The Criteria of Usability Design for Educational Online Courses

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Keywords: Criteria of Usability Design, Online Education, Online Course, Implementing the Usability Principles.

Abstract: The article addresses the issue of implementing the usability principles of educational internet resources. The paper debates the latest researches on the question concerning the search for the factors that influence the results of online education. The analysis, which we carried out, allowed us to focus on such known six criteria of usability design as Information Quality, System Navigation, System Learnability, Visual Design, Instructional Assessment, and System Interactivity and suggest the existence of the seventh criterion named Responsiveness. The research considers the principles of usability implementation following the example of the open platform of online education "Higher School Mathematics Teacher". The answers given by 203 respondents during the survey allowed defining the direction of implementing the usability criteria on the platform. We were eager to know the opinion of teachers and students who became the first users of the platform. The article discusses the criteria implementation while developing online courses on the platform. There was ground to conclude that when designing online platform courses, all seven usability subcategories are important.

1 INTRODUCTION

1.1 Problem Statement

Developing online courses is one way to a sustainable future for our society through education (Vlasenko et al., 2021, 2022). The modern market for online education offers a great number of online courses for educating adults, young people, and children. The subject matter and complexity of such courses differ a lot, but certain development principles and operation of educational internet resources have a lot in common. One of the most important questions while developing any of the sites is its usability. This term is used as a measure of site friendliness, its understandability, and naturalness for the user. Web-site usability is determined by simplicity. Simplicity makes internet resources easy to perceive by users, makes it possible to carry out a fast shift to the necessary content, and facilitates access to information. Therefore, the research of usability issues in educational software is an important aspect of developing distance education.

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Vlasenko, K., Volkov, S., Lovianova, I., Sitak, I., Chumak, O., Semerikov, S. and Bohdanova, N.
The Criteria of Usability Design for Educational Online Courses.
DOI: 10.5220/0010925200003364
In *Proceedings of the 1st Symposium on Advances in Educational Technology (AET 2020) - Volume 1*, pages 461-470
ISBN: 978-989-758-558-6

1.2 Literature Review

While searching for the factors that influence the results of online education, scientists paid attention to the interface of educational platforms. Nielsen (Nielsen, 1993) was one of the first scientists who used the term usability. He developed a heuristic evaluation – a methodology for researching software usability. The so-called "Nielsen protocol" consists of ten heuristics developed for the software:

(1) The user can detect the system status;
(2) The system uses the terminology, which is convenient for the user;
(3) Free system manageability, support of removal function (undo) and repetition function (redo);
(4) Consistency and standards;
(5) Error prevention and warning the user about further problems;
(6) Load minimization on the user's memory;
(7) Flexibility and efficiency of the usage;
(8) Aesthetic and minimal design;
(9) The system has to offer the user a constructive solution to the issues that arise;
(10) Presence of reference information in the system.

Benson et al. (Benson et al., 2002) increased the number of heuristics up to fifteen when they developed them specifically for electronic education. While designing the systems of electronic education, Srivastava et al. (Srivastava et al., 2009) proved that the attention should be focused on the learning outcomes and not only on satisfying users' interests. The interface has to be attractive and simple to use, but its main task is to enable the user to build their strategy of education. Squires and Preece (Squires and Preece, 1999) offered an approach that integrates the idea of software usability heuristics with the idea of considering the educational results and issues. In scientists' opinion, the main criterion of developing electronic education has to become its reliability. Asarbakhsh and Sandars (Asarbakhsh and Sandars, 2013) named the usefulness of technologies and their usability among the significant factors that should be considered while developing and implementing technologies of online education.

While highlighting and describing six criteria of usability design, Alshehri et al. (Alshehri et al., 2019) formulated and researched these criteria concerning their importance for students:

- Information Quality (IQ);
- System Navigation (SN);
- System Learnability (SL);
- Visual Design (VD);
- Instructional Assessment (IA)
- System Interactivity (SI).

