ASSESSING THE USABILITY OF SITES IN TERMS OF DIGITALIZATION OF THE ECONOMY

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Abstract. *The purpose* of the article is to study the degree of usability of sites from the point of view of their stakeholders. The usability indicator is responsible for how easy the site's interface is to use, that is, it means how easily the user without special training can interact with the information system of the website. The goal of usability is to have a product that is easy to understand, easy to learn, effective to use, and enjoyable to use. *Methodology*. The article proposes an approach for assessing the usability of sites of business entities, based on the results of an empirical study in the format of questionnaire, which allows us to take into account the subjective attitude of respondents to the usability of a particular site. When calculating the integral usability indicator, the assessments of the weight of each variant of the answer to the question, the weight of the question within the boundaries of each of the criteria, the weight of each criterion in the final indicator are taken into account. The approbation was carried out on the websites of higher education institutions. Highlighted the most important criteria for the usability of the website of a higher education institution from the point of view of applicants and students as stakeholders who are potential buyers and consumers of educational services: loading speed, convenience, efficiency, relevance, accessibility, interactivity, cross-browser compatibility, lack of forced content, attractive design, satisfaction. To obtain the *results*, a survey of 1170 stakeholders was conducted in the form of a questionnaire regarding the compliance of the websites of higher education institutions with the usability criteria. Based on the results of scoring and taxonomic analysis, quantitative values of the integral indicator of the usability of the websites of higher education institutions were obtained: NTUU "Igor Sikorsky Kyiv Polytechnic Institute"– 8,01; Taras Shevchenko National University of Kyiv – 6,47; Sumy State University – 7,87; Lviv Polytechnic National University – 7,85; V.N. Karazin Kharkiv National University – 5,32; Interregional Academy of Personnel Management – 7,7; Kharkiv University – 6,97; Academy of Advocacy of Ukraine – 5,62. The obtained quantitative values indicate that, according to Harrington's scale of desirability, the NTUU "Igor Sikorsky Kyiv Polytechnic Institute" site has the highest level of usability, the Sumy State University, Lviv Polytechnic National University, Interregional Academy of Personnel Management, Kharkiv University and Taras Shevchenko National University of Kyiv sites have a sufficient level, the Academy of Advocacy of Ukraine and V.N. Karazin Kharkiv National University sites are at the middle level. *Practical implications*. The proposed approach can be applied to the site of any business entity, it makes it possible to quantify the level of usability of the site from the point of view of stakeholders and become the basis for making effective management decisions regarding the compliance of the website with the requirements and needs of users. *Value/originality*. The proposed methodology for assessing the site of higher education institutions makes it possible to assess the degree of convenience of sites, which is a tool for ensuring the quality of online presentation of educational services in the context of limited information transparency of higher education institutions.

Key words: degree of convenience, usability criteria, assessment, higher education institutions, stakeholders, integral indicator.

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1. Introduction

To date, the activities of the majority of subjects and socio-economic processes have moved from an offline environment to an online environment, so the information content and structure of sites must fully meet the requirements of the present and the interests of site stakeholders. To do this, they quickly adapted to new conditions of functioning, changes in information needs. At the same time, in the context of the existing competitive struggle, stakeholders are becoming more and more demanding not only on the content of sites, but also on the efficiency of sites work, usage of modern services and platforms in order to improve navigation, design, interactivity and visibility on the Internet. The concept of usability is responsible for the convenience and ease of use of the site, since it is a low structured category, most often expert and sociological research methods are used for its research. The purpose of the article is to study the degree of usability of sites from the point of view of their stakeholders by means of questionnaires, scoring, taxonomic analysis.

2. Usability category analysis

According to International Standard ISO 9241-11 (ISO 9241-11: 2018, 2018) usability is "the extent to which a system, product or service can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use". Thus, usability in the context of websites characterizes the degree to which consumers can use a website to achieve their ultimate goal. The modern consumer does not want to solve the problem of finding out the location of certain content; he seeks to see a familiar, simple and convenient interface that will easily give an answer to any question that interests the consumer (Kucherova H. et al, 2020). Consequently, the main requirements that should be met by usability are (Nielsen, 2020): user-friendliness of the interface, a minimum of actions to achieve the goal. Based on a critical analysis of existing criteria, the authors have identified the most important criteria for the usability of sites from the point of view of users, which are studied in a certain period of time t and make it possible to obtain a reliable assessment: loading speed, convenience, efficiency, relevance, accessibility, interactivity, cross-browser compatibility, lack of forced content, attractiveness of design, satisfaction.

