Tashkent University of Information Technologies named after Muhammad al-Khwarizmi

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The schoolbook on the discipline

"Human and computer communication"

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The schoolbook on the discipline "Human and computer communication". Tashkent University of Information Technologies named after Muhammad al-Khwarizmi. Tashkent, 104 pages.

The aim of the training manual is to consolidate knowledge in the field of human interaction - computer interaction, interface design and design, to gain practical skills in developing the user interface.

Topics covered are: human interaction - computer interaction, usability principles and principles of emotion, user analysis and content analysis, technical platform and interface types, interface design, visual design, information architecture design, interactive design.

The manual is intended for teachers and students of higher educational institutions in the direction "5330500 - Computer Engineering".

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Reviewer:

Introduction

The course interface for computer-computer systems represents user interface and design principles of human and computer communication. The peculiarities of human perception, the psychological aspects of interactive interaction with the operator computer, the methods and tools for designing user interfaces.

The concepts of interactive interaction, the human-machine interface, the user interface are introduced. Approaches to the design of the user interface, questions of standardization are considered. A brief overview of some methodologies and principles of interface design is given.

A brief overview of the main requirements and typical steps in the development process of the user interface.

The stage of formation of functional requirements to the application interface and some methods applied in this case are considered.

A description of several methods of user analysis used in the design of human-machine interfaces is given.

Creating a user interface prototype is a simple and highly effective way to test ideas related to the development of the user interface before writing any code. Prototyping allows you to identify flaws and errors in the interface in the early stages and, thereby, reduce development costs.

The course "Human and computer communication" suggests studying the basics of human-computer interaction and learning how to add elements of natural-intuitive interaction to applications with it. The course is intended for undergraduate students in the direction "5330600 - Program Engineering". A total of 96 hours is provided for the curriculum course. Of these, 36 hours of lectures, 18 hours of practical training and 42 hours of independent work.

1. Human-computer interaction

1.1. Human-computer interaction

Human-computer interaction (HCI) is a multidisciplinary scientific field that exists and develops in order to improve the methods of developing, evaluating and implementing interactive computer systems intended for human use, and also for researching various aspects of this use.

Manipulator "mouse" - one of the means of human-computer interaction

Human-computer interaction (HCI) is the study, planning and development of interaction between people (users) and computers. Often it is regarded as the totality of the science of computers, design and other areas of research. The interaction between users and computers occurs at the level of the user interface (or simply the interface), which includes software and hardware; for example, images or objects displayed on display screens, data received from the user through hardware input devices (such as keyboards and mice) and other user interactions with large automated systems such as an aircraft and a power plant.

The Association of Computing Technology considers the interaction of a person and a computer as "a discipline that deals with the design, evaluation and implementation of interactive computing systems for human use, and the study of ongoing processes." An important aspect of human-computer interaction is the provision of user satisfaction.

Due to the fact that human-computer interaction is studied both from the human side and from the computer, the knowledge obtained during the research is based both on the human factor and on the computer one. On the computer side, the technologies of computer graphics, operating systems, programming languages and the development environment are important. On the human side, the theory of communication, graphic and industrial design, linguistics, sociology, cognitive psychology and such human factors as user satisfaction.

Also, engineering and design matters. Thanks to the interdisciplinary nature of human-computer interaction, people with different levels of training contribute

to its success. Sometimes human-computer interaction is termed as human-computer interaction, and computer-human interaction.

An important criterion is attention to human-computer interaction, since poorly designed interfaces can cause many unforeseen problems.

The main task of human-computer interaction is to improve the interaction between man and computer, making computers more convenient (usability) and responsive to the needs of users. In particular, human-computer interaction deals with:

• methodology and development of the design of interfaces (i.e., based on requirements and class of users, designing the best interface within the specified framework, optimizing for the required properties, such as learnability and efficiency of use);

• methods for implementing interfaces (for example, software tools, libraries and rational algorithms);

• methods for evaluating and comparing such interfaces;

• development of new interfaces and methods of interaction;

• development of descriptive and predictable models;

• The theory of interaction.

The long-term task of human-computer interaction is the development of a system that will reduce the barrier between the human cognitive model of what they want to achieve and the computer's understanding of the tasks assigned to it.

Experts of human-computer interaction are, as a rule, developers who are engaged in the practical application of development methods to real world problems. Their work, often, revolves around the development of graphical and web interfaces.

Researchers of human-computer interaction are engaged in the development of new design techniques, experiments with new hardware devices, the creation of prototypes for new software systems, the study of new paradigms for interaction and the development of theories and interaction models.

In the study of a personal information manager (PIM), the interaction of a person with a computer is in a vast information environment - people can work with various forms of information, some of which are computer, many are not (for example, boards, notebooks, stickers, stickers on magnets) to understand and effectively influence the desired changes in their world. In the field of computer-supported collaboration, the emphasis is on the use of computer systems in support of the teamwork of a group of people.

Principles of command work management expand the scope of computer-supported teamwork at the organizational level and can be implemented without the use of computer systems.

1.2. Human-computer interface

Creating a high-quality human-computer interface, which can be called a point of communication between a person and a computer, is the ultimate goal of studying human-computer interaction.

The exchange of information between a person and a computer can be defined as an interaction node. The interaction node includes several aspects:

• Scope of tasks: conditions and goals that are user-centric.

• Machine area: the environment with which the computer interacts, that is, the student's laptop in the room, in the college dormitory.

• Interface areas: non-overlapping areas relating to human and computer processes that are not related to interaction.

• Inbound: A stream of information that begins in the task pane when the user has several tasks that require the use of a computer.

• Output stream: the information flow that occurs in the machine.

• Feedback: the interaction nodes passing through the interface are evaluated, moderated and confirmed, as they pass from the person through the interface to the computer and back.

1.3. Differences in related areas

Human-computer interaction has differences with the human factor (taken into account in ergonomics and usability) in that human-computer interaction focuses more on users working with computers rather than other techniques or artifacts. Also, human-computer interaction focuses on the implementation of software and hardware to support human-computer interaction. Thus, the human factor is a broader concept; and human-computer interaction can be characterized as a human factor - although some experts try to separate these areas.

Also, human-computer interaction differs from the human factor by less emphasis on tasks and procedures, and much less emphasis on physical stress, resulting from the design of interface devices (such as a keyboard and mouse).

Human-computer interaction has developed in the context of multidirectional scientific vectors (computer graphics, engineering psychology, ergonomics, organization theory, cognitive science, computer science and many others).

The beginning of the ergonomic phase of human-computer interaction can be considered the thesis of Ivan Sutherland (Sutherland, 1963), which determined the development of computer graphics as a science. At the same time, computer graphics needed ergonomic projects to effectively manage complex CAD / CAM models. Studies in this area were continued in the works of Man-machine symbiosis, Augmentation of human intellect and Dynabook. As a result of scientific research, those tools have been developed without which it is difficult to imagine working with a computer now: a mouse, a bitmap display, a window, a desktop metaphor, point-and-click-editors.

Similarly, the problems of human operations performed by a computer were a natural extension of the classical goals of engineering psychology, except that the new problems had a significant cognitive, communication and interactive nature, not previously considered in engineering psychology, and contributed to the advancement of engineering psychology in this direction.

Ergonomic studies also emphasized the relationship of working conditions to stress-causing phenomena such as routine work, sitting position, visual perception of visual images on displays and many others previously not considered interrelated.

Finally, the question: "How does the use of computer technology fit into the design of production technology?" Brought interaction with computers to the level of effective work organization and included even in the problems of social management.

When evaluating the current user interface or developing a new interface, keep in mind the following design principles:

• From the outset, you need to focus on users and tasks: set the number of users required to complete the task and identify the appropriate users; someone who has never used the interface, or someone who will never use it in the future, is an unsuitable user. In addition, you need to determine what tasks and how often users will perform.

• Empirical measurements: at an early stage, conduct an interface test with real users who use the interface every day. Keep in mind that results may change if the user's performance level is not an accurate representation of real human-computer interaction. To establish quantitative features of practicality, such as: the number of users performing tasks, the time of the task, and the number of errors made during the task.

• Iterative design: after determining the number of users, tasks, empirical measurements, perform the following steps of iterative development:

1. develop a user interface,

2. conduct the testing,

3. Analyze the results,

4. Repeat the previous steps.

Repeat the iterative development until you create a practical, user-friendly interface.

A variety of methods, describing the techniques of designing human-computer interaction, began to appear during the development of this area in the 1980s. Most of the development techniques originated from the model of interaction between users, developers and technical systems.

Early techniques, for example, interpreted the cognitive processes of users as predictable and quantifiable, and suggested that developers, when designing user interfaces, consider the results of cognitive research in areas such as memory and attention.

Modern models tend to focus on constant feedback and dialogue between users, developers and engineers, and make efforts to ensure that technical systems revolve around users 'desires, rather than users' desires around an already-ready system.

• User-centered design: user-oriented development is currently a modern, widely practiced philosophy, the essence of which is that users should be central to the development of any computer system. Users, developers and technicians work together to clearly express wishes, needs and boundaries, and create a system that meets these requirements. User-oriented projects often use ethnographic research, in which users will work with the system. This practice is similar, but it is not a collaborative development that emphasizes the opportunity for users to actively collaborate through sessions and seminars.

• Principles for developing the user interface: these seven principles can be viewed at any time, in any order during the entire development time, such as: custom, simplicity, evidence, acceptability, consistency, structure and feedback.

1.4. Display Development

The display is designed to perceive system variables and to facilitate further processing of this information. Before designing the display, the tasks performed by this display (for example, navigation, management, training, entertainment) should be defined. The user or operator must be able to process any information

that the system generates and displays, so information must be displayed in accordance with the principles that provide perception and understanding.

Christopher Wickens identified 13 principles for the development of the display in his book "An Introduction to Human Factors Engineering".

These principles of perception and processing of information can be used to create an effective display project. Reducing the number of errors, the time required, increasing the effectiveness and increasing the level of user satisfaction are among the many potential benefits that can be achieved by applying these principles. Some principles cannot be applied to some displays or situations.

Some principles may seem contradictory, and there is no evidence that one principle is more important than another. Principles can be adapted to a particular design or situation. The functional balance between principles is important for effective design.

Principles pertaining to perception

1. Make the display clear. Readability of the display is an important criterion in the design of the display. If the characters or objects are not displayed clearly, then the user can not use them effectively.

2. Avoid absolutely strict boundaries. Do not ask the user to determine the level of the variable based on only one sensor variable (for example, color, size, volume). These sensory variables can contain many different levels.

3. Top-to-bottom processing. Signals are interpreted and interpreted in accordance with expectations based on the user's earlier experience. If the signal is presented contrary to the expectations of the user, then more will be required to demonstrate that the signal was correctly understood.

4. Excessive benefits. If the signal is presented more than once, there is more chance that it will be understood correctly. This can be done by presenting it in alternative physical forms (for example, color, shape, voice, etc.), since redundancy does not imply a repetition. The traffic light is an excellent example of redundancy, so the color and position are redundant.

5. Similarities lead to confusion. Use different elements. Similar signals will lead to confusion. The ratio of similar characteristics to different signs is the reason for the similarity of the signals. For example, A423B9 is more like A423B8 than 92 for 93. Unnecessary similar features should be removed, and unlike signs should be highlighted.

Principles of the speculative model

6. The principle of visual realism. The screen should look like the variable it represents (for example, the high temperature on the thermometer is shown by the highest vertical level). If there are many components, they can be configured the way they will look in the environment where they will be presented.

7. The principle of the moving part. Moving elements should move along that scheme and in the direction in which it occurs in the mental representation of the user, as it moves in the system. For example, a moving element on an altimeter should move upward with gaining altitude.

Principles based on attention

8. Minimize the time of access to information. When the attention of the user moves from one place to another in order to access the necessary information, it takes a lot of time and effort. The design of the display should reduce these costs, so the source often used should be in the closest position. However, understanding must not be lost.

9. Principle of compatibility. The divided attention between the two sources may be necessary to accomplish one task. These sources must be mentally interconnected and have a mental intimacy. Access time to information should be small and this can be achieved in various ways (for example, close proximity, the same color, patterns, shapes, etc.). However, the proximity of the display can lead to confusion.

10. The principle of a large number of resources. The user can more easily process information from different resources. For example, visual and auditory information can be presented simultaneously, than represent all visual and all audio information.

Principles of memory

11. Replace memory with visual information: world knowledge. The user should not store important information exclusively in working memory or extract it from long-term memory. The menu / list can help the user to simplify the use of memory. However, the use of memory can sometimes help the user, since it eliminates the need to refer to some types of knowledge in the world (for example, a computer expert would rather use direct commands from memory than refer to the manual). For effective development, knowledge in the user's head and knowledge in the world must be balanced.

12. The principle of predictive assistance. Proactive actions are usually more effective than reactive actions. The display should exclude resource-intensive cognitive tasks and replace them with simpler tasks in order to reduce the use of the user's mental resources. This will allow the user to concentrate not only on the current situation, but also to think about possible situations in the future. An example of predictive help is a road sign that informs about the distance to the destination.

13. Principle of compatibility. Old features of other displays can easily be transferred to the development of new displays if their designs are compatible. Long-term user memory will be triggered to perform the appropriate actions. During the development, this fact must be taken into account and the compatibility between different displays should be taken into account.

Question

1. What do you think about Human-computer interaction?
2. Who are the Experts of human-computer interaction?
3. What is Human-computer interface?
4. What is the interaction node aspects?
5. What are the differences between Human-computer interaction with human factor?

2. Principles of usability

Usability in translation from English means simplicity and convenience of use. With respect to web design, this means primarily the "friendliness" of the page to the visitor.

Often it turns out that the user does not do on the site what is expected of him: do not register, do not subscribe, do not order the goods. And the reason for this can be quite trivial - an uncomfortable interface. An invisible button, a large chain of clicks and a bunch of forms to accomplish the targeted action makes the site simply uncompetitive.

2.1. Usability Rules

1. The rule of seven. It is proved that short-term human memory is capable of memorizing 5-9 entities. From this follows the recommendation to use no more than 7 items in the navigation menu.

2. The rule of two seconds. In this case, the number 2 means the time in seconds that the user is willing to wait before the final page load or some element is loaded. In this regard, it is worthwhile to think carefully before placing on it a heavy flash presentation or game.

3. The rule of three clicks. Here everything is clear: from the main page to any internal one should lead a maximum of three consecutive links. First, thanks to this, the site is better indexed by the search engines, and secondly, it does not allow the user to get confused in the functionality.

4. The Fitts rule. In 1954, this man proposed a model of a person's movement describing the time for rapid movement to a certain zone, which depends on the distance to this zone and its dimensions. With respect to the interface of the site, this can be interpreted as follows: if the button is large enough, its even greater.

5. The reverse pyramid. This concerns the actual writing of the content: at the beginning of the article, the main conclusions should be drawn, after which it is

necessary to describe the key points, and complete all the most unimportant information (which of us reads all the articles to the end?)

Suppose, when designing the interface, all the above rules were observed. But this does not mean that the design was really good. In any case, he needs testing. It can be carried out in four stages and use a focus group for this.

Stage 1. Selection of focus group. Among the people who will test the site should be people from its target audience (so that the grandmother does not look for auto parts).

2 stage. Test plan. It is a list of requirements for the product. For example, for an online store, such a task will be searching for the goods, obtaining information about it, ordering the goods and removing it from the basket.

Stage 3. Implementation of the plan and fixing errors. The type of error is determined by the users themselves. It can be any little thing that they did not like: complicated captcha, the inability to cancel the action, many products on the page, the absence of messages about adding to the basket and so on.

4 th stage. Errors are analyzed, corrected and the testing cycle is repeated. Repeat as many times as necessary to correct all the shortcomings.

It is better not to postpone testing at the last moment, as it may be necessary to correct almost the entire project, and do it gradually, at different stages of work.

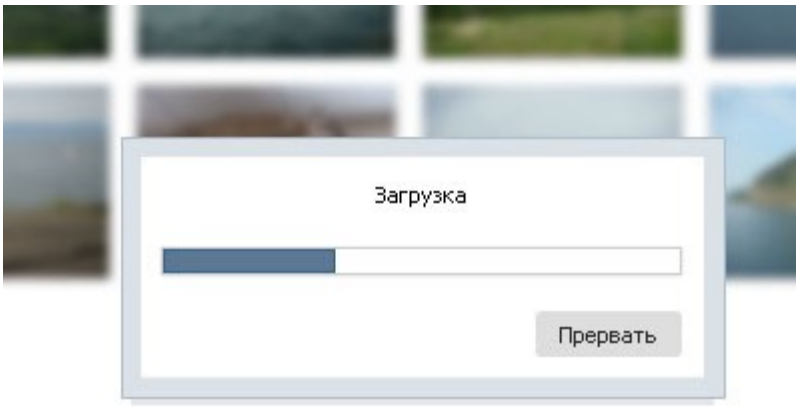
Again, the main goal of usability is to make the user comfortable on the site, and the information is accessible and understandable. If you do everything correctly, then you can keep the user, thereby reducing the failure rate to a minimum.

2.2. Principles of usability

Principles of usability are generally accepted principles of interaction with design, introduced by Jacob Nielsen (the founder of Usability). These principles are called "Heuristics", as it is rather a set of rules, rather than rigid guidelines. Total of such principles 10.

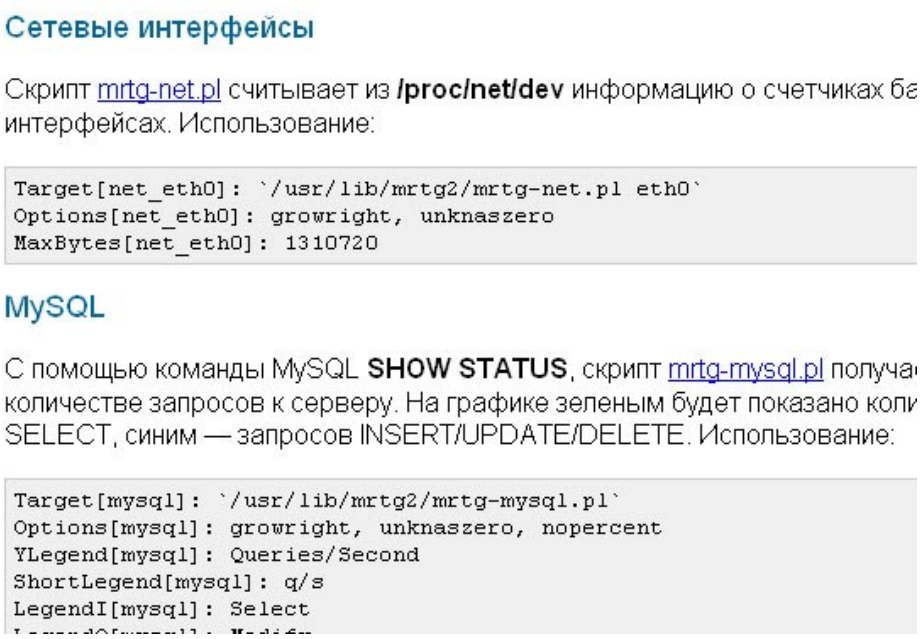
Principle No. 1. Visibility of the status of the system.

This principle means that the user must know what is happening and in which part of the path he stopped. If this is a complicated registration, indicate that this is 2 step out of 3.



Principle No. 2. Communication between the system and the user.

The following principle tells us that your site should be made for a certain audience and you must communicate with it in its language using its designations and level of preparedness. Therefore, always consider your audience, and make the site always for her. This applies not only to texts, but also to structure, assistance, design, visual perception of information, and so on.

