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METHODS OF DEVELOPMENT OF MOBILE APPLICATION GRAPHIC DESIGN FOR REMOTE INTERACTION WITH PATIENTS

Y. M. Hrabovskyi, P. G. Kots

*Simon Kuznets Kharkiv National University of Economics,
9a, Nauky Ave., Kharkiv, 61001, Ukraine*

The relevance of the subject of a mobile application graphic design for remote interaction with patients in conditions of coronavirus is substantiated. A list of functions of this mobile application is provided. A technique for creating a mobile application graphic design for remote interaction with patients is proposed. A structural diagram of the technology for creating a mobile application for remote interaction with patients is designed, which allows to formation of an algorithm for implementing the technology for developing this mobile application. The specifics of the process of brainstorming and the creation of preliminary design sketches are analyzed. The choice of the interface style is made, as a result of which the design of the active application buttons is selected. The best way to design buttons is to choose a rounded shape. A map of user flow transitions is created using the Google service. The user's path is demonstrated, starting from the entrance to the application and ending with the internal screens of each section of the application. Using the Figma environment, prototypes of the main application screens are created. A design system for a mobile application for remote interaction with patients is designed. Based on this design system, a graphical design of the interface of a mobile application for remote interaction with patients is created. An interactive prototype is developed in the Figma environment, which allows one to create a simulation of a real product where some controls work, and it is also possible to go to screens and interact with the interface. As a result of testing an interactive prototype, it turned out that it is adequately displayed on a certain mobile device.

Keywords: *mobile application, graphic design, remote interaction, interface.*

Problem statement. Life and health are important aspects of everyone's life. Good health is the key to energy, well-being and safety. But in 2020, the COVID-19 pandemic completely changed people's lives and forced them to accept new realities.

COVID-19 created conditions for the population of the whole world, under which millions of people had to adapt. Every outing has become a real risk to life, especially those at risk. More and more institutions were forced to switch to remote work, from business structures to educational institutions. Many services can now be obtained online, remotely in contact with the right specialists.

The pandemic has especially affected those who are in constant treatment and should often visit a doctor. But the hospital in such times has become one of the most dangerous places where there is a high risk of catching the virus. Usually, a large number of patients come to the hospital every day who do not even suspect that they may be carriers of COVID-19.

Given the fact that smartphones have recently become an integral part of society - the most optimal way for patients to interact with their doctors will be a mobile application. The application should be convenient, useful and easy to use.

The mobile application must fulfill the main needs of patients: review the treatment plan, analyze the course of the disease, create notifications about meals, medicines and cleaning, as well as contact the family doctor and have a possible appointment for consultations. Thanks to the creation of reminders, the patient will stop caring about important stages of treatment and will be able to discipline himself.

These aspects determine the relevance of the problems of influence by means of a mobile application on a person's attitude to his health and safety through the way of simplifying treatment and interaction with doctors. The creation of an appropriate methodology for developing the design of a mobile application for remote interaction with patients will provide an opportunity to obtain scientific tools to support the processes of creating such applications.

Analysis of recent research and publications. In scientific research on the subject of the article, technologies for visualizing information in mobile applications are systematized [1-3], general recommendations for maintaining human health are provided [4, 5], mathematical models that describe the design of application interfaces are substantiated [6-9], methods for processing graphic images in mobile applications are formed, taking into account their design features [10-14]. But today in the specialized literature there is no scientifically substantiated methodology for creating a graphic design of a mobile application for remote interaction with patients.

Aim of the article. The purpose of the study is to develop a methodology for creating a graphic design of a mobile application for remote interaction with patients.