3. Assessment of the level of usability

In order to assess the degree of usability of sites and obtain an integral indicator, it is proposed to use a sociological study. Each of the selected usability criteria is associated with a specific question in the questionnaire, the answers to which allow us to draw conclusions regarding the level of compliance of the site with a certain criterion. To determine the integral indicator of the usability of the site (I_{us}), a point assessment was applied in accordance with the formulas: $I_{us} = \sum_{j=1}^{n} w_j K_j$, where w_j is the weight of the criterion j, K_j is the score of the criterion j, n is the number of criteria by which the integral indicator of usability is calculated; $K_j = \sum_{i=1}^{m} p_i Z_i$, where p_i is the weight of the answer to the question i of the questionnaire that meets the criterion K_j, Z_i is the score of the question i of the questionnaire, m is the number of questions in the questionnaire that meet the criterion K_j; $Z_i = \sum_{l=1}^{k} v_l x_l$, where v_l is the share of answer l to the question, x_l is the point estimate of the weight of the answer l to the question, k is the number of answers to the question. Thus, the final formula for calculating the integral usability index is $I_{us} = \sum_{j=1}^{n} w_j (\sum_{i=1}^{m} p_i (\sum_{l=1}^{k} v_l x_l))$. Its use makes it possible to obtain a quantitative indicator that characterizes the degree of usability of the site under research.

4. Results of assessing the level of usability of sites

The assessment was carried out on the example of the websites of higher education institutions, since their information transparency affects the quality of the provision of educational services, in particular, during the period of quarantine restrictions and educational reform in Ukraine. For the selected usability criteria, a sur-vey was conducted of 1170 stakeholders of higher education institutions: students and applicants as the main consumers of educational services. Their opinion is valuable, since the overwhelming majority of applicants choose their specialty and place of study precisely on the basis of the website of the educational institution. The survey results are shown in Tables 1-17.

In accordance with the data in Table 1, the sites of Taras Shevchenko National University of Kyiv and Academy of Advocacy of Ukraine have the highest

download speed. The sites of Kharkiv University and Lviv Polytechnic National University have the lowest download speed.

According to Table 2, among the surveyed websites, there are three websites of higher education institutions, on which a significant proportion of respondents found a sitemap. Such institutions of higher education are NTUU "Igor Sikorsky Kyiv Polytechnic Institute" (77,78%), Sumy State University (72,65%), Academy of Advocacy of Ukraine (68,38%). For the rest of the sites of higher education institutions, most of the respondents noted that they could not find a sitemap, which significantly complicates the use

of the site, the share of such respondents ranges from 69.52% to 90.54%.

Data of the Table 3 indicate that the majority of respondents state that it is possible to go from any page of the site to the main page for all the sites studied. At the same time, V.N. Karazin Kharkiv National University has the lowest indicator, which is explained by the congestion of the website of this educational institution with the number of links that help to disperse the attention of users and make it difficult to find the necessary link to go to the main page of the site.

According to the results of the survey, the sites that turned out to be the most convenient for users

Table 1
Distribution of respondents' answers to the question:
"How much time do you spend loading the home page of a higher education institution's website?"

Higher education institutions	No more than 3 sec	4-6 sec	7-9 sec	Not less than 10 sec.
NTUU "Igor Sikorsky Kyiv Polytechnic Institute"	62,14%	20,77%	10,26%	6,84%
Taras Shevchenko National University of Kyiv	73,50%	18,80%	5,13%	2,56%
Sumy State University	35,04%	47,01%	11,11%	6,84%
Lviv Polytechnic National University	44,44%	34,19%	8,55%	12,82%
V.N. Karazin Kharkiv National University	60,68%	30,77%	4,27%	4,27%
Interregional Academy of Personnel Management	28,21%	51,28%	13,68%	6,84%
Kharkiv University	41,03%	31,62%	14,53%	12,82%
Academy of Advocacy of Ukraine	69,23%	20,51%	5,13%	5,13%

Table 2
Distribution of respondents' answers to the question:
"Is there a sitemap on the website of the institution of higher education?"