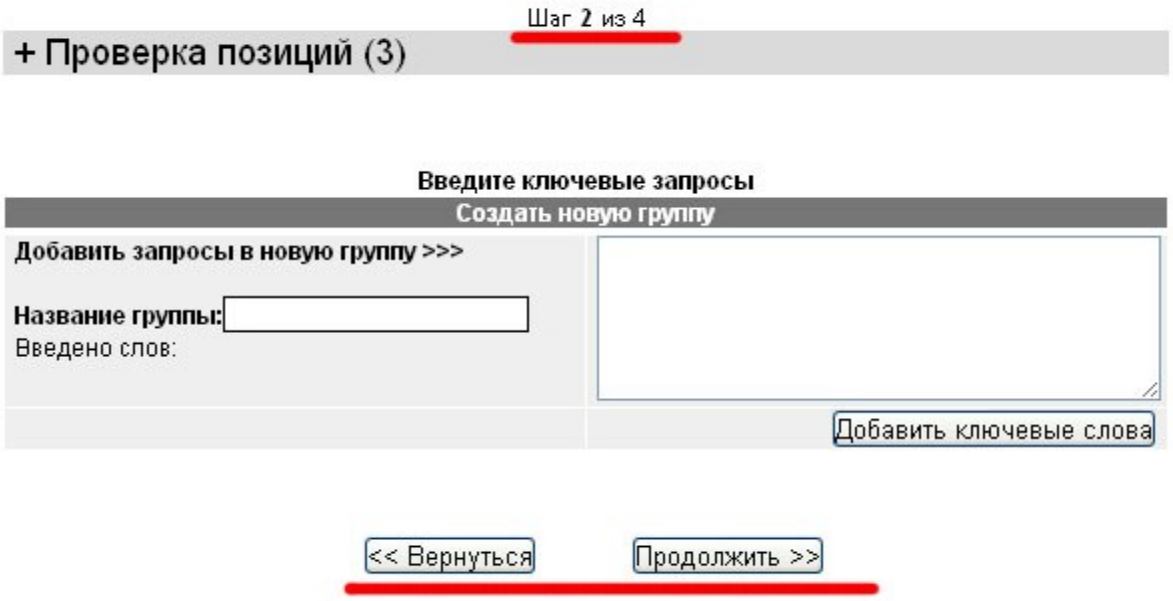


Principle No. 3. User management (freedom of choice)

The user always has to control the situation, so to speak keep his hand on the pulse. For example, when filling out the form, there must be a button "clean the

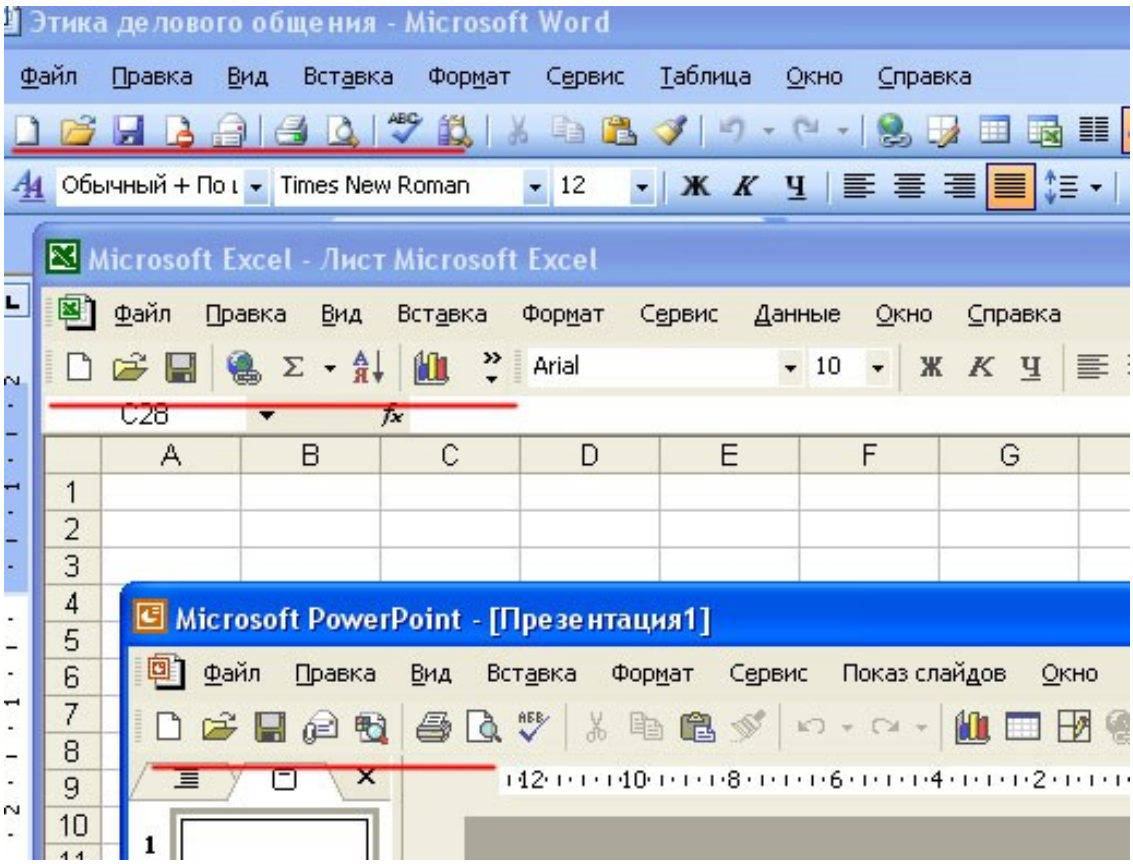
form". If the form provides for several steps - the user should return to the previous step, or vice versa, if possible, skip someone to later return to it.

This situation will create a user's impression that it is he who manages everything, he is not trying to deceive and confuse. And the complication at first glance of the interface with the right approach will be an oversimplification. After all, it is much easier for people to do 2-3 simple actions than one complex one.



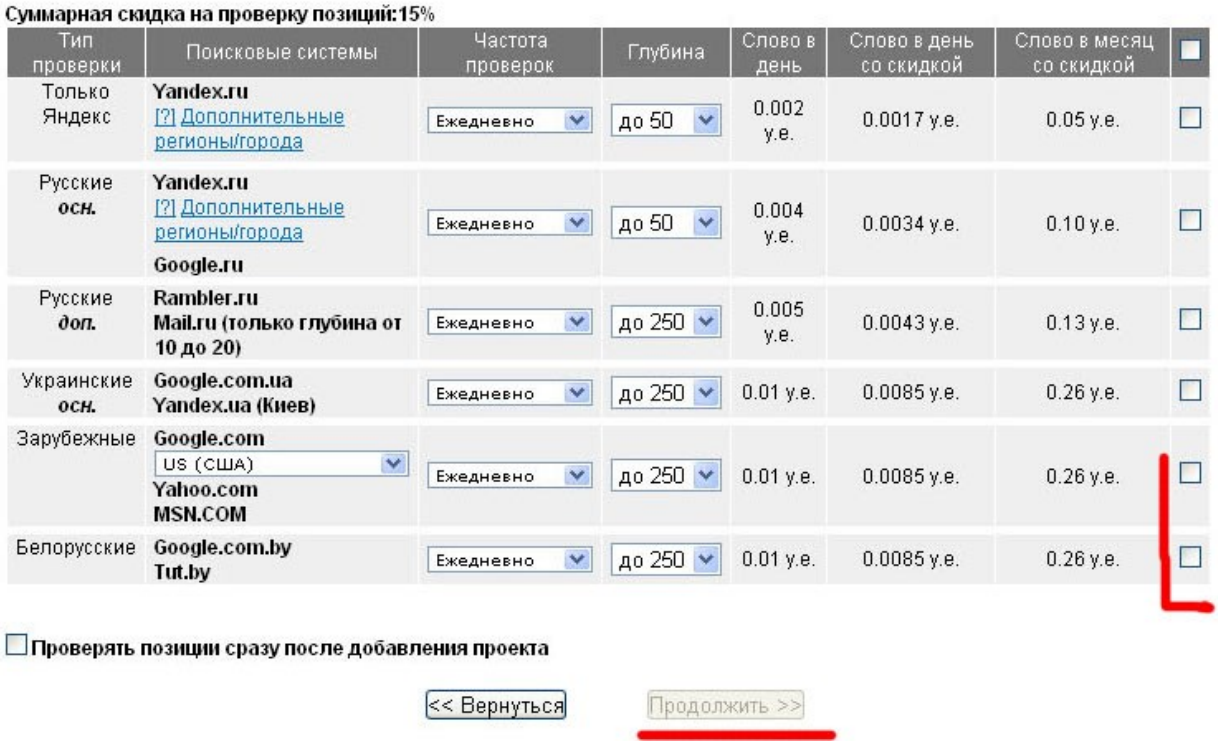
Principle No. 4. Consistency and standards.

On the Internet, there are already certain established symbols and standards (the type of basket, the contacts in the upper corner, etc.). Nevertheless, if you look at how many different types of baskets you will realize that an inexperienced user can seriously get lost among all these carts, electronic baskets, ultra-trendy bags, etc.). As for the sequence - then choosing a certain style - observe it everywhere. This applies to both fonts, and pictures, and text and layout.



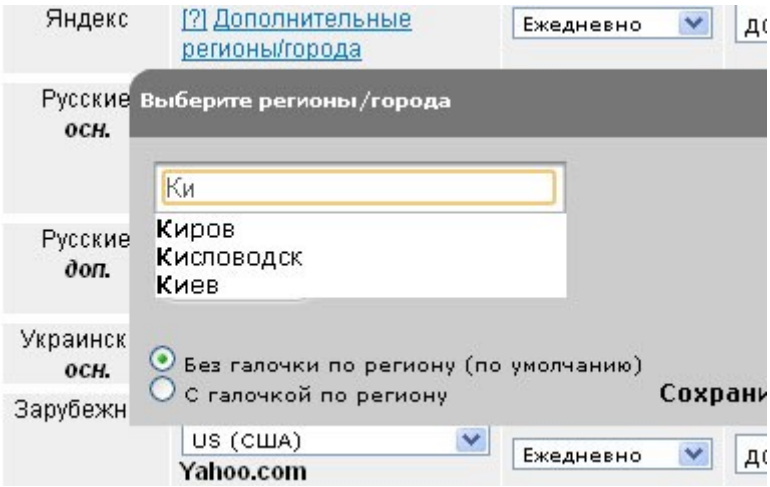
Principle No. 5. Prevention of errors.

This principle says that it is easier to prevent a mistake than to correct it. Wherever you can simplify the choice and remove unnecessary, random actions - they should be removed. In practice, this can be: a hint when typing anything whatever on the keyboard (cities / countries for example). This applies to the buttons. For example, to ACCEPT, usually make bigger and brighter than Clear form. If you know something about the information you enter, tell it to the user (phone format or region code), etc.



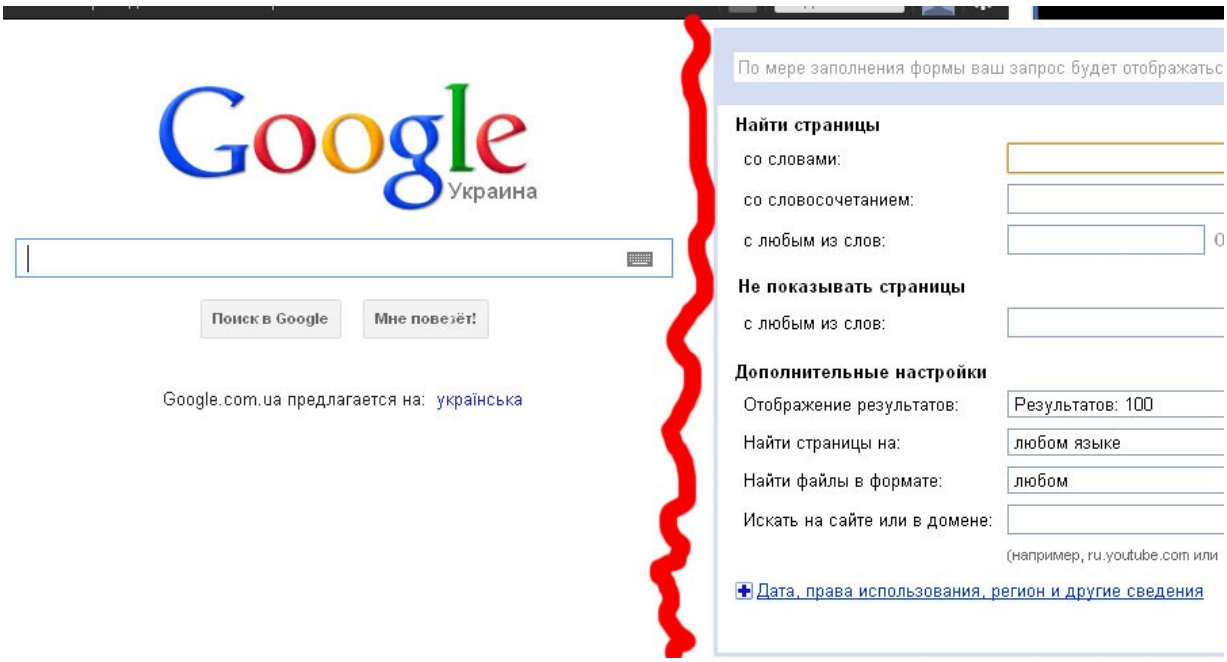
Principle number 6. Learn more easily than remember.

Make life easier for the user, make suggestions to him, remember the information he entered earlier (not only on the previous page, but also from his past visits to the site). For example, if you again have a multi-step registration form, show it already filled in fields, if they can be needed later.



Principle No. 7. Flexibility and efficiency of use.

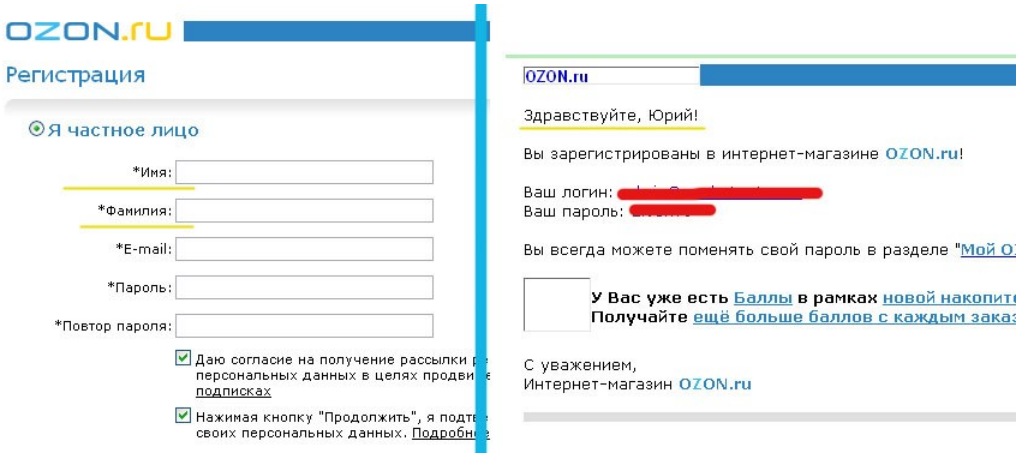
This principle states that the interface must be flexible, customizable to the audience that prevails. Make the main emphasis on simplicity based on a simple user. Elements for advanced can be done much less and put in less visible parts of the screen, as he will find them everywhere.



Principle No. 8. Aesthetic and minimalist design

This principle says - the interface should not have information that the user does not need or that may be needed in rare cases. Similarly, and in forms: you should not ask the user for information that you do not need, or is needed in some exceptional cases.

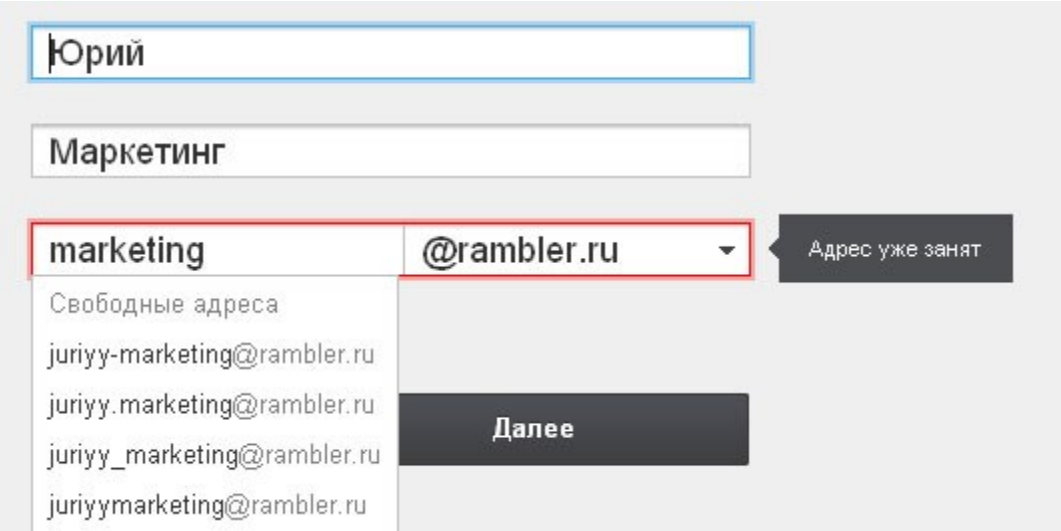
Unfortunately, almost nobody uses this principle. In 90% of cases when registering you are asked and home phone, and mobile, and the address and e-mail, and even the date of birth. And all in order to congratulate you on your new year and birthday.



Principle No. 9. Help the user understand and correct the error.

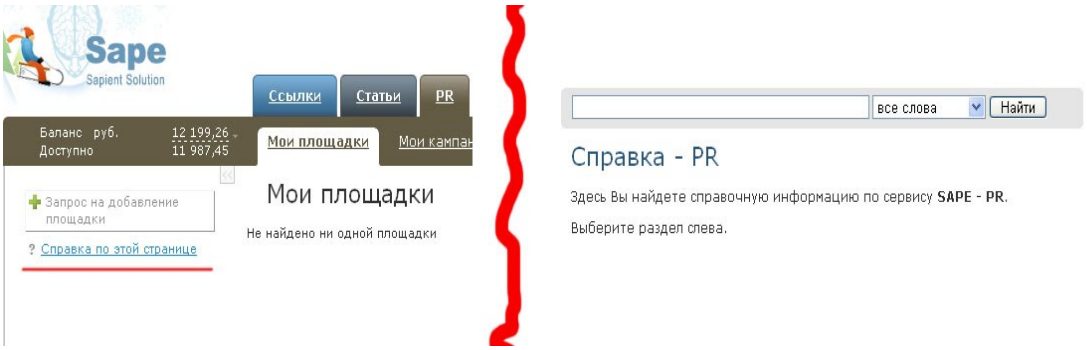
All the errors must be reported to the user in a normal, "human" language, rather than computer. If the error is a link, do not just write 404, write that error

when entering the page. If the user forgot to specify his phone when filling out the form, then write - an error when entering the phone number, and not just the "ERROR FORM".



Principle No. 10. Help and documentation.

Help or documentation should be simple, understandable, easily accessible, appropriate to the user's tasks. In addition, the documentation should not be large. It should contain clear and understandable steps. If all the same the document turns out enough volumetric - make on it the brief navigation for fast transition on different sections, and as search for the help.



2.3. Usability audit

Usability audit is an expert evaluation of the product in terms of usability. Such an assessment is carried out in order to get information on key disadvantages of the user interface and recommendations for their elimination in a short time.

The peer review method is suitable for projects where the ease of use of the product can affect business performance and competitiveness. It can be:

- Web sites;
- Intranet and desktop applications;
- mobile applications;
- payment terminals and ATMs;
- Any other interface solutions.

For example, we are often contacted by online shops to ensure that we conducted an audit of usability and gave recommendations on how to improve the conversion. If you plan on redesigning your product, and you have highly detailed layouts for new screens, the expertise will be effective for you: eliminating usability problems even before the implementation phase, you save on the subsequent rework of the interface.

Expert evaluation is also effective if you need to check whether your product meets the guidelines and standards of the platform for which it is designed. This is especially true for applications on Android, iOS, Windows Phone 7 and 8, Windows 8.

Usability audit has several advantages over testing the product by real users:

• Cost. Usability audit is much cheaper than usability testing, since there is no need to recruit users, conduct and process test sessions.

• Timing. Usability audit is much faster than testing and for websites takes an average of 5 days.

- Price-quality ratio. Usability-audit, conducted by a competent expert, effectively identifies most of the key interface problems.

• Ability to remotely interact with the customer. If customers, users and the usability company are located in different cities, then for the testing the employees of the company sometimes have to go on a business trip, which increases the time and budget of the project. In the case of an expert assessment, the geographic location of the customer is unimportant and does not affect the project plan in any way.

During the evaluation, experts strictly adhere to the usability methodology accepted in the world practice.

The project includes the following stages.