Presentation of the main material of the study. To create a convenient and attractive application design, one needs to go through the main stages of interface design. One needs to work out every detail, go deeper into each stage and follow the correct order of development. The main stages of the methodology for developing a graphic design of a mobile application for remote interaction with patients include:

1) creating a concept. This stage begins with the idea of the customer, and the developer, in turn, analyses the niche, analogues and target audience;

2) brainstorm and development of the first sketches. Brainstorm allows one to expand the range of possible approaches to design, because not always the first idea will be the best solution for further implementation. The first sketches are created on paper to transfer their ideas from the head into real images and demonstrate options to the customer;

3) creating a transition map. The transition map or User Flow is a visual scenario of user interaction with the application, which illustrates the product logic and transition options at each stage of using it;

4) approval of the structure and transition map. At this stage, we demonstrate to the customer the chosen structure and the developed transition map for their approval. This should be done in order to immediately make all changes regarding the structure of the application even before the design development, because in the next stages it will be more difficult to do this;

5) choice of interface style. At this stage, one needs to decide on the style and direction of the interface, given the niche and the target audience of users of this application. For convenience, one can pick up references, analyse them and choose the best option;

6) confirmation of style. At this stage, one needs to justify your choice to the customer and demonstrate possible options for a design solution. The goal is to complete the discussion by adopting an option that satisfies the client and the developer;

7) prototyping, design and demonstration of results. Once all these stages are completed, it's time to develop and show the customer the full version of the design. The demonstration may look different. The best solution is to create a clickable prototype, where the customer will be able to independently evaluate the convenience of using the application and the visual component of the design. But such a prototype takes a lot of time;

8) creating a design system for a mobile application. A design system is a set of rules and tools for visual and technical execution that reflects the philosophy of the product. It must be used to form a single style and holistic design for both developers and designers when designing mobile applications, as well as its individual screens and components;

9) design the interface of the mobile application.

Consider the specifics of the practical implementation of the main stages of the methodology for developing the design of a mobile application for remote interaction with patients.

Creating a concept. Figure 1 shows a block diagram of the technology for creating a mobile application for remote interaction with patients.

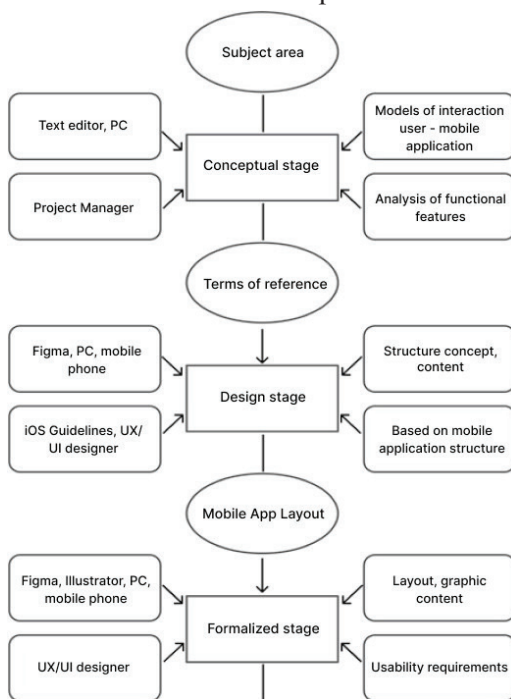


Fig. 1. Structural diagram of technology for creating a mobile application for remote interaction with patients (beginning)