Higher education institutions	Yes	Not found
NTUU "Igor Sikorsky Kyiv Polytechnic Institute"	77,78%	22,22%
Taras Shevchenko National University of Kyiv	30,48%	69,52%
Sumy State University	72,65%	27,35%
Lviv Polytechnic National University	11,33%	88,67%
V.N. Karazin Kharkiv National University	9,46%	90,54%
Interregional Academy of Personnel Management	11,17%	88,83%
Kharkiv University	10,35%	89,65%
Academy of Advocacy of Ukraine	68,38%	31,62%

Table 3
Distribution of respondents' answers to the question:
"Is it possible to go to the main page from any page of the site (there is a necessary link)?"

Higher education institutions	Yes	No
NTUU "Igor Sikorsky Kyiv Polytechnic Institute"	83,76%	16,24%
Taras Shevchenko National University of Kyiv	69,23%	30,77%
Sumy State University	81,20%	18,80%
Lviv Polytechnic National University	76,07%	23,93%
V.N. Karazin Kharkiv National University	66,67%	33,33%
Interregional Academy of Personnel Management	83,76%	16,24%
Kharkiv University	84,62%	15,38%
Academy of Advocacy of Ukraine	73,50%	26,50%

are clearly distinguished (Table 4). These are sites NTUU "Igor Sikorsky Kyiv Polytechnic Institute", Sumy State University and Lviv Polytechnic National University. The most inconvenient respondents consider sites V.N. Karazin Kharkiv National University and Academy of Advocacy of Ukraine.

Table 5 shows the distribution of the respondents' answers regarding the evaluation of the search bar performance for each of the studied sites of higher education institutions on a five-point scale, where 1 point corresponds to the complete inoperability of the search bar, and 5 points – the search bar will provide comprehensive information that fully corresponds to the request. Data of the Table 5 indicate that the best efficiency of the search bar is inherent in sites NTUU "Igor Sikorsky Kyiv Polytechnic Institute" and Interregional Academy of Personnel Management. According to the respondents, sites Taras Shevchenko National University of Kyiv, Sumy State University , Lviv Polytechnic National University and Kharkiv University demonstrate a fairly high performance of the search bar. The lowest efficiency of the search bar is demonstrated by the site V.N. Karazin Kharkiv National University.

Site Academy of Advocacy of Ukraine differs in that about half of the respondents did not find the search string on the site. This is due to the fact that the search line on this site is not in the usual place for users (top right), but at the bottom of the main page, which emphasizes the importance of the most familiar and convenient site structure.

A significant part of the respondents did not notice empty sections and pages on the websites of higher education institutions (Table 6). For NTUU "Igor Sikorsky Kyiv Polytechnic Institute", Taras Shevchenko National University of Kyiv, Sumy State University, Lviv Polytechnic National University and Kharkiv University, the number of such respondents ranges from 89.89% to 93.16%. This indicator is slightly lower for the sites of such institutions of higher education as V.N. Karazin Kharkiv National University, Interregional Academy of Personnel Management and Academy of Advocacy of Ukraine (varies from 80.47% to 82.91%).

To assess the level of relevance of the websites of higher education institutions, the respondents were asked to find on each website a list of specialties, the cost of training for full-time and extramural students of various specialties, and to

Table 4

Distribution of respondents' answers to the question: "Rate the convenience and familiarity of the structure of the websites of higher education institutions on a five-point scale"

Higher education institutions	1 point	2 points	3 points	4 points	5 points
NTUU "Igor Sikorsky Kyiv Polytechnic Institute"	3,42%	2,56%	13,93%	49,57%	30,51%
Taras Shevchenko National University of Kyiv	5,98%	15,38%	28,21%	27,35%	23,08%
Sumy State University	0,00%	3,42%	20,51%	36,75%	39,32%
Lviv Polytechnic National University	3,42%	3,13%	18,80%	32,77%	41,88%
V.N. Karazin Kharkiv National University	26,26%	29,66%	23,93%	10,79%	9,37%
Interregional Academy of Personnel Management	0,00%	8,26%	20,51%	41,88%	29,35%
Kharkiv University	1,71%	6,84%	23,93%	37,61%	29,91%
Academy of Advocacy of Ukraine	13,55%	18,38%	32,48%	22,64%	12,95%

Table 5

Distribution of respondents' answers to the question: "Rate the evaluation of the search bar performance of the websites of higher education institutions on a five-point scale"