While ascertaining if this list of criteria could be considered full taking into account the possibility to use mobile devices by users, we addressed the statistics data (Enge, 2021). It is clear from the data that 58% of site visits were from mobile devices. 44% of mobile device users visited the sites of the category "Career and Education" and 42% visited the sites of the category "Science". Using the service Google Analytics (Google, 2021) we detected that 35% of users of the platform "Higher School Mathematics Teacher" (formathematics.com, 2019) also use mobile devices. So, while analyzing the statistics we can say that the pattern of growth of website visitors from mobile devices will be kept in the future. Taking this fact into account we considered it necessary to introduce an additional seventh criterion "usability design" for educational web systems called Responsiveness (RS) that would reflect usability for visitors from mobile devices. The relevance of this assumption was checked in the research results.

This article is aimed at analyzing the online course developers' approaches to implement usability, showing usability implementation principles following the example of the open platform of online education "Higher School Mathematics Teacher"

2 METHODS

During the research, the analysis of the resources was used (Nielsen, 1993; Benson et al., 2002; Srivastava et al., 2009; Squires and Preece, 1999; Asarbakhsh and Sandars, 2013; Alshehri et al., 2019; Enge, 2021; Vlasenko et al., 2020c; Antonelli et al., 2015; Aery, 2007; Sánchez-Franco et al., 2013; Kurtcu, 2012; Lin et al., 2013; Mansor, 2012; Shahzada, 2017). As a result of the analysis, seven usability criteria of educational platform were determined.

2.1 The Criterion of Information Quality

The criterion of Information Quality reflects the accuracy, correspondence, completeness and actuality, simplicity of its understanding. The indicator of this criterion mainly depends on the competence of the tutor who creates and supports the online course.

The educational platform should consist of necessary tools so that the tutor can post content of the

online course to ensure the information quality. The tutor has to be able to add and edit conveniently text, graphic, animation, video, and audio content, publish documents of standard formats (presentations, mathematical expressions, PDF documents, etc.). The analysis and description of tools for posting an online course are represented in the article (Vlasenko et al., 2020c).

2.2 The Criterion of System Navigation

It is necessary to organize navigation elements, the quality of which reflects the criterion of System Navigation, for fast and convenient navigation through the sections of the educational platform. It implies simplicity and navigation options, link reliability, understandability of action sequence, and easy accessibility.

Interactive elements such as buttons or hypertext links are used for the technical implementation of the navigation system. For convenience, these elements have a separate interface that is different in its color range from the main content and interface. Usually, the navigation elements have interactive characteristics that change while using them in a particular way. For instance, when the cursor moves over the element or clicking the mouse button on the element, its style changes and it makes it clear for the user that this is a navigation element. For making the element clearer, it is necessary to add a tooltip that reflects the name or an abstract of the section that it refers to.

Navigation elements can be united in groups following their structural characteristics. These groups create the main and additional menu, a structural map, or a sitemap. The main menu is usually displayed at the top and the bottom of the interface in order to attract the user's attention to it as it contains a link to the main sections of the educational system (Antonelli et al., 2015). The structural map of the educational platform includes a complete hierarchy of references to the sections, subsections, and content that enables the user to navigate to any page of the hierarchy.

Navigation chains (so-called "breadcrumbs") that allow us to visually represent the hierarchy of top-level pages and navigate on them are displayed on every page for ease of navigation. (Aery, 2007). This element is particularly important when there are a great number of pages that are put one in another.

The reliability of links reflects the absence of navigation elements that refer to the non-existing content or section. This situation takes place when the operator gives the wrong reference system or content is deleted from the system without updating the navigation structure. For preventing the reliability decrease planned verifications of navigation structure with the help of special software (Screaming Frog SEO Spider Tool, Netpeak Spider, SiteAnalyzer, etc.) or manual testing is used.

The ease of navigation increases while implementing on the educational platform a search system that helps the user to navigate fast to the necessary content following the formed request. The search elements can be displayed at the top of the interface and additionally in a sidebar or at the bottom.

2.3 The Criterion of System Learnability

The criterion of System Learnability characterizes learning simplicity and promptness. Similar to the criterion of information quality, it depends on the online course developer's competence. The criterion includes learning simplicity, predictability of links, and learning without any initial preparation, formulation accuracy, and sufficient online assistance.

