МАТЕРИАЛЫ

VII Международной молодежной научной конференции

«МАТЕМАТИЧЕСКОЕ И ПРОГРАММНОЕ ОБЕСПЕЧЕНИЕ ИНФОРМАЦИОННЫХ, ТЕХНИЧЕСКИХ И ЭКОНОМИЧЕСКИХ СИСТЕМ»

Томск, 23–25 мая 2019 г.

Под общей редакцией
кандидата технических наук И.С. Шмырина

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CURRENT PROBLEMS IN UX-DESIGN SPHERE

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Introduction

The field of UX-design is an actively developing and changing field in science, it is also noted in scientific research [1]. Analysis of the scientific literature allows us to study the problems of UX design and their solutions, which are presented in the latest modern studies of 2016-2019. According to research, you can trace new directions in the study of UX-design.

1. Theoretical issues of UX research

Starting to talk about UX design, it is impossible not to consider human-computer interaction as well HCI initially focused on the work of a person with a computer interface, but now this concept has become much broader and includes all types of devices with displays (fig. 1).
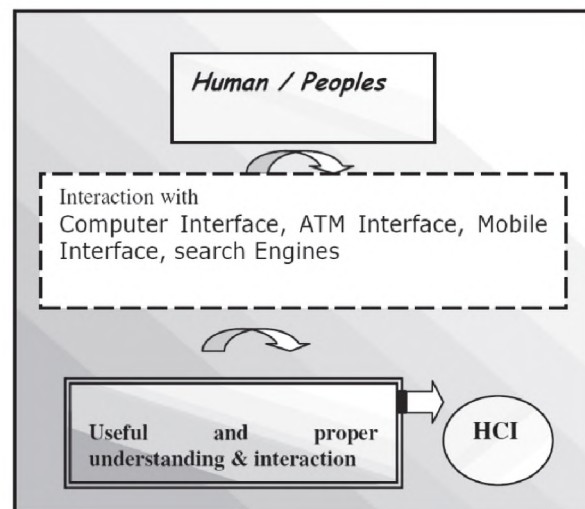

Fig. 1. Human interaction with computer and other devices

The main tasks of HCI are the creation of: more convenient interfaces, methodologies and interface design processes, an attractive interface, methods of using interfaces, a convenient information environment that allows you to process information faster [2]

Thus, UX-design can be considered a subsection of HCI, which focuses on creating efficient and user-friendly interfaces.Literature review by Tomasz Nedzielka [3] identified about 100 UX-methods of research. But despite this, the most common are the following: observa-

tion, interviews, prototyping, task analysis, cognitive passage, questionnaires, brief and longitudinal field studies as well as mixed methods.In addition, all of them can be divided into two global groups: individual and group laboratory studies.

Joy Robinson, Candice Lanius, and Ryan Weber [1] overlap in conclusions regarding the popularity of methods with previous work. However, they identified surveys and interviews as particularly common.It is worth noting that most of the UX research is based on methods imported from other disciplines, but there are a number of proprietary methods in the UX, such as contextual queries and eye tracking.

Despite the lack of similarity in the definition of the concept UX, due toits interdisciplinarity, Stefan Hellweger with co-authors [4], based on the literature, built a concept in which the elements of UX intersect with fields of application:

Element\ Field	Design	Information Technology	Psychology
Product	Novelty	Mobility, adaptability	Ethics
User	Ergonomic Issues	Productivity/reliability	Requirements (Needs), self-expression
Interaction	Brand	Engagement rate	Emotional fulfillment

On the basis of existing research methods UX, Hussein J., Khan V.A., Khur T. and other authors in their study [5] created a special research platform combining the collection of information using different methods and sensors (audio, video, sensors of fixing biometric indicators), as well as through direct user interaction (surveys, self-analysis, logging), fig. 2.
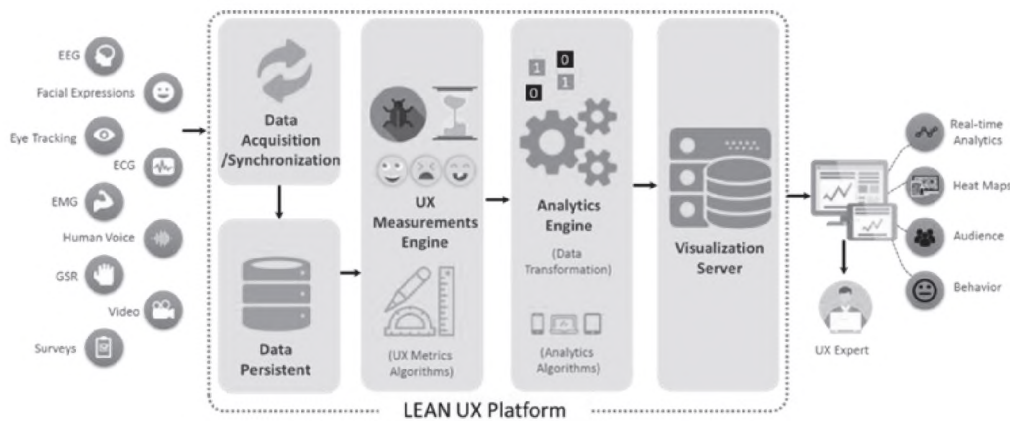

Fig. 2. Diagram of a research platform based on Lean UX

The considered research platform is based on Lean UX, which includes product development through continuous measurement of the so-called "learning loop» (construction – measurement – training) (fig. 3), and is able to receive and store data obtained from all sources, which are further analyzed. Data analysis allows us to conclude the user's perception of a product in order toits further improvement.