Higher education institutions	No search bar	1 point	2 points	3 points	4 points	5 points
NTUU "Igor Sikorsky Kyiv Polytechnic Institute"	1,71%	2,56%	2,56%	14,53%	36,75%	41,88%
Taras Shevchenko National University of Kyiv	11,11%	1,56%	8,55%	17,95%	37,61%	23,22%
Sumy State University	10,26%	4,27%	5,98%	17,95%	25,64%	35,90%
Lviv Polytechnic National University	3,42%	1,71%	4,27%	23,37%	27,35%	39,88%
V.N. Karazin Kharkiv National University	1,71%	74,93%	10,84%	5,37%	4,79%	2,37%
Interregional Academy of Personnel Management	2,56%	0,85%	3,13%	17,95%	35,90%	39,61%
Kharkiv University	4,27%	2,56%	17,69%	18,93%	26,62%	29,91%
Academy of Advocacy of Ukraine	53,59%	5,98%	5,98%	11,24%	16,24%	6,97%

Table 6

Distribution of respondents' answers to the question: "Have you noticed blank sections, pages on the website of the institution of higher education?"

Higher education institutions	No	Yes
NTUU "Igor Sikorsky Kyiv Polytechnic Institute"	90,60%	9,40%
Taras Shevchenko National University of Kyiv	90,60%	9,40%
Sumy State University	90,60%	9,40%
Lviv Polytechnic National University	93,16%	6,84%
V.N. Karazin Kharkiv National University	82,91%	17,09%
Interregional Academy of Personnel Management	80,47%	19,53%
Kharkiv University	89,89%	10,11%
Academy of Advocacy of Ukraine	82,18%	17,82%

assess the extent to which the information found corresponds to their needs. The distribution of respondents' answers is shown in Table 7. Data of the Table 7 indicate that according to the level of relevance, the websites of higher education institutions are divided into three groups. The first group includes sites with a high level of relevance (Lviv Polytechnic National University and Interregional Academy of Personnel Management). The second group includes sites with an average level of relevance (Kharkiv University, Sumy State University, NTUU "Igor Sikorsky Kyiv Polytechnic Institute" and Taras Shevchenko National University of Kyiv). And the third group includes sites with a low level of revalence (V.N. Karazin Kharkiv National University and Academy of Advocacy of Ukraine).

The answers of the respondents regarding the use of incomprehensible terms and designations on the site were distributed evenly: about 80% of the respondents did not come across terms that were incomprehensible to them, and about 20% of the respondents state the presence of designations and terms that they did not understand (Table 8).

Table 7

Distribution of respondents' answers to the question about assessing the rele-vance of the website of a higher education institution

Higher education institutions	1	2	3	4	5
NTUU "Igor Sikorsky Kyiv Polytechnic Institute"	6,84%	8,55%	23,08%	33,33%	28,21%
Taras Shevchenko National University of Kyiv	6,84%	15,38%	25,64%	29,91%	22,22%
Sumy State University	2,56%	10,26%	24,79%	30,77%	31,62%
Lviv Polytechnic National University	2,56%	5,13%	13,64%	36,19%	42,48%
V.N. Karazin Kharkiv National University	25,38%	20,38%	17,95%	17,35%	18,93%
Interregional Academy of Personnel Management	2,56%	1,71%	22,22%	40,17%	33,33%
Kharkiv University	3,42%	6,84%	27,35%	26,50%	35,90%
Academy of Advocacy of Ukraine	19,97%	18,97%	21,37%	19,50%	20,21%

Table 8

Distribution of respondents' answers to the question: "Have you met any understandable terms and designations on the site?"

Higher education institutions	No	Yes
NTUU "Igor Sikorsky Kyiv Polytechnic Institute"	78,63%	21,37%
Taras Shevchenko National University of Kyiv	80,34%	19,66%
Sumy State University	82,91%	17,09%
Lviv Polytechnic National University	80,34%	19,66%
V.N. Karazin Kharkiv National University	82,91%	17,09%
Interregional Academy of Personnel Management	81,20%	18,80%
Kharkiv University	80,34%	19,66%
Academy of Advocacy of Ukraine	76,07%	23,93%

According to the survey results, respondents single out two sites that, in their opinion, are too overloaded with large texts, the reading of which causes fatigue (Table 9). Such sites are V.N. Karazin Kharkiv National University and Academy of Advocacy of Ukraine. Less overloading with large texts according to respondents on sites Interregional Academy of Personnel Management and Kharkiv University.

