

Usability of gaming environments in cybersport

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Abstract. The article is devoted to the issues of engineering and psychological evaluation of gaming interfaces and environments for eSports. The typical program interface of group computer games is analyzed from the point of view of their user properties (usability). The functions and structure of the game interface are discussed. Definitions are given and the main usability functions are considered as an application to the gaming systems used in eSports. The basic requirements for user properties are formulated, and definitions of usability are given in accordance with the requirements of the International Organization for Standardization (ISO). The basic concepts of usability testing are given.

1. Introduction

Currently, when creating gaming environments and systems of interfaces in eSports, interest in applied aspects of ergonomics and engineering psychology is growing steadily, as well as usability is of interest which is a discipline quite new for the Russians [1]. This is primarily due to the intensive development of computer-aided simulation of artificial interactive gaming environments which form a sense of presence and the possibility of active action in accordance with the plot and scenario of the game. Virtual worlds are realized, reflecting some physical reality, including those with anomalous properties, forming the game world [2]. Questions about the inclusion of the subject of the game in the game world, its embodiment in the game character are associated with the implementation of the user interface, whose properties determine the capabilities of the gamer, his mental and psycho-physiological state and health [3]. This determines the urgency of solving the problem of the ecological gaming interface, which must take into account the user properties of interfaces and create comfortable and safe conditions for gamers.

Many developers of gaming environments for eSports are familiar with the technologies of design of games concept and scenario, programming and multimodal modeling and are able to independently create software products used in eSports. In addition to direct gaming appointments, these programs are replicated and are being introduced to the computer games market as innovative products created for the mass user. This fast-growing market involves tens of thousands of specialists in the field of organizing and conducting sports tournaments, coaches and teachers, engineering psychologists, game developers and game design experts [4]. The emerging industry of eSports requires managers and marketers in this area. Most modern conferences on computer games and information technology are mainly devoted to discussing the products of creative activity of developers. However, despite the mass character and serious financial costs for this field of activity, there has been created only a few number of high-quality products for meeting the requirements of gamers. There are only a few dozen products that are used in eSports. The main reason for this situation is low qualification of the game program creators in the field of engineering psychology and areas related to the design and evaluation of user interfaces. One of these directions is usability, and the present article is devoted to consideration of its methods and principles in relation to the interfaces of mass e-sports gaming platforms.

In many world countries the practice of attracting usability specialists to creating and evaluating various aspects of software products related to interaction has existed for more than 30 years, but only in recent years has become widespread (Jeff Jonson, Steve Krug, Alan Cooper, Jef Raskin, Russ Unger, etc.) [5–9]. In Russia, usability is understood as the Western version of a sufficiently developed in the works of Russian scientists, scientific and practical discipline for creating interfaces of ergatic systems. (A.N. Anokhin, V.F. Venda, A.I. Galaktionov, T.P. Zinchenko, G.L. Koroteev, A.N. Kostin, A.A. Krylov, V.M. Lvov, B.F. Lomov, V. M. Magazannik, A. I. Naftulev, A. A. Oboznov, S. F. Sergeev, A. G. Chachko) [10–17]. To solve problems in eSports, this is a new discipline that

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does not have deep scientific traditions and is fragmentary used in the design practice. However, every year attention to the usability of information products increases. A growing number of software developers are thinking how to make working with their products as comfortable, efficient and safe as possible [18, 19]. There is a growing understanding that usability can become a serious competitive advantage in wrestling.

Technologies and methods used in appropriate design situations should be known to practitioners associated with the design of user interface systems for mass computer gaming environments.

2. Software game interface and its structure

Working in a computer gaming environment, the gamer interacts with its software part called the interface. In general case, a game interface is a part of the system that ensures the interaction of the gamer with the game environment and other users in the process of realizing the goals and objectives of the game activity and its participants.

Interface software is a set of software tools which provide a user dialogue with computing tools and visualization of virtual objects on the screen.

Technical means of the interface is means of displaying information (MDI) and controlling elements (CI) used by the user during the dialogue with computing tools.

With growth and development of network data transmission systems, such as the Internet, interfaces have become widespread which provide gameplay and user interaction with various application and service programs through a browser. The systems of gaming web interfaces have appeared.

A web interface is a collection of means by which a user interacts with a website that implements the content of the game world through a web application. It is referred to software interfaces.

Web interfaces are convenient as they provide an opportunity for participants who are not in the same audience to conduct joint gaming activities.

A software interface is a system of unified networks designed for the exchange of information between components of a computer system. The program interface specifies a set of necessary procedures, their parameters and methods of treatment.

3. Gaming user interface

Working with a gaming computer program, participants of an e-sports competition are faced with a gaming user interface which sets the rules for interface elements and interactive technology, allowing the user to effectively solve the game problem. It is through a convenient and intuitive interface that the user judges the gaming platform as a whole; decides on its rejection or use. The user interface is designed to provide interaction between the user and the process which performs some task - an application program. The objectives of this interaction are the information transfer from the user to the application program, and the results of the program to the user. The interface also plays a major role in interpreting the results of the application program [20].

4. Key features and gaming user interface requirements

At present, in the engineering environment, software and user interfaces are most often used, and at the same time the available standards indicate what these interfaces should not be, i.e., limit the number of possible options for constructing an interface very slightly.

