MY FITNESS PAL APP HEURISTIC USABILITY EVALUATION

A REVIEW OF PROBLEMS AND SUCCESSES WITH RECOMMENDATIONS

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INTRODUCTION

"There's an app for that."® This popular advertising slogan was trademarked by Apple in 2010, and a decade later, the slogan couldn't ring truer. Browsing through the App Store you can find almost anything, apps for games, social media, productivity, education, entertainment, and lifestyle. It is the lifestyle app category where you will find a slew of fitness and weight loss apps. Grand View Research studied the fitness app market and published their findings in January of 2021. The fitness app segment is growing exponentially with a global value of $4.4 billion in 2020 and predicted growth of 21.6% (compounded annually) from 2021 through 2028. The largest segment of the fitness app market is exercise and weight loss, claiming 54.7% or $2.8 billion.(Grand View Research, 2021) That market share constitutes a remarkable number of downloads. Each download represents a person with health concerns, looking for a tool to guide them to a healthier lifestyle. App use as a means of healthcare is referred to as mobile health or mHealth and it can be a significant factor in the future of healthcare.

Obesity is a major health concern in the United States. A National Center for Health Statistics (NCHS) Data Brief estimates obesity prevalence from 2017-2018 to be 42.4% of the population.(Hales, et al, 2020) Obesity brings the possibility of comorbidities: diabetes, hypertension, and heart disease.(Apovian, 2013) Can an exercise and weight loss app reduce obesity rates? Staff at the Mayo Clinic recommend six strategies for long-term weight loss. It is not surprising that moderating calorie intake, eating healthy foods, and increasing physical activity are recommended. Realistic goal setting is also a key factor to success. The critical strategies, explained by Clinic staff, are being ready to commit to a permanent lifestyle change and having a personal, motivating reason to provide focus that will enable persistence.(The Mayo Clinic, 2019) Most weight loss apps provide features to track calories and exercise but it's clear there is more

needed to sustain weight loss. In a 2017 study Kim et al examine the use of a mHealth app to target those critical strategies defined by the staff at the Mayo Clinic. The study found that in addition to food tracking, self-efficacy and group participation through app use had a positive association with weight loss. (Kim et al, 2017)

My Fitness Pal (MFP) is an exercise and weight loss app designed to track and trend nutrition and exercise habits. Tracking features include the ability to scan barcodes and import activity data from a smartphone or wearable device. The app offers access to recipes sorted by categories, for example, breakfast, vegetarian, under 500 calories, and low carb. Another feature in MFP is access to a fitness and weight loss community through forums. The forums are topical and designed to motivate, challenge, and connect users. A new feature to MFP is 'Workout Routines'. Users may access a variety of activities focused on wellness and exercise, varying from stretching and yoga to cardio and strength training. While MFP is free to download, many features are not enabled unless you purchase access to the premium version through a monthly subscription. This evaluation was conducted with features accessible in the free app version.

METHODS

Heuristic evaluation is the process of using a specific set of design rules to measure the useability of application/app features to discover usability problems. Useability problems may be rated by severity based on their frequency, impact, and persistence. The evaluation is performed independently by several evaluators and aggregated to provide a thorough list of usability problems matched with the appropriate usability design rule.(Nielsen, 1994)

The usability evaluation of the MFP app was conducted by four independent evaluators using Nielsen's Heuristics. The heuristics rules are listed as follows(6):

- Visibility of system status

- Match between the system and real world

- User Control and Freedom

- Consistency and Standards

- Error Prevention

- Recognition rather than recall

- Flexibility and Efficiency of use

- Aesthetic and minimalist design

- Help users recognize, diagnose, and recover from errors

- Help and documentation

Each usability problem was given a severity rating of cosmetic, minor, major, and catastrophe. Cosmetic issues need only be fixed if there is extra time and resources available; minor issues are given low priority; major issues are very important and given high priority; catastrophic issues must be fixed before the product can be released.(Nielsen, 1994)

After independent application use, each evaluator suggested several features to evaluate. The following features are the 15 selected for the project.

1. Track food and fluid intake

2. Track exercise using iPhone steps

3. Setup a saved meal

4. Setup a recipe

5. Download recipe

6. Track progress (weight loss, fluid intake or steps)

7. Setup push notifications

8. Community forum

9. Friends feature

10. Edit / correct errors or notifications

11. Edit a user profile

12. Help features

13. Workout Routines

14. Connect to a device

15. Plan Feature

FINDINGS

Evaluators found 37 usability problems. The most frequently violated heuristics were flexibility and efficiency of use, with 16 errors, and aesthetic and minimalist design with 9 errors. These findings were expected given the general feelings about the usability of the MFP app. All evaluators felt the app was cumbersome and took too much time to add or locate information. Of these errors, most were not catastrophic and there were even considered major problems.

