Budgeting and Retirement Planning: The Design Process of Money Makers

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ABSTRACT

Our project started to support adults planning their retirement who want to keep access to their options of retirement plans and manage their budgets and health insurance. We designed *Money Maker*, a mobile budgeting app that holds all the features we found our users looked for when gathering all the necessary information to manage their budgets and health insurance plans for daily use and to plan their retirement. The app allows the users to connect directly with their bank account and update their budget as needed, being able to differentiate their budgets in different areas and share each specific budget with different people. Unlike other budgeting apps that focus only on managing daily, monthly, and yearly budgets, our goal was for the user to be able to see everything that pertained to managing their budgets in one single place. Here we will describe each step in the process of developing a high-fidelity prototype of our app.

Authors Keywords

Budget Management; Financial Wellbeing.

CSS Concepts

• Human-centered computing

INTRODUCTION

When managing our budgets people have different goals. They can be long-term or short-term, but to materialize each one, everyone needs access to all their information regarding money, be it spending, income, taxes, insurances, and others. However, most people have all this information scattered among computer files, papers, and folders. The fact that all the necessary information is not in one place makes managing finances difficult for the regular person.

Along with the difficult access to one's own financial information, we found that knowledge on finances, budgeting and the different options of retirement plans and health insurances (which were our focus) varied a lot from person to person. Some had acquired extensive knowledge of finances through education, others researched and were able to find helpful resources, others, however, were still trying to get a better understanding of the subjects at hand.

With the development of our project, we aim to create an app that mitigates the difficulty in keeping and maintaining all the information in one place, with easy access. Its design makes it easy to differentiate between the different types of budgets and easy to navigate between each shared budget. Between the different ideas we had, to mitigate the different levels of knowledge each person has, we implemented the one we thought was more feasible for the implementation time we had. This idea consisted of including a support chatbot which could answer the most common questions and that could analyse the already imputed data and make previsions about the future based on this data.

In this description of our project, we will explain what was found at each step of the process as well as the reason behind the design decisions.

This project was developed alongside a website where each step of the process is detailed to some degree, this site can be found through the following link: https://sites.google.com/view/financial-wellbing.

MONEY MAKER

Discovery Phase

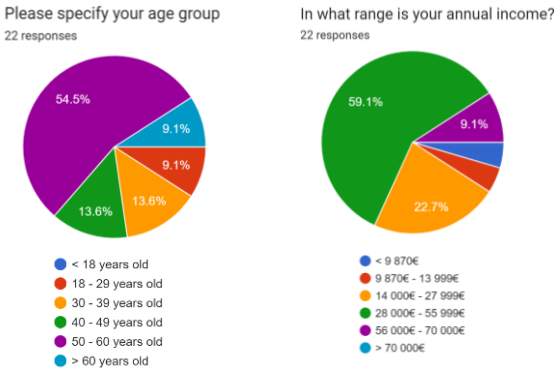
Research

Having defined our target group as working adults planning retirement and our areas of focus as budget management, health insurance and retirement planning, we defined our Hunt Statement: We want to research adults planning retirement to learn about how they handle their budget management, health insurance and retirement plans. The purpose of our research was to understand the end-to-end of how our participants manage their day-to-day, resilience, goals, and confidence in financial wellbeing.

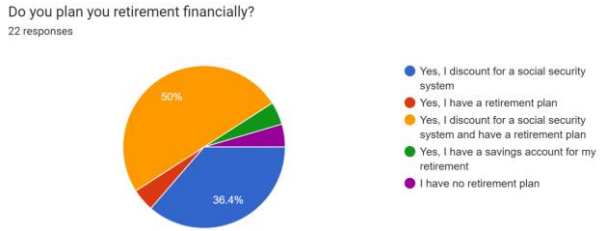
As a first step in our research, we used a form to filter our target group, get their contact information for future follow-up if they want and get some data on the areas of focus of our project. We mostly did multiple choice questions but also some short answer questions to explore or clarify some points. The information used at this step of the research includes information from 22 participants.

Data Analysis

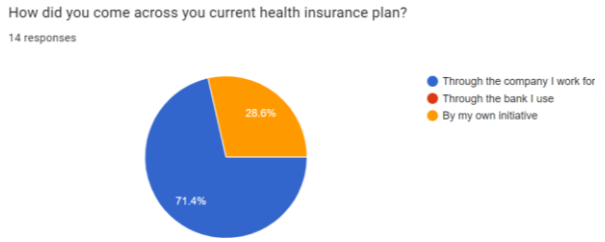
We started our questionnaire with some biographical questions to characterize our participants. As we can see in the graphics, most of our participants are people aged between 50 and 60 years and have an annual income between 28 000€ and 55 999€.

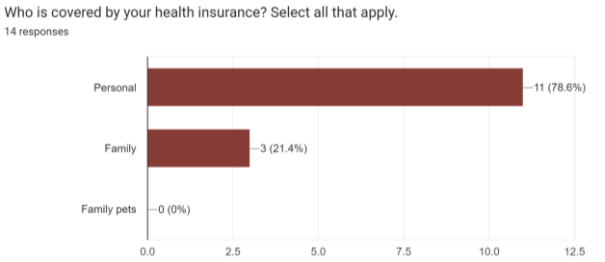


Then, we analyzed how our participants plan their retirement. We had one user that doesn't have a retirement plan, so his answers were excluded from our research from now on. Most of the participants have a retirement plan and discount for the social security system but a large part of the participants just discount for the social security system. Some people who have a retirement plan referred they have a savings account for retirement.



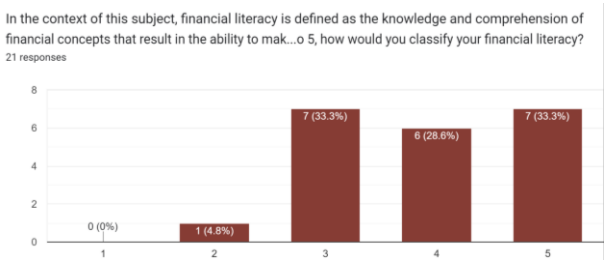
We asked about health insurance and only 66.7% of the participants have a health insurance plan. Of these, most of the participants came across the current health insurance plan through the company they work for. We also asked if their insurance is personal or not.



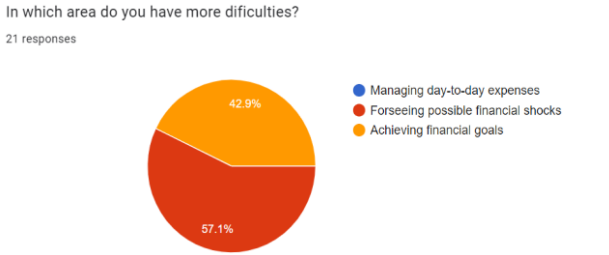


For those who don't have health insurance, we asked why they don't have one and most answered that they have a health subsystem and as such don't need health insurance.