In order to ensure System Learnability, the tutor has to determine clear aims and objectives of learning an online course, create a learning program according to the aims and objectives, develop the structure, content, forms, and methods of knowledge control, determine criteria of knowledge assessment, describe requirements for task completion, and ensure control over the learning process, keep in touch with course participants in form of private or group online consultations.

2.4 The Criterion of Visual Design

Apart from the quality of text, graphic, and multimedia information, the educational platform needs to have aesthetic attractiveness and convenient location of system interface elements (Sánchez-Franco et al., 2013) that enables users to perceive adequately the provided information. The criterion of Visual Design is an integral part of evaluating the interface of any information system. It includes readability, design aesthetics, quality of template structure, and typography, and the sequence of posting information on the educational platform.

In order to ensure design aesthetics general principles of interface creation are used. A general template of displaying information blocks is chosen and it usually has a header, footer, sidebar, and block of the main content. A logo or name of the educational platform is displayed at the top of the interface. Typography that determines text view is chosen. A font with notches or without, a particular style display for headings, subheadings, and main text can be used (Kurtcu,

2012). The main color range in RGB model coding is determined. Usually, light colors are used for the background, dark colors for the main content, and additional colors for structural elements and links. For the sense of use simplicity and clarity, the ratio between qualitative use of graphics and text is recommended to be used proportionally from 3:1 to 1:1 (Lin et al., 2013).

2.5 The Criterion of Instructional Assessment

The criterion of Instructional Assessment reflects the efficiency of assessment tools, simplicity of their use, feasibility of achieving educational aims, accessibility for material understanding, and informative nature of feedback.

For the implementation of this criterion on the educational platform tools for assessment and self-assessment are implemented and integrated: testing, survey, task sending, feedback forms, assessment book. Cloud services such as Google Forms, FormDesigner, Typeform, MyQuiz, etc. can be used for most of the indicated assessment methods (Mansor, 2012). The alternative to cloud services can be an individual development of assessment subsystem using a corresponding programming language and framework frontend (React.js, Angular, jQuery, Node.js, and others). In this case, data is stored on the server in the database, and access to them is ensured using the authorization mechanism and distribution of users' roles.

2.6 The Criterion of System Interactivity

The criterion of System Interactivity reflects the quality of interaction between participants of the educational process. This criterion includes the efficiency of communication tools, implementation of interaction tutor-student, student-student. Interaction tutor-student can be implemented using modern Internet services that are integrated into the educational platform.

For text communication emails, web-forums, messengers (Telegram, Viber, WhatsApp, etc.), and social networking sites (Facebook, Twitter, LinkedIn, etc.) are used. It often occurs that not only one but several services are used together. Emailing or push-messages are used to send organizational messages. Visual communication is implemented using the system of video-conferences (Zoom, Microsoft Teams, Google Meet, etc.). The file exchange can be done using cloud storages (Dropbox, OneDrive, Google Drive, iCloud, etc.), emails, and messengers. However, email services have limits for the size of files that are sent and filtering according to the file types (for instance, archives, executable files). That's why email is not convenient for this purpose. Messengers also have a considerable disadvantage that is explained by the fact that sent files are stored on the participants' devices but not on the server. This factor indicates the unreliability of this method because, in case of changing or damaging a device or accidental removal, files can be lost forever. Nowadays, cloud storages are the most reliable and convenient method for file exchange. The criterion of System Interactivity will depend on choosing the best combination of the described communicative services and their technical integration in the educational platform.

2.7 The Criterion of Responsiveness

The criterion of Responsiveness reflects the quality of aesthetic interface display of the educational platform on mobile devices that have different resolutions. As the number of users of mobile devices is constantly growing, this criterion is important nowadays. The criterion includes the responsiveness of the layout, image, media, menu, and navigation elements.