The respondents note that there are opportunities for feedback on the websites of higher education institutions (Table 10). At the same time, more than 80% of respondents note the presence of feedback opportunities on sites Sumy State University, Lviv Polytechnic National University, Interregional Academy of Personnel Management and Kharkiv University. Site Taras Shevchenko National University of Kyiv has the lowest indicator (58.12%).

The research was also carried out on the presentation of the official pages of higher education institutions in social networks (Table 11). NTUU "Igor Sikorsky Kyiv Polytechnic Institute" and Interregional Academy of Personnel Management are most actively represented on social networks. The lowest level of representation on social networks is observed for Kharkiv University. A low level of representation on social networks is also noted for Taras Shevchenko National University of Kyiv and Academy of Advocacy of Ukraine.

Table 9
Distribution of respondents' answers to the question:
"Are you tired of reading too large texts on the site?"

Higher education institutions	No, not tired	Yes, tired
NTUU "Igor Sikorsky Kyiv Polytechnic Institute"	72,65%	27,35%
Taras Shevchenko National University of Kyiv	58,97%	41,03%
Sumy State University	70,94%	29,06%
Lviv Polytechnic National University	70,81%	29,19%
V.N. Karazin Kharkiv National University	37,01%	62,99%
Interregional Academy of Personnel Management	76,92%	23,08%
Kharkiv University	74,36%	25,64%
Academy of Advocacy of Ukraine	18,86%	81,14%

Table 10
Distribution of respondents' answers to the question: "Does the site provide feedback options?"

Higher education institutions	No	Yes
NTUU "Igor Sikorsky Kyiv Polytechnic Institute"	24,80%	75,20%
Taras Shevchenko National University of Kyiv	41,88%	58,12%
Sumy State University	18,80%	81,20%
Lviv Polytechnic National University	17,66%	82,34%
V.N. Karazin Kharkiv National University	24,79%	75,21%
Interregional Academy of Personnel Management	16,24%	83,76%
Kharkiv University	19,50%	80,50%
Academy of Advocacy of Ukraine	28,21%	71,79%

Table 11
Distribution of respondents' answers to the question:
"Are the official pages of higher education institutions represented on social networks?"

Higher education institutions	No	Yes
NTUU "Igor Sikorsky Kyiv Polytechnic Institute"	12,82%	87,18%
Taras Shevchenko National University of Kyiv	44,44%	55,56%
Sumy State University	21,37%	78,63%
Lviv Polytechnic National University	17,09%	82,91%
V.N. Karazin Kharkiv National University	23,93%	76,07%
Interregional Academy of Personnel Management	13,68%	86,32%
Kharkiv University	87,01%	12,99%
Academy of Advocacy of Ukraine	52,74%	47,26%

According to the criterion of adaptability of the site version to different platforms and browsers, the sites of higher education institutions are divided into two groups (Table 12). The first group includes sites with a high degree of adaptation of content to various gadgets (NTUU "Igor Sikorsky Kyiv Polytechnic Institute", Sumy State University, Lviv Polytechnic National University, Interregional Academy of Personnel Management and Kharkiv University). The second group includes websites of institutions of higher education with a significantly lower level of adaptability of their content for any gadgets (Taras Shevchenko National University of Kyiv, V.N. Karazin Kharkiv National University and Academy of Advocacy of Ukraine).

According to the data in Table 13, the respondents are unanimous in the question of the presence of forced content on all the studied websites of higher education institutions. The share of respondents who note the presence of forced, pop-up content on the websites of higher education institutions ranges from 9.4% to 13.68%.

The respondents consider the color design of sites NTUU "Igor Sikorsky Kyiv Polytechnic Institute", Lviv Polytechnic National University and Interregional Academy of Personnel Management as attractive (Table 14). In the opinion of the respondents, site of the Sumy State University is less attractive according to the

Table 12
Distribution of respondents' answers to the question: "How well is the content displayed when loading the website of a higher education institution from a mobile phone?"