To conclude our form, we asked some questions about financial control. 95.2% of the participants indicated feeling confident when controlling their finances but when we asked to classify their financial literacy from 0 to 5, the answers were scattered. We can conclude that just one third of the participants effectively have knowledge to make informed decisions related to money.



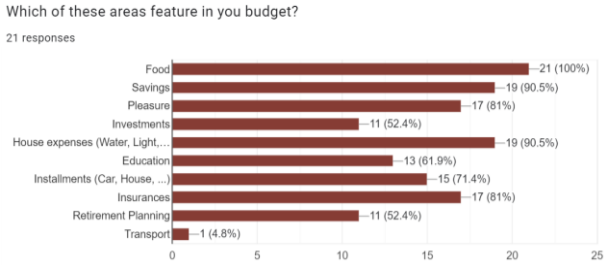
People referred they have some difficulties in foreseeing possible financial shocks and achieving financial goals.



Although they identified these difficulties, 71.4% of the participants said they don't have any support when managing their finances.

We have asked people to explain a little bit to us what could help them improve their confidence or what contributes to feeling confidence when managing their personal finances. Some participants referred that the solution to their problems with financial management is increasing the monthly income but, in that field, we can't help solving the problem. On the other hand, people with more confidence said the trick is having expenses grouped by type and if possible, having some education in the financial area.

Related to budget management, we asked our participants how they distribute their budget for the different areas. Food, savings, and house expenses were the most voted.



With all the data from the forms analyzed, we contacted some users to do individual semi-structured interviews where we did open questions, and with that we got more detailed information. 6 participants from the original 22 agreed to answer a few questions to help us understand some points better.

When questioned about retirement planning, people referred that the first step was to start discounting for retirement when they start working. Later, some of them started a personal retirement plan such as a PPR, that works as a saving account where they can put money as they want, to get it back when they retire.

Related to health insurance, we asked people if it's important to improve their insurance plans as they age and all of them answered yes. When asked about the importance of having health insurance, one person said it could be important but it's too expensive to have one. The rest of the people consider it important too and because of it, they have one.

To conclude the interviews, we asked a few questions about finance control. To understand if people have a notion about financial management, we asked how they think their budget will differ accordingly, for example, if the number of people dependent on them increases. Most of the participants answered that more people imply greater commitment to the management. Also, some of them said they would need more money for the monthly expenses and there would be less for savings. Another question was about how their financial literacy changed over time. Most of the participants answered that it's natural to improve with time but one person said they still need help.

Codebook and Themes

After analyzing the questionnaires and the answers given in the interviews, we looked at each area of our focus and tried to find codes that pertained to each of them.

Budget Management	- Calculates spending - Experts in the area - Studied the subject - Would like a course on the subject - Difficulty in making ends meet
Health Insurance	- Health subsystem - Covered by company - Most specialties - Too expensive - Not effective
Retirement Plan	- Savings account - PPR - Social security

From the codes we extracted and according to quantitative data obtained from the forms, we then gathered the main themes we got for each area.

Budget Management	- (Lack of) Education on the subject - Difficulty in managing expenses - Research the subject
Health Insurance	- Has health insurance paid by the company - Has health insurance or health subsystem - Does not have any form of health insurance
Retirement Plan	- Has private retirement plan - Deducts towards social security

Personas and Scenarios

Then, we elaborated four personas based on the answers we collected from the questionnaires and the semi-structured interviews. These personas represent our target audience both in demographic characteristics and in the qualitative descriptions they have.

One of our personas is Matthew Perry. Matthew is a 62-year-old man who has a bachelor's degree in agronomic engineering and works as an agronomist in a vineyard. He has three grandchildren, loves the countryside and is looking forward to a quiet retirement in just a few years. He is also looking into investing in some fruit trees. He's not very comfortable when it comes to technology and struggles to find information on retirement plans online. Matthew often ends up calling his children for help in that field. His goal is to manage his finances to have a comfortable retirement and spend less time on the computer doing financial management in the spreadsheets.

With each persona, we created some scenarios where each one shows a real situation related to one of our areas of focus: budget management, health insurance and retirement planning.

For example, for Matthew, we created one related to retirement planning because it is his main goal. He needs to make sure his retirement plan is in order and to know the details that concern it. The only expertise he has when it comes to computers is how to use tools like spreadsheets because he needs it to do his job, he finds his phone easier to use as he now uses it more often. This presents a problem when he wants to search the finances web page, for example. Matthew is annoyed at having to go through a site that he doesn't know how to interact with and having things that have nothing to do with what he is looking for often confuses him more. Matthew needs a way to easily search for the information he needs, a way that does not get him confused with where to click to find out which information is related to him.

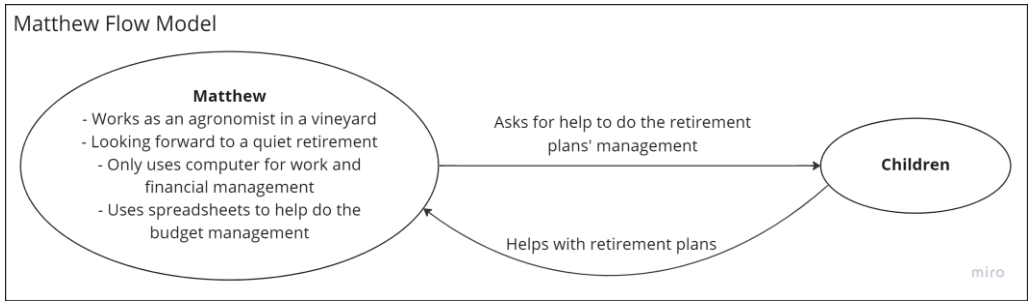
More information about the personas and scenarios we created can be found in the following link: https://docs.google.com/document/d/1HiWIuIZlxKnJhpePlvp6F0isJH1qk_mXhFrgoMRrZWY/edit

Ideation Phase

"How Might We" Statements

For the ideation process, we started with the following "How Might We" statements:

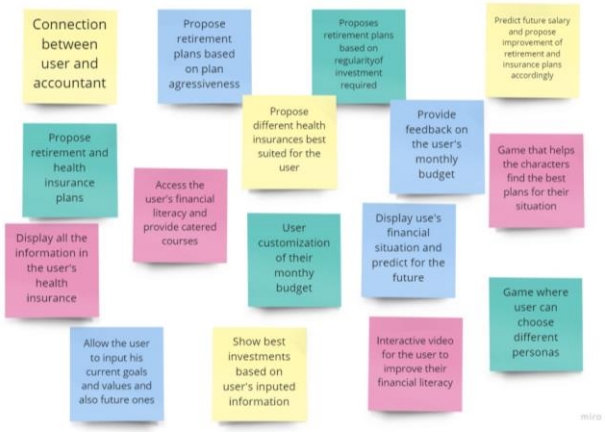
- How might we allow people on a tight budget to save for a specific goal?
- How might we combine the accessible data in one's bank with their monthly budget?
- How might we help people access the information in their health insurance in an easy way?
- How might we propose retirement plans that are best suited to one's lifestyle?



