

Check It: A User Centered Intuitive App, Enhancing Goal Accomplishment and Mood Tracking Based on Self Efficacy

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1 ABSTRACT

This paper introduces a novel mobile application, called "Check It", designed to prioritize subjective goal satisfaction over quantitative metrics for enhancing personal productivity and emotional well-being. Users categorize goals, assess daily achievements based on satisfaction, rate overall mood, and track progress, including the correlation between mood and goal completion over time. By emphasizing cognitive self-validation and emotional alignment, the app aims to foster deeper self-awareness and informed decision-making. User testing revealed that certain groups prefer subjective goal assessment for productivity. Experiments revealed that mid-day goal reminders significantly increased daily achievement, and users achieving more goals demonstrated improved mood over time. On the downside, individuals with specific health goals may prefer apps with detailed quantitative data analytics, such as calorie or step counts.

2 KEYWORDS

Mobile and Wearable Technology, Interactive Data Visualization, Personal Informatics Analytics, User Experience (UX), Mobile Application Development, React Native, Increased Motivation through Self Efficacy, Holistic Self-Development through Self Tracking, Mood tracking, Self-Validation, Productivity App.

3 INTRODUCTION

3.1 Motivation

To further contextualize the significance of this project, it's crucial to acknowledge the challenges in traditional approaches to goal tracking and personal informatics. The main problem is that success metrics often focus too much on easy-to-measure quantifiable results, neglecting the complex and subjective aspects of personal experience. Some audiences might struggle with the meaning and the potential usefulness of those data, so they may choose not to engage with the data at all. Additionally, inadequate task categorization, reliance on numeric evaluations without encouraging self-validation of goals, and a lack of emphasis on promoting self-awareness can contribute to user demotivation and disengagement from the app's intended benefits.

3.2 Literature Review

Many scientific studies reveal that [1], people mostly fail to achieve their everyday to do list or goals because they have not defined or prioritized their tasks accordingly. Besides lack of prioritizing or categorizing tasks, only using quantifiable metrics can inadvertently lead to a sense of disconnection or dissatisfaction, as users

may find themselves striving for numerical targets without addressing their deeper emotional or psychological needs. Additionally, the rapid integration of technology into daily life has created an abundance of data but has not necessarily translated into meaningful insights or improvements in well-being. Many researches have shown that, existing apps focus solely on output-oriented tracking, such as steps taken or hours slept, neglecting the intricate interplay between these metrics and the user's holistic state of emotional well-being [6]. In addition to these problems, a new challenge lies in motivating people to accomplish more everyday whereas they are used to quantifiable validation done in numerous health app without putting a sense of self validation. But, prior investigation shows that, people's functioning in productive situations is influenced by the way they think about themselves, especially by their perceived self-efficacy [7].

3.3 Prototype

In response to these challenges, our app called "Check It", was developed. The application's UI is built with the use of React Native which is an open-source User Interface framework that allows the creation of native apps, using JavaScript, that run both on Android and iOS devices. We also used Expo, a toolchain designed for React Native, that helps developers create and test their applications. Google's Firebase is used for the backend development of the app as it provides services like authentication, databases, file storage, push messaging, etc.

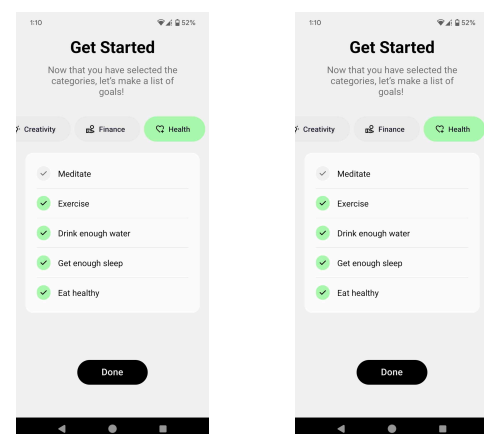


Figure 1: Setup Process

During the setup of our app, seen in Fig[1], new users are prompted to choose categories from various aspects of life, such as health, finance and creativity, that they wish to monitor. For each selected

category, users then specify the goals they want to track. This approach encourages users to pursue a balanced and fulfilling lifestyle that aligns with their individual preferences and aspirations.