In order to ensure the responsiveness of the platform design, methods to represent the interface using stylization CSS (Cascading Style Sheets) for particular device capabilities are used. In this case, the interface has several visualizations that are created particularly for devices following their screen resolution. Sometimes several options of the interface posted on separate Internet subdomains are used to support design responsiveness. But this variant is not an optimal solution, since it is necessary to make changes in all interface variants if the platform functionality is enlarged or changed.

Using stylization CSS the template of posting information blocks is changed but the interface elements have a different view on mobile devices, tablets, and computers. The size of the text, headings and subheadings, links, buttons, image size, and other interface elements are adapted following this criterion. Modern programming frameworks (Bootstrap, Angular, React, Node.js, etc.) can be used to implement Responsiveness (Shahzada, 2017).

3 RESULTS

The above-mentioned parameters were included in the survey of higher school teachers and students. The survey was aimed at getting the respondents' assess-

ment concerning the usability and simplicity of online courses on educational platforms that are used by the respondents. The survey was divided into two parts. In the first part, there were questions concerning the information about the respondents, such as sex, age, status (teacher, student), their experience of using online courses and educational platforms on which they took online courses, and the aim of online education. This information was gathered to get descriptive statistics of research selection and selection of educational online platforms for the analysis. The second part of the survey included the questions concerning the relative importance (value) of the determined usability categories and subcategories and category ratings for users.

This section included 35 elements divided into seven parts. We had to determine the category place from 1 to 7 depending on its impact on the platform usability (where 1 is the most important). Getting a smaller evaluation rate of the corresponding feature of usability demonstrates its greater importance for teachers and students during the online course. Subcategories have to be evaluated using a 3-point scale where "–1" affects the criterion, "0" does not affect the criterion at all, "+1" has a positive effect on the criterion.

The survey was held directly by the tutors of the educational online platform "Higher School Mathematics Teacher" in higher schools. 246 participants took part in the survey, among them 85 teachers and 161 students of Donbas State Engineering Academy, Volodymyr Dahl East Ukrainian National University, Kryvyi Rih State Pedagogical University, Donbas National Academy of Civil Engineering and Architecture. It must be said that 43 participants (18 teachers and 25 students who constituted 17.4% of the respondents) stated that they had never used online education. Therefore, the final number of respondents is 203 participants – 67 teachers and 136 students.

We offer to consider the division of respondents according to their age and sex in table 1.

According to the survey results in table 2, the majority of respondents (70.9%) studied the online courses in higher schools developed using the distance learning system Moodle (Polhun et al., 2021). Furthermore, the respondents used the platforms Prometheus (Prometheus, 2019), EdEra (EdEra, 2019), The Open University (The Open University, 2019), Edx (EdX, 2019), Coursera (Coursera, 2019), Intuit (Intuit, 2019) for education (respondents had a possibility to name several educational resources).The aim of the education determined by the majority (68.9%) was the current education; moreover, skills development – 23.8%, acquiring additional skills – 3.1%, personal development – 4.2%.

We offer to consider the categories and subcategories from the other survey part. We have found out the importance of the defined categories and subcategories for users, their usability, and rating.

Category 1 – System Navigation (SN), subcategories:

- 1.1 Ease of navigation
- 1.2 Navigation support
- 1.3 Reference reliability
- 1.4 Understandability of action sequence
- 1.5 Ease of access

Category 2 – Information Quality (IQ), subcategories:

- 2.1 Ease of education
- 2.2 Reference predictability
- 2.3 Education without any initial preparations
- 2.4 Formulation clarity
- 2.5 Sufficient online assistance

Category 3 – Visual Design (VD), subcategories:

- 3.1 Readability
- 3.2 Design aesthetics
- 3.3 Layout information content
- 3.4 Presentation structure
- 3.5 General course consistency

Category 4 – System Learnability (SL), subcategories:

- 4.1 Information correctness
- 4.2 Information conformity
- 4.3 Information completeness
- 4.4 Ease of information understanding
- 4.5 Information timeliness

Category 5 – Instructional Assessment (IA), subcategories:

- 5.1 Evaluation tools efficiency
- 5.2 Ease of using evaluation tools
- 5.3 Reality of achieving learning objectives
- 5.4 Accessibility for material understanding
- 5.5 Feedback Information content

Category 6 – System Interactivity (SI), subcategories:

- 6.1 Efficiency of communication tools
- 6.2 Implementation of communication between the tutor and student

Table 1: Division of respondents according to their age and sex.