- How might we give people access to all existing information about the retirement plans available to them?

Ideation

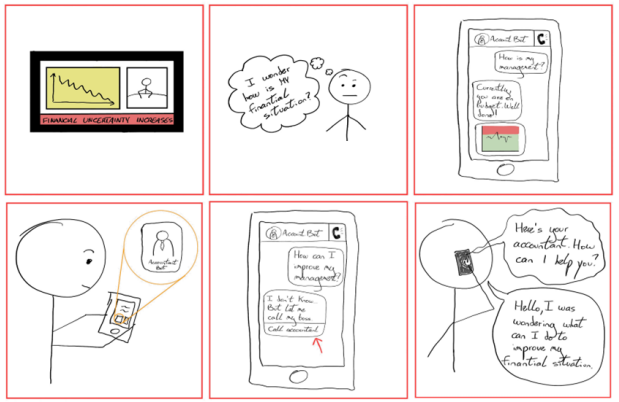
From here we started generating ideas that would help the personas we created and target the themes we identified in our data analysis, and we displayed them in Miro, as shown in the post-it board.



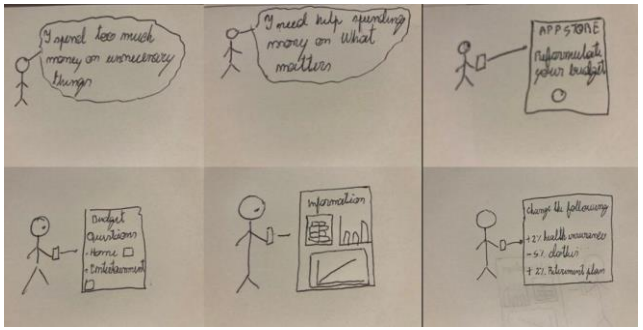
Storyboards

From these ideas, we picked and grouped some that seemed feasible to us but still of interest to the user and drew their storyboards:

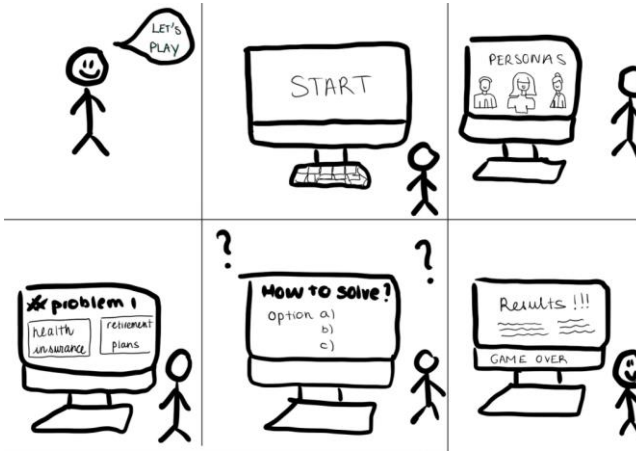
1. Feedback Through Bot and Accountant: connection between user and accountant; provide feedback on the user's monthly budget.



2. User Customization: user customization of their monthly budget.



3. Game: game where user can choose different personas; propose retirement and health insurance plans.



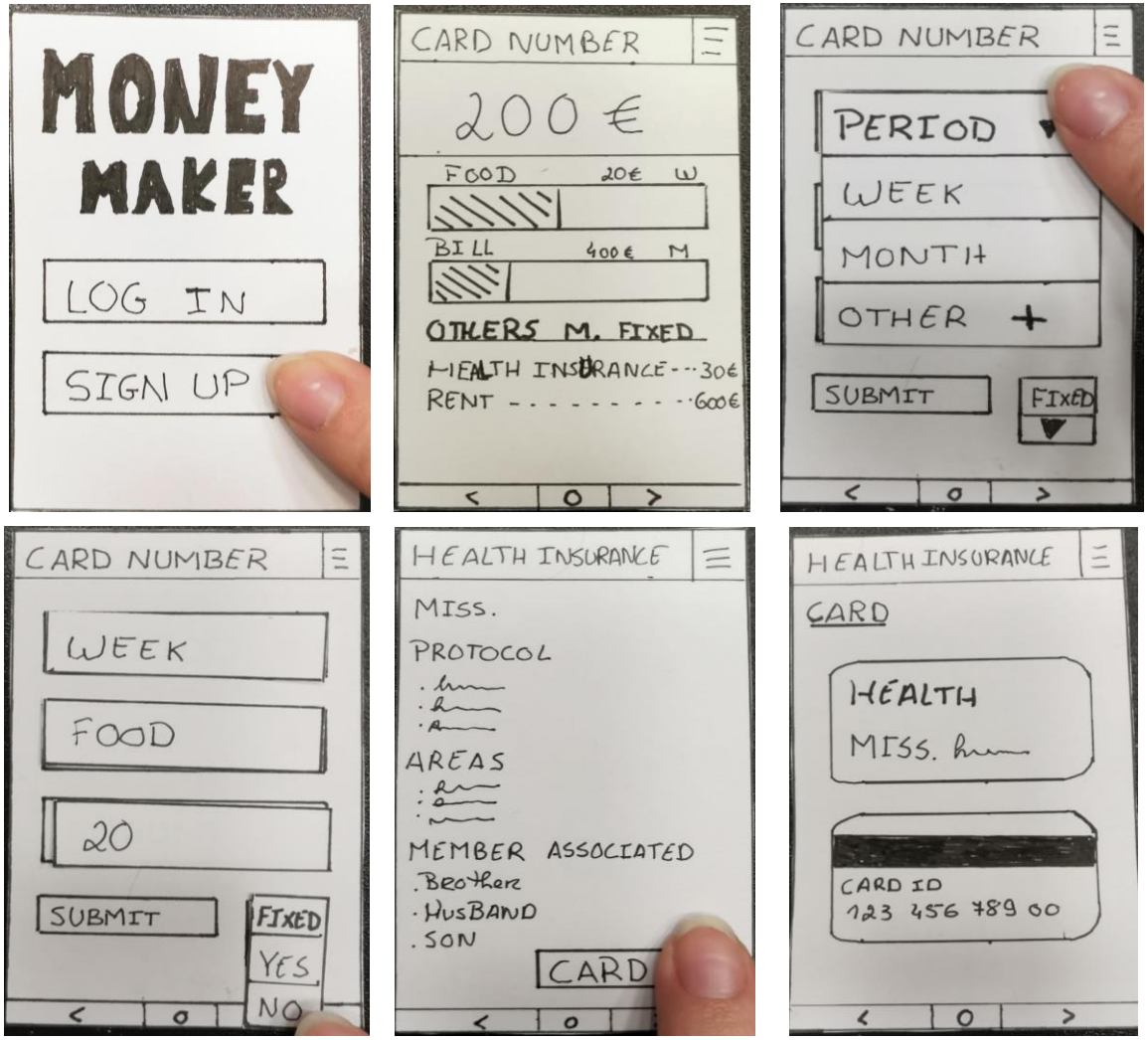
Low-Fidelity Prototypes

Our low-fidelity prototypes consisted of simple drawings of the interface we had in mind, in the shape of a cellphone.

