

WEBSITES OF SLOVAK UNIVERSITIES

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Abstract

The websites of Slovak universities play an important role. They are no longer just a graphical overview of the organization, but they are responsible representative for its products and brand.

The aim of the article is to highlight the importance of website creation tools, including their management, and to highlight one of the important attributes of website quality, which is usability - a user interface property that tells how easy it is to use this interface. Usability can be measured using different methods, models and tools. The well-known are: questionnaire, in-depth interview, heuristic evaluation, temperature maps of 'clicks', A / B testing, eye tracking, user testing, traffic analysis, measurement models and usability evaluation, focus group (discussion in a group), card scoring, expert reviews, persons (customer prototype), storyboarding (a story described by a sequence of sketches with a description) and multiple checklists. Less known methods and tools will be described in the article.

Keywords: *www. website, usability, CMS, University portal*

JEL Classification: *O10, I23, D83, L86*

1 Introduction

In 1991, the first website was created. Number of websites is estimated at one billion nowadays (Internet Live Stats, 2017). Websites are used today as an information and educational tool, but they also entertain the user and are used as a tool for communication and branding. They are useful in making surveys; the questionnaires are made available to the visitors to websites (Hallova, Polakovic and Slovakova, 2017). Websites can help improve the image of the company, so

that they can fulfill the e-commerce function. However, the expected result is not reached, because a lot of information overwhelms many of the websites, they become disorganized and the user "loses".

Thanks to the usability theory and usability evaluation methods, these shortcomings can be removed, the satisfaction and competitive advantage can be reached back.

2 Data and Methods

2.1 Usability of the Web Interface

The term usability has become frequent in the design and management of websites and applications in recent years. When computer manufacturers began to track users and their behavior, they talked about user-friendly systems, interfaces. Later, experts have replaced this concept with a new one, namely the computer-human interaction (CHI) respectively human-computer interaction (HCI). Worldwide, however, several terms are used for the same purpose, so we can meet concepts such as man-machine interface (MMI) and human-machine interface (HMI).

The usability as understood today was defined by Nielsen (1993) as a quality attribute, which says how easy it is something to use. The usability of the web interface can be defined as a user interface property that tells how easy is to use this interface (LLC, 2015). Nielsen (1993) emphasizes that usability is only one dimension of the user interface. In the case of web interfaces, it is necessary to provide the user with an environment where he / she will not have to learn to work, it will be easy to remember, will not be error prone, and the user will like it (Nielsen, 2006). It is not possible to ask users to study manuals when they are only interested in certain information. The user interface must be intuitive and simple. Nielsen (1993) defined five qualitative usability properties:

- Learning - determines how simple is to understand basic tasks when first time working with the interface. We evaluate whether the user is clear about what the interface is dedicated to and what he or she should do to meet the goal.
- Efficiency - determines how fast tasks can be performed. The more often the task is performed, the more emphasis should be put on efficiency and therefore speed of execution.
- Remembrance - determines how difficult it is to use the web interface after the long pause.
- Error rate - determines how many errors users make when working with the interface.
- Satisfaction - determines user satisfaction with the use of the interface and its features.

ISO 9241-11 points to the origin of usability described by users, their roles and objectives, environments, equipment and it is measured by the criteria of efficiency (such as achieved goals: accuracy and completeness), effectiveness, performance (comparison of resources with the accuracy and completeness of achieved goals) and satisfaction (user's subjective attitude towards the application).

2.2 Usability assessment

Usability assessment is available for nearly all available products and services. The usability has its specifics on the Internet. When a user is not satisfied with the site, with one "click through" he or she may be on a different page, which in the case of a commercial character of the website may mean that the user gets to the competition site.

Usability can be measured using different methods, models and tools. The most well-known are: questionnaire, in-depth interview, heuristic evaluation, "crank" temperature maps, A / B testing, eye tracking, user testing, traffic analysis, models and measurement methodology and usability evaluation, focus group (discussion in the group), card scoring, expert reviews, persons (customer prototype), storyboarding, and multiple checklists. Below less known methods and tools are described (Galovicova, 2017).

Heuristic evaluation is an engineering method for finding user interface usability issues (Nielsen, 1990, 1994). Heuristic assessment is one of the so-called expert assessments based on an inspection requiring the presence of an expert. Assessors, experts are part of the design process, examine the interface and assess whether it complies with the recognized usability guidelines, heuristics. It is known that a heuristic evaluation reveals more than 90% of usability errors if at least three to five experts participate in the evaluation. There are number of heuristics (Nielsen, Molich, 1990, Nielsen, 1994, Powals, 1996), but the most commonly used ones are the heuristics for user interface creation by Nielsen and Molich in 1990, modified in 1994: Visibility of the system state, consistency between the system and the real world, control and freedom of the user, consistency and standards, error prevention, recognition rather than memory, flexibility and efficiency of use, minimalistic design, help to users, error detection and its diagnostics and documentation.