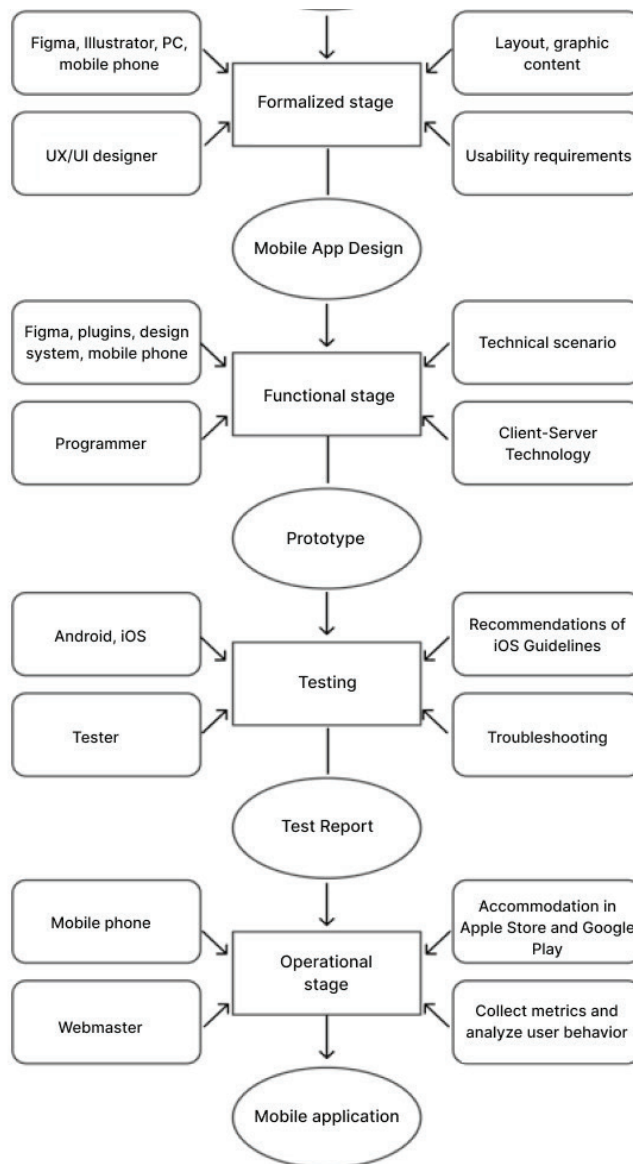


Fig. 1. Structural diagram of technology for creating a mobile application for remote interaction with patients

The created structural scheme allows one to form an algorithm for implementing the technology of developing a mobile application for remote interaction with patients.

The development of any mobile application begins with an idea. However, in order to achieve a good result, first of all one needs to conduct a deep analysis of competitors, the target audience and determine the needs of potential users. The target audience includes people over the age of 18 who have a valid declaration with a family doctor and need constant consultation with him, as well as constant treatment.

The most useful application will be for those who have chronic diseases, so as not to risk their lives and health during the pandemic, or those who do not have the opportunity to consult with a doctor offline.

Brainstorm and development of the first sketches. The next stage in the design of the mobile application interface is the process of brainstorming and the creation of preliminary design sketches, which in the future will serve as the basis for the final product.

Brainstorming or brainstorming is an effective way to solve problems and current tasks, based on stimulating the creative activity of team members. The goal of brainstorming is to generate as many ideas as possible and determine the best solution in various ways.

During the brainstorm, it will be logical to determine the main screens that will make up the structure of our application. Such screens are: login or registration of the user, the main menu, the “Treatment” section, in which one can go to the “Diary,” “Timers,” “Condition analysis” and “Information,” the “Consultations” section, where one can go to the chat (text, audio or video) with the family doctor and sign up for a consultation, as well as the “Profile” section, where one can view personal data, medical history and consultations, add contact persons and exit the application.

Based on the conclusions that were made during the Brainstorm, one can go to the definition of the structure and hierarchy of sections in order to further develop a transition map and prototypes.

Choice of interface style. At this stage, it is also advisable to choose the design of the active buttons of the application: the best option for them will be a rounded shape. Colors should be such that they evoke emotions of calm, confidence for their health, related to the topic of medicine and were attractive to the user. Therefore, the optimal color will be green.

Creating a transition map. For the mobile application for remote interaction with patients, user flow is developed using the Google service and the user’s path was demonstrated, starting from the entrance to the application and ending with the internal screens of each section. The result of creating a transition map is demonstrated in Fig. 2.

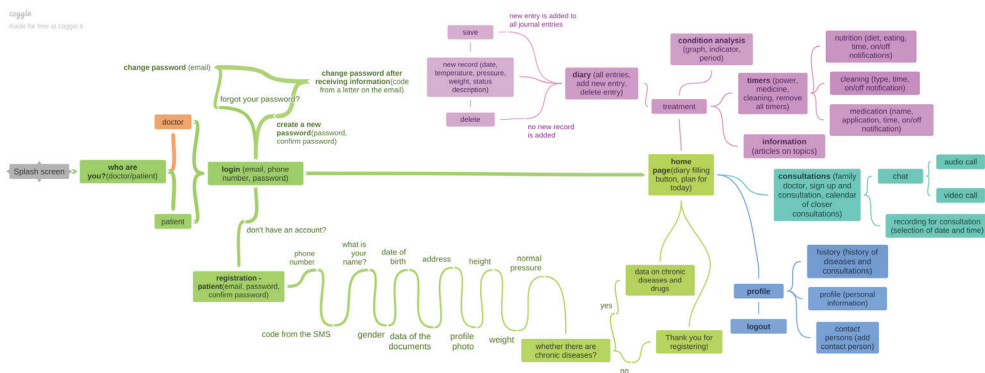


Fig. 2. Result of mobile application transition map creation

Prototyping is the creation of a layout, a model of a future module in order to determine the correctness of the structure of the module, its functionality and, in general, the concept of the module. The prototype can be either accurate or schematic, static or interactive.