The ideas we took from our ideation phase came from the first two storyboards. We wanted to create a budgeting app that allowed the users to keep track of all the information necessary to handle their finances in a way that was user customizable, and provide help whenever necessary, even without having to keep contacting one's accountant.

To allow for user customization we wanted to allow the users to input their budgets themselves, providing different types of budgets according to the areas we gathered most use. As such we created the options to create a fixed budget, to have budgets that get tracked in different time periods and in a second prototype we also included the options to share each budget with different people and to assign an area to the created budget.

From our discovery phase we gathered that there were users that were just starting out to plan their retirement, and that was accompanied by many doubts on what to do and if they were on the right track. To avoid the need to call an accountant or to research online through endless pages we included the option of a chatbot. This chatbot gathered all previously inputted data from the user and would be able to make previsions and guide users in their budgeting. Users could massage the support chatbot and get information on previsions or different options they



First Prototype

could follow and their benefits and drawbacks and if there came a point in which the chatbot was unable to answer it would prompt the user to call their accountant.

Designing the Prototypes

Having the ideas defined and already a structure thought out from the storyboards we designed our two prototypes. The first had only the simple ideas we were sure we wanted to keep and in the second we included the ideas we wanted to present to our users and see if they were viable.

Both prototypes included the normal features needed for a mobile app such as creating an account and logging in. However, the second prototype included the association of a bank card to the app which would automatically have access to the balance of the card and any health insurance cards associated with the bank account.

Tasks

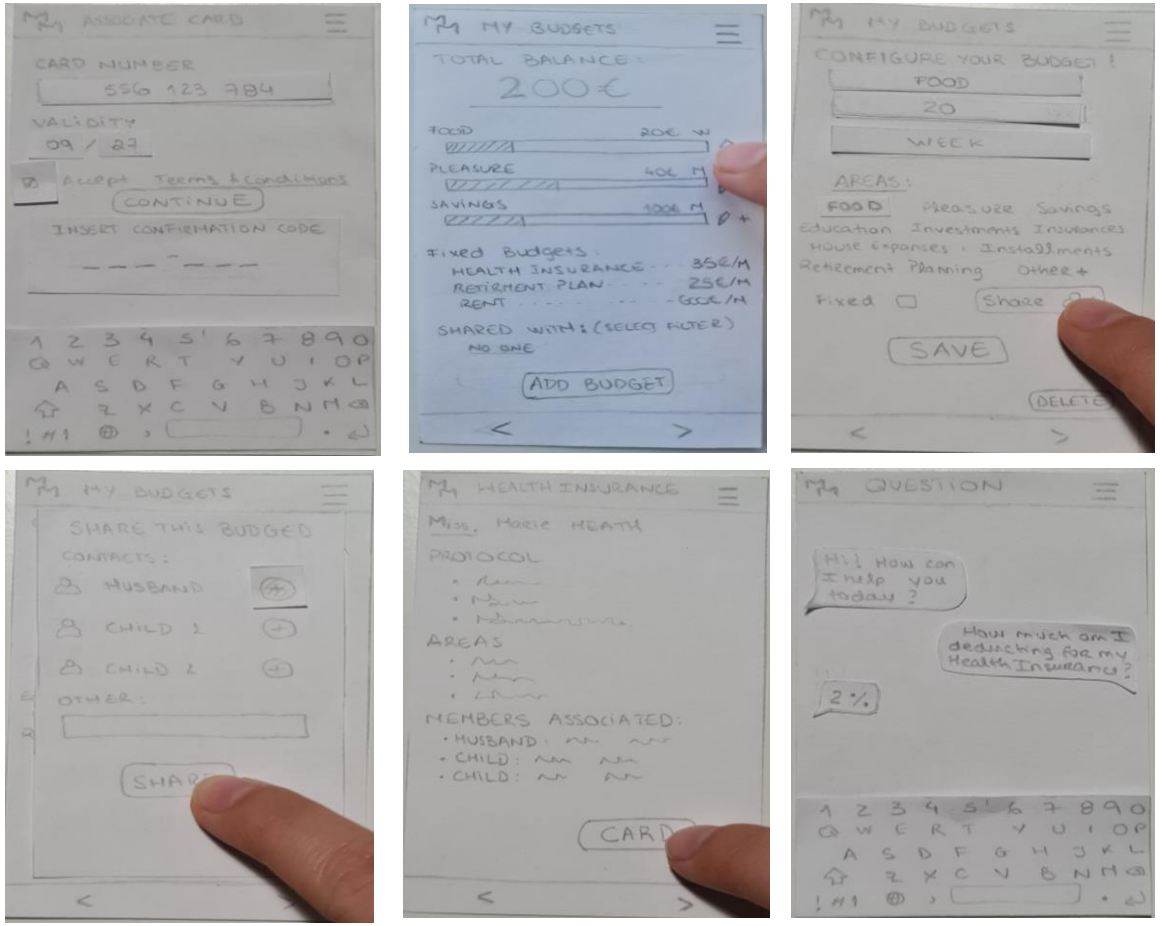
For the formative tests, we had our participants perform the following tasks for each prototype:

<u>First paper prototype:</u>

1. Create a new account (name: Marie, email: marie@gmail.com, password: M@******).
2. Add a new weekly budget for food with a value of 20€.
3. See your health insurance card.

<u>Second paper prototype:</u>

1. Create a new account (name: Marie Heath, email: marie@gmail.com, password: 123, card number: 556 123 774, validity: 09/27, validation code: 937-546).
2. Add a new weekly budget for food with a value of 80€ and share it with your husband.
3. Delete the budget that was previously added.
4. See your health insurance card.
5. Send a message to the support asking, “How much am I deducting for my health insurance?”



Second Prototype

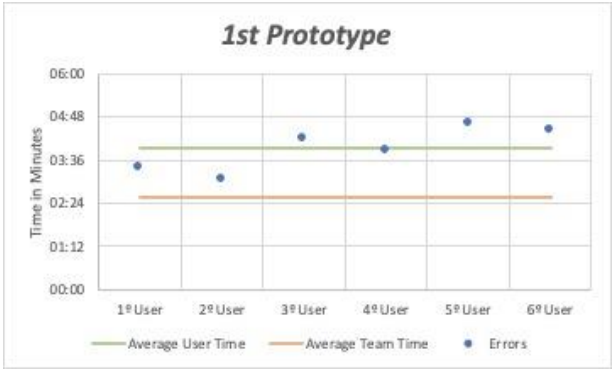
6. Send another message to the support asking, “What other plans are available?”
7. Contact your accountant.