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Fig. 3. The "tlearning loop" scheme

Marieke Van Camp and his co-authors also wrote about the effectiveness of methods of monitoring physical condition [6]. They analyze in detail the method of electroencephalography (EEG) to collect data on the bioelectric activity of individual zones, areas, brain, which occurs when the user interacts with the product, but the study also summarizes that for an adequate assessment of the user experience it is necessary not to limit the EEG results and combine both objective and subjective measurements.

Also, speaking about the UX study, one cannot fail to mention the cases when users showed a lot of negative emotions during interaction with the product, but afterwards they were convinced that their experience was positive. One of the reasons for this phenomenon can be called the gap in memory, defined as "the discrepancy between averaged experiences and the overall assessment of the experience, which is usually more intense than the averaged emotions." Hence the need to use a set of empirical research methods with methods that use machinery [7].

Lin Feng [8] in her work suggested using an approach that helps determine the quality of user experience, both in primary and in continuous use. Its essence is in the combination of the Attrakdiff questionnaire with the Hassenzal model [9] and the UX Curve method.

2. Practical applications of UX research

2.1. The use of UX for commercial purposes

In addition to the analysis of the UX sphere as a whole, as well as the development of new methods, researchers pay considerable attention to the application of methods in practice and evaluation of their effectiveness.

So, Rendani M. Kruger and colleagues conducted work in this direction [10]. They investigated the potential value of comparative UX for e-commerce. By comparative UX between companies, they understand a detailed study of the similarities or differences between user behavior when using interfaces of various organizations, with comparable goals. The main tools in the study were the case method and the eye tracker.

Florian Lachner et al. [11] in their study, tested the applicability of UX-based web analytics metrics as part of a cross-cultural experience of interacting with sites. The result of the work was the identification of significant differences in the perception of the same element of users from France, Germany and Italy, and hence the need to take this fact into account when developing products.

2.2. Application of UX techniques to help users with disabilities

UX techniques can be considered not only for commerce, but also on the social agenda. Scientists are paying a lot of attention to developing interfaces for people with various disabilities.

Papri Ghosh et al. [12] describe collective approaches to designing human-computer interaction for people with disabilities. At the moment, there are a lot of interfaces that embody these principles, such as an audio navigation system for people with visual impairments, a video navigation system for people with hearing problems and a voice command wheelchair for people with limited movement abilities. However, the complexity of designing such systems lies in maintaining a balance between the embodied functionality and the cost of implementation, since it is necessary to make devices accessible to audiences with different financial capabilities.

A particular difficulty lies in the fact that most user experience assessment (UX) tools require users to reflect and express their thoughts on their own (for example, thoughts out aloud, retrospective interviews, questionnaires). However, in the context of development for people with dementia, conditions such as aphasia and overall cognitive decline limit the applicability of these methods. To do this, Stefan Huber and co-authors [13] developed a separate application, the essence of which is to record human emotions and their subsequent video comparison.

Continue to work with people with dementia and Parkinson's disease and Naomi Kokubu with co-authors,[14] consider a cognitive function testing device sensitive to the determination of neuropsychological parameters in patients with these diseases. EXperience test-Trail Making User (UX-TBL) is a modified test ways of solving problems, which considers the achievement of the objectives on the screen of the tablet. UX-TY consists of 3 main components: 1) neurocognitive assessment, 2) cognitive training and 3) logging. In addition, UX-TMT has moderate Cronbach alpha values, indicating good internal consistency. UX-TBL is currently only available in Japanese language, but can be used for mass screening and monitoring the progression of dementia disorders.

Tiago Nogueira and Deller Ferreira [15] work with people with visual impairments. They study in their work the perception of web trends by visually impaired and blind users. They highlight the fact that websites are fundamental tools for communication, information and services, especially for people with visual impairments. For people with disabilities, the Internet is necessary for social and professional integration. However, millions of people around the world have difficulty interacting with websites and web applications. The reason is the low level of usability of these products.

3. The latest ways to improve human-computer interaction

In addition to researching existing UX design methods, scientists are also working to create new methods and devices. So, in April 2019, a patent was registered for a UX enhancement device based on the voice query history [16].

Another group of inventors moved away from the UX enhancement model for a large group of users and focused on creating a device to personalize user preferences[17]. B. Alenlyung, J. Lindblom, R. Anderason and T. Zimke [18], however, proceeded to consider the prospects for further development of user experience. In their opinion, socially interactive robots will be of increasing importance in everyday life for a large number of people. Recently, the number of socially interacting robots in the human environment has increased, and their level of participation in everyday activities has become increasingly diverse. For robots – as with all other types of interactive systems, products, and devices – a positive user experience is needed to achieve the intended goals.If the use of a robot entails a negative user experience, this can have negative consequences, such as unwillingness to use a particular robot or robots in general. Therefore, it is important for developers of robots to make serious efforts to

create robots that users consider positive. The study emphasizes the importance of researching not only a negative user experience, but also a positive one.

Conclusion

In the course of this work, the most recent studies in the field of UX-design were studied. Note that the literature highlights the problems of collecting and analyzing user experience, both theoretical and practical. Summarizing the above, we can say that today UX-design is an actual research direction not only in practical activities, but also in science. The user experience thus makes it possible to improve existing products and create new ones so that they meet the needs of users for efficiency, reliability, usability, and also evoke positive emotions. UX-research is a complex and multifaceted process both from a theoretical and practical point of view, therefore this topic is relevant for research in science.

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