A number of these problems arise from the difference in active features for free app users and premium app users. It is understandable that MFP would leave premium features within the free app version to sell users on a monthly subscription. However, the frustration is these features are not often indicated as premium. A user may click several times researching a feature only to find that it's unavailable for use.

Of the 37 usability problems, five were considered catastrophic and four were considered major. This translates to approximately 24% percent of the usability problems needing attention

in a near future update. The catastrophic errors were as follows and are recommended for immediate correction.

- Users can manually enter nutrition facts for food items not saved in the app but can only do so by exiting out the recipe, inputting the information, and restarting the recipe.

- App does not tell the user which friend requests they have already sent out, resulting in users possible resending requests.

- A Help article linked to a specific issue is out of date. The article instructed the user to click buttons that are not on the screen.

- To comment in a forum thread, the user is required to 'Sign-in or Register'. The user is already in the app as a registered user. Tapping the 'Sign-in' option required a second login, tapping the 'Register' option resulted in an Authorization Error. ("Error 403: disallowed_useragent")

Major problems are not as severe but do cause considerable problems for users and are recommended to be corrected with the next scheduled app release. These errors are listed here.

- When using the barcode scanner for food intake, if a barcode is not in the system, the user's only choices are to either find a similar food or manually enter nutrition facts into the app.

- When using the chat feature responses seem automated and only direct the user to help articles.

- There are no workout guides for the workout routines, no instructions or motivation from instructors.

- When viewing a specific thread in the community forums, if a user wants to return to the topic section there is a < symbol at the bottom of the screen. A more obvious choice is the

'Done' option at the top right of the screen. Unfortunately, 'Done' completely closes the forums and the user must start over.

Most flexibility and efficiency of use problems were due to a lack of clear direction or too many clicks to execute an action. The Progress feature is an example of a single feature with both issues. The Home Screen clearly shows the user's daily status for both calorie intake and steps, but if the user wants to see how their steps for the current day are tracking earlier in the week. There is no apparent way to find this information. Instinct tells the user to tap the daily details for steps. This navigates to the Steps Setup Screen, a convenient way to change the daily Steps goal, but no way to view progress or steps history. The bottom of the Home Screen has a navigation bar with a Progress button. Clicking the Progress button takes you to the Progress Screen and the user's weight progress is displayed. There is no indication, for example a drop-down caret, indicating that weight is one of many categories to select. The word 'Weight' is in blue and many times this will indicate a link, but that is not always the case and is certainly not clear to users new to MFP.

There were six usability problems dealing with visibility of system status. These errors were most common when performing an action that doesn't result as expected. For example, when inviting friends to connect in the app, the user selects to send an email to the contact requesting the join and become a 'friend'. There is a notification the email was sent, but there isn't a list of pending notifications. The user is left unsure of who was contacted and may repeat the request. Another example is when connecting to another device app there is no visible status to see if information is being transmitted or what is being transmitted between apps.

There were five usability problems associated with help and documentation. These problems all arise from the inability to locate specific help content and some help content being outdated or incorrect. Lastly there were five usability problems associated with match between

system and the real world. All these problems were due to the app not functioning in the way users have experienced similar features functioning in other mobile apps.

During the testing process, users found ten useability successes. Successes are features within the MFP app that would be beneficial for similar apps to adopt because they enhanced the users' experience.

When tracking food and fluid intake, the app confirmed when the user successfully entered a food item. This feature makes the status of entering food very clear and does not make the user guess thus it meets the visibility of system status heuristic. Also, when tracking food and fluid intake, the app gives the user a lot of control. For example, if the user accidentally inputs an item into the wrong meal, they can either drag the selection to the right meal or swipe left to delete the entry.

When setting up and/or editing notifications, the user can select which notifications to receive and can set "Do not Disturb" for specific times during the day when they don't want to be notified. These features give the users control and freedom by not making it "all or nothing." Allowing users to choose which notifications to receive, allows users to receive as many or as few notifications as they want. This is beneficial for people who want to receive important notifications, but who don't want information constantly being pushed to them.