Expert assessments based on the inspection may take the form of checklists. The checklist by Nielsen mentioned in his book *Homepage Usability* is the best known. It contains 113 points (Meyers, 2009). The second checklist is by the company User Effect – 25-point Website Usability Checklist, which contains 4 main areas - Accessibility, Identity, Navigation and Content, together 25 rating points. It uses simple three-color symbols (green symbol of accuracy („ “) = good, red

symbol of accuracy - needs to improve, but not bad and red cross - wrong) that tells if and how the site meets that rating point (Travis, 2014).

Another method of expert assessment based on an inspection is "web usability guidelines", that is, some guidelines, guides how to make a proper assessment. The company Userfocus introduced 247 such guides (Usabilitynet, 2006).

User Testing is a qualitative method that provides information on how users work on the site, how pages are going, how they perform tasks, what caused them problems, and what information was visible to them, or what they could not find.

Eye tracking is the process of eye movement. It allows us to monitor what the person is looking at. By observing what a person is looking at, we can see the sources of information he perceives.

Web analytics, known as the traffic analysis, is the utility assessment tool that delivers quantitative results. With the help of the software, the company can monitor its website. It reveals how many people visit the web, how long they stay and what are they doing, what they can do to help them understand how the site is used, where visitors come from and where they are heading, or where they left. The company can use the services from the host, local software (WebTrends Log Analyzer, QuestFunnel Web Analyzer, AnalogWebalizer, Mach5 FastStatsAnalyzer, NetGenesisNetAnalysis, W3Perl, etc.) or server software (WebTrendsEnterpriseReporting Server, Urchin, MediaHouseLiveStats). In Europe, Google is the most widely used tool, Google Analytics and Google Tag Manager. Visual maps of clicks are used to visualize visitors' movement on the web. The links that users clicked on can be viewed from the home page level. The analysis is displayed as a reference map of the percentages that represent the number of clicks (Brooke, 1986).

SystemUsabilityScale (SUS) is a method that uses a questionnaire that consists of 10 questions with five options of responses for respondent; from 'I definitely disagree' to 'I definitely agree'. Wording of the questions: 1. I would like to visit this page more often. 2. The site is unnecessarily complex (it contains unnecessarily large amounts of information and features). 3. I think it is easy to use this page. 4. In order to be able to use this page, I will need the help of another person who already knows the page. 5. I have found many good functionalities on this page. 6. I think there are many shortcomings on the site. 7. I think that many people would learn to work very quickly on this page. 8. I consider this page very clumsy. 9. I was very self-confident when working on this site. 10. I think I have to get to know the page first - use it several times so I can easily find the necessary information on the site. SUS was created by J. Brooke in 1986. It is used to evaluate a wide range of products and services, including hardware, software, mobile devices, websites and applications. It contains complex scoring (Brooke, 1986, Brooke, 2013, Sauro, 2011).

2.3 Methodology

Since we do not know whether and how the usability of the school website is evaluated, we did a primary research where we used the query – the tool was questionnaire - electronically distributed to those responsible for the university website. The goal of the research (Galovicova, 2017) was to find out how many colleges and universities in selected countries assess the usability of their websites.

VC1: What approach was used to create website (internal or external).

VC2: Web Usability Assessment Level.

VC3: Degree of Google Analytics data usage.

Research, the main goal of which was to fill in an information gap on the current state of assessment of the applicability of websites at universities, was complemented by a further assessment of the usability of the websites of universities in Slovakia. The aim of the additional research was to find out what the level of usability is achieved by the websites of universities in Slovakia. A combination of methods was used in the research:

Method 1: Querying. The respondent answers questions that are divided into parts: 1. Identifying (here he evaluates his computer skills on the scale 1-5, where 1 = the beginner, 5 = the professional. To the open question he/she answers the school name, this question being used only for control, students of which university answered).

Method 2: Remote testing. The respondent has the option to choose the school according to his or her interest, and according to the assignment, he performs a task to find on the school's website the study programs. Consequently, we find out if the task is fulfilled and how easy it was to accomplish it. The open question is asked for a subjective evaluation of the respondent's site.

Method 3: SystemUsabilityScale (SUS) - Score above 68 points is considered above the average and anything below 68 points is below the average. Interpreting the results is a scale (25 = terrible, 38 = weak, 52 = OK, 72 = good, 85 = excellent, 92 = best) (Brooke, 1986, Brooke. 2013, Sauro, 2011). The target group of the web presentation of universities is also secondary school pupils, who are potential future university students. The pupil normally does not attend all the schools personally, but has the opportunity to read about them in newspapers, brochures, and especially on the school's website. That is why we have identified the basic set of pupils attending the last year of selected secondary schools in Žilina Region, who have the opportunity to submit the application for study at higher education institutions during the monitored period. The exact number of pupils who have graduated this year has been obtained from the Department of Education of the

Self-governing Region (Kucharczyk, 2017). Determining the sample - the formula used to calculate the size of the minimum sample is:

$$n = \frac{N * t^2 * \sigma^2}{(N - 1) * \Delta^2 + t^2 * \sigma^2}$$

Where: N - basic set, ∂^2 - scattering, ∂ - standard deviation = $\sqrt{p * (1-p)}$, t - Table value (for N > 30 normal division) = 1,96 (at 95% confidence interval), Δ - Permissible error = 0,05. Table 1 shows the calculation

Table 1 Calculation of the sample file

	Žilina region	Slovakia
N – number of high school graduates	6237	45358
p	0,1375	
∂^2	0,1186	
n	177	

Source: Own.