• Project preparation. Even before the drafting of the contract, the project manager will find out the key information about the project objectives and your expectations from it. After this, the timing and cost of the project is coordinated.

• Collect information about the product and target audience. At the beginning of the project, the usability expert collects data about the specifics of the product and its target audience. To do this, he conducts business interviews with two or three representatives of the customer, and, if necessary, involves additional sources of information, for example, web analytics data (Google Analytics, Yandex.Metrica).

• Processing of received information. At this stage, the specialist summarizes and fixes the information received. The results of the analysis phase are necessarily consistent with the customer. Only after this begins the evaluation stage.

• Evaluation. Based on the data received from the customer, the expert will evaluate the interface "according to the scenarios." He performs two or three key tasks in the interface and determines where the interface problems interfere with the user to perform a logical chain of actions to advance to the goal.

- Compilation of a report. All identified problems and recommendations for their elimination will be recorded in the report. The report is internally coordinated with the company's leading specialists and the project manager. After that he goes to the customer.

• Presentation. If necessary, a usability expert can go to the customer to personally present the report and answer any questions that arise.

Who conducts usability audit

Examination is carried out by one specialist under the supervision of the project manager and a leading specialist. Our name and experience of usability audits allow us to state with confidence that the project will be carried out as high as possible, since any of our specialists:

• Undergoes special training in conducting business interviews;

• Undergoes special training to conduct peer reviews;

• has extensive experience of usability testing, communication with real users;

• Has experience of examining interfaces.

2.4. Usability testing

Only users know if your product is suitable for them. The most equipped usability lab will help to check how much your product meets the expectations of your users. The most reliable method of assessment: a study of how real people use your product.

What can I test?

Any user interface with which the user solves their problems. It can be:

- Web sites
- Intranet and desktop applications
- "boxed" software products

- Consumer electronics and mobile phones. Any device with a user interface should be tested.

Especially important are the stages of the start of operation and installation.

- Prototypes of all of the above. Identifying usability problems at an early stage allows us not to spend resources on developing unsuccessful solutions.

Types of testing

Usual usability testing is the simplest method of research, but it often gives the greatest effect, it gives a powerful push for new solutions.

It can be of several types:

- Qualitative testing studies user behavior, finds out what works and what does not work in product design. The purpose of this research is to give you recommendations on how to make your product more user-friendly.
- Quantitative testing contains many statistically important data. With their help you can, for example, compare several versions of the same product. Such an investigation is quite expensive, so it makes sense in those cases, for example, when you need to find out how much your product is better or worse than the competitor.
- Comparative testing is one of the most valuable methods. It is used when it is necessary to compare your product with several of its most important competitors in the market. This happens, for example, when you release a new version of your product and do not want to repeat other people's mistakes.
- Cross-cultural testing is necessary in two cases: when your product is oriented to a foreign user, or when you adapt a foreign product to the Russian market.

We recommend usability testing at several stages of your project, but even one single testing significantly improves the quality of the projected product.

Timing

- Usability testing usually takes 3 weeks, including preparing, conducting and writing a report.

- Repeated testing within the same project takes less time. We advise you to do two or three such iterations.
- Comparative and cross-cultural studies take longer (1-2 months).

The test report is a report on the problems identified and ways to solve them. The report contains three levels of recommendations:

- Specific usability problems of the interface and suggestions for their elimination. Even in a small product, the number of such problems can reach several tens.
- User tasks and analysis of how much the product helps the user to implement them.
- Further recommendations on product design.

Question

1. How many rules for usability and what are those mean?
2. What is visibility of the status of the system in human-computer communication?
3. What are advantages of Usability audit in human-computer communication?
4. How we can check the number of meets with our product and with our users?

3. The principles of emotion

3.1. Human factors

There are many ways to characterize the human in interactive systems. One is the model, which was introduced in Chapter 1. Other characterizations exist as well. Human factors researchers often use a model showing a human operator confronting a machine, like the image in Figure 2.2. The human monitors the state of the computer through sensors and displays and controls the state of the computer through responders and controls. The dashed vertical line is important since it is at the interface where interaction takes place. This is the location where researchers observe and measure the behavioral events that form the interaction.

Figure 2.2 is a convenient way to organize this section, since it simplifies the human to three components: sensors, responders, and a brain.

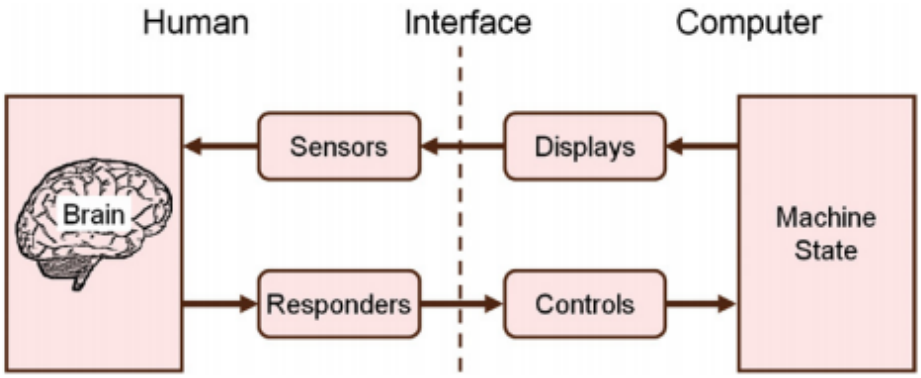


FIGURE 2.2

Human factors view of the human operator in a work environment.

Sensors

The five classical human senses are vision, hearing, taste, smell, and touch.

Each brings distinctly different physical properties of the environment to the human. One feature the senses share is the reception and conversion into electrical nerve signals of physical phenomena such as sound waves, light rays, flavors, odors, and physical contact. The signals are transmitted to the brain for processing.

Sensory stimuli and sense organs are purely physiological. Perception includes both the sensing of stimuli and use of the brain to develop identification, awareness, and understanding of what is being sensed.

Vision (Sight)

Vision, or sight, is the human ability to receive information from the environment in the form of visible light perceived by the eye. The visual sensory channel is hugely important, as most people obtain about 80 percent of their information though the sense of light. The act of seeing begins with the reception of light through the eye's lens. The lens focuses the light into an image projected on to the retina at the back of the eye. The retina is a transducer, converting visible light into neurological signals sent to the brain via the optic nerve.

Near the center of the retina is the fovea, which is responsible for sharp central vision, such as reading or watching television. The fovea image in the environment encompasses a little more than one degree of visual angle, approximately equivalent to the width of one's thumb at arm's length (see Figure 2.4). Although the fovea is only about 1 percent of the retina in size, the neural processing associated with the fovea image engages about 50 percent of the visual cortex in the brain.

As with other sensory stimuli, light has properties such as intensity and frequency.

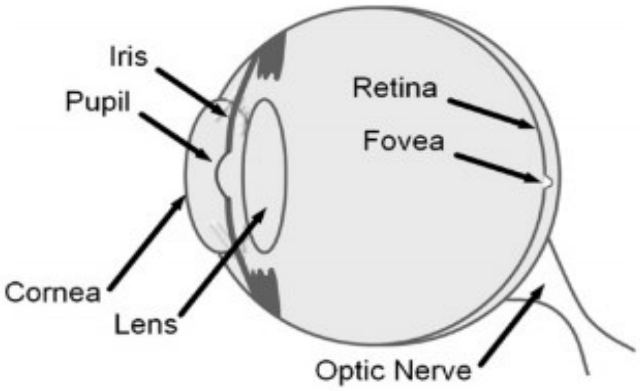


FIGURE 2.3

The eye.

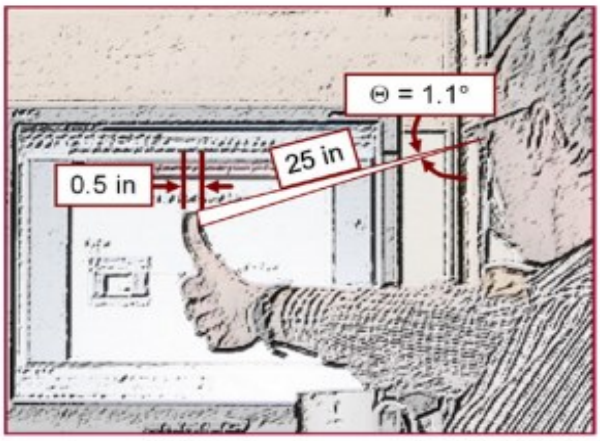


FIGURE 2.4

The fovea image spans a region a little more than one degree of visual angle.

Frequency. Frequency is the property of light leading to the perception of color. Visible light is a small band in the electromagnetic spectrum, which ranges from radio waves to x-rays and gamma rays. Different colors are positioned within the visible spectrum of electromagnetic waves, with violet at one end (390 nanometers) and red at the other (750 nm). (See Figure 2.5; colors not apparent in grayscale print).

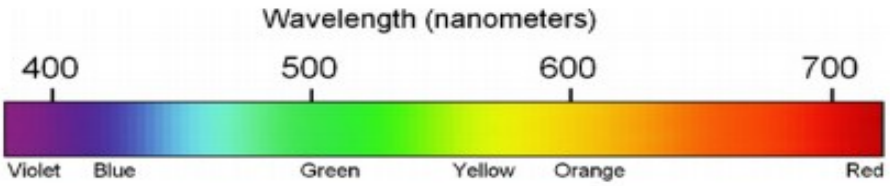


FIGURE 2.5

The visible spectrum of electromagnetic waves.

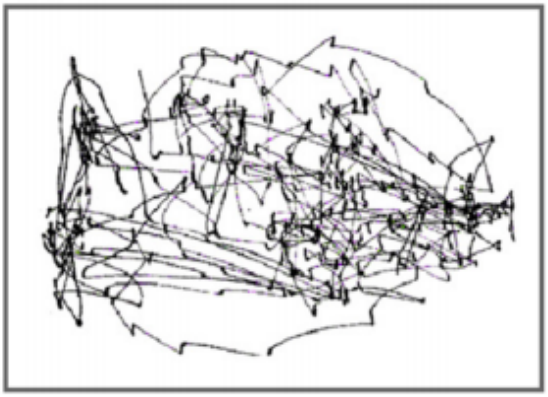
Intensity. Although the frequency of light is a relatively simple concept, the same cannot be said for the intensity of light. Quantifying light intensity, from the human perspective, is complicated because the eye's light sensitivity varies by the wavelength of the light and also by the complexity of the source (e.g., a single frequency versus a mixture of frequencies). Related to intensity is luminance, which refers to the amount of light passing through a given area. With luminance comes brightness, a subjective property of the eye that includes perception by the brain. The unit for luminance is candela per square meter (cd/m2).

Fixations and saccades. Vision is more than the human reception of electromagnetic waves having frequency and intensity. Through the eyes, humans look at and perceive the environment. In doing so, the eyes engage in two primitive actions: fixations and saccades. During a fixation, the eyes are stationary, taking in visual detail from the environment. Fixations can be long or short, but typically last at least 200 ms. Changing the point of fixation to a new location requires a saccade—a rapid repositioning of the eyes to a new position. Saccades are inherently quick, taking only 30–120 ms.

HCI research in eye movements has several themes. One is analyzing how people read and view content on web pages. Figure 2.7 shows an example of a scan path (a sequence of fixations and saccades) for a user viewing content at different places on a page. The results of the analyses offer implications for page design. For example, advertisers might want to know about viewing patterns and, for example, how males and females differ in viewing content. There are gender differences in eye movements, but it remains to be demonstrated how low-level experimental results can inform and guide design.

(a)

(b)



(c)

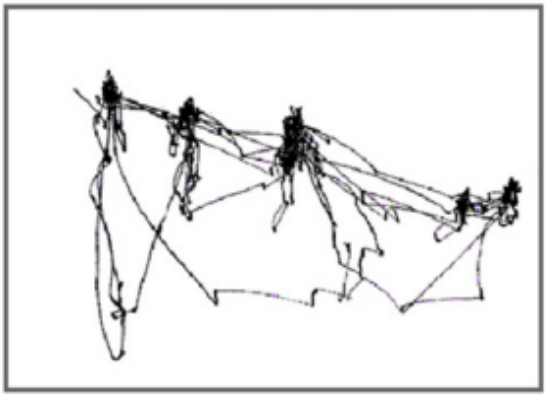


FIGURE 2.6

Yarbus' research on eye movements and vision (Tatler et al., 2010). (a) Scene. (b) Task: *Remember the position of the people and objects in the room.* (c) Task: *Estimate the ages of the people.*

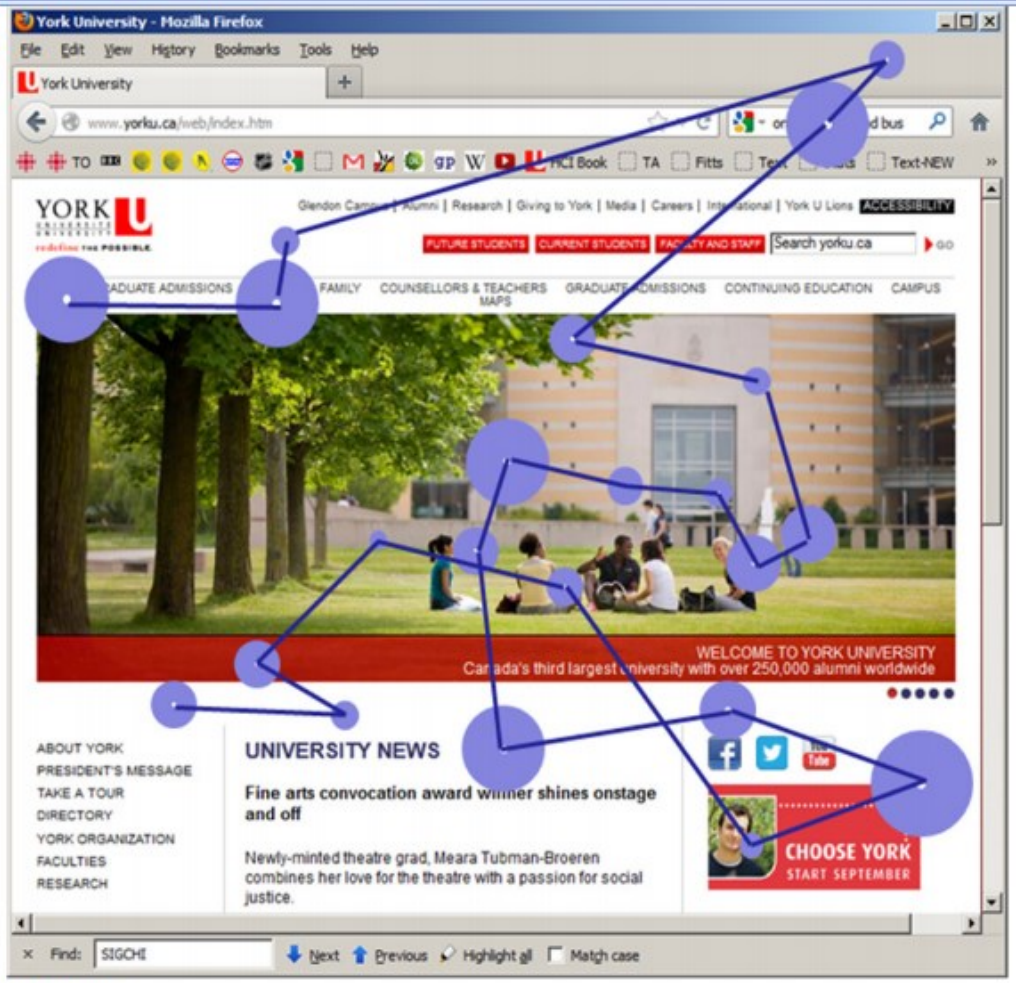


FIGURE 2.7

Scanpath for a user locating content on a web page.

Hearing (Audition)

Hearing, or audition, is the detection of sound by humans. Sound is transmitted through the environment as sound waves—cyclic fluctuations of pressure in a medium such as air. Sound waves are created when physical objects are moved or vibrated, thus creating fluctuations in air pressure. Examples include plucking a string on a guitar, slamming a door, shuffling cards, or a human speaking. In the latter case, the physical object creating the sound is the larynx, or vocal cords, in the throat.

Hearing occurs when sound waves reach a human's ear and stimulate the ear drum to create nerve impulses that are sent to the brain. A single sound from a single source has at least four physical properties: intensity (loudness), frequency(pitch), timbre, and envelope. As a simple example, consider a musical note played from an instrument such as a trumpet. The note may be loud or soft

(intensity); high or low (frequency). We hear and recognize the note as coming from a trumpet, as opposed to a flute, because of the note's timbre and envelope.

Loudness. Loudness is the subjective analog to the physical property of intensity. It is quantified by sound pressure level, which expresses the pressure in a sound wave relative to the average pressure in the medium. The unit of sound pressure level is the decibel (dB). Human hearing begins with sounds of 0–10 dB.

Conversational speech is about 50–70 dB in volume. Pain sets in when humans are exposed to sounds of approximately 120–140 dB.

Pitch. Pitch is the subjective analog of frequency, which is the reciprocal of the time between peaks in a sound wave's pressure pattern. The units of pitch are cycles per second, or Hertz (Hz). Humans can perceive sounds in the frequency range of about 20 Hz–20,000 Hz (20 kHz), although the upper limit tends to decrease with age.

Timbre. Timbre (a.k.a. richness or brightness) results from the harmonic structure of sounds. Returning to the example of a musical note, harmonics are integer multiples of a note's base frequency. For example, a musical note with base frequency of 400 Hz includes harmonics at 800 Hz, 1200 Hz, 1600 Hz, and so on. The relative amplitudes of the harmonics create the subjective sense of timbre, or richness, in the sound. While the human hears the note as 400 Hz, it is the timbre that distinguishes the tone as being from a particular musical instrument. For example, if notes of the same frequency and loudness are played from a trumpet and an oboe, the two notes sound different, in part, because of the unique pattern of harmonics created by each instrument.

Envelope. Envelope is the way a note and its harmonics build up and transition in time—from silent to audible to silent. There is considerable information in the onset envelope, or attack, of musical notes. In the example above of the trumpet and oboe playing notes of the same frequency and same loudness, the attack also assists in distinguishing the source. If the trumpet note and oboe note were recorded and played back with the attack removed, it would be

surprisingly difficult to distinguish the instruments. The attack results partly from inherent properties of instruments, but also from the way notes are articulated.

Touch (Tactition)

Although touch, or tactition, is considered one of the five traditional human senses, touch is just one component of the somatosensory system. This system includes sensory receptors in the skin, muscles, bones, joints, and organs that provide information on a variety of physical or environmental phenomena, including touch, temperature, pain, and body and limb position. Tactile feedback, in HCI, refers to information provided through the somatosensory system from a body part, such as a finger, when it is in contact with (touching) a physical object. Additional information, such as the temperature, shape, texture, or position of the object, or the amount of resistance, is also conveyed.

All user interfaces that involve physical contact with the user's hands (or other body parts) include tactile feedback. Simply grasping a mouse and moving it brings considerable information to the human operator: the smooth or rubbery feel of the mouse chassis, slippery or sticky movement on the desktop. Interaction with a desktop keyboard is also guided by tactile feedback. The user senses the edges and shapes of keys and experiences resistance as a key is pressed. Tactile identifiers on key tops facilitate eyes-free touch typing. Identifiers are found on the 5 key for numeric keypads and on the F and J keys for alphanumeric keyboards. Sensing the identifier informs the user that the home position is acquired. (See Figure 2.8a.)

Augmenting the user experience through active tactile feedback is a common research topic. Figure 2.8b shows a mouse instrumented with a solenoid-driven pin below the index finger. The pin is actuated (pulsed) when the mouse cursor crosses a boundary, such as the edge of a soft button or window. The added tactile feedback helps inform and guide the interaction and potentially reduces the demand on the visual channel. A common use of tactile feedback in mobile phones is vibration, signaling an incoming call or message. (See Figure 2.8c.)