Successes found while using the "friends" feature include allowing users to find friends through multiple ways: contacts, email, and/or Facebook. This meets the user control and freedom heuristic. Additionally, the layout is like other social media apps, the minimalist design and match between the system and real world made it easy for users to learn how to use the feature.

Lastly, the "Help" feature gave users some control over content by allowing them to rate and comment on an article's usefulness. If the user says the article is not useful, they are given options to chat or email support. The email feature makes it easy for users to communicate issues by including the option to attach screenshots. If the user wants to delete their account, the help feature includes instructions on how to do so, solutions to common issues, and notifies the user that deleting their account cannot be reversed. There is a service status tab which notifies users of if the system is working properly which meets the visibility of system status heuristic.

The heuristic that was linked to the most successes was user control and freedom. It is important for weight loss apps to give users a high sense of control and freedom to motivate them to continue using the app. Due to the nature of tracking food and exercise to achieve weight loss, users would be using the app throughout the entire day thus they should feel that they have as much control as possible. Additionally, people have varying needs and goals, so the app should be able to adjust to users' individual needs and not make them feel like there is only one way to do something.

DISCUSSION

Most usability issues found in MFP deal with flexibility and efficiency of use, and aesthetic and minimalist design. These problems were most prevalent on the Home Screen and during the process of adding food intake. It is recommended that both the Home Screen and the Add Meal Screen be redesigned.

The homepage is the first screen that users are required to visit, all app navigation is initiated here, but the current design offers very little to the user and needs a revamp. The concept for the screen redesign is a dashboard feel with links that navigate to the most popular features in

the app. The top third of the screen is a daily status area. The Total Calories Consumed space will display calories consumed and their remaining calories, the current space only displays calories remaining. Next to Total Calories Consumed is a button to add food or water intake. Below Total Calories Consumed, is a Calories Burned display. This is a feature not available in the current app, and this type of information is important to fitness users. Next to these display areas are buttons to easily add intake and exercise. One complaint shared by evaluators was the time required to add daily intake. The addition of these buttons reduces the number of clicks required and is more visible to the user, making navigation easier. Below the Daily Status area is the Community display. This area provides ways to connect with other app users, to find someone with common goals and interests. These features are currently not located on the Home Screen. The Friends link allows you to quickly move to your friends list for messaging. Because social media plays a large part in motivation and support for anyone trying to lose weight it should be easily accessible. Below the Community display is the Progress/History display. Seeing success is a powerful motivator and this data should be visible on the Home Screen and easy to access. This area includes graphs for steps and weight that are automatically updated as data is entered or collected. This recommendation includes links to see more detail or customize the display. The bottom section of the Home Screen provides the user a trending feed of diet and exercise trends, recipes, and fitness tips. Figure 1 previews recommendations for the MFP Home Screen.

Evaluators struggled with the Add Meal Screen; therefore, Figure 2 depicts a recommended screen design to improve flow and allow easier meal entry with fewer clicks. The first recommendation for this screen is a new display area under the search bar allowing users to choose how they want to add food intake. The display features selections for Multi-Food Add, Barcode Scan, and Scan Food/Add Food. The multi-add feature is an existing feature, but one that is easily

overlooked on the bottom of the screen. The current design often resulted in adding one item, confirming, and returning to the Home Screen only to realize you were never asked a quantity. This scenario required you to readd the same information. Another frustration for evaluators were the number of premium features not available to users of the free version of MFP. The frustration didn't come from the feature not being included in the free app version. The problem with the design is there is no realization the feature is premium until the user has gone through several clicks to use the feature, and it then shown a screen to sign up for a premium subscription. This usability issue could be resolved by highlighting the premium features as shown above with the Scan Meal feature.
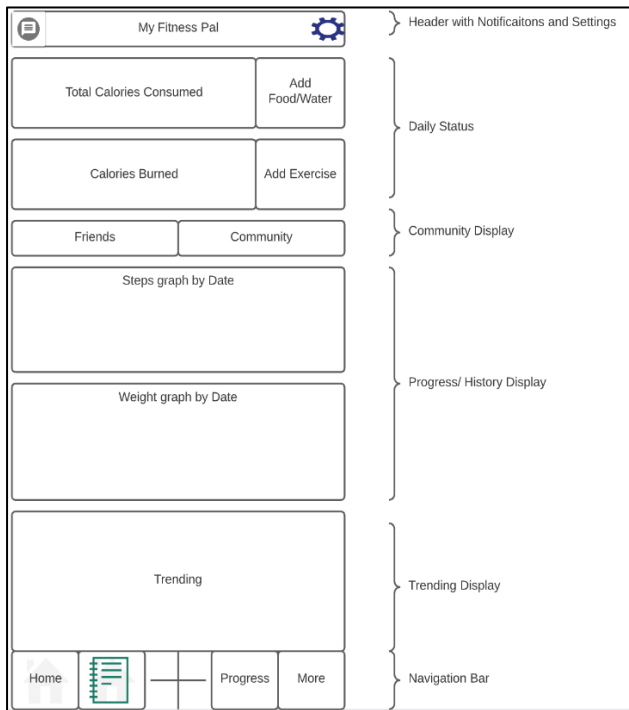