The main task at the prototype stage is to project schematically the appearance of the screens, and even to think over the logic of the transition from among them.

There are many tools on the market that make prototyping for mobile applications easier, from online services to desktop products. To create a prototype of the mobile application, the Figma application was used. This environment has excellent tools for developing prototypes, as well as the ability to create a new page in a file for convenience.

In our case, it is advisable to develop prototypes for the main sections, namely: Home, Treatment, Timers, Diary, Condition Analysis, Information, Consultations, Chat, Profile (Fig. 3).



Fig. 3. Prototypes of main screens

Thanks to prototyping, it is already possible to understand the structure and hierarchy of data sections of a mobile application, to determine the order and location of headings, subheadings, main and secondary elements. No less important are graphic images that will complement the basic information and contribute to its better assimilation. Images also give the layout a more attractive look, form a single interface style and simplify the use of the application.

At this stage, it is clear how the navigation, main menu items and individual sections will be located.

Creation of a design system for a mobile application for remote interaction with patients. At the stage of creating a design system, we must already decide on the main design elements: fonts, colours, the appearance of buttons and cards, icons, etc. To design a mobile application for remote interaction with patients, I chose white as the background, bright green as the main colour, black as the text colour, and coral, yellow, light green, light grey and dark grey as additional colours.

To design the text, the grotesque “SF Pro Display” headset was taken, which is native to the IOS system and therefore causes the user to trust and confidence. SemiBold is selected for the first-level headings, Medium for the second and third, and Regular for the main and secondary text.

The result of the design system development can be considered in Fig. 4.

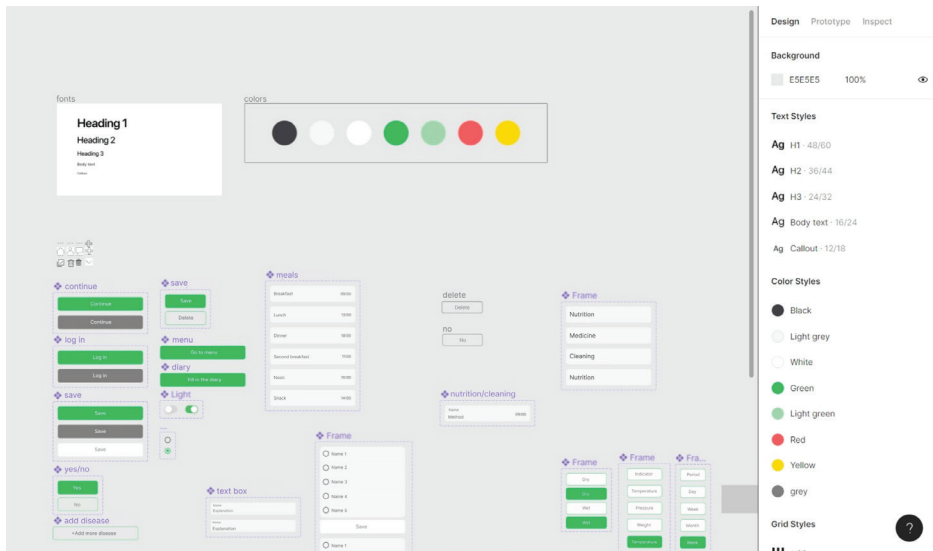


Fig. 4. Result of design system development

Development of a mobile application interface design for remote interaction with patients. First of all, one needs to decide on the name and logo of the application. This is very important since the name and “icon” in the App Store will be the first user interaction with the application. As a logo (Fig. 5), a heart-shaped sign is developed with a cardiogram that runs throughout it, which will be associated with life and medicine by the user.