Characteristics	Teacher		Students		Total	
	number	%	number	%	number	%
sex						
male respondents	35	52.2	84	61.8	119	58.6
female respondents	32	48.8	52	38.2	84	41.4
age						
under 30	3	4.5	136	100	139	68.5
31-50	42	62.7	0	0	42	20.7
over 50	22	32.8	0	0	22	10.8

Table 2: Online platforms where respondents studied.

Characteristics	Teacher		Students		Total	
	number	%	number	%	number	%
Moodle-based LMS	14	20.9	130	95.6	144	70.9
Prometheus	8	11.9	2	1.5	10	4.9
EdEra	16	23.9	-	-	16	7.9
The Open University	4	6.0	1	0.7	5	2.5
Edx	4	6.0	2	1.5	6	3.0
Coursera	18	26.9	-	-	18	8.9
Intuit	7	10.5	5	3.7	12	5.9
Other platforms	4	6.0	3	2.2	7	3.5

6.3 Possibility of communication student-student

6.4 Interaction organization

6.5 Feedback speed

Category 7 – Responsiveness (RS), subcategories:

7.1 Flexible layouts (website layout that will dynamically resize to any width)

7.2 Flexible images (scalable images)

7.3 Flexible media (scalable images, video, and other formats)

7.4 Flexible menu

7.5 Flexible navigation

Respondents selectively evaluated each of the online courses on 7 usability criteria. Each criterion was evaluated on a scale from 1 to 7 (where 1 is the most important, 7 is the least important). Based on these results, the average values for the usability criteria for each of the online courses were found. The results of the respondents' evaluation of usability criteria are provided in table 3. In addition, the average estimates of the significance of the criteria for all online courses that were selected are presented in figure 1.

The results analysis helped us to confirm the assumption about the necessity to consider one more criterion. The respondents recognized the greater importance of the criterion Responsiveness rather than the criteria Instructional Assessment and System Interactivity.

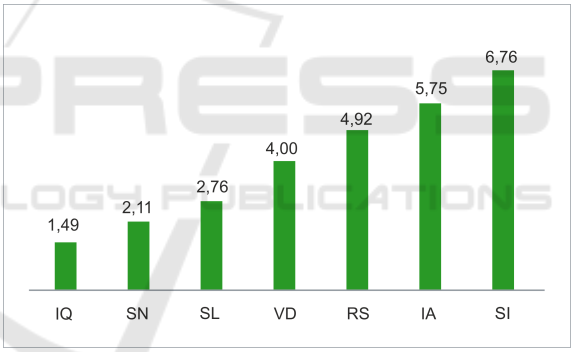

Figure 1: The distribution of places categories from 1st to 7th depending on their impact on the usability of the platform (where 1 is the most important).

We offer to consider the evaluation results of the importance of usability subcategory in table 4.

According to the results, we can conclude that all the usability subcategories are important because any of them has a negative average rating.

4 DISCUSSION

While researching the usability of educational platforms, scientists marked site usability as an important element of developing educational platforms.

Inductive Content Analysis Method helped to determine the direction of implementing usability criteria on the platform "Higher School Mathematics

Table 3: Respondents' evaluation of online education systems according to Usability design criteria.

Systems of online education	Criteria						
	IQ	SN	SL	VD	IA	SI	RS
Systems of distant education based on Moodle	1.31	2.3	3.17	3.99	6.11	6.87	4.56
Prometheus	1.18	1.87	2.95	4.02	5.89	6.76	4.81
EdEra	1.04	2.12	3.01	3.68	6.03	6.94	5.12
The Open University	1.24	1.97	2.76	4.17	5.84	6.63	5.26
Edx	1.11	2.07	3.24	4.31	6.24	6.80	5.08
Coursera	2.13	3.14	1.05	3.79	5.26	6.48	4.74
Intuit	2.41	1.27	3.15	4.02	4.87	6.81	4.86