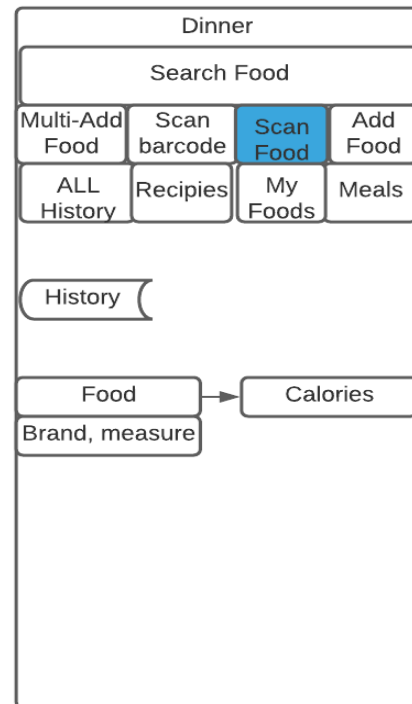*Figure 1 - Home Screen Recommendation*

Figure 2 - Add Meal Screen Recommendation

Below the Intake area are options to access user food history, saved recipes and meals and favorite foods. With a single tap, these options will list stored content from user history and saved foods. Foods are listed using the MFP format of food or drink name with the brand name below and calories per serving to the right. These recommended design of these two rows of options truly

streamline useability. Now, with only three clicks a user can select a favorite food and multi add to their daily intake.

One other feature with considerable usability problems was Help functionality. While the screen doesn't need a redesign, it is recommended a search feature be added to allow users to look for specific information with fewer clicks. It is also recommended that help documentation be updated frequently for accuracy. One help document that would be beneficial is a listing of all free and all premium features.

CONCLUSION

While there were numerous usability errors, the majority were considered cosmetic or minor. With a little searching, motivated users will find plenty of functionality to manage logging their intake and exercise. There are also many nice extras like recipes, workout routines, and a community forum. Unfortunately, most of the serious usability problems will not be corrected by purchasing a premium subscription. These errors need to be addressed by the developers at MFP. Will MFP increase positive outcomes for users seeing to lose weight? The answer lies somewhere between the ease of app use and the lesson learned from the staff at the Mayo Clinic. If users are not motivated to take the time required to use the app effectively, they are not likely to stay with it.

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APPENDIX I – Problems Linked to Corresponding Heuristic(s)

Finding	Heuristic
Multi-add option for food is easily overlooked	Aesthetic and minimalist design
App provides an alert when you make food choices that are contrary to your set goals; however, the alert is small and could be easily missed.	Aesthetic and minimalist design
User can scan barcode to log food, but if the barcode is not in the system, user can only find a food that is similar or manually enter nutrition facts into the app	Flexibility and efficiency of use Help user recognize, diagnose, and recover from errors
There are several features available that speed a user's ability to add foods; however, they are difficult to find and not grouped together.	Flexibility and efficiency of use
There are a lot of distractions and ads on the home screen.	Aesthetic and minimalist design
Ads on home screen will take you out of the app and to a website. Depending on the site, this could lead to problems.	Error Prevention
In the help section, users must click multiple times through numerous categories to find solutions. There is no search button.	Help and documentation Flexibility and efficiency of use
The MFP "Help" feature states that historical steps data can be viewed on the progress page, however this is not the case for non-premium members.	Help and documentation
There is no indication that there is a meal plan option that user can do themselves	Aesthetic and minimalist design
When a user adds the food to the meal plan. The users are consistently sent back to the "Edit Meal" page.	Aesthetic and minimalist design
When the user "bulk" enters a recipe, the app does not pull up your selection; the app makes the user select the option before moving on.	Visibility of system status Flexibility and efficiency of use