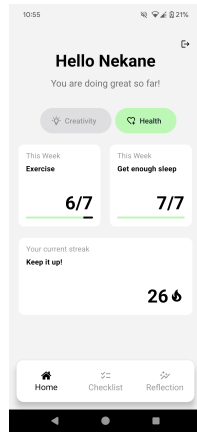


Figure 2: Home Screen

On the Home page, seen in Fig[2], users can filter which category they want to view and then see, for the goals within that category, how many times they checked each goal in the last 7 days. Additionally, users can track their strike, indicating the number of consecutive days they have checked at least one goal. This feature provides users with valuable insights into their progress and consistency in pursuing their chosen goals across different aspects of their lives.

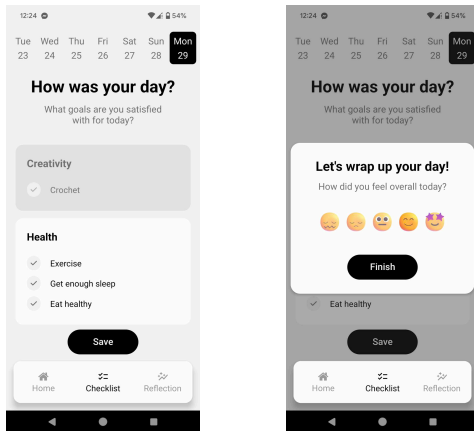


Figure 3: Checklist Screen

On the Checklist page, seen in Fig[3], users are asked to check the goals within each category that they are satisfied with for the day. For example, what constitutes "enough sleep" may vary between users, for one individual, it could mean seven hours, while for another, it might be closer to nine. Moreover, even for the same user, the amount of sleep considered sufficient may fluctuate from day to day based on various circumstances. After checking and saving their progress, users are prompted to rate their mood for the day by

selecting one of five emojis representing different feelings. Asking the user which of the goals they were satisfied with moves beyond rigid numerical targets to prioritize the qualitative aspects of goal achievement, fostering a more meaningful and sustainable path to personal development. This approach is supported by earlier exploration [8] that indicated how this process can influence peoples' cognitive ability to do better because they think better of themselves. Additionally, on this screen, users have the option to navigate back a week and review which goals they checked off each day. This feature enables users to reflect on their daily accomplishments fostering self-awareness and informed decision-making in their pursuit of personal growth and well-being.



Figure 4: Reflection Screen

On the Reflection page, seen in Fig[??], users can track their progress through interactive data visualization for each category. These include a bar chart titled "Daily/Monthly Accomplished Goals Percentage", a scatter plot titled "Relation of Emotions and Accomplished Goals" and a pie chart titled "Goal Accomplishment Distribution".

In the bar plot, users can observe trends in their goal accomplishment over time. For example, they may notice patterns such as higher goal accomplishment rates on certain days of the week or during specific months. This information can help them identify factors that positively or negatively impact their productivity and adjust their routines accordingly.

The scatter plot enables users to gain valuable insights into the interplay between emotions and goal attainment. Users can observe how different emotions correlate with their level of goal accomplishment. For example, they may notice that they tend to accomplish more goals when they are feeling happy, while feelings sadness may hinder their progress. Or the other way around, their goal accomplishment rates could affect their mood.

With the pie chart users can identify which goals they tend to check more frequently compared to others based on the sizes of the pie slices. A larger slice indicates that the corresponding goal is checked more frequently compared to others. Users can easily

identify which goals they tend to prioritize or focus on more consistently. Smaller slices represent goals that are checked less frequently. Reflecting on this, users may realize that they are not making as much progress on these goals as they would like.

This self-reflection process empowers individuals to cultivate greater self-awareness, enabling them to make informed decisions that enhance emotional fulfillment and overall productivity in their daily lives.

4 METHOD

In this report, we present the findings from a series of experiments and user evaluations conducted to assess the usability and effectiveness of "Check It". The goal of these studies was to gather valuable insights into user interactions, perceptions, and experiences with the app, ultimately aiming to inform iterative design improvements and enhance user satisfaction.