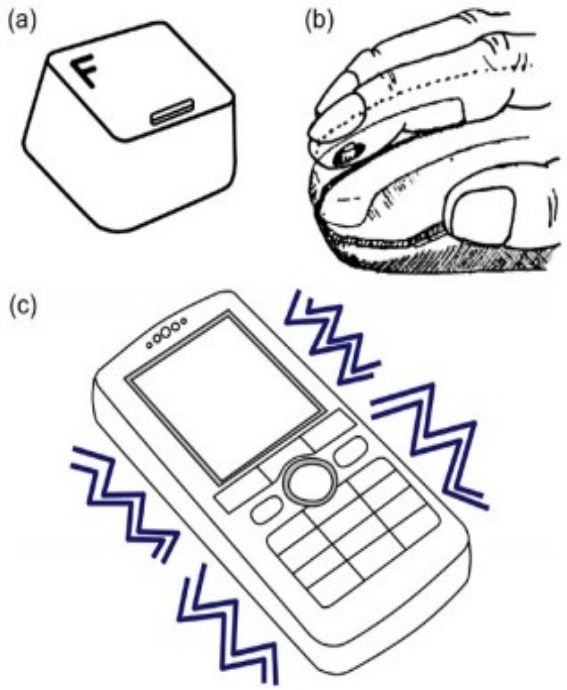


FIGURE 2.8

Tactile feedback: (a) Identifier on key top. (b) Solenoid-driven pin under the index finger. (c) Vibration signals an in-coming call.

Smell and taste

Smell (olfaction) is the ability to perceive odors. For humans, this occurs through sensory cells in the nasal cavity. Taste (gustation) is a direct chemical reception of sweet, salty, bitter, and sour sensations through taste buds in the tongue and oral cavity. Flavor is a perceptual process in the brain that occurs through a partnering of the smell and taste senses. Although smell and taste are known intuitively by virtually all humans—and with expert-like finesse—they are less understood than the visual and auditory senses.

Responders

Through movement, or motor control, humans are empowered to affect the environment around them. Control occurs through responders. Whether using a finger to text1 or point, the feet to walk or run, the eyebrows to frown, the vocal chords to speak, or the torso to lean, movement provides humans with the power to engage and affect the world around them. Penfield's motor homunculus is a classic illustration of human responders. (See Figure 2.9.)

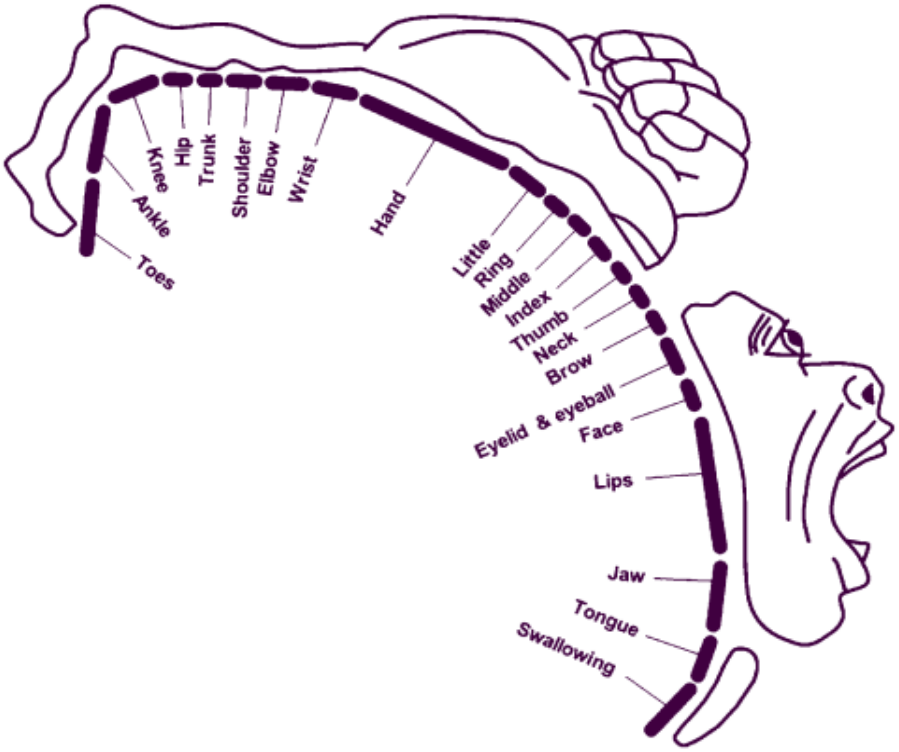


FIGURE 2.9

Motor homunculus showing human responders and the corresponding cortical area.

The illustration maps areas in the cerebral motor cortex to human responders. The lengths of the underlying solid bars show the relative amount of cortical area devoted to each muscle group. As the bars reveal, the muscles controlling the hand and fingers are highly represented compared to the muscles responsible for the wrist, elbow, and shoulders. Based partially on this information, hypothesized that "those groups of muscles having a large area devoted to them are heuristically promising places to connect with input device transducers if we desire high performance," although they rightly caution that "the determinants of muscle performance are more complex than just simple cortical area".

Questions

1. What is the main human senses to characterize the human in interactive systems?
2. What is the role of vision senses of human in human-computer communication?
3. How we can use audition for improving the human-computer communication?
4. How a human brings considerable information to the human operator?

4. User Analysis

- Methods for analyzing users
- User Analysis Tools
- Analysis of user behavior

A user-oriented design involves researching the audience on which the software product is targeted. In the course of this study, various methods are used to identify the needs, desires, opportunities and preferences of potential users of the information system.

4.1. Methods for analyzing users

Let's look at some of the methods used at various stages of developing user interfaces.

Personification

This method involves the preparation of detailed typical profiles of potential users, belonging to different groups. Analysis profiles allows you to simulate behavioral aspects such as goals, desires, needs, preferences and expectations of users. This will be useful in making decisions related to the product's capabilities, their visual presentation and ways of interacting interactively.

Context analysis

The analysis of the context of use consists in gathering all available information about what exactly users are doing in the process of performing a specific task and in what environment they are doing it. This allows you to direct the development of the interface so that it most closely matches the order of work of users with the components of the system. The results of the analysis are the basis for the development of use scenarios (Use Cases).

Use scenarios (Use cases)

Scenarios describe the behavior of users in solving production problems in a specific context. They present examples of use as a starting point for design, and also lay the foundation for usability testing.

Advantages of using scripts is that they allow:

- to simulate the behavior of prospective users, their tasks and their environment;
- to investigate usability issues at the earliest stages of design;
- Identify the goals of users and the likely time spent by them to achieve these goals;
- to get by with minimal resources;
- use scenarios for further evaluation studies;
- reduce the need for expertise of the human factor.

The algorithm for developing custom scenarios can be presented as follows:

- Defining the general context, highlighting potential users and their tasks in this context.
- Functional decomposition of user tasks into sequences of operations necessary to solve them.
- Separation of operations into those that must be performed by users and those that are computer.
- Direct formation of scenarios in the form of a sequence of operations. It should not be emphasized that some features of the product are used to solve certain tasks.
- Adding scenarios to time estimates and completeness criteria

Scenarios are realistic and detailed descriptions of user actions, but there should not be any references to the use of any elements of the user interface.

The main difficulty in using this method is associated with the conscious need to develop a number of scenarios that cover the largest number of different situations, and not only the most typical or, for example, interesting to developers.

Card sorting

This is a simple, reliable and inexpensive method for studying users, used to divide information into groups. The sorting results (obtained groups) can be used

to structure the application and, as a result, create a navigation scheme (for example, the definition of the menu structure of a website).

The essence of the card sorting method is as follows:

1. *Forming a list of materials and topics*. For this, various sources are used, starting from the materials used in the existing application (or in competing developments) and up to the planned in future versions. Inclusion of future materials, which are not included in the current development, will allow to reduce costs in the future, since the possibility of expanding the functionality and the information provided will already be designed.

2. Selection of participants. Card sorting can be performed individually or in a group. For individual testing, a dozen volunteers will be required. For group testing it is recommended to form at least five groups of three people each. In both cases, the main thing is that the test participants should be the most typical representatives of the target audience.

3. Preparation of cards. In one way or another, previously selected materials are applied to individual paper cards. The signatures on the cards should be short enough so that the participants can read them quickly and at the same time be sufficiently detailed so that the participants can understand what is being said. It is recommended to leave a few empty cards where the test participants can enter their proposals. All cards, incl. and empty, are supplied with a unique identifier.

4. Run the test. Before starting the test, cards are mixed, blank cards are placed side by side. Participants in the test, one by one (or by groups) enter the room and lay out the cards as they see fit, if necessary - record their vision in blank cards. The observer, who is constantly present in the room, fixes the results of the sorting, the cards are mixed again and the next participant (group) is invited.

5 Analysis of results. The results of the tests are reduced to a single table and already on it identify the same user preferences, for which all this was started. There are no precise instructions here, since any analysis is "something between magic and science".

Questions

1. Why the various methods are used in human-computer communication?
2. What is Personification?
3. What is Context analysis?
4. What are advantages of using scripts for developing user interfaces?
5. What is Selection of participants?

5. Context analysis

5.1. Context analysis

Context analysis allows you to analyze a specific page in the most detailed and instantaneous. Context analysis is a content analysis

The analysis of the text shows the general information, the length of the text, the size of the page, the number of words, information on the title of the site, its density, the number of unique entries and detailed information on the content of the site.

Content is the texts on the site. Search engines love texts. Even more they love when the text on the site on the topic, it is interesting and its a lot. For approximately the same people like the site visitors and prospective buyers.

To achieve success in promoting the site, it is necessary to conduct a so-called content analysis.

Content analysis - the process of comparing pages on the site to search queries from the semantic kernel or requests selected for website promotion. The essence of content analysis, determine which requests to move each page of the site, which pages of the site most closely match the requests, for what requests on the site there are no texts.

Based on the results of the content analysis, a list of correspondence of pages to requests is made, as well as a list of requests for which there are no texts (content) on the site.

Comprehensive text analysis is an indispensable tool for SEO-promotion of the site, because with its help you can correct your headings, descriptions, anchors, keywords, check their density and relevance (matching search results). A table with the number of words encountered, their weight and number of entries will help to understand what words need to be used and which ones to reduce. Convenient navigation will simplify the analysis of texts and information processing.

The purpose of the content analysis is to search for pages that can be displayed in the visibility zone with minimal effort.

Links in search results are sorted by relevance, which is defined as "the correspondence of the document to the query text".

5.2. Methods of conducting content analysis

Search on the site (Yandex, Rambler, Google). Search engines index all pages of the site, but in the search results they usually give out a link to only one - the one most relevant to the query. But Yandex, Rambler and Google provide the ability to search within and within one site, showing all the pages relevant to the given question. Algorithms of search results within one site and search in the Big Internet are the same: at the top the most relevant page, below is a little less relevant and so on.

The results of the content analysis are entered in the table, where for each query from the semantic kernel corresponds the address of the most relevant search page in different search engines. For more information, the table also records the frequency of the request and the title phrase. Such a table, combined with a full table of visibility, gives the most comprehensive information about which pages on which queries and in what search engines are easier to promote.

There are several types of content analysis of the site:

• Content analysis for compliance with the semantic core of the site or SEO analysis of the content of the page.

• Content analysis from the point of view of visitors is the definition of value for users of content content on the site, the availability and usefulness of the texts laid out on the site.

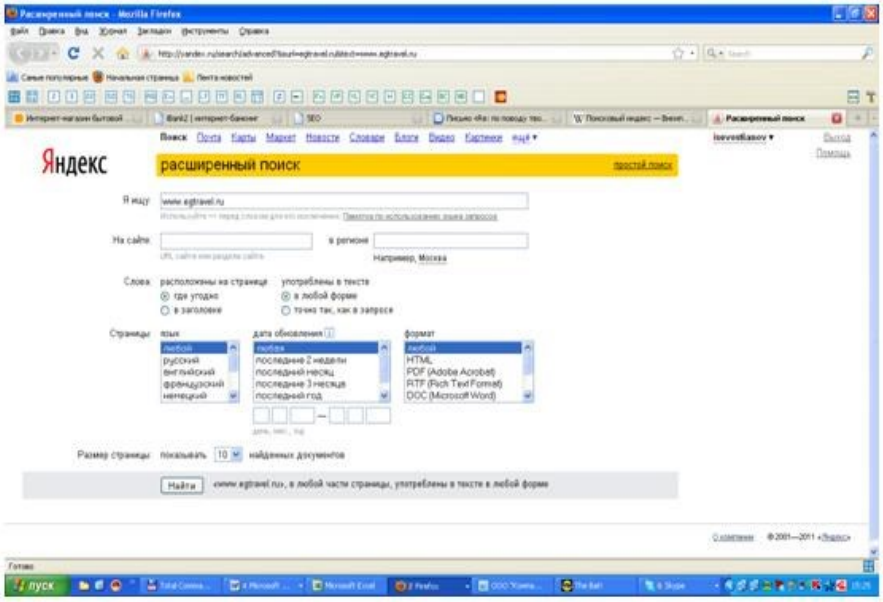
The method "from search engines"

The essence of the method is that for each query, the pages most relevant to this query are selected from the perspective of the search engines. Leading search engines Yandex, Rambler, Google provide the ability to search for a specific site

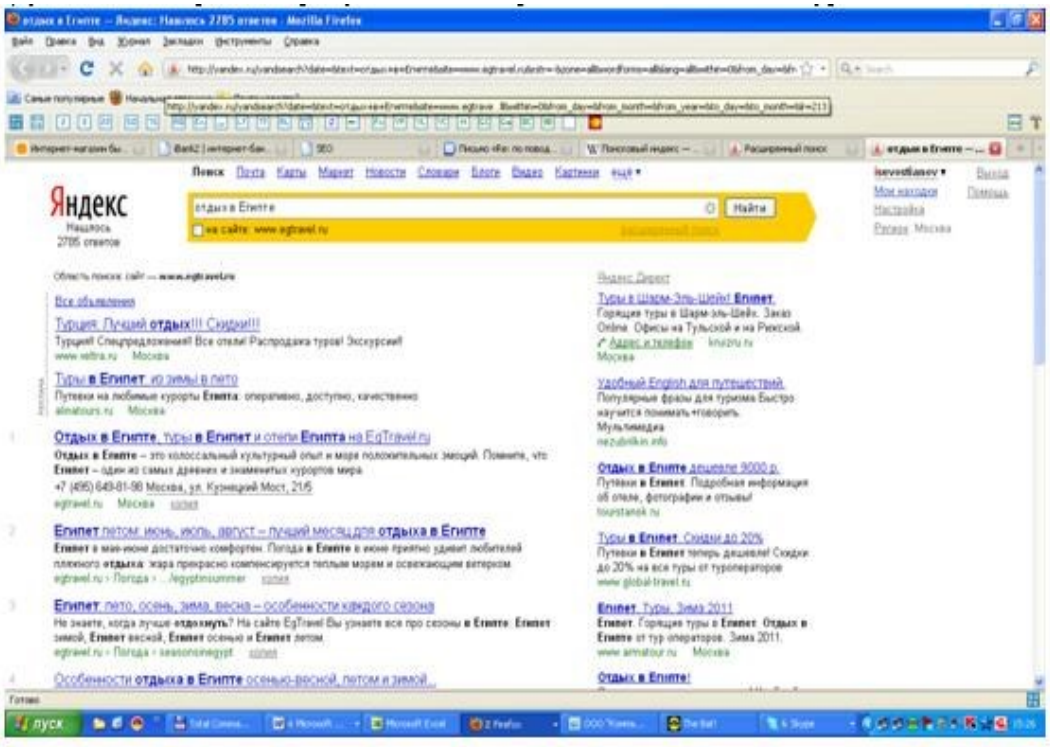
on request. And the algorithms for ranking when searching the site and for "large search" are the same.

The query N is taken and the most relevant page is determined by the site search. This is the first place on request N.

Example, take the site www.egtravel.ru and find the most relevant page for the query "rest in Egypt" for the search engine "Yandex" .. This is very easy to do using the advanced search on Yandex: http://yandex.ru/search/advanced ? & surl = egtravel.ru & text = www.egtravel.ru



The result of the search will be as follows: http://yandex.ru/yandsearch?date=&text=%D0%BE%D1%82%D0%B4%D1%8B %D1%85+%D0%B2+%D0%95%D0 % B3% D0% B8% B0% D0% B8% B0% B5 & site = www.egtravel.com & rst = - & & gt; = all & within & quot; = & & quot; & gt; 10 & lr = 1



And in the first place will be the page most relevant to the version of Yandex. You can practice on any other queries, the result is always the same - the top link found by the site search is at the maximum position for this site and in the search results for the entire search engine database. This is the most relevant page of the site, in the opinion of this search engine. The ranking algorithms for the Big Search and for Site Search are the same.

Advantages of the method:

• Allows you to determine which pages and which queries are most relevant to search engines

• Will allow to understand, under what requests there is no content (in terms of search engines)

• Automates the process of content analysis

Disadvantages of the method:

• Not suitable for non-indexed (new) sites.

• Does not take into account the needs of site visitors because the search engine can choose the wrong page.

Method "from the site"

The essence of the method is that each page of the site is analyzed in sequence and that query or group of queries from the semantic kernel is determined, under which this page will be promoted.

Advantages of the method:

• Allows better analysis

• takes into account the interests of users

• Suitable even for non-indexed sites

Disadvantages of the method:

• Quite costly (especially if there are several thousand pages on the site)

• Can not automate

Based on the results of the work, a list of correspondence is drawn up, which may look something like this:

№	Запрос	Частота	Страница на сайте под запрос
1	maritim pine	900	http://www.turkeyonline.ru/hotels/info/10115/
2	maritim pine beach	850	http://www.turkeyonline.ru/hotels/info/10115/
3	crown plaza	1600	http://www.turkeyonline.ru/hotels/info/10134/
4	crowne plaza	1600	http://www.turkeyonline.ru/hotels/info/10134/
5	plaza hotel	1500	http://www.turkeyonline.ru/hotels/info/10134/
6	rixos premium	1000	http://www.turkeyonline.ru/hotels/info/10641/
7	amara club	750	http://www.turkeyonline.ru/hotels/info/10643/
8	amara wing	900	http://www.turkeyonline.ru/hotels/info/10644/
9	grand haber	800	http://www.turkeyonline.ru/hotels/info/10645/
10	grand отель	2500	Нет
11	турция grand	1300	Нет
12	amara dolce vita	900	Нет
13	dolce amara	900	Нет

This is just a "clipping" from a large table of correspondence. For many sites, the matching list contains hundreds and thousands of lines. From the list of correspondences in the example, we can see that out of 13 requests on the site it was possible to find content under 9. There are no texts for 4 queries and they need to be created.

Questions

1. What is done the Context analyzing?
2. Which method help to analyze content information?
3. What is The method "from search engines"?
4. What are advantages of the method "from search engines"?

6. Technical platform and types of interfaces

6.1. Technical platform

Platforms can be considered a combination of hardware and software tools that allow the product to function - both in terms of interaction with the user, and at the level of internal mechanisms.

Undoubtedly, you are familiar with some common platforms for interactive products, including desktop applications, web sites and web applications, kiosks, automotive systems, portable devices (cameras, phones, PDAs), home entertainment systems (game consoles, TV tuners, music centers) and professional devices (medical and scientific instruments).

Looking at this list, you can note that the concept of "platform" does not have a clear definition.

This is rather a shortening to describe a number of important product features, such as physical shape, size and resolution of the display, how to enter and connect to the network, the operating system and the possibilities for working with data.

All these factors significantly affect the way the design, construction and use of the product. The choice of a platform is the search for a balance between the best support for the needs and context of the characters on the one hand, and the constraints and challenges of the business, as well as technological capabilities, on the other.

The type of interface defines the behavioral essence of the product - the way it presents itself to the user. The type of interface is a way to describe how much the user will pay attention to the interaction with the product and how the product will respond to this attention.

Like all other design solutions, the choice of type of interface must be based on an understanding of the likely contexts and the environment for using the product.

6.2. Interface Type

Most people demonstrate behavior typical of their profession. The soldier is alert and alert, the tax collector is boring and indifferent to everything, the actor is bright and noticeable in any society, the person from the staff is cheerful and helpful. Like people, products present themselves to the user in a certain dominant manner.

The program can be bold or modest, colorful or dim, but these qualities should be determined by a specific purpose-oriented purpose. The style of the program's behavior should not depend on the personal preferences of its designer or programmer. The way a program presents itself creates the user's attitude to it, and this, in turn, greatly affects the usability of the software product. The program, whose outward appearance and behavior conflict with its purpose, is annoying and looks inappropriate, like hair in a cup of tea or a clown at a wedding.