Fig. 5. Application icon

When designing a mobile application, one needs to pay attention to its functional component, that is, to all the steps that the user will overcome during interaction with the application. Due to the fact that User Flow and the design system have already been prepared, design development will become more understandable, fast and effective.

When the user enters the application, first of all, he sees the loading screen (splash screen). Next, he is asked to choose whether he is a doctor or a patient, and then to intercept the entry screen. If the user does not have an account, he can click on “Register” and go to the registration screen.

Registration consists of 14 steps, during which the user must enter information about himself, which will help the doctor during the treatment of the patient. This, for example, creating an account thanks to Email and password, adding a phone number, surname and name, gender.

Next, the user is asked to indicate the date of birth, document data (for synchronization with the electronic database of health care), home address, profile photo, height data, weight.

Equally important is the addition of information about normal pressure, as well as existing chronic diseases and medications taken through them, so that the doctor can adjust the treatment depending on the indications and contraindications.

After registering or logging in, the user enters the main screen of the application (Fig. 6). It is a plan for the day, which indicates the meals, medicines and cleaning that the user has created in the “Timers” section. He also has the opportunity to quickly go to the diary and add a new record of his well-being.

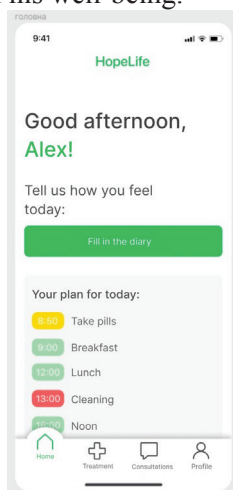


Fig. 6. Main application menu

The Treatment menu consists of four sections: Diary, Timers, Condition Analysis, Information. The diary (Fig. 7) is somewhat similar to ordinary notes on the phone, in which the patient can add indicators such as temperature, pressure and weight, as well as describe his condition and symptoms in free form. Unlike ordinary notes, the family doctor also has access to the patient's diary. He can view the notes from his account and, thanks to this, adjust the treatment.

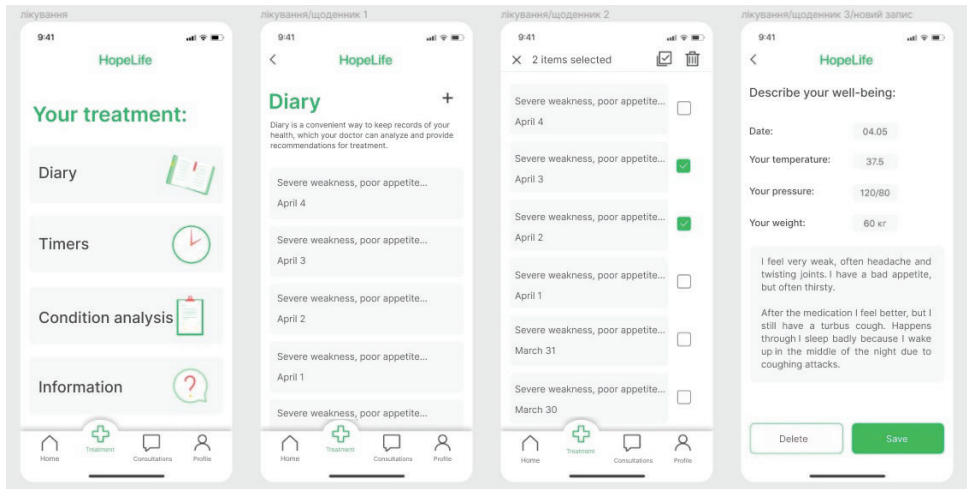


Fig. 7. Design of the screens “Treatment” and “Diary”

The Timers section has three subsections: Food, medicine and cleaning. Figure 8 shows the appearance of subdivisions before and after filling them.

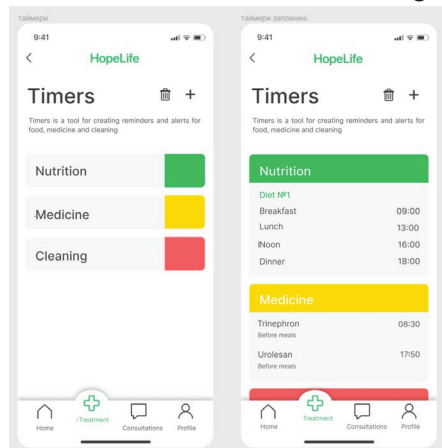


Fig. 8. Design of “Timers” menu screens

In each of the units, one can set up reminders for meals, medicines and dry or wet cleaning. Specifying the exact time, the patient will receive notifications on the phone, so that he will not forget, for example, to drink pills on time.