Teacher". We agree with Alshehri et al. (Alshehri et al., 2019) that the most important criterion of usability design is Information Quality that describes the correspondence of the information in the system to learners' needs. We have also considered point of view of Nielsen and Loranger (Nielsen and Loranger, 2006), who point out that the efficiency of any application work and its attractiveness for the user depend on the search engine and navigation, downloading speed, menu design. In the authors' opinion, the focus on the user, their needs, and requests have to be principal. This idea is agreed with the conclusion provided by Hodakov and Boskin (Hodakov and Boskin, 2017) in which they believe that the adaptive user interface is the main criterion of computer system attractiveness. Such interface reflects the capability of a simple software product or a complicated program technical complex to adapt to the user's needs, consider their psychophysical characteristics and abilities, dynamic change, support the consolidation of common actions to solve the given task.

The ranking results are presented in the diagram (figure 1).

While analyzing categories and subcategories we paid attention to the research by Dringus and Cohen (Dringus and Cohen, 2005) who defined 13 heuristic categories that influence the usability of the educational environment on the Internet. They include visibility, functionality, aesthetics, feedback and assistance, mistake prevention, memory, course management, interactivity, flexibility, consistency, efficiency, mitigation, contraction, and accessibility. While researching the criteria of evaluating the usability of the electronic educational system, Fang and Holsapple (Fang and Holsapple, 2007) highlighted system navigation, performance system, visual design, information quality, instructive assessment, and system interactivity. Following the results of their research, information quality is the most important criterion; navigation in the system of electronic education takes the second place. Instructive assessment and system interactivity are the least important design categories that influence the usability evaluation of the electronic educational system. In order to consider the concept of the platform "Higher School Mathematics Teacher" (formathematics.com, 2019), according to which we have to take into account the wish of different age audience of online courses, we followed the recommendations by Hasan (Hasan, 2014) who studied the usability of educational websites from university students' perspective. The scientist defined that the content and navigation are the first and second desirable design categories that have to be considered during the usability evaluation of websites for educational programs while organization and architecture are the least important categories.

Research conclusions reached by Vlasenko et al. (Vlasenko et al., 2019, 2020a,b) and the analysis of the results of teachers' and students' survey allowed determining the direction of implementing usability criteria on the platform "Higher School Mathematics Teacher" (formathematics.com, 2019).

First of all, we found out how we can implement the criterion *Information Quality* (IQ) that describes the information correspondence in the system to learners' needs and the criterion *System Learnability* (SL) that characterizes education simplicity and rapidity. The quality of these criteria depends on the tutor's competence that creates and supports the online course. In order to create high-quality content following the criteria IQ and SL, the tutors of the platform "Higher School Mathematics Teacher" (formathematics.com, 2019) are given a possibility to use software tools to format the text, insert graphics, video- and audio information, insert links, formulas, tests, surveys. Vlasenko et al. (Vlasenko et al., 2020c) and Panchenko et al. (Panchenko et al., 2020) described the application use during the development of the educational online platform.

The criterion *System Navigation* reflects the quality of navigational tools. On the platform, it is formed with the help of main and additional menus that are posted at the top of the interface and are present on every page. Their presence allows the user to navi-

Table 4: Respondents' assessment of the usability subcategory importance.

Usability subcategories	Average estimate
1.1. Ease of navigation	0.91
1.2 Navigation support	0.72
1.3 Reference reliability	0.64
1.4 Understandability of sequence of actions	0.78
1.5 Ease of getting access	0.81
2.1 Ease of education	0.88
2.2 Reference predictability	0.42
2.3 Education without any initial preparations	0.56
2.4 Formulation clarity	0.71
2.5 Sufficient online assistance	0.65
3.1 Readability	0.57
3.2 Design aesthetics	0.74
3.3 Layout information content	0.63
3.4 Presentation structure	0.59
3.5 General course consistency	0.47
4.1 Information correctness	0.81
4.2 Information conformity	0.67
4.3 Information completeness	0.52
4.4 Ease of information understanding	0.87
4.5 Information timeliness	0.62
5.1 Evaluation tools efficiency	0.42
5.2 Ease of using evaluation tools	0.37
5.3 Reality of achieving learning objectives	0.93
5.4 Accessibility for material understanding	0.86
5.5 Feedback information content	0.72
6.1 Efficiency of communication tools	0.62
6.2 Implementation of communication between the tutor and student	0.71
6.3 Possibility of communication student - student	0.69
6.4 Interaction organization	0.53
6.5 Feedback speed	0.74
7.1 Layout flexibility	0.85
7.2 Image scaling	0.78
7.3 Media scaling	0.81
7.4 Menu flexibility	0.67
7.5 Navigation flexibility	0.91