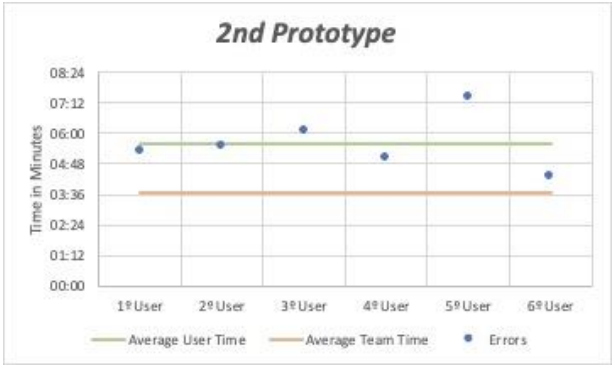
For our Low-Fidelity Prototypes, the evaluation process was done with participants based on our personas. Considering this information, we had six participants testing each prototype and the participants were either comfortable with technology or not comfortable (like our persona Mathew). The participants had different ages, so we could test the adaptivity of our solution. We gave extra thought to the remarks that participants less comfortable with technology made.

We created five scenarios for each persona and tasks based on the scenarios. We wanted to test if a certain task could be performed easily (under 10 minutes), if the users

felt satisfied by the information they found and if the interface felt intuitive and user-friendly, even for people who don't feel comfortable with technology, making sure that there were not more than 2 errors. With this in mind, we took note of any comments and asked their opinion on the structure and features of the app, as well as what rating they would give in terms of ease of use and if they would use this app in the future.

Time Comparison

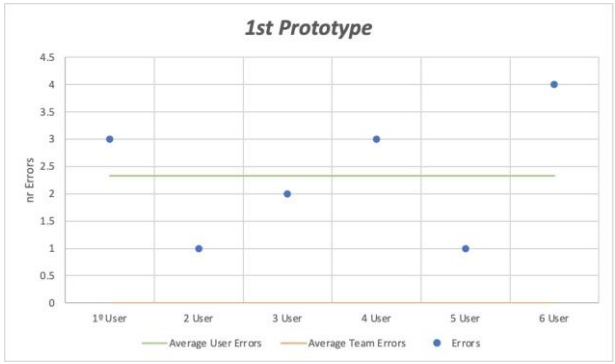


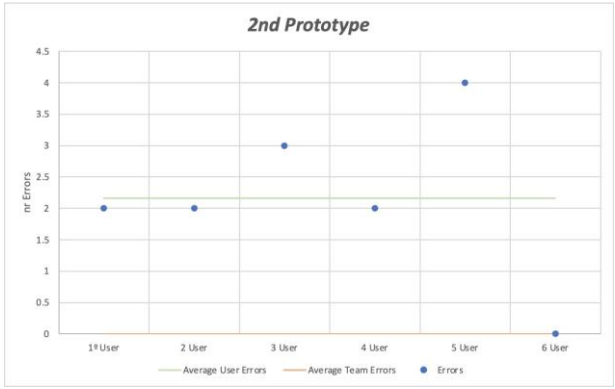


Comparing the above two graphics, we can see that all the users have a completion time superior to our team members. This happens because we know the prototypes. We believe that with experience, users will be familiarized with the app.

Error Comparison

We noticed that most errors occurred once a user used the forward or back arrows. Once that happened the flow of the tasks was lost given that they would then need to repeat some steps. Most times users used the arrows by mistake, and it did not take them to the screen they were expecting, creating confusion.





User Feedback

Users liked the changes in the second prototype, like sharing budgets and the chatbot support. However, they mentioned we should have a "Configure Your Budget" screen to check who is sharing a certain budget.

We intended to measure the time that users took to complete all the tasks and then we compared it to the baseline time set by the team (users should take less than 10 minutes to complete all the tasks). We also intended to measure the number of times they committed errors (users should not "get lost" in the app flow more than twice) and needed to go back or if they look confused, how they reacted to what they found and, at the end, how they rated the overall experience in terms of ease of use (users should rate the ease of use of app 4 or higher in the Likert scale). We also used the think-aloud method associated with Wizard of Oz and therefore, write down the comments made by people throughout the session. All the data was analysed "by hand".

Conclusions from the Formative Tests

We concluded from the feedback we got that the users liked the interface, that it was accessible even for those who have difficulties with technology. The second prototype has more features and people completed the tasks as in the first prototype.

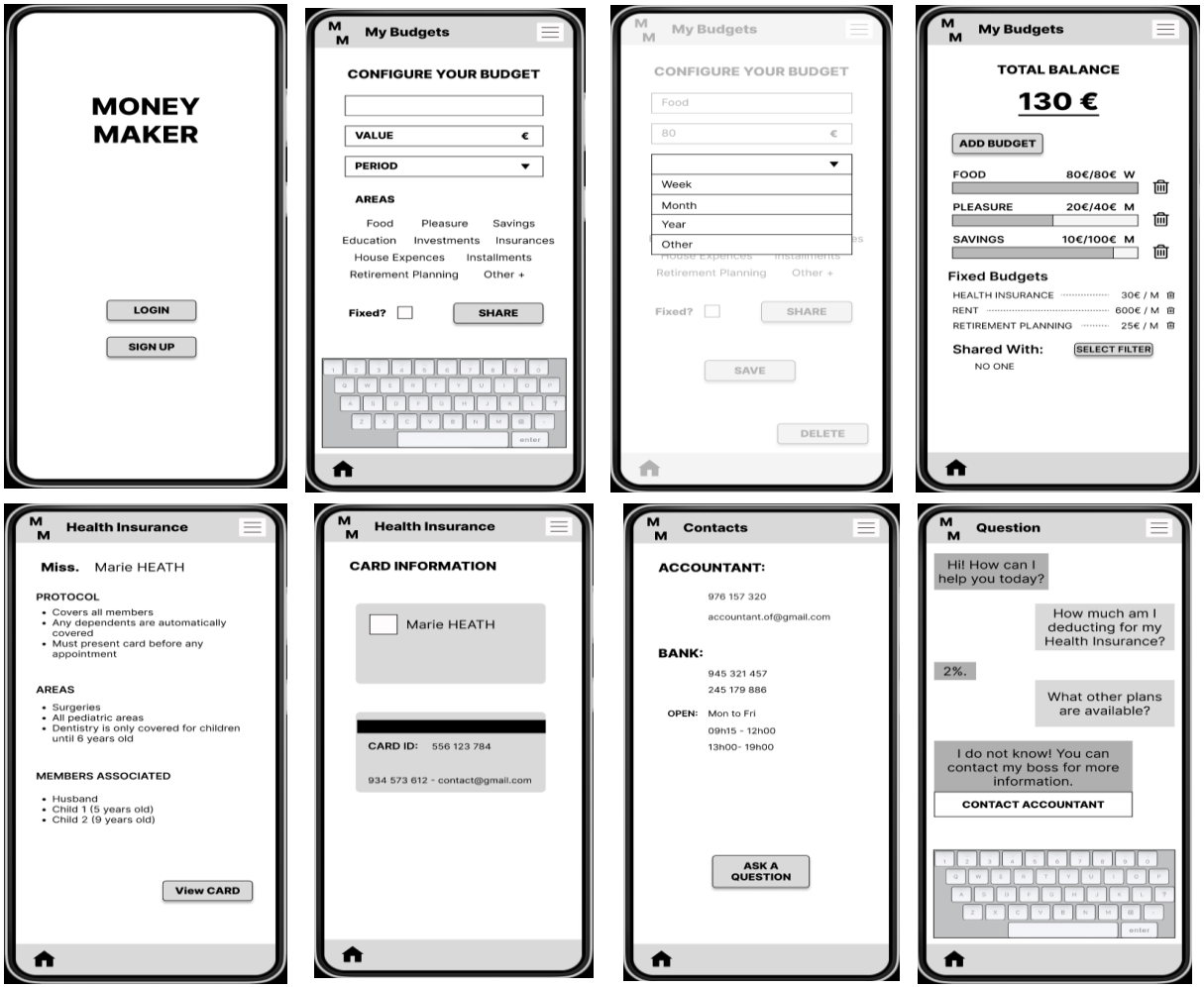
As such we set out to make two major adjustments. Given that the arrows we had in place only created confusion and were not necessary to move from screen to screen we decided to remove them.