The external representation and behavior of the product must correspond to the way it is used, and not to the personal tastes of the designers. From the point of view of program positioning, its external presentation and behavior are not only an aesthetic category - it is a behavioral category. The interface type of your program is part of its behavioral foundation, and all aesthetic decisions must be in harmony with it.

The interface type defines many important guidelines for all other design decisions, but it does not allow you to divide the world into black and white. How a person is able to behave differently depending on the context, and some products can exhibit signs of different types. Reading an email from a BlackBerry device while traveling by train, the user can focus on interacting with the device (and expect comparable in quality of reciprocity), but the same person can no longer pay so much attention to the device interface when trying to find the address, hurrying to a meeting. Another example: a word processor should usually be optimized for thoughtful, enthusiastic and frequent use, but some built-in tools,

such as a spreadsheet creation wizard, are used infrequently and gradually. In such cases, you should not only determine the dominant type of interface of the product as a whole, but also think about independent types of interface for individual product features and application contexts.

The technical platform and interface type are closely related: different hardware platforms favor applications of different behavioral types. The application working on a mobile phone, obviously, should be developed taking into account a different kind of user attention, than the educational program for a game console.

Designing Desktop Applications

The term "desktop applications" we use as a generalization for programs running on a modern personal computer. Generally speaking, the design of the interaction is rooted in desktop applications. Of course, situations in which designers had to deal with problems in the implementation of complex behavior arose on a variety of technical platforms, but it was personal computers that brought this complex behavior to each desktop. Therefore, many of the topics discussed in this book are based on our understanding of what desktop applications need to effectively serve the needs of the individual. In recent history, this understanding has spread to the World Wide Web, to large devices and mobile devices, as well as to other real-time systems, as will be seen later in this chapter.

By defining the product platform, it is obviously necessary to go beyond the term "desktop" to select the appropriate operating system, database management system, and user interface technology. Evaluation of each of these aspects of desktop applications is beyond the scope of our topic, and yet the decisions made in this area are extremely important to analyze in terms of supporting the needs of users. Moreover, since all kinds of design, in fact, there is a dialogue with the material, it is also important to understand the limitations and opportunities associated with each of these key technologies.

Unfortunately, decisions related to platform selection - especially with regard to hardware - are still accepted in many organizations before a designer is

involved in the work. It is important to inform the management that the choice of the platform will be more effective if it is done after the completion of the work of the designers.

Decisions on the choice of a technical platform should be correlated with the work on the design of interaction.

The interface of desktop applications can be attributed to one of three types: exclusive, temporary and background. Since each of the categories has its own set of behavioral attributes, the category defines an individual type of interaction with the user. It is important that these categories give the designer a starting point in designing the interface. For example, a program that is exclusive will not be convenient if it does not behave according to this status.

Monopoly type

To applications of a monopoly type are programs that completely take over the attention of users for long periods of time. Monopoly application offers users a large set of closely related functions and capabilities, and users usually deploy such an application on the entire screen and work with it continuously. Here are typical examples of applications of this type: word processors, spreadsheets, programs for working with e-mail. Many applications for vertical markets are also monopolistic, as they often remain on the screen for a long time, and interaction with them can be very complicated and confusing. Users of monopoly programs are often in a state of flux. The window of the exclusive program is usually deployed on the entire screen (the status of the windows we'll discuss in Chapter 20).

For example, it is difficult to imagine working with Microsoft Outlook in a window of 7.5 × 10 centimeters. With this size, you can not use this program for its intended purpose, that is, create and view e-mail messages and meeting information.

Products with a monopoly interface are characterized by continuous operation over long periods of time. In the process of user's work, the monopoly product is its main tool and prevails over the others. For example, the PowerPoint application takes a full screen all the time that a user is working on a presentation,

from start to finish. Even if other programs are involved in the process, PowerPoint retains its monopoly essence.

Users of monopoly applications, as a rule, are middle peasants. People usually devote much time and attention to working with monopoly applications and are often vitally interested in overcoming the learning curve and becoming middle-users. Each user goes through the novice stage, but this stage is short compared to the total time during which he works with this product. Of course, a beginner has to overcome the initial rise in the learning curve, but from the point of view of the total time spent working with the application in the future, the time spent on getting to know the program is small.

For the designer, this often means that the program should be aimed at using the eternal middle peasants, not by novice users and not specialists. It is equally inappropriate to sacrifice performance and power for the awkward idiom that facilitates learning, and to give the user only complex, albeit powerful tools.

However, if you find more simple idioms that do not work at the expense of interacting with an average user, then this will be the best option. In any case, the preparation of the user to whom the optimization is oriented is determined by the choice of the key character and your understanding of his views, inclinations and contexts of use.

Between beginners and middle peasants there is a significant layer of users, resorting to the services of exclusive applications only from time to time. They can not be ignored. Of course, the success of the monopolist's application is still predetermined by the middle peasants, who often use it, but only until a competing application appears that satisfies both the middle peasants and the newcomers. A good example is WordStar, an ancient text with a monopoly interface. This program for a long time is on the screen, continuously interacting with the user, and its numerous navigation and information panels feel good when they occupy the entire processor. It dominated the word processor market in the late 70's and early 80's, as it responded exceptionally well to the needs of the middle peasants, although it was extremely difficult for beginners and those who used it from time

to time to work with it. WordStar Corporation flourished until one of its competitors offered a program as powerful and convenient for the middle peasants and simultaneously more understandable for less experienced users. The WordStar editor turned out to be uncompetitive and quickly disappeared from the scene.

Do not spare the place on the screen Because the interaction of the user with the exclusive application takes almost the entire session of the computer, the program can safely request all available screen space. No other program will compete with it, so do not waste the screen space in vain, but do not be shy - take as much as you need. If you want to provide the user with four toolbars, create four toolbars. For a program positioned in another category, it would be too much, but the application of a monopolist is in its right. In most cases, the window of the exclusive application is expanded to the full screen. In the absence of explicit instructions from the user, your stand-alone application should occupy the entire screen by default. The program should allow the user to resize the window and remain functional for any size, but by default the interface should be oriented to the full screen, rather than to other, more rare options.

Optimize exclusive applications for full screen operation.

Use a strong visual style

Since the user looks at the exclusive application for a long time, take care to mute the colors and texture of the visual part. Stick to the conservative color palette. Large and bright controls are able to attract newcomers, but after a couple of weeks of daily work, they will appear to be screaming. Tiny dots or light color accents will ultimately be more effective than large blobs and, moreover, allow you to tightly pack the control elements.

The interface of the exclusive application must adhere to a conservative visual style.

The user will look at the same palettes, menus and toolbars for a long time and, due to considerable work experience, will get used to the layout of the interface elements. This gives the designer the opportunity to achieve high information content with a minimum "consumption" of pixels. Toolbars and

related controls can be reduced in size. Service elements, such as screen dividers, rulers and scrollbars, can be placed denser and narrower.

Enriched Feedback

Monopoly applications - an excellent platform for creating environments with rich feedback for users. You can increase productivity by expanding the interface with additional information blocks. The status bar at the bottom edge of the screen, the ends of the scroll bars, usually occupied by sliders, the title bar and other dusty corners of the visible area of the program can be filled with indicators of its status, the state of the data being processed, the state of the system, and other tips that increase the user's productivity. However, be cautious: enriching the visual feedback, be careful not to get a hopelessly littered interface as a result.

The newcomer will not notice these artifacts and the more will not understand them, because they will not be conspicuous. But after some time of constant work, he will pay attention to them, take an interest in their meaning and study them using the "poke" method. At this point, the user will want to make some effort to learn more. If you provide him with a simple way to figure out the purpose of these elements, he will not just become a more experienced user - he will become a more satisfied user, and his power over the program will grow along with his level of knowledge about it.

Adding such additional indicators to the existing interface is similar to adding a variety of ingredients to the meat broth: the dish as a whole is getting better.

Enriched input tools

Similarly, monopoly applications benefit from rich input tools. For each frequently used aspect of the application, several management methods must be provided.

Direct manipulation, dialog boxes, keyboard shortcuts - everything in this case will be appropriate. When using direct manipulation idioms, you can impose more stringent requirements on the accuracy of the user's motor skills.

Sensitive areas on the screen can be 2 × 2 pixel in size, because you have the right to assume that the user is comfortable in the work chair, his hand is stably located on the table and the mouse is clearly moving along the elastic mat.

Monopoly applications should use enriched input. You can go even further - place the interface elements in the corners and on the borders of the program window. In the cockpit, the most commonly used controls are located directly in front of the pilot, and those that he uses occasionally or in an emergency situation are on armrests, above the head or on the side panels. In the Word editor, the most commonly used functions are placed on the two main toolbars. Frequently called, but changing the appearance of the screen functions are assigned to the small buttons to the left of the horizontal scroll bar at the bottom of the screen. These buttons completely change the presentation of the document: Normal, Page Layout, Structure. Beginners use them rarely, and a random call to these functions can confuse an inexperienced user. Being located at the bottom of the screen, these buttons are almost invisible to beginners. Their isolation subtly and silently hints that they should be used with caution. More experienced and confident in their actions, users will notice these interface elements and ask themselves about their purpose. They can experiment with these elements when they are mentally prepared for the consequences. This is a very accurate and useful linking of the placement of elements with their use.

Applications that are document-oriented

The axiom that the exclusive application should work in full screen is also true for the windows of documents opened by the application. Child windows with documents should always be deployed if the user explicitly did not require otherwise or did not need to see several documents at the same time to perform a certain task.

Expand documents in exclusive applications to full screen. Many monopoly applications are focused on working with documents (their main purpose is to create and view documents containing a variety of data). As a result, it's easy to start thinking that the application window is the document window. However, this

is not always the case. If the application works with the document, but performs only one simple function, say it scans the image, it is not exclusive, and it should not monopolize the user's attention. Such "applications of one function" have their own type - temporary.

Temporary type

A temporary type product comes and goes, offering one function and a limited set of controls associated with this function. The application is called when necessary, does its work and quickly disappears, allowing the user to continue the interrupted activity (usually in the window of the exclusive application).

The defining characteristic of a temporal application is its transient essence. Since it is not on the screen for long periods of time, the user does not have the opportunity to get used to it. Therefore, the program interface should be unambiguous and present controls clearly and clearly, eliminating errors or confusion. The interface must report its functions. There is no place for beautiful but ambiguous pictograms or images. Just here the buttons should be large, and the inscriptions on them - clear, typed in a large and well-readable font.

Temporary applications should be simple, clear, clear. Although the temporary program can undoubtedly be the only running program on the desktop, it, as a rule, plays the role of auxiliary with the exclusive application. A typical example of a scenario for working with a temporary application is to call Explorer to find and open a file while you are already editing another file in the Word editor. Another example is adjusting the volume of the computer's speakers. Since the temporary program selects a place on the screen at the monopoly, it must show respect and do not require space more than necessary.

If the monopoly application has the right to dig a foundation pit and lay the foundation, the temporary just puts the tent on the weekend.

It can not occupy all the space on the screen and the user's entire time. It's a car in the software world.

If the entire computer system as a whole plays the role of a temporary application in the physical world of atoms, it is not necessary to minimize the

number of pixels consumed and the amount of attention attracted. This property is, for example, monitoring monitors in the production environment and digital video systems in the operating room. Here the entire screen of the computer is used only at times, while the user is exclusively engaged in mechanical activity. In such cases, it is extremely important that the information is intelligible and easily perceived from a distance of several meters, and this obviously requires a more ambitious application of color and a more generous distribution of the screen space.

Background type

Programs that do not interact with the user in a normal state are positioned as background. They work in the background, invisible and inaudible, and perform tasks that are possibly important, but do not require user intervention. A printer driver or a network connection are two excellent examples. As you might guess, any discussion of the interface of the background program will be brief for natural reasons. While a temporary application controls the execution of a function, background applications usually control processes. Palpitation is not a function that requires conscious control, but a process that occurs autonomously in the background. Similar to the processes controlling heartbeat, background applications remain usually completely invisible, conscientiously fulfilling their purpose while the computer is turned on. However, unlike the heart, they are required from time to time to install and delete, and also to adjust in connection with changes in circumstances. It is at such moments that it becomes necessary to communicate background applications with the user. The interaction between the user and the background program is by nature extremely temporary, so that all the rules for temporary applications apply here.

Adherence to the principles of designing temporary applications, namely ensuring that users are informed of the purpose of the application and its capabilities, and also informing about the meaning of the selected values, becomes even more critical in the situation with background applications. In many cases, the user does not even suspect the existence of a background program. In view of this

fact, it becomes apparent that messages from such programs can confuse the user, without being presented in the appropriate context. Since many of these programs perform mysterious functions (such as a printer driver or a connection concentrator), messages from them must be such that users are not confused or bewildered.

The question, the answer to which is considered obvious when it comes to applications of other types, becomes fundamental for background programs: if the program is invisible, how to call up its window on those rare occasions when it becomes necessary? One of the most common approaches in the Windows system is to present the background program with an icon in the system notification area.

Placement before the eyes of a user icon, which he may never use, is an insult no less than sticking advertising on the windshield of the car.

Background program icons should always be before glazes only if they provide useful information about the status of these programs. Microsoft solved this problem in Windows XP: the icons of background programs are hidden if the user does not address them actively enough.

An effective approach to setting background programs, used both in Mac OS and in Windows, are control panels.

These are temporary-type programs that provide a single point of entry for setting up services. It is also important to provide direct, consistent access to background applications at any time when a problem arises that interferes with the user's ability to perform their tasks. For example, if the icon in the notification area indicates a problem with the printer, clicking on this icon should give access to the mechanism to fix the situation.

There are two types of user interfaces:

Procedural-oriented

Procedural-oriented: the traditional model of interaction with the user, based on the concepts "procedure" and "operation" is used. Within the framework of this model, the software provides the user with the ability to perform some actions for

which the user determines the correspondence of data and the result of which is to obtain the desired result. Procedural-oriented interfaces:

- Provides the user with the functions necessary to perform tasks;
- The focus is on tasks;
- The icons represent applications, windows or operations;
- The contents of folders and directories are reflected using a list table.

Procedural-oriented are

Primitive - is called an interface that organizes interaction with the user and is used in console mode. The only deviation from the sequential process, which is provided by the data, is the organization of a cycle for processing several sets of data.

Interface Menu - Unlike a primitive interface, allows the user to select an operation from a special list displayed by the program. These interfaces assume the implementation of a set of work scenarios, the sequence of actions in which is determined by users. The tree organization of the menu assumes a strictly limited implementation. In this case, two options for organizing the menu are possible: - each menu window occupies the entire screen-there are several different level menus (Windows) on the screen at the same time. In conditions of limited navigation, regardless of the implementation, searching for an item of more than two level menus is quite a challenge.

Interface with free navigation (graphical interface) - Supports the concept of interactive interaction with software, visual feedback from the user and the ability to directly manipulate the object (buttons, indicators, status bars). Unlike the Menu interface, the interface with free navigation makes it possible to perform any operations that are permissible in a particular state, access to which is possible through various interface components (hotkeys, etc.). The interface with free navigation is implemented using event programming, which involves the use of visual development tools (via messages).

Object-oriented interface

The object-oriented interface uses a model of interaction with the user, focused on manipulating objects in the domain. Within the framework of this model, the user is given the opportunity to directly interact with each object and initiate the execution of operations in the process of which several objects interact. The task of the user is formulated as a purposeful change of some object. The object is understood in the broad sense of the word - the database model, the system, etc. Such an interface assumes that interaction with the user is accomplished by selecting and moving the icons of the corresponding object-oriented area. There are single-document (SDI) and multi-document (MDI) interfaces.

Subtypes of user interfaces:

Command interface

It is called so because in this form of interface a person submits "commands" to the computer, and the computer executes them and gives the result to the person. The command interface is implemented in the form of batch technology and command line technology.

Batch technology

First, data is accumulated, and a data packet is formed, and then the packet is sequentially processed by a number of programs. Disadvantages of this mode - low efficiency of decision-making and isolation of the user from the system.

Command-line technology

With this technology, as a way of entering information, usually the keyboard is used, and the display is a means of output. The commands are typed on the command line.

WIMP interface

WIMP - interface (Window - window, Image - image, Menu - menu, Pointer - pointer). Although in this interface the machine is given commands, but this is done "indirectly", through graphic images. This kind of interface is implemented

on two levels of technology: a simple graphical interface and a "clean" WIMP interface.

Simple graphical interface

Distinctive features of this interface:

• Selecting areas of the screen.

• Override the keyboard keys depending on the context.

• Use of manipulators and keyboard gray keys to control the cursor.

Actually WIMP This subtype of the interface is characterized by the following features:

• All work with programs, files and documents occurs in windows;

• All programs, files, documents, devices and other objects are represented in the form of icons;

• All actions with objects are performed using the menu;

• Wide use of manipulators to point to objects.

SILK interface

SILK - interface (Speech - speech, Image - image, Language - language, Knowlege - knowledge). The computer finds commands for itself, analyzing human behavior.

• Speech technology

With this technology, commands are given by voice by pronouncing special reserved words - commands.

• Biometric technology

Here the person appears as a set of signs of behavior. The picture is read from the digital video camera, and then commands are used to highlight the images from this image using special image recognition programs.

Semantic interface

Little is known about this technology. It seems that it is closely related to artificial intelligence and is similar to all the subtypes of SILK and other types too. It is possible that in connection with the important military significance of these developments, these directions have been classified.

User interface of the computer program

The user interface of the computer application includes:

• means of displaying information, displayed information, formats and codes;

• command modes, the language "user-interface";

• devices and technologies for data entry;

• Dialogues, interaction and transactions between the user and the computer, feedback from the user;

• support for decision-making in a specific subject area;

• The procedure for using the program and the documentation for it.

The user interface is often understood only as the appearance of the program. However, in practice, the user perceives through him the whole program as a whole, which means that this understanding is too narrow.

In fact, the UI unites all the elements and components of the program that can influence the user's interaction with the software, it's not just the screen that the user sees.

These elements include:

• a set of user tasks that he solves with the help of the system;

• The metaphor used by the system (for example, the desktop in MS Windows®);

• System control elements;

• navigation between system blocks;

• visual (and not only) design of the program screens;

• Means of displaying information, displayed information and formats;

• devices and technologies for data entry;

• dialogs, interaction and transactions between the user and the computer;

• feedback from the user;

• support for decision-making in a specific subject area;

• the procedure for using the program and the documentation for it.

To simplify the perception of the function of the program by the user in the development of the user interface, it is desirable to use metaphors.

Questions

1. What is the Platforms in human-computer communication?
2. What means the "desktop applications"?
3. How many types can be attributed the interface of desktop applications?
4. What is Monopoly type?
5. What advantages of Interface Menu human-computer communication?
6. What is WIMP interface?
7. What is SILK interface?

7. Visual design

7.1. Visual design

Visual design forms the aesthetics of the site, it is strategically important for the qualitative realization of the image, color, font and other elements. A successful visual design cannot exist separately from the content placed on the page, as well as its functionality.

No matter how much effort you invest in researching users and creating a model for the behavior of a product that contributes to the achievement of their goals, these forces will be wasted if you fail to properly communicate the principles of this behavior to users. In the case of interactive products, this is often done by visual means - by displaying objects on the display, (although in some cases the behavior of the product has to be reported through physical properties, such as the form of a hardware button or the tactile sensations from it).

The visual design of interfaces - due to their similarity to graphic design and visual arts - is often misunderstood. Often, it is incorrectly defined as "skinning" on the interface; We even heard the wording "product decoration".

