times’ (P77, Female, 59).

In summary, participants envision a workplace culture that uses anonymous feedback, data sharing, technology-mediated emotional expression, collective team monitoring, open discussions and calendar-based wellness scheduling to create transparency and support for mental well-being.

## 5 Discussion

The study of well-being is a central topic of interest in many scientific disciplines. Over recent years, well-being has also increasingly caught the attention of commercial entities, leading to many policies, actions, tools and services that companies can employ to monitor and hopefully improve their employees’ well-being. Critics of this have labelled some of these efforts as ‘digital well-being washing’, in which companies use digital well-being more as a marketing tool rather than improving their employees’ actual well-being (Clausen *et al.*, 2023). Similarly, some of our participants considered their companies’ ongoing well-being efforts insincere or insignificant. In recent years, more broadly, well-being and mental health have been moved into the public, academic and commercial focus, accelerated by the COVID-19 pandemic (Blackburn *et al.*, 2022, Yamada, 2021). They have become concerns in our society, with services and products delivering to well-being projected to reach an overall market value of over 1.5 trillion USD with annual increases of 5-10%<sup>1</sup>. In 2022, the U.S. Surgeon General released a ‘Framework for Mental Health & Well-Being in the Workplace’ that dives into the negative aspects of the relationship between work and well-being []. Employers are also expecting their employees to invest more in well-being-related support. For example, the APA 2022 Work and Well-being Survey shows that 81% of employees look for workplaces that actively support their mental health when looking for job opportunities (American Psychological Association, 2022). Furthermore, Smith *et al.* (2022) found that office workers increasingly use technology to improve their well-being at the workplace. Given this pressing issue, we sought to explore new ways to introduce well-being support in the workplace and better understand employee wishes and requirements for technology in this space.

In Study 1, we analysed the long-term usage of a self-report system for well-being in the workplace. As is common in such longitudinal deployments (Gouveia *et al.*, 2015), we observed a large drop in engagement with the tool over time. Almost a quarter of the users dropped off within the first week, with the usage of the application further falling to 42.9% after six months and 23.3% of users after twelve months. Surprisingly, however, we also observed a substantial group of users returning to the application after extensive breaks in their usage patterns. Given the typically shorter deployment periods of HCI research studies,

little is known about these patterns of inactivity followed by regained interest in application usage. Based on these results, we hypothesize that employees do not necessarily look for a tool to use consistently over time but rather seek well-being support through technology when required, corroborating the findings by Smith *et al.* (2022). After all, not every employee who starts using a tool has critical well-being issues at that time. Still, such matters—either influencing the employee positively or negatively—could arise over time. External factors could play a role, too, as the workplace is a social setting where individuals (and hierarchy) influence others’ behaviour. Seeing others benefit from digital trackers might encourage someone to use them too. Alternatively, management could encourage using digital tools if employees’ well-being is on a downturn or simply if the tools are not actively used. Nevertheless, while the use of digital tools tends to dwindle due to the novelty effect wearing off, the frequency of use and usefulness of such tools are not in a perpetual downswing.

Study 2 subsequently investigated employee perceptions of ongoing well-being practices at their workplaces and their thoughts on future opportunities to improve well-being. We aimed to uncover how employees reflect on their well-being at work. Unsurprisingly, our results show that participants found well-being at work to be highly important, reflecting the aforementioned APA survey results on work and well-being (American Psychological Association, 2022). Furthermore, we find that there is a large interest in reflecting on well-being while at work. This supports the extensive work from the HCI community and other related disciplines towards supporting employers in this practice (Swain *et al.*, 2023, Spektor *et al.*, 2023). Despite their extensive interest in reflecting on their well-being, our participants were divided in their willingness to share these considerations with their direct peers and, more conservatively, with their managers.