Process of recipe is different from the process of logging food items individually, which makes it difficult for users to understand how to save a recipe.	Consistency and standards Recognition rather than recall
Users can manually enter nutrition facts for food items not saved in the app but can only do so by exiting out the recipe, inputting the information, and restarting the recipe.	Error prevention Flexibility, and efficiency of use
When downloading a recipe, users were confused by the arrows to go forward or back in the downloading process.	Match between system and the real world User control and freedom Error prevention
It is unclear how to view progress for metrics other than weight. The user must tap the word weight on the progress screen and a selection will appear for other metrics, but these can only be viewed one at a time, not in a dashboard format.	Flexibility and Efficiency of use
Although all notifications were turned on, user only received one notification over course of using app	Visibility of system status Flexibility and efficiency of use
App states user will see notifications within app regardless of if the notifications are turned on, but user could not find where notifications showed up in the app	Aesthetic and minimalist design
User did not receive notifications on connected devices	Flexibility and efficiency of use
User did not receive an email when notifications were turned on and/or off	Visibility of system status
App does not tell the user which friend requests they have already sent out.	Visibility of system status Match between system and the real world
There are no safeguards to prevent users from entering the wrong information when locating friends.	Error prevention
Users cannot see if friends received their friend requests.	Help users recognize, diagnose, and recover from errors

User did not know how to delete notifications within the app because user could not find where notifications appeared	Aesthetic and minimalist design
Article linked to a specific issue is out of date. Article says to click on buttons that are not there	Match between system and the real world Help users recognize, diagnose, and recover from errors Help and documentation
User can use the chat feature, but responses seem to be automated; responses seem to just direct user to articles	Help users recognize, diagnose, and recover from errors Help and documentation
To cancel subscription, user can only cancel on the original platform user bought the subscription on	User control and freedom Flexibility and efficiency of use
No workout guides available, instructions, or motivation from instructors	Flexibility and efficiency of use
Many Workout Routines are shown, but they are not classified as available for users of the free version or the premium version. Users selected several to review and found they were only available with the premium version.	Recognition rather than recall Flexibility and efficiency of use
User's Apple Watch was connected and tracking exercise, but the user was not sure how this occurred. Users could not determine how to connect to the Apple Watch.	Visibility of system status
Instructions were in the MFP app, so user had to toggle between both apps to follow the instructions	Aesthetic and minimalist design
After connecting to another app, the user could not tell what information was being shared between apps. Users did not see a difference between having other apps connected and not having them connected.	Visibility of system status
Only two plans available for non-premium members	User control and freedom Flexibility and efficiency of use
Too many pages of instructions on how to use the app; many features within app are not self-explanatory	Match between system and the real world Flexibility and efficiency of use Help and documentation

User preferences, unable to change username in the app, required to login to the website for the change.	Flexibility and efficiency of use
Community feature, difficult to navigate. When viewing a specific thread, if a user wants to return to the topic section there is a < symbol at the bottom of the screen. A more obvious choice is the 'Done' option at the top right of the screen. Unfortunately, 'Done' completely closes the forums and the user must start over.	Recognition rather than recall Flexibility and efficiency of use
To comment in a thread, you are required to 'Sign-in or Register'. The user is already in the app as a registered user. Tapping the 'Sign-in' option required a second login, tapping the 'Register' option resulted in an Authorization Error. "Error 403: disallowed_useragent"	Match between system and the real world Flexibility and efficiency of use

APPENDIX II – Successes Linked to Corresponding Heuristic(s)

Finding	Heuristic
App confirms when user successfully enters in a food item	Visibility of system status
Users must confirm selections before entering them into the diary. If the user enters in the wrong location, they can drag the selection to the correct location.	User control and freedom Flexibility and efficiency of use
If information is entered in the diary in error users can simply swipe their finger to the right over the selection and they are given the option to delete the entry.	User control and freedom Flexibility and efficiency of use
User can set their status to "Do not disturb" to avoid push notifications and messaging when in a meeting or resting.	User control and freedom
User can find friends through contacts, email, or Facebook.	Match between system and the real world User control and freedom
The Friends feature layout is like other social media apps and easy to follow	Match between system and the real world Aesthetic and minimalist design
User can select which types of notifications to receive. Does not have to be "all or nothing".	User control and freedom Flexibility and efficiency of use
App has a service status tab to see if everything in app is working properly.	Visibility of system status
App makes it easy to delete your account. It gives user warnings stating delete is permanent.	Flexibility and efficiency of use Help user recognize, diagnose, and recover from errors
Setup and link to iPhone Steps is seamless to the user and Steps goal is easy to change.	Flexibility and efficiency of use