Higher education institutions	Not well	Well
NTUU "Igor Sikorsky Kyiv Polytechnic Institute"	12,53%	87,47%
Taras Shevchenko National University of Kyiv	40,51%	59,49%
Sumy State University	9,40%	90,60%
Lviv Polytechnic National University	11,97%	88,03%
V.N. Karazin Kharkiv National University	47,35%	52,65%
Interregional Academy of Personnel Management	8,55%	91,45%
Kharkiv University	11,11%	88,89%
Academy of Advocacy of Ukraine	40,51%	59,49%

Table 13
Distribution of respondents' answers to the question: "Have you noticed any forced content on the site?"

Higher education institutions	No	Yes
NTUU "Igor Sikorsky Kyiv Polytechnic Institute"	87,18%	12,82%
Taras Shevchenko National University of Kyiv	89,74%	10,26%
Sumy State University	89,74%	10,26%
Lviv Polytechnic National University	88,89%	11,11%
V.N. Karazin Kharkiv National University	88,89%	11,11%
Interregional Academy of Personnel Management	90,60%	9,40%
Kharkiv University	86,32%	13,68%
Academy of Advocacy of Ukraine	88,89%	11,11%

Table 14
Distribution of respondents' answers to the question: "Do you find the site's color scheme attractive?"

Higher education institutions	No	Yes
NTUU "Igor Sikorsky Kyiv Polytechnic Institute"	16,24%	83,76%
Taras Shevchenko National University of Kyiv	86,32%	13,68%
Sumy State University	32,48%	67,52%
Lviv Polytechnic National University	11,11%	88,89%
V.N. Karazin Kharkiv National University	91,45%	8,55%
Interregional Academy of Personnel Management	9,40%	90,62%
Kharkiv University	76,92%	23,08%
Academy of Advocacy of Ukraine	82,91%	17,09%

indicated criterion. The sites of such institutions of higher education as Taras Shevchenko National University of Kyiv, V.N. Karazin Kharkiv National University, Kharkiv University and Academy of Advocacy of Ukraine.

A significant number of respondents note the adherence to a single style of design for all pages of the website of a higher education institution (Table 15). For sites Academy of Advocacy of Ukraine and V.N. Karazin Kharkiv National University, this indicator is the lowest compared to other sites of higher education institutions.

The most convenient sites for viewing photos and videos from the point of view of the respondents are the sites of such institutions of higher education as NTUU "Igor Sikorsky Kyiv Polytechnic Institute", Sumy State University and Lviv Polytechnic National University (Table 16). According to the indicated criterion, the respondents consider the sites Taras Shevchenko National University of Kyiv, V.N. Karazin Kharkiv National University and Academy of Advocacy of Ukraine the most inconvenient.

The respondents received the highest level of satisfaction from working with the site when working with the sites of such institutions of higher education as Sumy State University and Lviv Polytechnic National University (Table 17).

Table 15
Distribution of respondents' answers to the question:
"Is there a uniform style of design on all pages of the site?"

Higher education institutions	No	Yes
NTUU "Igor Sikorsky Kyiv Polytechnic Institute"	15,38%	84,62%
Taras Shevchenko National University of Kyiv	15,38%	84,62%
Sumy State University	16,24%	83,76%
Lviv Polytechnic National University	11,97%	88,03%
V.N. Karazin Kharkiv National University	20,09%	79,91%
Interregional Academy of Personnel Management	13,68%	86,32%
Kharkiv University	15,38%	84,62%
Academy of Advocacy of Ukraine	23,95%	76,05%