### 5.1 Humans in Wellbeing Dynamics

Moore and Robinson (Moore & Robinson, 2016) talk about the quantification of the workplace and how the Taylorist influence of ‘economics over well-being’ and performance-focused work can lead to individuals’ well-being being stripped away. Several of our participants mentioned workplace dynamics influencing their well-being communication—whether it is employees not being open to discussing well-being matters with their superiors or, similarly, managers finding it difficult to find others to talk to about their well-being. Mentioning poor work well-being leading to being neglected for job opportunities or shunned at work for being unwilling to put as much effort as others was mentioned by many as a concern or obstacle. The mentioned coping methods for better well-being were strictly personal: keeping diaries and short breaks for meditation and focus. Socializing (with peers) and open communication as by-products of a well-functioning work environment also lead to easier reflection.

The organization-level actions can easily be critiqued as being only done for show—some participants mentioned many of the workplace rules not being followed by others, thus making them purposeless. One organizational function that gained positive feedback was using a well-being coordinator. Someone outside the typical hierarchy and to whom one could open up anonymously—or at least without fearing the information being openly shared and gossiped by others. Anonymity in digital tools was also one of the main opportunities brought up. But could we combine the best of both worlds? Perhaps not fully, but the emerging possibilities of generative AI (Abrams, 2023) have given rise to academic research on using GPT-based tools in psychiatry—so why not have a weekly

<sup>1</sup> <https://www.mckinsey.com/industries/consumer-packaged-goods/our-insights/feeling-good-the-future-of-the-1-5-trillion-wellness-market/>

session about your well-being at work with a chatbot? The limitations of such systems include the information not necessarily passing to those to whom it matters—if actions are required in the workplace, a human still needs to discuss these matters—among many others, ethical and technical (Cheng et al., 2023).

## 5.2 Implications for Design

Our results have implications for how we can design applications for reflection on employers' well-being that better cater to end-users' preferences and how we assess the effectiveness of well-being applications for tracking or improvement in HCI research. We first discuss the identified design implications and provide concrete recommendations for well-being reflection technology at the workplace.

**Design recommendation 1: Support anonymity and organizational accountability.** Our results highlight multiple reasons for the importance of anonymity, ranging from fears and barriers to reporting well-being to the freedom to share and communicate with peers. Naturally, sharing insights on one's well-being and work challenges is most challenging when one has to provide negative reflections. Simultaneously, respondents in Study 2 mentioned a lack of accountability in implementing well-being measures from the organizational side and having little power to effectively act on this in fear of repercussions. Therefore, the ability to anonymously hold organizations accountable for prior agreements through a digital application would benefit employees' well-being. This is similar to the 'blocker' functionality presented in Study 1, where we found the majority of blockers to be work-related rather than personal-related—suggesting a need for this type of accountability system.

**Design recommendation 2: Distinguish between data input and reflection to protect user's time.** Results from Study 1 highlighted typical check-in times clustering around the start and end of the working day, as well as before going to bed (Fig. 9). Consistent with previous work and these findings, we conclude that tracking data frequently during the day can be burdensome and cause people to drop out. In Study 2, we found that time is often perceived as a barrier to engaging with well-being practices in the workplace. These findings suggest that digital well-being tools should support efficient ways of providing input (i.e. data logging). Examples of such have been explored in the HCI literature, for example through wearable devices (Intille et al., 2016). Rather than providing users with well-being recommendations or suggestions every time they use an application, we suggest that applications present such information only when explicitly requested by users, as they might not be able or interested in immediately following up on their input. As observed in the qualitative findings of Study 2, participants mentioned using wearable devices or intending to use them in the future to better document their well-being. Passive and continuous sensor tracking can provide an alternative way of collecting well-being data, and previous work (e.g. (Brombacher et al., 2022, Wilson, 2009)) has shown the effectiveness of wearable sensor tracking. Critically, however, sensors and similar data streams may not be able to detect valuable subjective aspects of daily life that also contribute to one's overall well-being perception.