The experiments and evaluations encompassed various methodologies to comprehensively assess different aspects of the app's functionality and user interface. Each study was designed with specific objectives in mind, leveraging both quantitative and qualitative data collection techniques to provide a holistic view of user interactions.

4.1 User Experiment

During the app's design phase, we paid great attention to ensuring that its features and user interface are intuitive and facilitate improved goal achievement for the user. Earlier studies [4] show that push notifications in health based mobile applications can have an impact. We conducted an experiment to find out if the reminder system helps the user engage more with the app, and if so, how many reminders a day should give optimal result.

• Experiment Setup:

To ensure smooth user testing while the application was still in development and not yet ready for individual download and installation, we implemented the "Wizard of Oz" method [2]. The experiment was set up following a few simple steps:

1. The entire experiment was voluntary for adults and the data collected were partially anonymous (only a user name or nickname was collected for follow up in stage 2). Users were briefed clearly about the experiment through the recruitment form and experiment was conducted only after receiving their informed consent.
2. In stage 1, users chose specific goals through a multiple choice feature in Google Forms where they could give input only once.
3. In stage 2, users were sent a customized Google Form based on their chosen goals. In this form, they could check off completed tasks and provide ratings on their overall mood.

We took care to ensure that the Google Form closely resembled our app in terms of the questions and options provided. As shown in Fig[5], the questions asked in the form mirrored the communication style of the app with its users. For mood rating, we made sure to provide explicit instructions to users on how to rate it, considering that the emojis were not available in Google Forms.

Figure 5: User Goals and Mood Collection in Google Forms

• Research Question:

Does having a reminder system helps the user engage or perform better in terms of achieving more goals? How many reminders a day can be effective for the user?

• Independent Variable:

Reminder is the independent variable, it's existence and recurrence different among groups.

1. Control Group: No Reminder
2. Experimental Groups: With Different frequencies of reminders throughout the day.

• Dependent Variables:

We are measuring 3 kinds of different variables depending on the change of reminder system.

1. Checklist Completion Rate: Percentage of completed tasks.
2. App Engagement: Frequency of app usage per day.
3. Users' Mood Rating.

• Random Variables:

User Demographics: Age, gender, and prior app experience, nationality etc.

• Control Variables:

In the app, the users in general can choose goals from different categories like Health, Finance, Creativity etc. But for the current experiment, users are confined to choose specific health-related goals like: Exercise, Mindfulness, Eating Healthy, Drinking Enough Water etc.

• Experimental Groups:

1. Control Group: No Reminder
2. Experimental Group1: One Reminder at the end of day(8pm)
3. Experimental Group2: Two Reminders, one at the middle of the day, another one at the end of day(8pm)

The reminder of 8pm was like a pop up notification, suggesting the user to complete the checklist for today, whereas the 12 pm reminder was a pop up notification reminding the users that they have some goals to be accomplished today. Our intention was to see whether having a reminder in the middle of the day drives the user to achieve more goals and engage more with the app.

• Test Conditions:

1. Participants are randomly assigned to groups.
2. One-week duration using a pop up reminder system in participants' devices stating the same push notification message as the app.
3. Conducted remotely through Google Forms, following the method Wizard of OZ.

• Data Collection and Analysis:

User input along with the date and timestamp was collected after 7 days and was converted into csv files before statistical analysis. we tried to look into the user data and apply simple statistical calculation to find out the differences between 3 groups in terms of User Engagement, Goal Counts and Mood Rating .

4.2 User Evaluation

We decided to carry on user evaluation method through a "Think Aloud Test" to evaluate some features designed for the app in order to gain direct insight into users' experiences and perceptions, helping us understand how they engage with our app. Previous work has demonstrated the effectiveness of this approach. Previous studies[5] have shown effectiveness of the chosen method.

• Participants :

There were 10 participants, from age 18-40, from different demographic zones and professions. We selected 6 Android users and 4 IOS users to carry out the test.. The entire test was voluntary, personal data and user responses were collected with participants' informed consent for research purpose usage.