gate to the necessary section. In order to provide a clear sequence, "breadcrumb" navigation is posted on the pages and allows representing visually the hierarchy of top-level pages and navigating all over them. The presence of such an element is especially important when there are a great number of pages that are put one in another. Ease of navigation is also provided by the presence of links directly in the content of the educational text.

The criterion *Visual Design* reflects the aesthetics of displaying the educational system. In order to ensure readability and aesthetic design the following basic color scheme in the RGB model coding was determined: light colors for the body (#FFFFFF, #F0EAEE), dark color for the main content (#333333), and additional colors for structural elements, for links (#993333, #B8999F, #D6DDE3). The general structure of the platform interface includes a header, footer, sidebar, and content layout elements. This structure corresponds to the purpose of the platform information content. Typography was chosen to provide the text and it includes the text without any notches, a particular style display for headings, subheadings, and the main text.

The criterion *Instructional Assessment* reflects the simplicity and efficiency of evaluation tools. This criterion is provided using feedback forms, subsystems of testing, survey, and file downloading. Feedback forms are used both for educational and general questions.

The criterion *System Interactivity* reflects the presence of simple tools of interaction among participants of the educational process. In order to correspond to this criterion the forum of the platform users that ensures the interaction student-teacher, teacher-student, and student-student was implemented.

The criterion *Responsiveness* reflects the quality, aesthetics of system display on mobile devices that have different resolutions. In order to ensure the adaptability of platform design, methods of the interface presentation using stylization CSS for particular separate capabilities of the devices are used. The elements of the menu and sidebar interface have a particular view on mobile devices. Text size, headings and subheadings, links, buttons, image size, and other interface elements were adapted to correspond to this criterion.

Localization and customization are also important in order to implement usability. The adaptation of mass products on demand of a particular customer on the educational platform "Higher School Mathematics Teacher" takes place through partial content change following a particular request, additional staffing of the course with extra activities and materials. Platform tutors monitor regularly discussions concerning the courses on the "Teachers' forum", react promptly to offers made by the users of the course. The development of new courses is also based on studying requests and wishes made by platform users.

5 CONCLUSIONS

The actuality of researching the usability issue in educational software as a direction of developing distance education arises from the growth of the modern Internet education market. This implies particular requirements concerning the usability of online courses.

The Inductive Content Analysis Method helped us review the existing researches concerning the criterial basis of usability design. This method also helped to define the actual usability criteria of the educational platform as well as to provide an assumption about the necessity to consider the criterion driven by the presence and active use of mobile devices.

In order to clarify the hypothesis, we developed a survey for teachers and students who are online course users. The analysis of survey results was held in two directions: to get descriptive statistics of online course users and study the relative importance of evaluating categories of educational platform usability. Such an approach to the survey allowed getting substantial information concerning the preferences of online course users that should be taken into consideration during its development.

Therefore, according to the research results, we found out that it is worthwhile to add the criterion Responsiveness that reflects the usability of mobile devices for online education. So, according to the results of researches and surveys, we offer the next order of usability criteria in descending order:

1. Information Quality (IQ);
2. System Navigation (SN);
3. System Learnability (SL);
4. Visual Design (VD);
5. Responsiveness (RS);
6. Instructional Assessment (IA)
7. System Interactivity (SI).

Further research will be aimed at the usability criteria analysis of the educational online platform "Higher School Mathematics Teacher".

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