Table 16
Distribution of respondents' answers to the question: "Rate the convenience of viewing photos and
videos on the site on a five-point scale (1 point is completely inconvenient, 5 points is very convenient)"
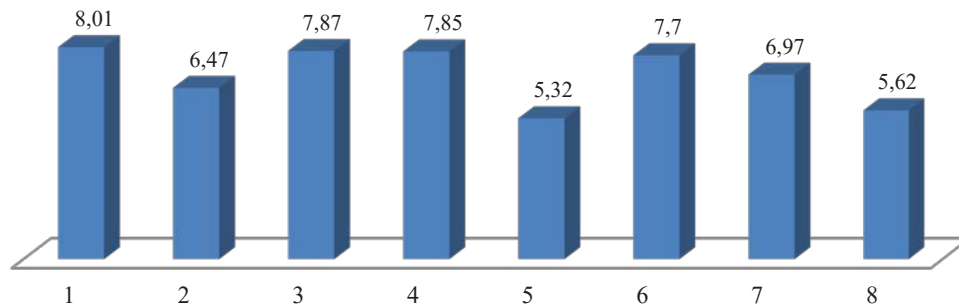
Higher education institutions	1 point	2 points	3 points	4 points	5 points
NTUU "Igor Sikorsky Kyiv Polytechnic Institute"	2,56%	5,13%	19,66%	39,32%	33,33%
Taras Shevchenko National University of Kyiv	11,84%	11,84%	28,21%	25,77%	25,35%
Sumy State University	1,71%	6,84%	17,95%	35,90%	37,61%
Lviv Polytechnic National University	3,42%	4,27%	17,95%	36,75%	37,61%
V.N. Karazin Kharkiv National University	9,40%	18,55%	24,79%	25,04%	22,22%
Interregional Academy of Personnel Management	2,56%	14,27%	16,24%	30,17%	36,75%
Kharkiv University	2,56%	10,98%	23,80%	29,32%	33,33%
Academy of Advocacy of Ukraine	7,69%	7,69%	27,35%	33,33%	23,93%

Table 17
Distribution of respondents' answers to the question: "Rate the level of satisfaction from working
with the site on a five-point scale (1 point is not satisfied, 5 points is completely satisfied)"

Higher education institutions	1 point	2 points	3 points	4 points	5 points
NTUU "Igor Sikorsky Kyiv Polytechnic Institute"	0,85%	1,71%	10,38%	44,30%	42,75%
Taras Shevchenko National University of Kyiv	4,27%	18,26%	33,50%	21,75%	22,22%
Sumy State University	0,00%	3,42%	13,80%	37,61%	45,17%
Lviv Polytechnic National University	1,71%	1,56%	9,53%	38,61%	48,59%
V.N. Karazin Kharkiv National University	31,26%	25,82%	22,64%	11,79%	8,50%
Interregional Academy of Personnel Management	1,71%	5,98%	20,95%	35,46%	35,90%
Kharkiv University	0,85%	4,27%	21,68%	41,03%	32,17%
Academy of Advocacy of Ukraine	28,97%	22,55%	27,35%	11,93%	9,21%

Figure 1. Diagram of websites of higher education institutions by the integral indicator of usability

1 – NTUU "Igor Sikorsky Kyiv Polytechnic Institute"; 2 – Taras Shevchenko National University of Kyiv; 3 – Sumy State University; 4 – Lviv Polytechnic National University; 5 – V.N. Karazin Kharkiv National University; 6 – Interregional Academy of Personnel Management; 7 – Kharkiv University; 8 – Academy of Advocacy of Ukraine

A lower level of satisfaction was received by respondents when working with sites such as NTUU "Igor Sikorsky Kyiv Polytechnic Institute", Interregional Academy of Personnel Management and Kharkiv University. The lowest level of satisfaction was provided by work with sites Academy of Advocacy of Ukraine and V.N. Karazin Kharkiv National University. At the same time, the same sites received the highest number of minimum points according to the criterion under research.

The calculated values of the integral indicator are shown in Figure 1. The answers to the questionnaire were evaluated on a ten-point scale, the weights of the usability criteria when calculating the integral indicator have the following values: con-venience, efficiency, relevance, interactivity, satisfaction – 0.15; download speed, accessibility, cross-browser compatibility, no forced content, design attractiveness – 0.05.

5. Conclusions

The article studies the degree of usability of the websites of higher education institutions from the point of view of their stakeholders. Highlighted the most important usability criteria for the website of a higher education institution from the point of view of applicants and students. A survey of 1170 stakeholders of higher education institutions was conducted in the format of a questionnaire. It was found that, according to Harrington's scale of desirability, site NTUU "Igor Sikorsky Kyiv Polytechnic Institute" has a high level of usability. The group with a sufficient level of usability includes sites Sumy State University, Lviv Polytechnic National University, Interregional Academy of Personnel Management, Kharkiv University and Shevchenko National University of Kyiv. Sites Academy of Advocacy of Ukraine and V.N. Karazin Kharkiv National University are characterized as having an average level of usability. Provided that the border of online development of higher education institutions is reached, it is recommended to fundamentally revise the structure of the site and content in order to qualitatively change their state. Sites of higher education institutions with sufficient and average usability values have the potential to satisfy stakeholders from using the sites, for which development directions have been identified.

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