Health analysis is a section of the mobile application that contains a summary of all the indicators that affect treatment, namely temperature, pressure and weight. This analysis is presented in the form of a graph on which one can view the dynamics of changes in a certain indicator for the selected period (day, week, month).

Analysis of the patient’s state of health is also available to his family doctor. Thanks to such monitoring, the doctor will be able to quickly determine the patient’s condition without looking for the necessary entry in the diary.

The “Information” section is simply a source of useful articles that the patient may need during treatment. There one can find, for example, useful information about diets (what one can and cannot eat within each of them), or about the symptoms and prevention of COVID-19, etc.

The “Consultations” menu (Fig. 9) consists of information about the family doctor, the calendar of the nearest consultations and the opportunity to sign up for a new consultation. One can also go to a text chat with a family doctor, make an audio or video call. When one clicks on the “Sign up for a consultation” button, one can select the desired date and time of the consultation, after which it will appear on the calendar.



Fig. 9. Design of screens in the “Consultations” section

The audio and video call interface is similar to the usual call interface on iOS. The only difference is that in addition to the name on the screen there is an inscription “family doctor” (Fig. 10).



Fig. 10. Design of audio and video call screens

The “Profile” menu (Fig. 11) consists of the sections “Personal Information,” “Contacts,” “History,” it is also possible to exit. In “Personal Information” one can view the data that the user added during registration and change some of them. In the “Contact persons” section, one can add close people (relatives, friends) and their contacts to quickly contact them in case of an emergency with a patient. The “History” contains a history of diseases and consultations with dates for a convenient view of the chronology of treatment. In this section one can see the dates and times of consultations, the doctor who conducted them, recommendations and prescribed drugs. Also fixed the beginning and end of each disease, as well as the prescribed treatment.

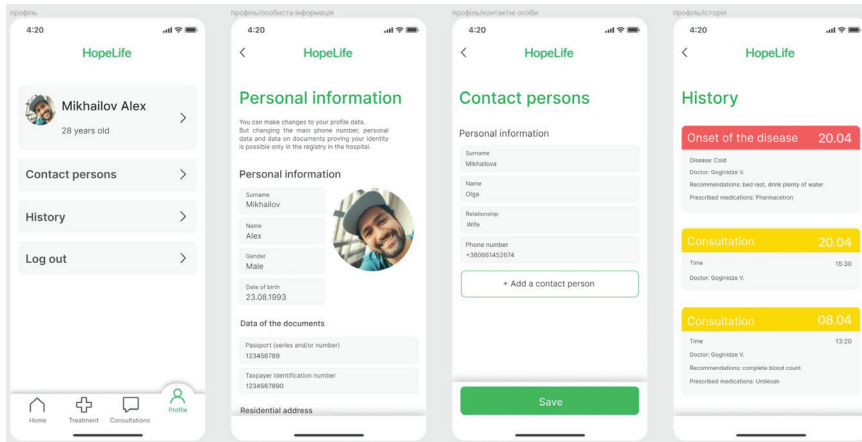


Fig. 11. Profile section screen design

Thus, the design of the screens of the mobile application for remote interaction with patients was developed.

Interactive prototypes in the Figma environment allow one to create a simulation of a real product in which some controls work, it is possible to go to screens and interact with the interface. In such a prototype, one can simulate pressing buttons, scrolling the screen, shuffling elements, etc. One can also customize the animation, which will make the design of the mobile application more interesting and easy to use.

With the help of an interactive prototype, it is much better to demonstrate the result of the design development to the customer, since he has the opportunity to independently present himself as a potential user and interact with the application.

An interactive prototype is developed by creating links between frames, setting triggers and animations. This is quite voluminous and painstaking work that requires maximum concentration. Some elements of the interactive prototype are shown in Figure 12.