• Test Design:

It was an onsite evaluation test, where the code was run from the developers' computer ,in VS Code and was connected to users' phone through Expo Go app. During this test, users are given some task to pursue and and were asked some followup questions. The task entitled to the users involved :

1. Setup the App for Daily Usage
 2. Complete the Checklist.
 3. Insert your mood rating .
 4. Find-out how many days you have been engaging with the app at a stretch.
 5. Reveal what days in the week you have been achieving the most.
- The task instructions were made intentionally implicit to evaluate the ease and usability of the app for mass population. During task 4 and 5, users were shown an account with simulated data and then was requested to perform the tasks thinking it's their own account. The clarity of instructions, intuitiveness of goal setting, and ease of goal tracking were key focus areas. The engagement and goal achievement analyses aimed to understand user behavior and preferences within the app.

After completing tasks 4 and 5, users were asked specific questions:

1. Were the app's instructions clear during registration and setup? If not, please elaborate.
2. How intuitive was the app's goal setup process (rated on a scale of 1 to 5)?
3. Could you identify and check off accomplished goals for the day?
4. Overall impressions of app usability and user experience (rated on a scale of 1 to 5).

5. Does the visualizations you saw in app app, motivates you to do better and check more goals tomorrow? (rated on a scale of 1 to 5).

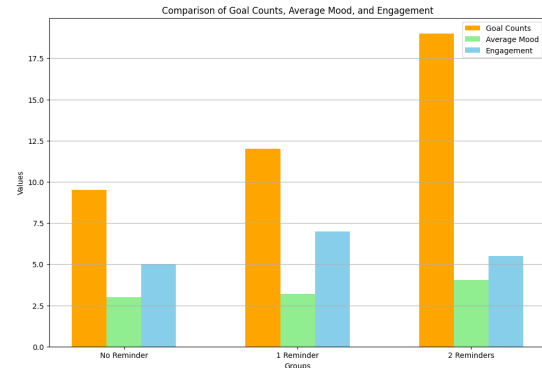
• Data Collection and Analysis :

During the user evaluation, participants were asked to 'think aloud' as they interact with our app. This means verbalizing their thoughts, feelings, and actions in real-time. We encouraged the participants to narrate their thought processes while performing specific tasks, such as setting goals, rating mood, or exploring visualizations and testers documented their unfiltered reactions, usability issues to understand user preferences and challenges. Later on, both qualitative and quantitative data were reviewed and the Likert Scale Ratings were calculated individually and as mean average. Aggregated and summarized ratings and feedback was taken into account to assess the effectiveness of app features and future design elements.

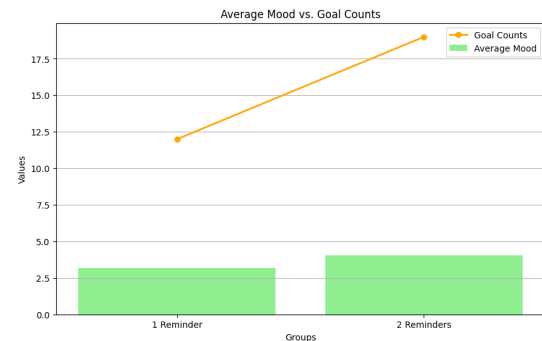
5 RESULTS

5.1 Experiment Result on Reminder System

It was found out that 3 different groups demonstrate different behaviour in terms of user engagement and goal accomplishment. We tried to compare the results between the groups and deploy them inside the following plots. In Fig[6], Plot A: No Reminder refers to the control group, whereas One Reminder was the experimental group 1 and Two Reminders referred to Experimental Group 2.