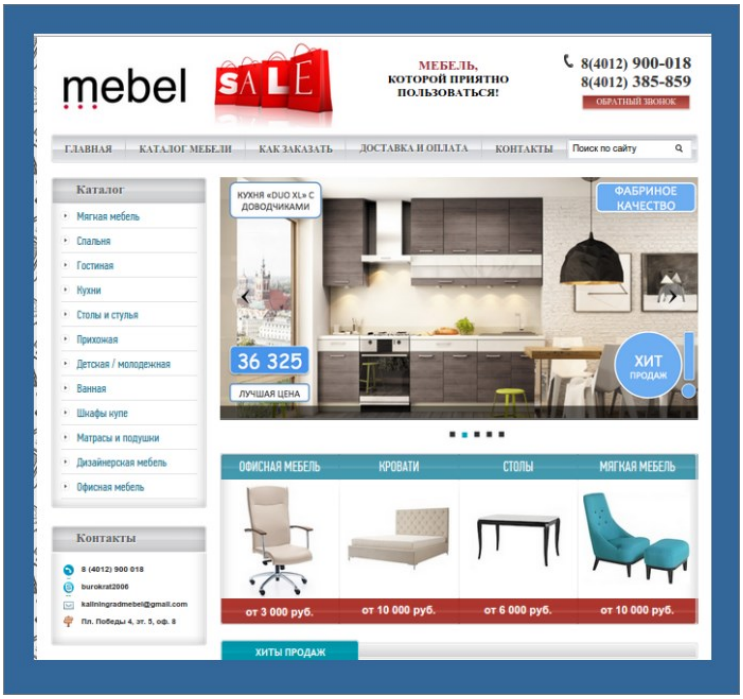
Our experience led us to the conclusion that the visual design of interfaces is a very necessary and unique discipline that should be used in conjunction with interaction design and industrial design. It can seriously affect the effectiveness and attractiveness of the product, but in order to fully realize this potential, you need not postpone the visual design for later (otherwise attempts will be made to "paint the pig"), but make it one of the main tools for meeting the needs of users and business.

Developing a visual interface design requires a number of related skills. A specific set of skills is determined by the product being created. To create attractive and convenient user interfaces, the interface designer must have basic visual skills - understanding color, typography, form and composition - and knowing how they can be effectively applied to convey behavior and information, to create moods or stimulate physiological responses. The interface designer also

needs a deep understanding of the interaction principles and interface idioms that determine the behavior of the product.

In addition, it attracts users and helps build their trust and interest in the brand. It would seem, how many nuances must be taken into account and correctly applied in practice.

However, once you build a logical chain and begin to gradually combine the basic elements of visual design together, everything becomes much easier. And to be convinced of this, we will clearly show how some principles are combined in action, by the example of one of our clients.



7.2. Basic elements of visual design

The basic elements, combined among themselves to create a visual design, are:

• **Lines** are connections of two points and can be used to define the shape, its components and create a texture. All lines, if they are straight, have length, width and direction.

• **Blocks** are autonomous regions. To determine the area, the graphic artist uses lines, differences in color or texture. Each object has a shape.

• **The color of the palette** is selected based on a combination of shades. This must be done in order to differentiate objects, create depth, add emphasis and better organize the flow of information. Color theory explores how various options can psychologically affect users.

• **The texture** shows how the surface feels, or how it seems to us. Repeating in the elements, the texture creates and forms models. Depending on which texture is applied, it can be used to attract or distract attention.

• **Typography** determines which font was selected, its size, alignment, color and spacing.

• **The form** includes three-dimensional objects and describes their volume and mass. A form can be created by combining two or more objects, and can be expanded with different tones, texture and color.

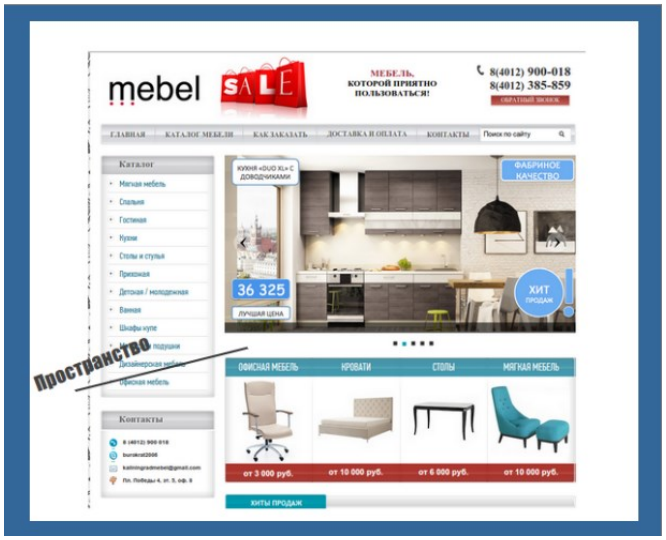
7.3. Principles of creating a visual design

Visual design is applied to the elements mentioned above and effectively integrates them in such a way that they acquire meaning. In order to find out how to use the basic elements, you need to consider the following questions:

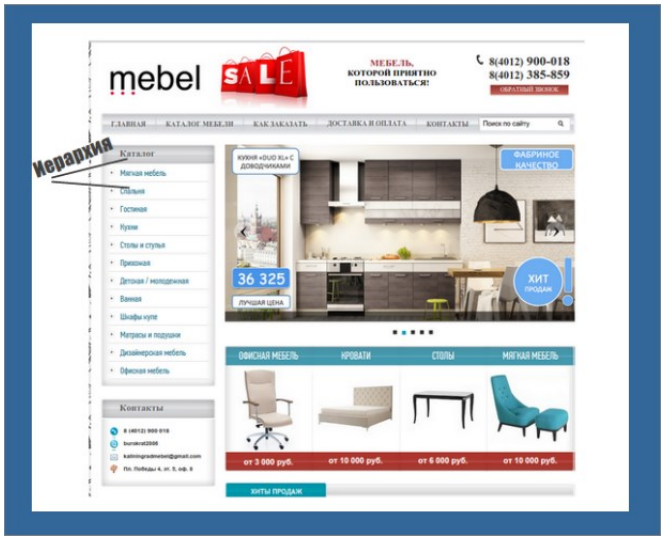
• **Unity** refers to all elements on a page visually or conceptually called to be together. Visual design must find a balance between unity and diversity, so as not to become stupid or dull.

• **Gestalt** in visual design helps users to perceive a common design - as opposed to considering individual elements. If the design elements are positioned properly, the general design gestalt will be understandable.

• **The space** "is defined when something is in it," as Alex White wrote in his Elements of Graphic Design. The inclusion of space in the design helps to maintain attention, increase readability and create an illusion. White space is an important part of your layout.

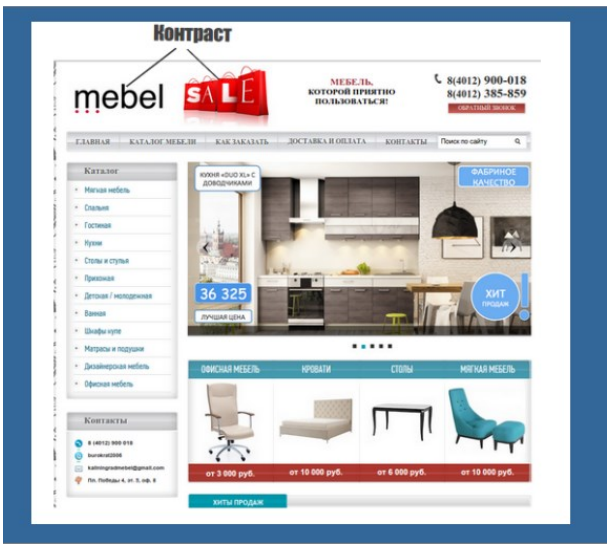


• **The hierarchy** shows the difference in the value between the elements. Designers often create hierarchies at the expense of different sizes of fonts, colors and layout on the page. Usually the elements located in the upper part are perceived as the most important.



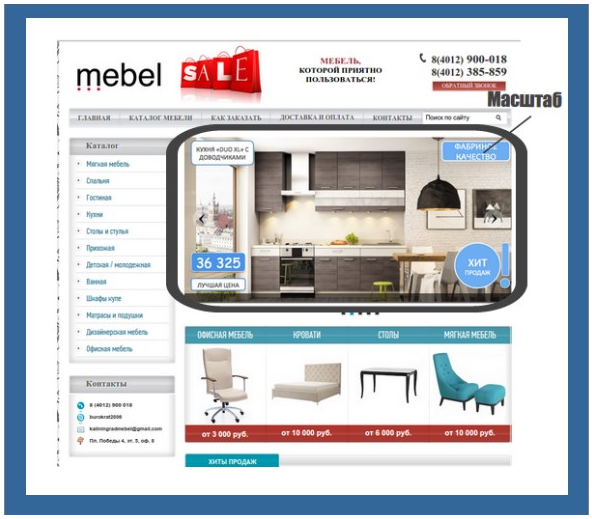
The text spacing and size creates a visual hierarchy.

- **The balance** creates the impression of an equal distribution. This does not always mean that symmetry is achieved.
- **Contrast** focuses on highlighting elements, emphasizing differences in size, color, direction and other characteristics.

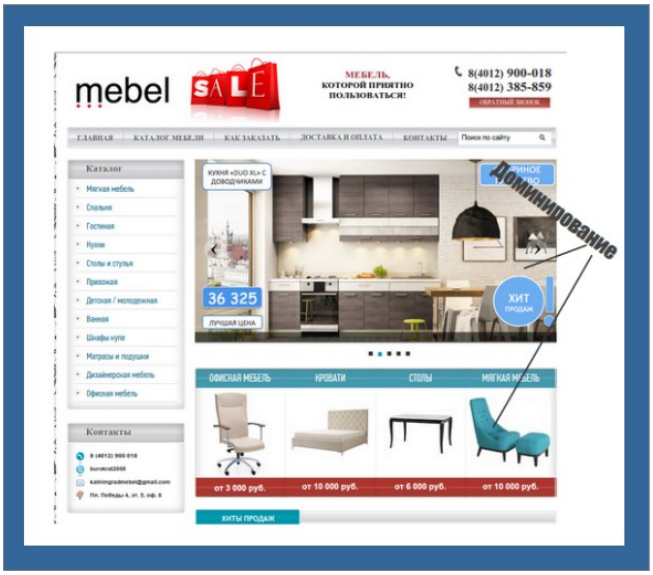


The color contrast was applied to the production of the logo. The word "SALE" stands out in shape, style and color.

• **The scale** determines the size range. It creates interest and depth, demonstrating how each element relates to each other depending on the size.

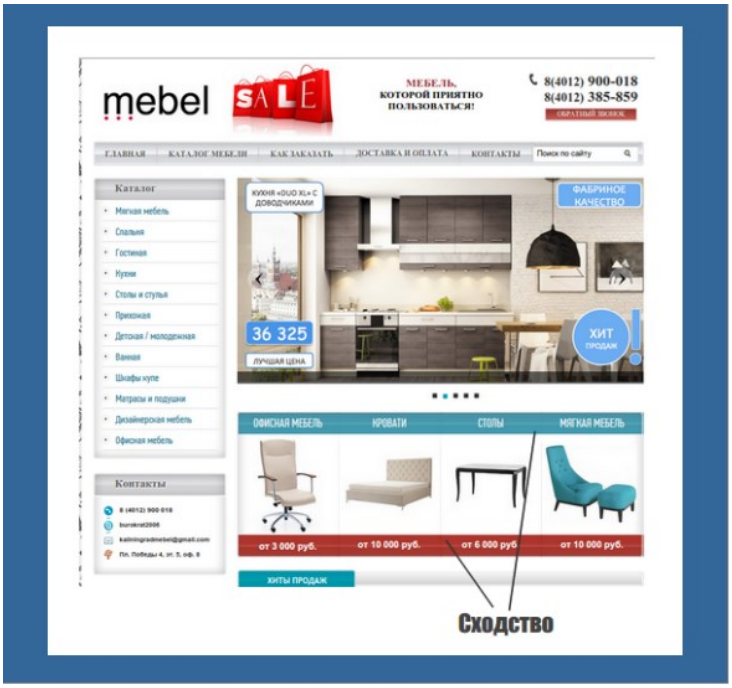


• **Domination** focuses on one element as a key point, while others are seen as subordinates. This is often done by expanding and creating contrast depending on the size, color, position, shape, etc.



The recommended images in the carousel dominate the smaller images below to create a focal point.

• **Similarity** is designed to create continuity throughout the design path, but without direct copying. Similarity is used to ensure that the elements work together and help users to master the interface more quickly.



7.4. Conceptual design

The notion of conceptual design is rather amorphous, attributing to it various trends in contemporary design and art, so let's try to understand the meaning of this interesting term on more familiar and simple things. Remember the design of the title in the children's magazine "Funny Pictures" - this is the simplest and most graphic explanation of what, in fact, is a conceptual design. Giving something, what are the specific features that distinguish this something from the general mass.

The task of conceptual design is the development of a concept on the basis of which one or a number of subjects having common features will subsequently be designed.

Conceptual design also includes designing objects and giving them personality. This type of design is by design to engineering than to design, so when designing design concepts of things, web studio professionals take into account not only the plausible and at the same time interesting design, but also ergonomics, because not only is the thing aesthetically attractive, it should also be practical.

The basis of modern conceptual design is to give customary and even virgin things unusual shapes, textures, and other design elements. The houses, designed entirely from curved lines, clothes, unthinkable forms of unusual materials, ornaments from seemingly simple but interesting materials, are all examples of bold and original solutions in conceptual design.

Conceptualism is a direction that unites the process of creativity and the process of its exploration. About processing in design now write a lot and contradictory, defining design as a single process of shaping the environment, as a business process, as the practice of processes of transversing things into signs and signs into things, as a process of communication. Consistently revealing the main aspects of conceptualism, we get the opportunity to consider it from the position of relations in the product / process hybrid.

Conceptual design is, above all, the power of an idea, not a material. In conceptual design, the concept is more important than physical expression. That is why this pore is already being written about the advent of a new era - the "conceptual era". S. Ogurtsov in the article "Art after conceptualism: the conceptual space of art" calls "precisely conceptualism (and not avant-garde) the main - and not yet meaningful - artistic revolution of the twentieth century."

At present, the problem of definition of design is very acute for analysts. Attempts to identify the problematic field of design can be found in the works of M. Heidegger, J. Derrida, J. Baudrillard, K.M. Cantor, V.M. Rosina, V.L. Glazycheva, O.I. Genisaretsky. In the monograph "Design. Experience of metaphysical transcription »G.N. Lola notes the dynamics of the design definitions "from the outline of the object, which then must be made or built," to the idea of "design without a product, but as a process or way of life itself".

Conceptual design is good only when a conceptual idea is good.

Concept and idea are different things. The concept sets the general direction; the idea is a component of the work. Ideas allow to realize the concept. In fact, the concept is the logical foundation of the idea.

Any idea or solution in conceptual design can’t arise and act without consciousness, those conditions that influenced its appearance. The nature of the conditions can be understood on the basis of previous decisions. It can be some accomplished facts, observations, known patterns and concepts. The conceptual designer at every moment is able to restore these conditions as logical bases for the unfolding of his conceptual activity.

If there are no such previous decisions, if the facts are still "silent", and a decision is necessary, such assumptions, assumptions, or, strictly speaking, hypotheses, are the basis for the conditions. "... You can understand something only thanks to the assumptions about it beforehand, and not when it is to us as something absolutely mysterious."

This does not contradict the following aspects of the concept of "conception" (from the Latin conception - understanding, system, view, view): fixing limit

values; introduction to the discourse of assumptions, without which it is impossible to "untwist" and detailed elaboration of the idea presented; as well as "disguise" within the initial (basic) theory of the components of personal knowledge.

It should be noted that conceptual thinking occurs in principle where the facts are really "silent" or merely "hinting" at reality, and the designer already needs to somehow understand and act on it. Under these conditions, hypotheses and assumptions are not at all signs of professional impotence. On the contrary, they are evidence of the courage of the designer and his "cognitive impudence" - after all, he goes to where there was no one else. But such logical foundations of ideas and decisions are a force only because the conceptual designer always remembers that they are only hypotheses and is ready to return and revise them if his decisions are unsatisfactory.

So, the conceptual designer behind each idea can find and see his logical reason, which justifies him.

Commenting on his autumn show of 2000, Hussein Chalayan explained: he knew that he wanted to show an empty living room, "and from this idea the whole collection was born."

The moment of "inclusion" of conceptual thinking can be related to the transition to a state of consciousness in which any idea is regarded as an element of a set. This happens even when the conceptual designer deals with one single idea, because there are sets consisting of a single element or even "empty" sets.

In fact, the transition from an idea to a set of ideas is an act of recognizing that each concept has not only content but also scope. This is the most important characteristic of the concept, showing the sum of ideas that can be deduced as consequences from their logical foundation. We read from Levitt: "For every conceptual product that has received a physical form, there are many variations that have not been embodied in matter."

Constant retention in the mind of the conceptual designer of the content of the concept and its volume, the transition from the first to the second, the operation

of elements of the volume of concepts and the restoration of signs of ideas on them allows the designer to master and manage the diversity.

Each designer-conceptualist has the ability to keep the variety of things in some unity. Each idea of conceptual design reveals many other ideas.

Any idea or decision is a trace of human effort. Each of them has its own author, although not always the one who signed it. In the practice of conceptual design, the author's footprint is more noticeable than in others. Among the uncountable number of links that design-concepts can form, only what is needed to understand the idea is left consciously. But, most importantly, it leaves only what is somehow understood, "captured" by the designer in the "here and now" state.

In other words, products of conceptual design always give out a research position (cognitive intent), which the designer shows. It is noticeable by intent, which served as the reasons for somehow built assumptions about the idea. In the course of conceptual work, these intentions become explicit, they are explicated. Through the author of the design concept, you can outline the limit of the world that is created by the fruits of his conceptual thinking.

The personality-boundary character of intellectual work is a sign of conceptual design. This brings him to the philosophy. To this specific property of philosophy, G. Simmel very accurately pointed out: "The reaction of philosophizing thought means not the absorption of the world by an individual, not its humanization, but the fact that, on the contrary, a typical picture of the world arises, into which an individual also joins; a whole is formed - just such as this type of "human" can think; and thanks to this the individual, conscious of his own, undoubted reality, establishes the unity of the whole and can be understood through him. Another important aspect of the concept of "conception" - a pronounced personality beginning, the figure of the founder, who knows only the original design. It is thanks to this aspect of the concept that we easily distinguish the Comme des Garcons collection from the Alexander McQueen collection, Martin Margiela from Hussein Chalayan, and John Galliano will never be confused with Viktor & Rolf.

Conceptual design, of course, is sketchy. This allows designers to realize their idea as accurately as possible and remain understood.

Understanding, in fact, is a process of liberation from excess. "The fact that we see something really real, neither more nor less, is the result of guiding our vision of the process of obtaining clarity, cutting off illusory entities." In the conceptually constructed mechanism, the possibility of the existence of what could become a source of ambiguity is excluded, or this possibility is minimized.

The effectiveness of using the conceptual design method in design is ensured by the following conditions:

- conceptual design is always justified, i.e. always has a designer-reasoned logical basis;

- the product of conceptual design can always restore the identity of the creator;

- conceptual design works with the quality of the projected object, and not with a set of quantitative characteristics;

- in the conceptual design the subject area is always defined, within the framework of which the designer designs;

- conceptual design has many options for the presentation;

- conceptual design is a special method of ascent from concrete to new concrete through synthesis of abstract;

- conceptual design is always thinking "from above";

- conceptual design in the design is a continuous spiral process of concept formation, hypothesis formation, concept creation, its criticism and the emergence of a new concept;

- conceptual design in consumption is a continuous process of identifying the design object in accordance with different cognitive situations;

- conceptual design - one of the ways to actualize the idea of temporality.

The conceptual designer in the process of his work makes an interpretation, a kind of exegesis (Greek exegesis - interpretation), the observed reality and turns it into the object of his activity - the product of design. This happens: first, through

the comprehension of a concrete cognitive situation, secondly, through the realization of one's own research intent and, finally, thirdly, through the establishment of a point of view on the conceivable object. These are the three whales on which the conceptual design is based.

The conceptual designer always projects phenomenologically "purely", without distorting the meaning, and mainly this is because he expresses the idea in a conceptually rigorous form - in the form of concepts and relationships between them.

In his collection dedicated to the structural idea of "flat", Marzhiel shifted his sleeves and armholes - they were arranged so that things could lie flat when they were not worn by a person. Sometimes they even wore hangers, so they could also hang flat. In most cases, clothes made more sense when they did not wear it: thus emphasizing the superiority of the form, or rather, even its basic absence. It is clear that the idea of a flat cut served as a "mechanism" that developed a whole structural concept.