The second adjustment was to add the requested feature of indicating in the "Shared" section which budget was shared with who.

With these two alterations, we hope to remove confusion and make it easier to navigate within the app, as well as give the users the features they believe are useful.

Mid-Fidelity Prototype

Using Figma as our prototyping tool we took our second low-fidelity prototype as our base and implemented the changes we extracted from the formative tests done on both low-fidelity prototypes. The resulting prototype can be viewed and tested in the following link: https://www.figma.com/file/yEo3foCs0JpSgUoMV3UDIf/MidFidelity?node-id=0%3A1&t=WzhxTZxy1WZzKYjG-1.



Tasks

For this prototype's formative user tests, we asked our users to complete the following tasks:

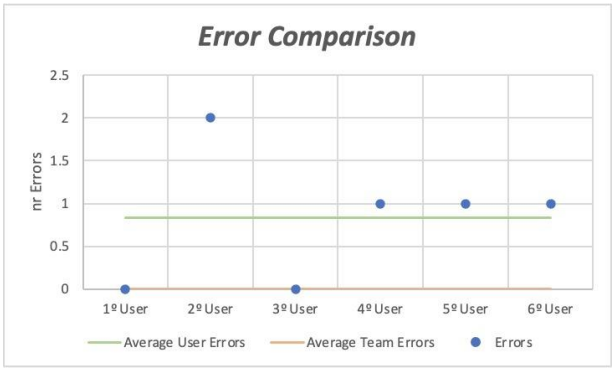
1. Create a new account.
2. Add a new weekly budget for food with a value of 80€ and share it with your husband.
3. Delete the budget that was previously added.
4. See your health insurance card.
5. Send a message to the support asking, "How much am I deducting for my health insurance?"
6. Send another message to the support asking, "What other plans are available?"
7. Contact your accountant.

With the same metrics used in our low-fidelity prototypes we measured the time each user took to complete all these tasks, and how many times users made an error or had to go back. We want the user's average completion time to be like our own so we can see if the users find the app as intuitive as we do (who know the structure of the app).

Time Comparison

All the users stayed under 5 minutes. Two of the users have done a time similar to the team members. We can see in the graphic above that the time is less than in the low-fidelity prototypes because some fields are pre-filled at this stage to test if it's working our implementation for users.

Error Comparison



Our goal was for the users not to make more than 2 errors, and only one user reached that number, all others were below. Also, we can in the graphic below, two users made no mistakes!

User Feedback

Like in the previous tests, we took note of any comments made during the think-aloud and after completing all the tasks, we asked the users their opinion of the app. We asked for improvement areas, how they would rate the app in the Likert Scale and how the app relates to others they have tried in the past. We received an average rating of 4.2 in the Likert Scale when asking if they would use our app (we asked our users to keep in mind that what they were testing was only a prototype of what the app would be like).

In terms of usability, more than one user mentioned the fact that if they did not have their health insurance connected to their bank, they would not be able to use the insurance card feature. It was also pointed out by two of our users that sometimes it may be useful to simply call their accountant for a quick question and not have to text the support chatbot first.

Excluding these two major changes, all others pertained to aesthetics and changed a lot from user to user.

Conclusions from the Formative Tests

From the feedback we got we set out to add the option to add an insurance card manually inside the health insurance menu.

Another change was to add an option to call the accountant directly from the contacts page. Having added this option we decided that it would be less confusing to remove the option to call the accountant from the messages with the support chatbot, this way the chatbot can still inform the user it has found an area in which it can be of no further assistance and ask the user to call the accountant, while we can make sure the user knows where to go to make the call if we place the button to call the accountant next to the button to start messaging the support chatbot.

High-Fidelity Prototype

Basing ourselves on the conclusions drawn from the evaluation of our mid-fidelity prototype we made the changes we deemed necessary in our prototype.

For this prototype, we also introduced color. We chose a color that was appealing to all age groups and that did not exclude people that have color blindness. Some members of our group previously developed a project that aimed at mitigating the difficulties color blind people face, and as such had researched the issue. We took that knowledge and got the help of a friend who suffers from this condition and researched which colors could best suit our needs. After research, we found that the color that met our requirements was blue and chose a shade that did not cause problems to our friend. As such, we used different shades of this color for different purposes but avoided mixing different colors to make it an app that kept users focused.

We made these changes and created our high-fidelity prototype (which can be found in the following link: https://www.figma.com/proto/7eOpDlnXu8Wt5RWJgE2JXf/High-Fidelity?scaling=scale-down&page-id=0%3A1&starting-point-node-id=1%3A4&node-id=1%3A4).

Evaluation Plan

For our summative tests we intend to follow the same path we had taken in the formative tests, such as having our user test group composed of adults planning their retirement, with both people who feel comfortable using technology and those who do not.

However, unlike the previous tests we will now have a bigger user group, this time with 20 participants.

While maintaining the created scenarios and personas in mind we will once again focus on the speed in which users perform the requested tasks and ask the users opinion on if they believe all the relevant information they need for each task is displayed as well as if they think the interface is user-friendly (if they have any difficulty knowing where to go next and if they believe the structure of the app is appropriate).

We maintain the same metrics and criteria. We want our users to not take more than 10 minutes to complete all the tasks but will be comparing their completion times with our own. We want to make sure that the times users look confused, make a mistake, or have to go back is limited to two. And lastly, we will take note of any comments they make during the think-aloud, any reactions to what they find and their opinion of ease of use (which we want to 4 or more in the Likert Scale).