(a) Plot A



(b) Plot B

Figure 6: Average Goal Accomplishments, App Engagement and Mood Ratings among Control Group, Experimental Group 1 and 2

The bar plots give us a clear notion on the following facts :

- (1) The control group having no daily reminders demonstrates a poor average performance in all the 3 aspects : goal achievement, app engagement and mood rating.
- (2) The experimental group 1, with a daily reminder once, seems to engage with the app daily whereas the goal accomplishment rate and overall mood rating is significantly lower than experimental group 2.
- (3) On the other hand, Experimental Group 2, having 2 daily reminders seems to engage less with the app, which is approximately 5 times a week, but shows 1.5 times higher goal achievement per week.
- (4) Experimental group 2 demonstrates better overall mood throughout the week with an average 4.3 rating whereas the other experiment group has an overall rating of around 3.
- (5) Figure 2, Plot B also demonstrates that goal accomplishment has a linear relationship with mood ratings.

Overall, having reminder notification seems to help user to engage and achieve more on a daily basis.

5.2 Test Result on User Evaluation

In our user evaluation utilizing the "Think Aloud Test," we gathered insightful feedback from 10 participants representing diverse demographics and smartphone platforms (6 Android, 4 iOS). The evaluation aimed to assess the usability and effectiveness of our productivity app, focusing on goal setting, mood tracking, and engagement metrics and reveals the following findings :

• Task Completion and Ease of Use:

1. 8 out of 10 Participants found the app setup process clear and straightforward. Goal setup was intuitive for most users, with a majority rating it positively (average rating: 4.3/5).
2. All participants successfully identified and checked off accomplished goals and rated their mood for the day, indicating effective task management and mood registering features. Daily mood tracking was perceived as beneficial for self-awareness and well-being, with users consistently using this feature.

• User Engagement and Motivation:

1. Visualizations within the app received positive feedback, with users reporting motivation to set and achieve more goals based on progress charts. But unfortunately, 3 out of 10 users found it hard to identify how consistent they were at a stretch, and later on revealed that they were not familiar with the word : "Streaks" due to inexperience in using similar apps.

• User Experience and Impressions:

Overall impressions of app usability and user experience were highly favorable (average rating: 4.4/5). Participants appreciated the app's simplicity, yet comprehensive functionality based on subjective assessment based on self validation rather than checking on complex numbers like heart beat, step counts macros and calorie intake in tracking productivity and mood.

6 DISCUSSION

The experiment on the reminder system yielded valuable insights into user engagement and goal accomplishment patterns. The comparison between the control group (No Reminder) and experimental groups (One Reminder and Two Reminders) revealed distinct behaviors. Notably, the control group exhibited poorer performance across goal achievement, app engagement, and mood ratings, underscoring the potential benefits of reminder notifications. Conversely, Experimental Group 1, receiving one daily reminder, demonstrated consistent app engagement but lower goal accomplishment rates and mood ratings compared to Experimental Group 2, which received two daily reminders. Although Experimental Group 2 engaged less frequently, they achieved goals at a higher rate and reported better overall mood, suggesting a nuanced relationship between reminders, engagement, and outcomes. Furthermore, the linear relationship observed between goal accomplishment and mood ratings, as shown in Fig[6] Plot B, highlights the app's potential to positively influence users' emotional states through productivity.

The user evaluation through the "Think Aloud Test" provided additional insights into usability and effectiveness. The majority of participants found the app setup intuitive and straightforward, indicating a positive user experience in goal setting and mood tracking. Daily mood tracking was perceived as beneficial for self-awareness and well-being. However, challenges were noted regarding user familiarity with certain terms like "Streak", highlighting the importance of user education and intuitive design for broader accessibility. Despite this, overall impressions of app usability and experience were highly favorable, with participants appreciating the app's simplicity and comprehensive functionality, as well as the subjective metrics over numbers to feel self-motivated. However, users also revealed that in a context where they want to make specific changes in their life, such as in weight loss/gain journeys, reversing diabetes, or managing PCOS, numerical data is still needed to precisely track their progress.

7 CONCLUSION

In conclusion, the experiment and user evaluation underscored the significance of incorporating reminder systems and intuitive design elements in wellbeing apps. The findings suggest that well-timed reminders can enhance user engagement and goal accomplishment, ultimately contributing to improved mood and productivity. Several participants expressed interest in additional features, such as customizing goal categories and receiving personalized insights based on their usage patterns. Some suggestions were made for refining the on boarding process to better communicate app features and benefits. Moving forward, addressing user familiarity with specific terms and refining visualizations based on user preferences will further enhance app usability and accessibility.