In another collection by the same designer, dedicated to the idea of "excessive", the concept was realized through the huge round banquet tables set as a decoration, covered as if for a wedding or a formal dinner. The audience sat at tables, and models in large-sized clothes paced the tables. It was assumed that the view from the bottom up, large clothes and giant furniture will make viewers doubt the importance of their own person.

It can be concluded that in order to understand the conceptual design, it is first of all necessary to correctly "consider" a specific cognitive situation within the framework of which the designer has set himself, and in accordance with it isolate only what makes sense here and now, . Thus, the idea of a conceptual designer can always be interpreted on a product consisting of somehow organized concepts and relations between them.

Question

1. What is Visual design?
2. IS Visual design important for human-computer communication?
3. What the best skills for interface designer to do best Visual design?
4. What are Basic elements of visual design?
5. What is Conceptual design?

8. The design of information architecture

8.1. The design of information architecture

The design of information architecture (often reduced to "IA") - a combination of organization, presentation and navigation schemes implemented in the information system. Information architecture deals with the principles of organizing information and navigating through it in order to help people more successfully find and process the data they need.

Examples of Information Architecture Design

• structuring of information that will be presented on the site;

• design of information space, facilitating the fulfillment of tasks and intuitive access to content.

Practical results

• site maps

• navigation lists

• taxonomy

• Content audit

• Travel of users

Information architecture includes several related concepts. First, it is the structure of the available information. This is how the content on the site, on the intranet, the Internet community or any other Internet space is organized and marked out. Secondly, it is the art and science of ordering and marking. An information structure in which to find the right content is easy for the user is the final product of the information architecture. Thirdly, this community, consisting of practicing teachers, their goal is to make sure that a good information architecture is brought to the forefront of UX.

To find out which IA strategies are needed for a particular project, one can use the example of architectural drawings used in construction. The average house on the same street in the middle city can be very well built according to the

standard plan. There are dozens, hundreds of other houses built for the same sets of drawings throughout the country. They perform their functions. They are economical.

Of course, each of these houses is different: they have different finishes, they stand on different sites, they are inhabited by different people who use them in different ways. From the template solution you can make a website that will meet the needs of a wide range of customers. Minor cosmetic changes are all that will be needed for the final adaptation of such projects. The front-end developer can easily make all these changes, and no IA is needed.

Another scenario is when the house needs major repairs. Often houses are built "with a reserve", so that changes can be made without damage to the building. Residents can add and clean rooms, move the kitchen, demolish partitions. The architect is involved: after all, repairs involve serious structural changes.

These kinds of decisions are also applicable to the world of IA. The general pattern of the information architecture can be close to what you need. But maybe you need a major overhaul? Maybe you need to add a module so that the needs of users are fully covered. Or maybe the project needs to be simplified. The information architect determines the changes that need to be made on the project, develops a plan to translate these changes into life.

At the other end of the spectrum is a completely individual project. By analogy with the architecture, this will be a set of blueprints developed from scratch. The architect will assess the needs of the future tenant, and then talk to the engineer and builder to make sure that these desires are achievable. This is the most expensive solution, but in some cases only it can satisfy the client's needs.

The same happens with large web projects. For example, start-ups simply can not manage solutions out of the box, even adapted to their needs. They need a solution that fully corresponds to their business model, scalable (after all, the startup will grow). This is the case when the information architect (or a team of such) can prove himself by one hundred percent. Of course, there are unique cases. So a small project may need IA, and a large one can easily fit into a boxed

solution. That's why the IA strategy should be developed from the very beginning, instead of trying to squeeze good content into the existing markup of the site.

Although most often the information architect performs several roles in the company at once, there are cases when it is a separate specialist. So, what is he doing?

First of all, the architect serves as a link between the designer of the site and the developers. They need to make sure that the designer has created the correct content organization, and the developers have correctly interpreted everything. And, of course, it is responsible for how the information on the site will be organized and filed to best suit the needs of the user. This is a very important mission, for in case of its failure, the user is disappointed.

The last thing that many information architects do is the development of prototype sites. Using a prototype, you can demonstrate how users behave on the site, and how some elements should function.

8.2. Principles of Information Architecture Design

Dan Brown has been practicing the information architecture for more than 20 years. He developed 8 principles IA, which can serve as a good base for any project.

1. **The principle of objects**. The principle prescribes to view content as a developing entity that has its own life cycle. Different content will have different attributes and behavior, and this should be taken into account when designing a design.

2. **The principle of choice**. The principle means that you must offer your users a meaningful choice. However, you have to make sure that the choice will be focused on something specific: too many options can disorient the user. Information, too, should be submitted in the form of hierarchy, categories and sub-categories, instead of simply listing it as a long list.

3**. The principle of disclosure**. It is important to give the user the information he needs, but it's worth making sure that this is really what he needs,

not what you wanted to give. The principle also says that you need to give the user the information necessary for understanding: what he can find on other pages of the site and what is not. Information should be submitted gradually, from page to page, and not try to dump everything and immediately.

4. **The principle of examples**. Using the principle greatly improves the user experience. For example, when you go to a certain category of goods on Amazon, the site displays examples of products that fall into this category. This helps the user to quickly navigate, especially if he does not fully understand what the category name means.

5. **The principle of the main entrance**. Half of the visitors get to your site not through the main page. This means that any page should contain the necessary minimum of textual information - so that users understand where they are. This also confirms point 3 again, you do not need to try to fit all the information on the website home page.

6. **The principle of multiple classification**. This principle suggests that different users use your site in different ways, they may have different methods for finding the same information. For example, some will use the search, others will prefer to err on the site. The content needs to be adapted to different scenarios of user behavior.

7. **Principle of purposeful navigation**. It's not so important where the menu is located, what's important is written on it. Try to have your menu and navigation bar show where the user is now and where he can get from the current page.

8. **The principle of growth**. On the vast majority of sites, content is a fluid, volatile entity. The amount of content you have on the site today can only be a small fraction of what may be there tomorrow. Organize content in a way that allows it to grow in the future. And not only in terms of expanding some block with the text: content can be added completely different types.

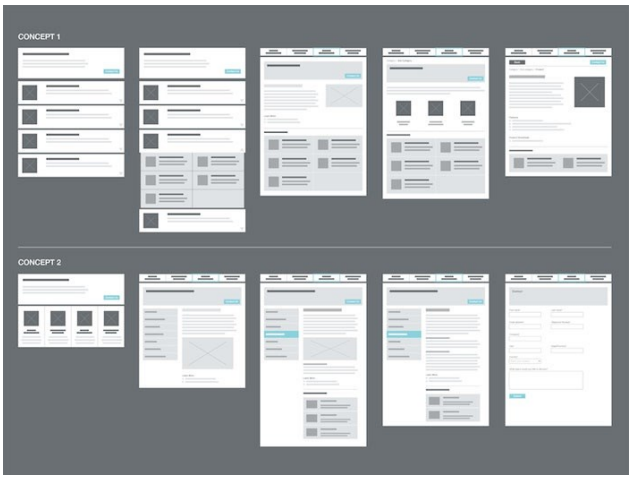
All these principles will apply to a particular project to a greater or lesser degree. How to start work on the information architecture?

With what it is necessary to begin is from finding-out of the purpose and mission of the project. And you need to understand what his mission is today, and what it can be in the future. Try to find out from the client how they see the project in six months or a couple of years. Finally, you must think like end users. Technically savvy users and beginners have a completely different style of using the site. After clarifying these two points - you can plan the content strategy in detail. There are four different ways how users search for information on a website. Classification provides a good starting point for designing an information architecture.

Principle of objects

This principle is based on the idea that the content should be perceived as an organic whole, it must have its own face, as well as strengths and weaknesses. A simple example: there is a clear distinction between a blog and a photo gallery - these are different types of content with different functions.

In the blog content is presented in the form of text, broken into paragraphs, it has headings and subtitles, perhaps, quotations. It may contain illustrations that perform an auxiliary function. If the image is part of the gallery, then in this case you may need additional illustrations. Some images may need an accompanying text, but the user immediately understands what type of content he is dealing with.



Another example: a page with a recipe. In the description of the method of preparing the dish, text is used, including subtitles and lists, photographs, possibly

video. At the same time, despite the fact that the recipe is basically text, it's not a blog, but a separate type of content.

It is very important for the designer to determine at the outset what types of content will be used for development. To do this, you need to break all the content into virtual categories with clearly defined structural requirements.

In accordance with the principle of objects, each new task must be performed taking into account the category to which the content belongs. You also need to remember about several levels of content delivery.

For example, in an online store there may be content that broadly describes the variety of products presented. This is a low feed rate. Since in the online store all products are grouped, the content that describes the properties of the product is a high-level feed.

Thus, the organization of all these specific categories of content and the definition of the type of their interaction is the initial stage in the development of the information delivery strategy. The task of the designer is to present the content in the most effective way.

Principle of choice

The designer should design such pages, which will be valuable and relevant to users, but it is very important to limit the number of opportunities for visitors to the site. Too many options with which the user can reach the set goal, will lead to the fact that people simply will not be able to make a choice.

The larger the selection, the longer it takes to process all the data received, and this can cause user annoyance. Despite the fact that many people claim that they prefer a variety of choices, numerous studies show that multivariance causes people anxiety.

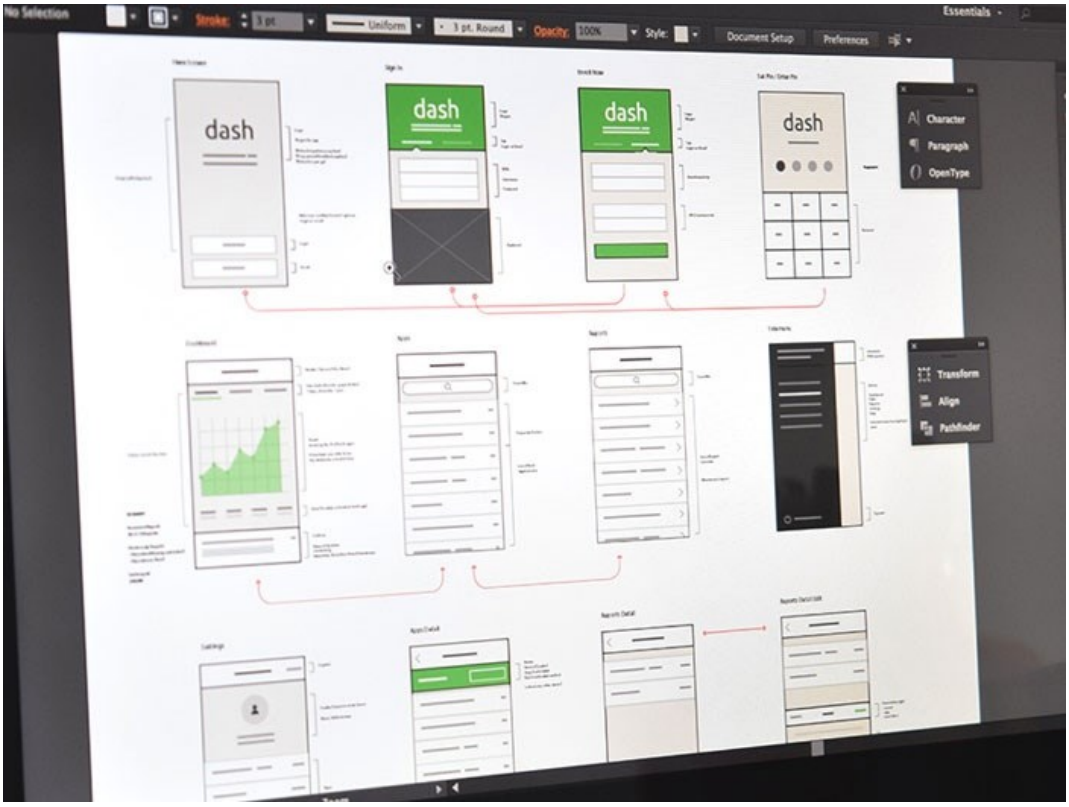
The more options - the more time users spend in search of what they need. If they have to view too much content in order, say, to place an order or register on a website, they will either just close the site or try to reach the goal with a phone call, which negates all the designer's efforts. The choice should be small, especially

in the design of registration forms, in which case the user's actions must be strictly limited.

Principle of Disclosure of Information

The best strategy that a designer can use is to put as much content on the page as is necessary for the user to know what to expect next.

The principle of gradual disclosure is a popular design model, because it is based on the idea that a person can perceive a certain amount of information for a limited period of time. And since the user is able to assimilate the presented content, he can use the received data in order to guess what information will be presented on the next page.



How can the principle of gradual disclosure affect the designer's actions? This way of submitting content makes us consider the content of the site in the form of semantic layers. As a result, the site consists of many layers with similar content, but broken into small parts.

If you go back to the example with a culinary recipe, then placing all the content on a separate page is absurd. Therefore, designers and break all the content

into categories. The category page contains less data than the page with the recipe and this is correct. The information is disclosed sequentially and the user moves from the general to the particular.

Principle of samples

The principle of content allocation, which is placed inside the category, will help attract the attention of the user to the proposal that is contained on the site. For example, on the Amazon website, when viewing a product category, the user is shown examples of products that fall into this category.

This way of submitting content helps the user to determine the choice of the desired product.

In some cases, the principle of choice is impossible to implement, because everything depends on the type of content. However, it can be very useful if there are several options on the page and the selection of the desired content will help improve the user experience.

Principle of main entrance

Today, all designers know that the main page of the site does not have to be the only target page. In fact, users can access the website from virtually any page. Simply put, a modern site looks like a building with lots of open doors. Therefore, you need to remember that users will get to the site through the "door", which is not the home page.

Ideally, the concept of main entrance implies that any page of the site should be perceived as the main one. Therefore, the designer will have to solve two problems: to explain to the user where he got and help him find the necessary information.

Sometimes users will get to the right page at once, sometimes not. Therefore, each page should refer to another, close in meaning to ensure that the user was sure that he was on the site he needed.

Also, the principle of the main entrance assumes that the landing page should not be overloaded with information. The function of the main page is to briefly inform the user and offer him various options for action. That is, in this case

it is about the support of the user: he is offered links to other pages of the site, where he can find the data he needs.

Principle of multiple classification

Designers who follow the principle of multiple classification know that different users use different approaches when searching for information presented on the site. There are different approaches to navigation and different ways of viewing data.

For example, some users prefer to use the search field, and some like to use the navigation menu.

An example is an online store that sells fashionable clothes and accessories. Users are all different, some need to see all the products presented in the "Bags" section, others need a bag of a particular model or the cheapest product in this category. If the designer can offer visitors a variety of ways to find the right product, this will increase the level of user satisfaction.

The principle of focused navigation

This principle sounds very simple: do not mix the categories within a single navigation structure. Designers use various technical terms to describe how the content will be displayed and how users will navigate the site. But in simple terms,

the designer's job is to provide the user with all the elements necessary for navigation. Since all content is concentrated within one site, different navigation tools can be used to implement the approach to localization. For example:

• Search for an item. This is the key navigation area that contains the main content

• Actual search is the main tool that allows you to quickly get to the right subsections

• Index search - a tool placed on internal pages that shows how the content is organized

• Promote search is a tool that offers links to pages with available services.

Principle of growth

Most sites contain constantly updated content. And the complexity and quantity of content increases with time. This means that it is very important to use a flexible approach to content management. The entire structure of the site, along with the search tools, should be easily scaled so that the site can grow regardless of what types of content it will appear in the future.

It is important for the designer to be able to correctly predict how the content will change in the coming years, what it will be and how it will relate to the already available information.

The principles of the information architecture help to build a flexible and easily configurable data hierarchy. In this case, it is not necessary to use all the principles when designing a site. For small sites, it is sufficient to use the principles of objects and the gradual disclosure of information. But if the site contains more than 10 pages and contains content of different types, then the requirements for its structure are toughened. If this is not done, then it will not be possible to implement complex links and the classification of data will be irrational.

A big problem for the online business was the lack of instant interaction with site visitors. If in an offline store an employee can immediately answer the buyer's questions, find out his preferences and suggest the most suitable option, then on the

Internet, managers have only to guess how the person on the other side of the monitor will act. At the moment the solution to this problem has already been found. Interactive design is a process of communication, which directly affects the thinking of the consumer with the help of intellectual emotions, caused by the wide possibilities of flash-technologies. With the help of interactive design, sites are created that can "communicate" by users.

Interactive design is used in the development of Web sites, software products, interfaces, games. All these products are created on the basis of the interaction of the information carrier and the user.

Creating an interactive design is a time-consuming process, in which a successful combination of content, graphics, visual, sound effects and programming is performed.

Informational design of the schedule of the march of Napoleon to the Russian Empire, designer - Charles Minar

Information design is a branch of design, the practice of artistic and technical design and presentation of various information, taking into account ergonomics, functionality, psychological criteria of human perception of information, aesthetics of visual forms of information and some other factors.

In information design, traditional and new design principles are applied to the process of transforming complex and unstructured data into valuable, meaningful information. With the help of pictures, symbols, colors, words, there is a transfer of ideas, illustration of data or visualization of relations.

According to Robert Horn from Stanford University, information design is the art and science of preparing information in such a way that it can be effectively used by people.

Dino Karabeg gave the following definition of information design:

Information design is the design of information.

In the cited work, the definition unfolds: information design is contrasted with traditional information, in which professionals in their field conduct information communication by traditional means, using channels traditional for

this or that sphere of activity. For information design, the answers to the following questions are important:

• What are the goals of information in this culture?

• How can they be achieved more effectively?

• What new goals can information serve?

• How should information be presented to achieve goals? [8]

In his article Gerlinde Schuller (Gerlinde Schuller) gives the following formula for the design of information architecture:

Information architecture design = Complexity + Interdisciplinarity + Experiment

with the following explanations. Information design

• makes complex sets of facts accessible to perception,

• requires an interdisciplinary approach to communication, for example, combining the skills of graphic design, three-dimensional design, digital technology, cognitive science, information theory, cultural studies,

• should be developed in the direction of experimentation, expanding the repertoire of means and not excluding complex systems from consideration.

In the Information Information Digest, Jeff Raskin stated that "information design" is the wrong name, since the information itself can not be designed, unlike the way it is transmitted and presented.

The main purpose of information design is clarity of communication: the message should not only be accurately conveyed by the sender, but also correctly understood by the recipient.

Information design is built on functional and aesthetic principles.

Functional principles include:

• Facilitating understanding and learning;

• Clear structure of the message;

• Clarity;

• Simplicity;

• the unity of the elements of the message;

• ensuring the high quality of the message;

• decrease in cost.

Known purpose

In this case, the user knows exactly what he is looking for, knows how to describe it, and even knows where to start looking for it. Such users do not need to be driven by the handle, they will most likely use the search or dive into the menu. If your search returns informative results, then there will be no problems.

Study

When a user knows what to look for, but does not represent how. The solution is the search module, which itself offers terms that allow you to narrow the search. Such a search will provide the user with an invaluable service.

Uncertainty

The user has a vague idea, he thinks he knows what he needs. Particularly relevant for complex industries: financial, legal. There is no one-size-fits-all solution, but how to push the user to the right result - it is necessary to invent it.

Re-search

The user has already seen the content he needs, but does not know how to find it again. There are two options: to make the section "you recently viewed these pages" and the function of adding to the bookmarks. The first one works passively, the second one requires the user's participation, but it is not limited by the amount of "memory". There are six basic models for organizing and structuring content on the site. Sometimes they can be combined, as a rule, in different sections of the project. But they can be used independently of each other.

1. **One page**. Suitable for sites with very limited content, narrow purpose. Suitable for product sites, sub-sites of large companies or personal pages.

2. **A flat structure**. Flat structure is most often used on websites less than 10 pages. The navigation chain is through, has no branches. Such a structure can often be seen in the portfolio of agencies, on simple business websites or small e-commercre sites.

3. **The index**. The structure is similar to flat. However, there is a list of all pages on the main page. Examples are similar to the previous structure.

4. **Camomile**. This structure is most often found in web applications, on educational websites. After performing targeted actions on a specific page, the user is offered to go to the main page. For example, in the to-do list application, after the task is created, edited, or completed, the user returns to the list.

5. **Strict hierarchy**. In a strict hierarchy, you can only go to the next page from the parent page. This is an excellent structure for sites whose authors do not want users to skip pages. For example, if the site has a sequential training course.

6. **Multidimensional hierarchies**. One of the most common structures, in large part due to the ease of implementation in the IA plan. In this structure, the greatest number of navigation elements, each page is accessible from everywhere.