Tasks

This prototype was then tested with users. For these tests we asked them to perform some tasks we defined:

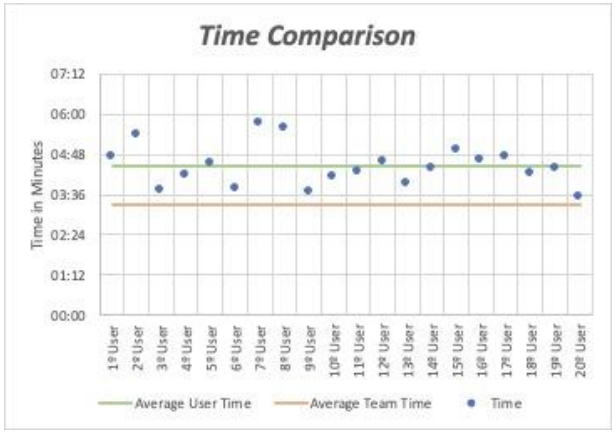
1. Create a new account (name: Marie Heath, email: marie@gmail.com, password: 123, card number: 556 123 774, validity: 09/27, validation code: 937-546).
2. Add a new weekly budget for food named “Market” with a value of 80€ and share it with your husband.
3. Add a new weekly budget for food named “Restaurant” with a value of 20€ and share it with your Child 1.
4. Add a new monthly fixed budget for Education named “School” with a value of 70€ and share it with your husband.
5. Edit the previously added budget and change the value to 65€.
6. Delete the budget for Education.
7. Add a new health insurance card (health insurance’ Company: Company, user’s name: Marie Heath, card ID: 845 478 203).
8. See your health insurance card.

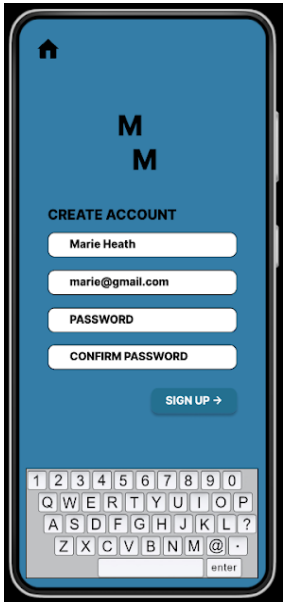
9. Log out from your account.
10. Log in with your previous account (email: marie@gmail.com, password: 123).
11. Contact your accountant.
12. Send a message to the support asking, “How much am I deducting for my health insurance?”
13. Send another message to the support asking, “What other plans are available?”
14. Contact your accountant again.

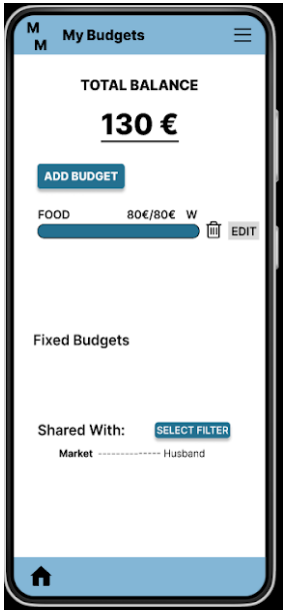
We once again measured the time each user took to complete all these tasks, and how many times users made an error or had to go back. The metrics we used were the same as the ones used to test the other prototypes. We compared the average time users took to complete all the tasks with the time our team took on average. Our goal is again for the difference between the two values to not be two big. The same logic is applied to the error average.

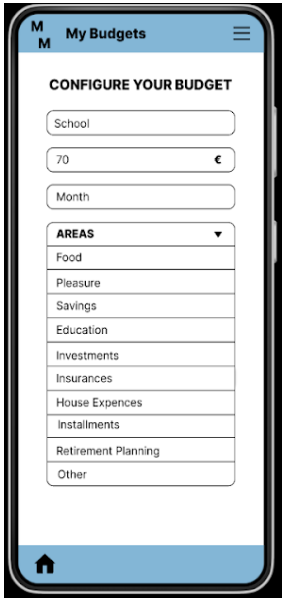
Time Comparison

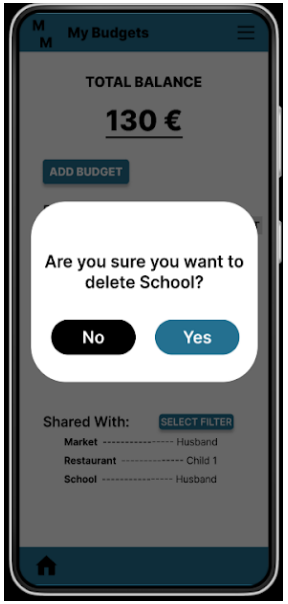
We can see, in the graphic below, that all the users stayed under 10 minutes and that the users’ average time is just 34% longer than the baseline set by our team.

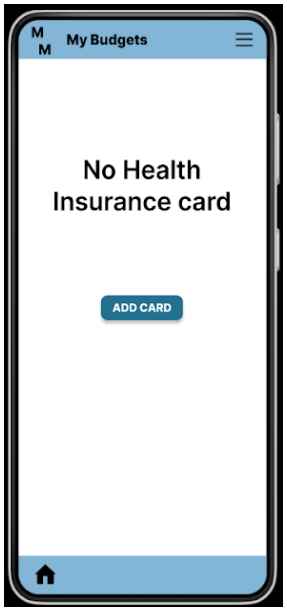


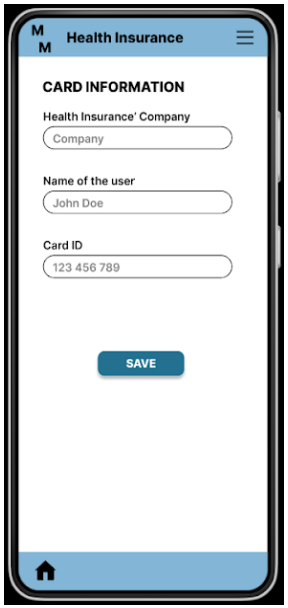


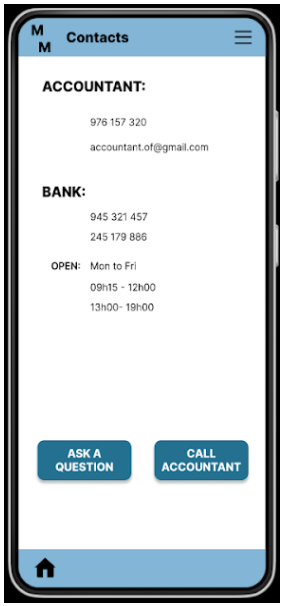






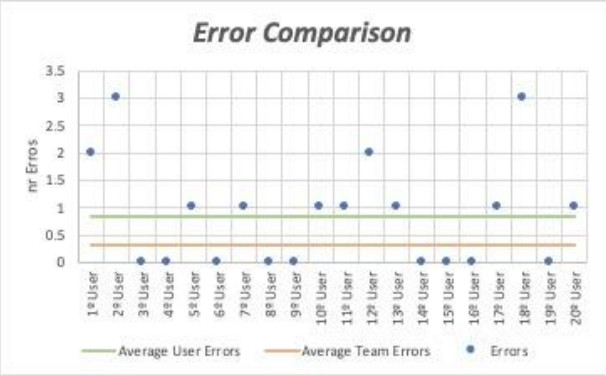






Error Comparison

Our goal was for the users not to make more than 2 errors. We observed that the average was safely below that number however, we saw that two of our users did make 3 errors. We attribute the errors above 2 to the fact that the users were not very comfortable with technology as well as the added complexity in the tasks given their number.