8 FUTURE WORK

For the ease of development and simplicity in conducting experiments, only the "Health" category is activated in our developed application. This will be expanded to include all categories. Additionally, future efforts will prioritize enhancing usability and user engagement by allowing users to customize categories and goals

according to their preferences. Users will also have the flexibility to personalize reminder frequencies based on their intentions and needs. Reviewed user feedback and researches [3] show that by incorporating gamification and personalized feedback based on user performance, user motivation can be boosted and user interaction with the app can be improved. Furthermore, there may be opportunities to integrate the app with other platforms such as Apple Health, Fitness Pal, and Fitbit, both on mobile devices and wearables. By leveraging cross-platform integration, users can efficiently track their progress and health metrics across various devices and platforms, enhancing the overall user experience and effectiveness of self-monitoring.

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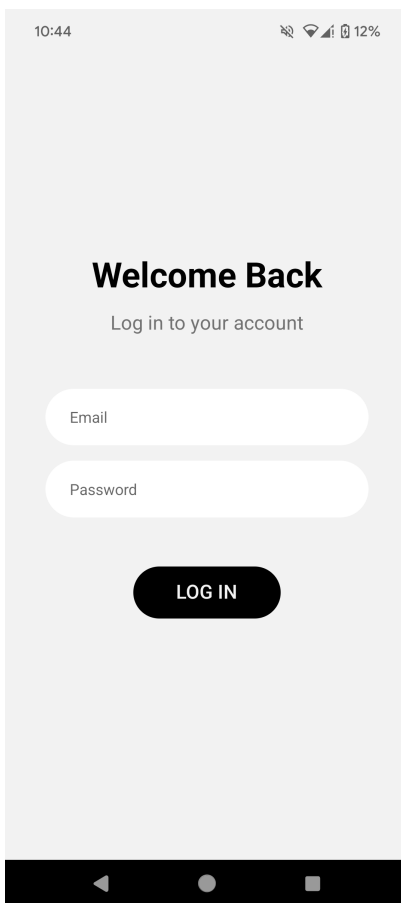
CONTRIBUTIONS

	GT	KF	MM
Scientific Paper	X	X	X
Prototype	X	X	
Experiment & Evaluation			X

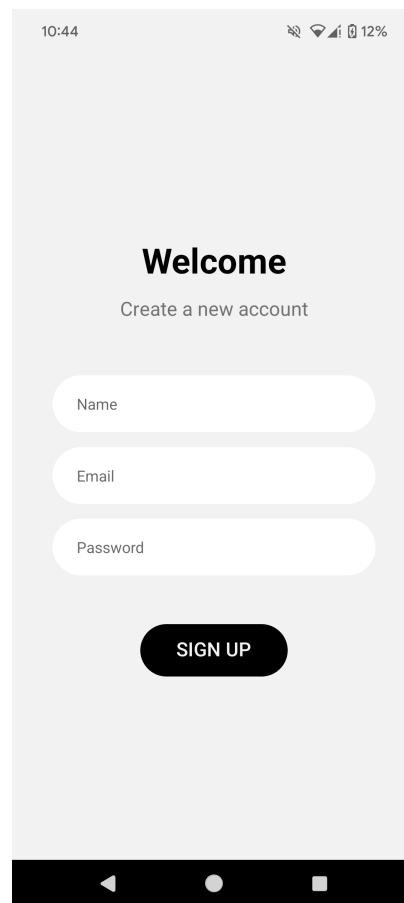
A LOG IN/ SIGN UP SCREENS



(a) Splash Screen



(b) Login Screen



(c) Signup Screen

B SOURCE CODE

This project's code is hosted on Github in the following repository: <https://github.com/GeorgiaTsoukala/CheckIt-MobileApp>

C PARTICIPANTS' RECRUITMENT FORM FOR USER EVALUATION

Here is the link for the form.

D PARTICIPANTS' CONSENT FORM FOR EXPERIMENT DESIGN

Here is the link for the form.