The names of some pages are very important to write in a certain way. For example, when a user searches for contact information, he will first look for links to the "contact us" section, "contacts" or something like that. But if you call the page "get through" or "feedback", then the user will have to work hard. Or even go to the site of a competitor. Similarly - the page "about the company" or "team" is better perceived when it is named something like this.

A good organization of content is important for any site, large and small, but the more content you have on the site, the more important the role of the structure. Imagine that in the Wikipedia articles there would be no references to other articles. I would have to use the search every time. Many designers and developers think that IA is only part of the work of the UX-designer. Yes, these areas are inextricably linked, but this is not the same thing. A good information architecture is the key to a positive user experience. Of course, your UX designer can perform the role of IA, but on large and complex projects it is better to have a dedicated specialist. Regardless of how good your information architecture is, if the project does not pick up an adequate CMS, do not make the process of creating content for its authors simple, everything will be wasted.

Ask yourself: who will interact with the CMS, what kind of people these levels of technical knowledge and experience. A technical and complex CMS, although it will allow you to perform more tasks, but it can be overwhelming for content managers.

Many tools for IA are analog, despite the digital origin of the science itself. Boards, card sorting - very popular methods IA.

Boards, card sorting are very popular IA methods, especially help in the initial stages.

8.3. Digital Tools of Information Architecture Design

These tools are gaining popularity, because more and more teams are working remotely.

Applications-boards perfectly help to hold a brainstorm together with a remote team or clients. The best representatives of such services function like real boards, but they can easily be referred to.

Instruments:

• Awwapp.

• Twiddla.

• Scribblar.com.

Tools for creating mind maps (mindmap) help to create structured notes, categorize information. Of course, you can make mind maps on paper, but digital versions are easier to edit and open to them access to colleagues.

Instruments:

• Coggle.

• XMind 6.

• Bubbl.us.

Tools for prototyping are key in the set of information architect.

Instruments:

• Justinmind Prototyper.

• MockFlow.

• Mockingbird.

Information architecture is a vital part of creating a good user experience. Well-organized and structured content makes the site easier to use (and more useful for visitors). Even if you are a designer and work together with an information architect on some projects - this cooperation will improve your design skills.

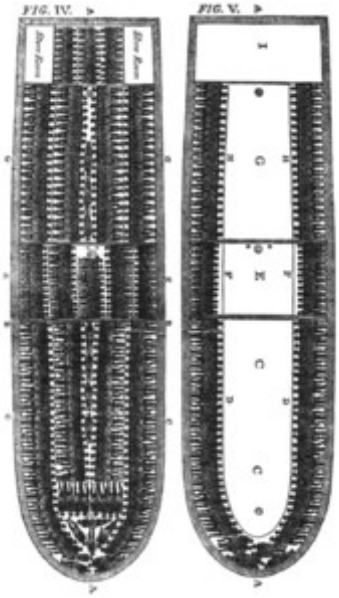
If you do not have high-quality content, you will not be able to create a good website, because in web design everything is tied in exactly with the content and ways of submitting it to users. That is, the basis of web design is the information architecture. To a large extent, the function of a web designer is to correctly position the content that users need and draw their attention to the most important materials. In order to achieve this goal, designers use visual markers that highlight different types of content and demonstrate its diversity.

In web design, there are no hard models for content delivery, but there are several important concepts that designers use when designing web pages. Also, these concepts allow designers to focus on creating the optimal structure, which in the future will determine the final design of the site.

Many designers, themselves not aware of this, repeatedly guided by some principles of information architecture in their work, so it will not hurt to remember about them in the event that an order is made to design a new site. If the designer

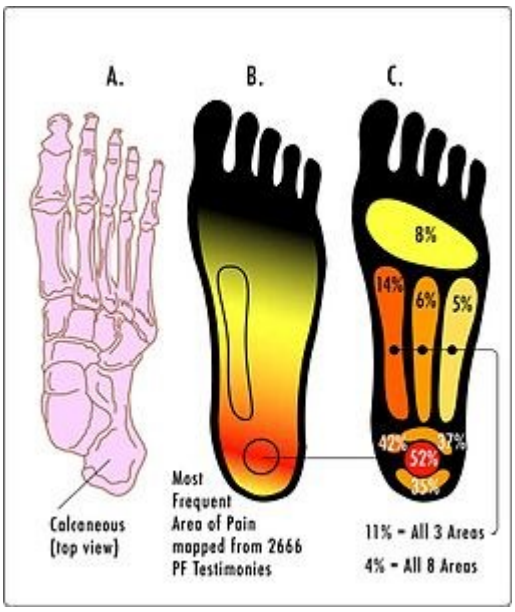
learns to use the principles of information architecture, it will be easy for him to work even with the most complex projects. And vice versa: if the designer is not able to understand the essence of the principles, then it is unlikely that he will be able to create a user-friendly site.

8.4. Information Design Work



Location of slaves on board the ship, 1786

Metro map of Washington



Areas of pain in the foot

Design Methods

Card sorting

Card sorting is one of the methods for designing a web portal structure or software application in which potential users participate. The method is aimed at identifying a structure that makes it easier for users to find the information they need. The essence of the method consists in the distribution of cards with the names of the site materials by groups. There are open and closed versions of the method, depending on whether users have the ability to create their own groups or a set of groups is hard set. The merits of the method include its simplicity, cheapness, speed, time-tested, attractive to users. Among the shortcomings can be attributed to the lack of consideration of user tasks, the spread of results, the laboriousness of the analysis of results, possible superficiality.

Common techniques

Accent

By changing various text parameters (font size and font, position, etc.), you can achieve contrast for the part of the text to which the reader should pay attention.

Parallel presentation

Notes in the margins - parallel texts, lanterns (frogs) - help to draw attention to the most important moments.

Adding "air"

Significant parts of the material can be identified by surrounding it with an empty space - "air". The "air" document and its parts are more pleasant and easier to read, it gives the text elegance.

One of the problems with information design can be considered its excessive complexity (English over-designed), which can be expressed in the presence of distracting elements.

Information design finds application in various fields of activity, such as:

• information materials (in any form) and forms for obtaining information;

• internal workflow of the enterprise;

• pointers and the organization of an environment for orientation (English wayfinding) in space;

As a rule, to stimulate a person using a product, service, system, they need an opportunity to respond. This reaction should be evaluated, with clearly defined communication, and, in most cases, cause a clear and half-predictable response. And then it works.

The above is the basic definition of Interactive Design (IxD), which brings together the general trends of definitions given by famous designers Dan Saffer1 and Robert Reimann2, as well as by the Interaction Design Association3.

It is also very important to note that interactive design is a concept completely different from other types of design. This is not an information architecture, or an industrial design. This is also not a kind of user interface.

Interactive design is not any form or structure, but something more ephemeral is rather the concept of "why" and "when" rather than "what" and "how."

For any kind of design, the primary task is to formulate what is called the basics or basic elements. Creation of such semantic concepts provides:

- better communication between participants
- creation of common aesthetic concepts
- the best tools for learning
- area for research

These, as well as other reasons that are currently insignificant - this is an occasion to talk about the basics.

According to Costellow, there are six elements that form the foundations of industrial design: line, lighting and color, space, volume (dimensions), negative space (background, background) and texture (surface, texture). Blending these elements and experimenting with them is the heart of design in the field of 3D forms. The students of the Pratt Institute have mastered these grounds during the one-year course. They had to define boundaries and dependencies, discussing abstractions and real projects.

Since I'm not the only person who thought about these things, we can assume that we all think about it in different ways. For example, Den Saffer, in his book Developing Interactivity, a big chapter, where he describes elements of interactive design: time, motion, space, appearance, texture and sound. The elements of Dena are arranged according to how I can call them on the form for the appearance of interactivity, and not by what form of interactivity will be available to me or not, except, perhaps, for time.

If this is really the basis of interactive design, they must be completely abstracted from the form and do not have physical attributes.

Questions

1. What is the design of information architecture?
2. How to use the principle of choice in human-computer communication?
3. What is Digital Tools of Information Architecture Design?
4. What is Information Design Work?
5. What common techniques for Information Design Work?

9. Interactive Design

9.1. The concept of interactive design

Interactive design is used in the development of Web sites, software products, interfaces, games. All these products are created on the basis of the interaction of the information carrier and the user.

Creating an interactive design is a time-consuming process, in which a successful combination of content, graphics, visual, sound effects and programming is performed.

Interactive design is characterized by a more emotional perception of information through the use of clean graphics or professionally executed illustrations. In each project, it is necessary to participate not only designers, but also artists who in their work create memorable original images. It is these works, in contrast to the classical design, have a greater impact on the audience.

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It is worth noting that the concept of graphically saturated design does not mean redundancy. Each task is considered individually with the preservation of a reasonable balance of the graphic and text component.

In the process of developing each project, we are guided by the following principles:

• Develop an idea. At the initial stage, we comprehend the project and define together with the client the idea of design, functionality and other requirements. All this is fixed in the technical task. After completing the assignment, we make plans for artists, designers, programmers and layout designers. In doing so, we generate additional opportunities for improving the project.

• High level of quality is achieved due to the talent, perseverance and professionalism of each team member, his unique life position. The final result is estimated by the art director of the company, who perceives each project as his own. The process of work is considered completed only when an irreproachable result is achieved.

• Convenient service. Each project has its own manager, who regularly informs the client about the progress of work and provides the necessary reports for each stage of product creation.

9.2. Basics of interactive design

Time

"Time" distinguishes interactive design from other types. This is the shell of our notions of interactivity.

But time is not the only basis of interactive design. There are so many interrelated aspects of time manipulation. And as we all know, time is relative, it exists over a set of axes at the same time. So we can distinguish three time-dependent bases of interactive design:

Pace

Interactive design is the creation of narrative, gradual changes in individual experience, but at the same time remaining within the boundaries. For example, if I use a mail client, I absolutely do not want to turn on the stove while I'm writing a letter.

The narrative has a tempo. We clearly understand this when we watch a movie. If the movie is good - we never look at the clock. Tempo is also part of interactive design, because sometimes you can look at the clock not because of boredom, but because you want to understand - whether you can finish the process of "interactivity" in time.

Reaction

The simplest way of determining time in interactive design is "reaction time". How long does the system respond to the event? This happens when we see how the cursor turns into an hourglass or in a proverbial progress bar, and we wait for the system to answer us, but other reaction times are also important.

An action that takes place in real time (synchronously) is associated with the current moment, while the asynchronous action loses this connection. Since some systems are sensitive to time, one must know how to take into account the differences in these types of reaction.

Context

Each basic element, such as time, must have a sub-element - "context". In our case, the interactivity of the course for a person, this means that design can not be considered by itself. For example, when we say "time," we can not design an application without understanding how long a person can spend on direct contact with the system.

Alan Cooper and Robert Reimann in the book "About Face 2.0" talk about a temporary context as a "position" principle. Here are four positions:

- Host - the application requires full attention.
- Resident - the application is on the periphery of our attention and attracts only for short moments.
- Demon - warning systems
- Parasite - supports both the interactivity mode "host" and "lodger".

Metaphor

Metaphor is a literary device in which one well-understood phenomenon or concept is used to explain another concept that is more difficult to understand, or when it is difficult to explain in another way. The virtual nature of computers requires finding "real" metaphors in order to explain to people all these foggy

things. From what type and how many metaphors you use, the quality and emotional perception of your product directly depends.

The most obvious example of a metaphor is an urn or a trash can (in the operating system on your computer). The idea is that your files are in a virtual "bucket" or "trash", so if you make a mistake, you can rummage there and restore them in their original form. And, of course, you can always "empty the bucket" by making the contents unrecoverable. Metaphor works well for any people, because it is precisely and flexibly connected with reality.

Abstraction

Working in tandem with a metaphor, abstraction relates more to physical and mental activity, which is absolutely necessary for interactivity to take place. By and large, everything that we see in the computer is originally an abstraction, since we have two primary interfaces for the input point - the mouse and the keyboard.

Some truth places the monitor inside a special kind of pointing devices and lowers the level of abstraction for some type of interactivity, mainly for drawing. However, most of us use keystrokes, pointing, clicking and moving the mouse across the screen.

Negative space

All the "right" design disciplines have the concept of the form of negative space. In architecture and industrial design, it is a cavity or space between arrays. In graphic design this "white space" without color, lines or shapes - like white spots on a printed sheet of paper. The design of the sound uses silence, the design of light is darkness.

Pause - A very clear concept of the time when no action is related to interactivity. Often interactive design tries to fill such failures, but maybe these failures are useful.

Stop and think - What if there is no reaction from the system? To think, as one student of the Swedish Institute of Interactivity did and came up with a "ball of thought." If you think little, the ball rolls away more and more.

Inactivity - Do nothing, the product does not react to the action, it may be due to its incorrectness. This is not a pause, since in this case inactivity is a reaction to an action, not a stop in action.

Mixing in interactivity

Unlike other form-building design disciplines, interactive design is very confusing, because it requires other disciplines to build interactions. For this reason, interactive design is more like choreography or film shooting than with music or costume making. The main elements listed above are only suitable for interactive design or have been redefined exclusively for it.

For example, the use of color as an aesthetic tool improves or worsens the level of interactivity. In general, for most cases, an information architecture is required to prepare information before interactivity is created.

In the end, interactive design is the choreography or orchestral arrangement of other form-building designs for creating an interrelated dialogue between people and the products and systems that surround us.

Questions:

1. Where is the interactive design used?
2. What is interactive design?
3. What characterizes the interactive design?
4. What is the Basics of Interactive Design?

10. Interface design

10.1. Basic principles of interface design

Simplicity and clarity. Any interface should be intuitive to the user - he must immediately understand what the next step he can make.

Attention of the user at any cost. Do not fill out the application with unnecessary elements, let it focus on the main task.

Let the user feel that the situation is under control - periodically displaying the state of the system.

One screen is one main task. Each application screen should serve one task.

The best interface design is an invisible design. A successful design helps to concentrate on the tasks of the user, rather than on the interface.

Stages of design

Stage I. Pre-project analysis

The design of the interface begins with a pre-project analysis. At the working session with the client, we describe the vision of the project, which tells about its essence and goals, and also lists the expected functionality of the system in the form of brief interaction scenarios.

In addition, the needs and context of the target audience are analyzed, which is described as key characters. An initial site map is also drawn up, which shows the approximate structure of the future system. The writing and approval of these basic documents takes about 3 days, after which we plan the remaining work and give an accurate estimate of the timing and cost of their implementation.

Stage II. Collection of requirements

At the next stage, we prepare a detailed list of functionality. It allows you to take into account all the functional requirements and better understand the features of the future system. Based on it, we conclude which of the functions require a whole process, which are just a separate page, and what a simple button would be

enough for. Focusing on the previously composed characters, we update the site map and compose a navigation scheme.

After that, diagrams of transitions between pages are drawn - they unite the pages of the system within specific processes. Now we know how users will work with the product as a whole and how to perform specific tasks. The stage lasts about 4 days.

Stage III. Designing an Interface

The third stage is the most important. Here we create page layouts that show what information and controls should be placed on the pages of the system. This is not yet a design, but already the basis for it - wireframes are a technical task for the designer.

Communication with the client at this stage is quite dense - clarification of the issues and the approval of the drawings goes several times a day. But the results are sufficient - depending on the complexity of the project, it comes from a few dozen to a couple of hundred page schemes. The duration of the stage is from one to several weeks.

Stage IV. Interface design

The final stage is the visual design of the interface. First, on the basis of a couple of key pages, we develop a creative concept. After the general style is approved by the client, the layout of the key pages of the system is drawn. At this stage, the product acquires the appearance - before that we were engaged in its essence and principles of work.

For projects that are planning to actively develop, we also prepare a guide to the style of the interface. He describes the principles of visual design of the product and will preserve its integrity in the process of improvements. The work on this stage lasts 1-2 weeks.

Stage V. Preparation of the specification

If necessary, we prepare a preliminary technical assignment for the development of the system. It combines the documents received earlier, expands and lists additional requirements to the system - functional, architectural,

operational. At the client's request, detailed interaction scenarios can be compiled that describe step by step the process of the user's work with the system.

Final stage. Acceptance

Acceptance of work by the client can take place with one large package of comments or split into several smaller stages. The timing in which comments should be exhibited, evaluated and corrected are specified in the contract.

We also support the projected interface.

This means that when the requirements for the system are changed, we update the package of interface documents in accordance with this revision. In modern projects such changes occur constantly and support allows to preserve the integrity, convenience and efficiency of the designed interface.

Stages of interface development

- Analytics. Collection and analysis of information
- Development of? Prototypes of the user interface
- Development of interface design
- Front-end development
- Testing the User Interface

Creating a competent user interface is a time-consuming process and requires maximum attention to detail. The interface created should maximize the possibilities of the program, but at the same time do not overload the user with an abundance of menus, buttons, images and text.

Even the most powerful software, designed and written by the most skillful programmers, without the convenient organization of interaction with the user, risks to remain unclaimed.

The cornerstone of the convenience of the program or Internet site is its speed, which is achieved through a detailed study of product features and the development of the most effective, intuitive navigation menu, the competent use of icons (ico), in which the user does not waste time searching for the required link.

Questions:

1. How many design stages are there in Human-computer interfaces?
2. How many stages of interface development?
3. What is the Basic principles of interface design?

11. Creating a high-quality interface

The design principles are recommendations for the design of useful and desired products, systems and services, as well as recommendations for successful and ethical design. Design patterns are typical generalized solutions of specific classes of design problems.

11.1. Principles of interaction design

Principles of interaction design are generalized recommendations, oriented to the behavior, form and content of the product. They support the design of such behavior of products that serves the needs and purposes of users and causes them positive emotions when using these products. In fact, these principles are a set of rules based on values, the carriers of which we are both designers, and our experience with the implementation of these values.

At the core of our values is the idea that technology should serve the mind and creativity of man (and not vice versa) and that the experience of human communication with technology should be structured in accordance with the possibilities of human perception, cognition and movement.

The principles are applied throughout the design process, helping us to transform the tasks and requirements that arise during the development of scenarios into the formalized structures and behavioral responses of the interface.

Principles operate at different levels of detail

The design principles operate at several levels of detail - from the general practice of designing the interaction to the specifics of the interface. The boundaries between the levels, to put it mildly, are blurred, but the principles of interaction design can be broadly divided into the following categories.

• Design values - imperatives of effective and ethical design practice. These principles serve as a starting point for lower-level principles from the categories listed below.

• Conceptual principles help to determine the essence of a product and its place in the wider context of usage that is required by users.

• Behavioral principles describe how the product should behave - in general and in specific situations.

• Interface principles describe effective strategies for visual communication of behavioral and informational aspects of the interface.

Most design principles for interaction and visual design are not tied to a specific platform, although some platforms, such as mobile devices and real-time systems, require special considerations related to limitations such as screen size, input methods, or application context.

Behavioral principles and interface principles reduce labor costs

One of the main purposes of the principles is to optimize the experience of the user interacting with the system. In the case of office tools and other non-entertainment products, this optimization of experience means minimizing labor costs. Reduce the following types of work:

• Cognitive work - understanding the behavior of the product, as well as text and organizing structures.

• Mnemonic work - remembering the behavior of the product, command vectors, passwords, names and location of data objects and controls, as well as other relationships between objects.

• Vision work - search for a starting point on the screen, searching for one object among many, decoding the visual layout, revealing the differences between the interface elements that are color coded.

• Physical work - the number of keystrokes, mouse movements, gestures (click, drag, double click), switch between input modes, the number of clicks to navigate.

Most of the principles described in this book are aimed at minimizing the work and at the same time ensuring better feedback and better informing the user within a certain situation.

It should also be noted that some entertainment products (in particular games) are able to win the attention of users, requiring them to perform a reasonable amount of certain work and rewarding them for this work. Remember the insanity of Tamagotchi in the late 90's of the last century: people developed dependence on manipulations for the care of pocket virtual pets. Of course, too much work and too little reward can turn a game into an unpleasant occupation. Designing interactions of this kind requires a subtle approach.

Questions:

1. How to create a high-quality interface?
2. What is design values in the principles of interaction design?
3. What is Conceptual principles?
4. What is Cognitive work?
5. What is Mnemonic work?
6. What is Vision work?

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Content

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