User Feedback

Like in the previous tests, in addition to taking note of any comments made during the think-aloud, after completing all the tasks, we asked each user their opinion of the app. We asked for points that could use improvement, how they would rate the app in the Likert Scale, if they think the app is easier to use and more appealing than others they have tried in the past. Our goal was to find if users would use our app and if not, what could we improve to make that happen. We received an average rating of 4.3 in the Likert Scale when asking if they would use our app.

When asked, most users identified that the blue colour was a good choice, others said they were indifferent, and one said they thought a livelier colour would be a better option. In terms of usability, more than one user pointed out that the buttons could be better identified, and the older users identified that the size of the buttons could also be increased for easier access. We also identified that when deleting a budget, some users chose the wrong one.

Conclusion from the Summative Tests

We concluded that keeping the colour we had chosen was the best option given our goal of tranquillity and focus when using the app. This was supported by most of the feedback pointing to it being a good choice.

After the feedback received, we decided to increase the button size and add a stroke around the button to better differentiate it from the background, thus increasing its visibility.

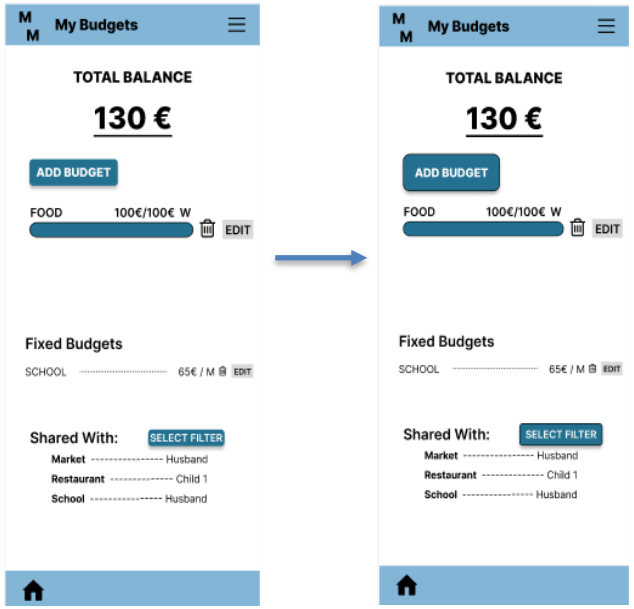
Given that most errors were around the action of deleting a budget, namely trying to delete the wrong one, we also believe a red colour on the button that confirms the action would be a better choice as it can alert users and make them pause before deleting, as to give them time to confirm their choice.

Apart from these changes we found that the users describe the app as easy to use and navigate and rate it well in the Likert Scale.

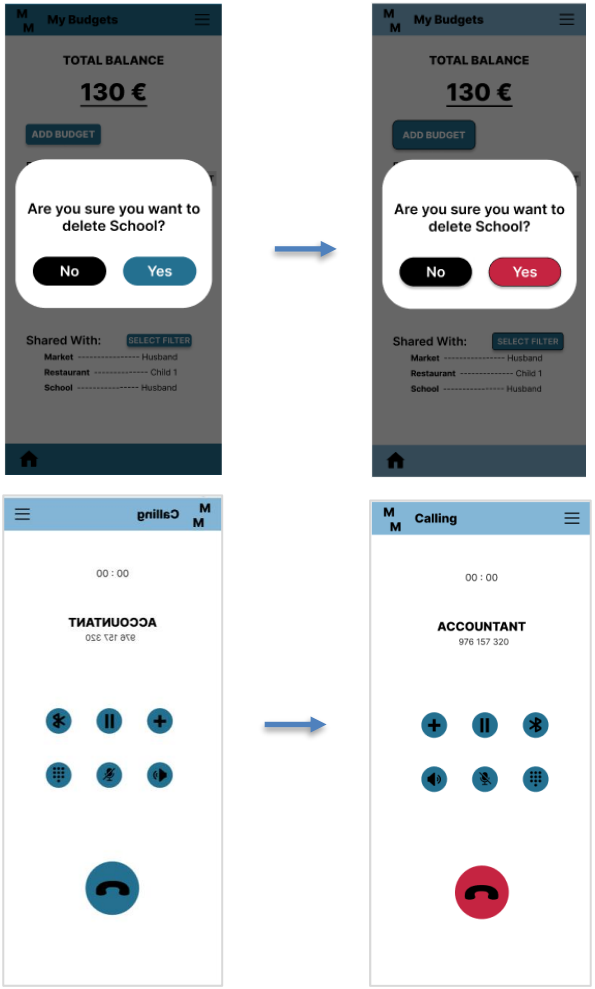
Prototype After Refinement

The refinement of our high-fidelity prototype consisted solely of making the three alterations we set out to make. This prototype can be viewed and tested here: https://www.figma.com/proto/yo8jCOACcIapZRgQqfu4gT/High-Fidelity-improvement?scaling=scale-down&page-id=0%3A1&starting-point-node-id=1%3A4&node-id=1%3A4

We increased the button size and added a stroke for better visibility.



We change the button color to red in cases that require the attention of the user, such as deleting a budget or ending a call.



CONCLUSION

Through our budgeting app, users can manage all the information they have on their finances in one place. This information can pertain to retirement plans, health insurances or simple periodical budgets to keep track of their spending. The app also allows family members to keep shared budgets that everyone can interact with, this allows for everyone to be on the same page but keep track of which people are included in which expenses.

Our app did prove to be easy to use, even for users who identified as not being comfortable with technology like our persona Matthew, users did not take too much time to complete the tasks given to them which indicated that the app presented a clear oath to resolve them, and users did not make many errors while using the app. In addition to quantitative results, we also obtained positive feedback when compared to other apps in the market given these present the same features but rarely all in one. As such, we believe that people would use our app to track their finances. However, given our last evaluation in the Likert Scale we believe that more iterations would be necessary to create an app that could rival the ones already available to the public.

Future Work

When it pertains to future work, other features could be implemented. We believe template selection allows people to choose the template that would help them visually to understand and keep track of their data. We also believe general budgets would further improve the differentiability between types of budgets, a person could then clearly separate business-related information and budgets from personal ones, and still have access to all the information at the click of a button. If we had more time, we also believe that the game idea that appeared during the ideation phase would benefit our users as it would be a tool, they could use to improve their financial literacy.

ACKNOWLEDGMENTS

We thank all the volunteers who participated in our user tests and those who answered our online questionnaires and interviews.