As a result, the interactive prototype is displayed on a specific device (which was previously selected from the settings on the right side of the screen), making it more convenient to present.

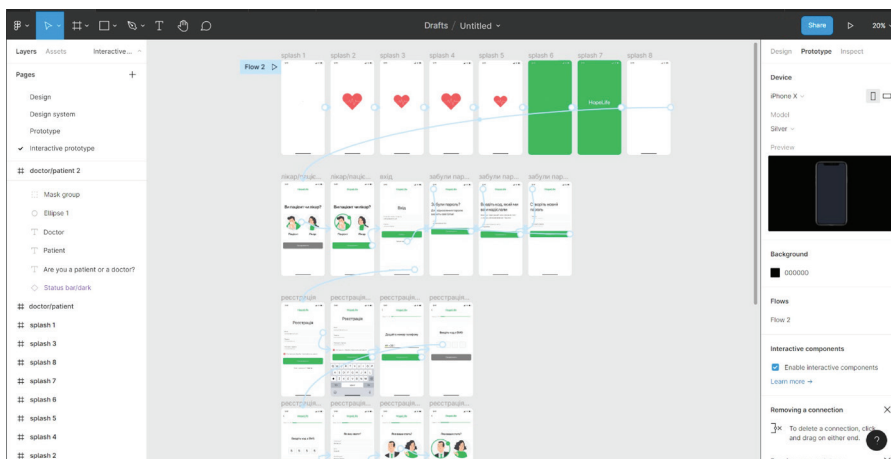


Fig. 12. Developing an interactive prototype

Conclusions. General theoretical aspects of designing graphic design of mobile applications are considered. The main stages of the methodology for developing a graphic design of a mobile application for remote interaction with patients are proposed. A block diagram of the technology for creating a mobile application for remote interaction with patients is developed. A design system for this mobile application is created based on a pre-designed User Flow scheme. The design of the interface of the mobile application for remote interaction with patients is developed. The technology of implementation of the developed methodology in the form of an interactive prototype of a mobile application in the Figma environment is analysed.

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МЕТОДИКА РОЗРОБКИ ГРАФІЧНОГО ДИЗАЙНУ МОБІЛЬНОГО ДОДАТКУ ДЛЯ ДИСТАНЦІЙНОЇ ВЗАЄМОДІЇ ІЗ ХВОРИМИ

Є. М. Грабовський, П. Г. Коц

*Харківський національний економічний університет імені Семена Кузнеця,
просп. Науки, 9а, Харків, 61001, Україна
maxtin903@gmail.com,
kocpolina11@gmail.com*

Обґрунтовано актуальність тематики розробки графічного дизайну мобільного додатку для дистанційної взаємодії зі хворими в умовах коронавірусу. Надано перелік функцій даного мобільного додатку. Запропоновано методика створення графічного дизайну мобільного додатку для дистанційної взаємодії зі хворими. Спроектовано структурну схему технології створення мобільного додатку для дистанційної взаємодії зі хворими, яка дозволяє сформувати алгоритм реалізації технології розробки даного мобільного додатку. Проаналізовано специфіку здійснення процесу брейншторму та створення попередніх ескізів дизайну. Здійснено вибір стилістики інтерфейсу, внаслідок чого обрано оформлення активних кнопок додатку. У якості найкращого варіанту оформлення кнопок обрано округлу форму. Створено мапу переходів user flow за допомогою сервісу Google. Продемонстровано шлях користувача, починаючи з входу у додаток та закінчуючи внутрішніми екранами кожного розділу додатку. За допомогою середовища Figma створено прототипи головних екранів додатку. Спроектовано дизайн-систему для мобільного додатку для дистанційної взаємодії зі хворими. На основі даної дизайн-системи створено графічний дизайн інтерфейсу мобільного додатку для дистанційної взаємодії зі хворими. Розроблено інтерактивний прототип у середовищі Figma, який дозволяє створювати імітацію реального продукту, де працюють деякі елементи управління, а також є можливість переходити на екрани і взаємодіяти з інтерфейсом. У результаті тестування інтерактивного прототипу виявилось, що він адекватно відображається на певному мобільному пристрою.

Ключові слова: мобільний додаток, графічний дизайн, дистанційна взаємодія, інтерфейс.

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