Any gaming user interface (UI) should provide the following four main functions:

- Management by a gamer's actions the resources and means of the game available in accordance with the rules and plot of the game.
- Data input from gamers, and obtaining a response system.
- Data display, including the display of information entered by the gamer controlling the display process.
- Gamers support during the gaming activities, carried out through feedback channels, in which information about erroneous or random (not algorithm) actions circulates.

An efficient UI should ensure the full use of the gamer's potential capabilities, technical and informational software of the workplace, high accuracy and speed of activity when using PIs for their intended purpose. In addition, a well-designed UI should ensure maximum comfort for a gamer's activity. In particular it should not result in an unjustified increase in activity intensity, a decrease in the level of psycho-physiological and psychological indicators necessary for effective and comfortable performance of a game activity.

In accordance with domestic and foreign standards, the user interface of a game program should:

- Contribute to the gamer rapid mastering of the game control algorithms, formation of his activity stereotypes;

- Be designed in such a way that the gamer enters information in a natural way, without worrying about the course of the computing process;
- Meet the work and expected needs of a gamer;
- Contain a system of user rules that allows easy control of the gaming system;
- To be under control of the gamers during the whole game time, no actions of the latter should lead to a deadlock or to the program hang-up;
- Provide the ability to easily correct input errors, do not require re-entry of data;
- Feedback and help should provide the user with information allowing him to manage the dialogue, recognize and correct mistakes, determine the subsequent actions included in the game algorithm;
- Computer-generated information should be concise, clear, specific and understandable to the gamer;
- The amount of information provided must be consistent with the amount of RAM and the stage of the game;
- Provide for the use of four types of dialogue: menus, commands, manipulations and dialogue by filling out forms;
- When solving game problems, the user should be given the opportunity to use at least two types of dialogue. The criterion for selecting the type of dialogue in the course of solving a specific task is to ensure the specified indicators of accuracy and speed.

5. The structure of the gaming user interface

The user interface consists of three main parts:

- Visual design, responsible for presenting information to the gamer.
- The functionality of the system, including a set of features for the efficient implementation of gaming activities.
- Techniques of user interaction with the gaming environment.

However, computer game developers often consider the functionality of a gaming system separately from its user interface, and hardly consider the elements of the user-system interaction. It is assumed that the UI is a kind of addition to the functionality of the system. For their part, users of programs, as a rule, do not divide functionality and the user interface. For users, it is the UI that is the program. The impression of interaction with the gaming software product (SP) is formed directly from the work with the interface.

A step-by-step development of the user interface allows one to increase the efficiency of the software product, reduce the time of user training, reduce the cost of finalizing the system after its implementation, and also fully utilize the functionality incorporated into the program.

6. Basic usability concepts

Usability (applicability) of a product means that people who use this product (program) can quickly and easily set and carry out their own (including gaming) tasks without noticing the interface and its features.

This definition relies on four statements: (1) usability means the need to focus on users; (2) man uses products to be productive; (3) users are busy people trying to complete tasks; and (4) it is the users who decide when the product is convenient.

Usability means that this or that thing works well if a person of average ability and experience can use it for its intended purpose regardless of what it is. Usability begins with a philosophy - the belief that design meets the user needs and focuses on creating a high-quality user experience. To achieve a real goal of usability, certain technologies and methods are required. Usability takes into account the circle of people using the product, answers the questions what their goals and needs are, selects the right methods to answer the question - "How well does this product meet the usability requirements of users?"

It is important to understand that the applicability is not a one-dimensional quality of the user interface. Usability has many components and is traditionally associated with five signs: learning ability, efficiency, memorability, errors, satisfaction.

Usability (user properties, applicability for use) is a measurable characteristic that is present to a greater or lesser extent in all products, which describes how effectively (actually) the user can interact with the product.

"Usability refers to the extent up to which a product can be used by specified users to achieve specified goals with efficiency and satisfaction in the specified context of use." - International Organization for Standardization ISO 9241-11 [21].

"A person-oriented project is characterized by: active involvement of users and a clear understanding by users the task requirements; appropriate distribution of functions between users and technology; repeating project decisions; multidisciplinary of the project «. - International Organization for Standardization ISO 13407 [22].

The benefits of adding usability methods to the process of ensuring the life cycle of a product (game program) include:

- Increased productivity;
- Increased sales and revenue;
- Reduced time and cost of training;
- Reduced time and costs of development;
- Reduced maintenance costs;
- Increased customer satisfaction.

Special software testing methods are used to evaluate software usability. Usability testing is a set of methods and tools to measure the characteristics of user interaction with a product in order to assess the level of implementation of user properties (usability) of a product.

During usability testing, it is examined how well users perform particular standard tasks and what problems they face. The results of such testing help to identify both problems that complicate the understanding and use of the product, as well as successful solutions. Usability testing is carried out in special laboratories equipped with special equipment that ensures testing and compliance with the psychometric requirements for the testing procedure [15].

7. Conclusions

The use of usability methods in designing user interface properties of gaming environments of cybersportsmen allows improving the quality of gaming platforms and gamers' activities. This allows one to expand the audience of eSports by ensuring the quality of activities and reducing the requirements for psycho-physiological qualities of gamers.

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