**Design recommendation 3: Support data-driven reflection and insights on an organizational level.** Concrete support mechanisms for improving well-being can be implemented through longitudinal data collection periods, during which data can be anonymously shared within the organization as group or individual-level data. If employees and users can observe the factual effects of actions over time, they are more likely to remain

motivated. Given the recent trend of more people wanting to work from home, it has become more challenging to keep an eye on employees' well-being. Participants in Study 2 reflected on the desire for technology to support their work-life balance by helping them differentiate time between work and leisure, especially when the physical boundaries between their workplace and home become blurred. Consequently, both employees and employers would benefit from digital tools to collect and reflect on well-being data. To ensure the ethical and effective implementation of such systems, designers must consider the extent and depth of data being collected. Especially, well-being data often contains sensitive information about employees' physical and mental health, as well as their daily routines. Designers should consider clear communication about the data that are being collected, how they will be used and who will have access to them. Providing employees with transparency and control over their data can build long-term trust and could better uphold their privacy values.

## 5.3 Implications for Methodology

Finally, we reflect on the implications of studying well-being (applications) in HCI. Much of the research in HCI on well-being is focused on collecting regular, typically daily, self-report data on well-being. This approach to well-being data collection conceivably follows from our academic endeavours towards data collection, in which our empirical evaluations typically benefit from data collected at regular intervals. However, the real-world needs of end-users do not necessarily align with these methodological concerns of data collection and analysis. Since daily notifications can similarly frustrate end-users and study participants, there is an opportunity to explore alternative ways of supporting well-being reflection (Tag et al., 2022a). Earlier work has, for example, delayed notifications for reflection to evening hours and provided contextual queues to assist in the recollection process (Rabbi et al., 2019). Others have attempted to collect data passively and continuously without requiring active input by the user (Tag et al., 2022b, Berkel et al., Apr, 2023). Future work could expand on this by allowing participants to choose their own moments of reflection (in addition to passive sensing approaches) without being actively probed to do so. In addition to allowing participants to choose their own reflection moments, designers could take a cue to allow people to also set up self-tracking based on their preferences. Characteristics such as data type and frequency of data tracking could be kept flexible to be more relatable to user context. As our results from Study 1 highlight, some users are willing to return to self-report activities even after prolonged periods of non-use, suggesting they chose to use the application when it provided the most benefit.

## 5.4 Limitations and Future Work

We recognize several limitations in our work. In the first study, we limited our analysis to an individual application deployed to two organizations. As such, the results from this study may not generalize to other applications or contexts and are likely to be affected by the working practices in these two organizations. This motivated our second study, where we sought a broader perspective from participants across various organizations. While this provided in-depth qualitative insights into participants' perceptions of well-being at work, we miss a nuanced understanding of their work context—such as organizational dynamics, function, work experience and other parameters likely to affect their perspectives. Likewise, we do not have certain details from the first study, such as how many people opted out. As such, there is a clear opportunity for future work based on the insights

obtained through our two studies. Specifically, we call on the HCI community to explore alternative ways to support well-being reflection while at work and measure the impact of successful deployments. While metrics such as participant response rate and daily active users are meaningful from a scientific (such as in self-report studies (Berkel et al., 2017)) or commercial perspective, they do not necessarily provide a full picture of the effectiveness and end-users perceptions of a well-being support tool.

## 6 Conclusion

Our results, based on two distinct studies, provide an in-depth assessment of well-being-focused applications in the workplace. We show that established well-being-focused applications may not align with users' needs in terms of sharing their well-being status, finding support from their peers or managers and obtaining insights into the overall well-being of the organization. The notion of a shared insight into the well-being of teams or organizations requires careful consideration, given the obvious challenges regarding privacy concerns and the voluntary nature of self-reported well-being. Based on the real-world usage data presented in Study 1 and the reflections of our survey respondents outlined in Study 2, we highlight the need to reconsider which metrics we use to assess the success of well-being reflection applications. Given that various indicators highlight that our collective well-being is under pressure, it is key for HCI researchers and practitioners to investigate how to best support employees in maintaining and increasing their well-being.

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