3 Results and Discussion

The Internet has long been a medium that allows sharing of information in text or graphic form or medium providing "chat" and e-mail based on a text (Hošťovecký-Zařková, 2011). Domestic and foreign universities conduct marketing activities on the Internet. Fabus, Juraj, Kremenova and Fabus Jozef (2014) followed marketing communication on the Internet.

The results of analyzes from the Slovak universities' web sites confirm the fact that even the Slovak academic environment is aware of the crucial role of the web in making the results of its activities available and in the visibility in the virtual information and communication space (Jedličková, 2010).

In the reviewed period, 28 responses were received from Slovak universities. The first question was directed to VC1: The way of web page creation (internal or external). The results are very similar when nearly half of the schools have created web pages internally and half externally (Table 2).

Table 2 The way of web creation

	Slovensko
Internal	46,40%
External	53,60%

Source: Own.

VC2: By evaluation of the usability of web sites, we found out that 28.6% of the Slovak universities evaluate the usability, 64.3% do not evaluate it and 7.1% do not know to answer the question (Table 3, Figure 1).

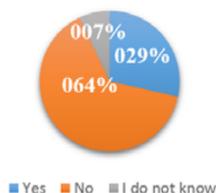
Table 3 VC2: The web pages' usability assessment

	Slovakia
Evaluate	28,60%
Do not evaluate	64,30%
Do not know	7,10%

Source: Own.

Figure 1 Web Usability Assessment - Left Results for SR

Was the web site evaluated for usability?



Source: Own.

In this question, the respondents also answered what are the most common methods and tools for usability assessment, namely: user testing, A / B testing, questionnaire, and two schools also mentioned eyetracking. They also highlighted the issues that were revealed: "Little visibility on mobile devices, interface responsiveness, page orientation speed". Some schools responded that they did not identify any errors.

Table 4 shows the results of the last section and answers to the question whether they use Google Analytics data. Up to 64,3% of Slovak schools (who participated in the research) use the data and 35,7% do not use it.

Table 4 VC3: Usability of Google Analytics data

	Slovakia
Use	64,30%
Do not use	35,70%

Source: Own.

In complementary research, 23 secondary schools were addressed in the Žilina Region. In the period under review, we received 189 responses. Results were cleared by 12 responses (school staff and wrong students' answers). We then worked with 177 responses. In remote user testing, we asked students to choose one of the universities in Slovakia, visit their website and try to find the offered study programs. 88% of pupils have found study programs, and nearly 12% have not found (Table 5, Figure 2).

Table 5 Success of students when searching the study programs

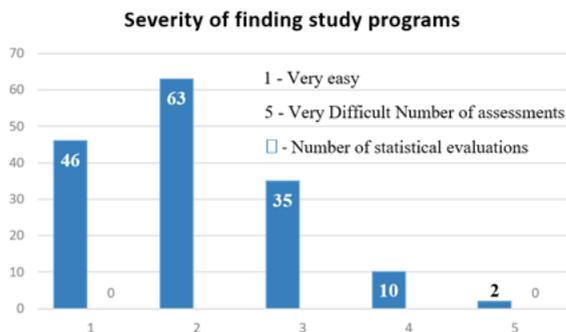
	Students
Found study program	88,10% (156)
Did not find study program	11,90% (21)

Source: Own.

Figure 2 Graphic Assessment of Student Success in Searching for Study Programs



The students who found the study program further evaluated how easy it was to find it, on a scale of 1 to 5, from very easy to very difficult. The results are shown in Figure 3.

Figure 3 **Graphic evaluation for searching the study programs**

Source: Own.

Students could also express their own opinion on the school's website. Here are some of the opinions: "The information is stored in documents and not directly on the page. It is not very clear. It is not very clear and it is difficult to find basic information. Therefore ... I did not find a study program.... the page was not user friendly ... a lot of text on one side ... The page was unclear, I did not find a suitable study plan Small font, too complicated. Too much news on the main page. Need to download a document with programs, unnecessarily complicated, no description of the programs. It's fine ... only the font is small. It could have a newer version of the graphics. It is cool, but some things have to look for longer. It is made simple and super. There are no pictures or information. I like it :) I found everything I needed, super. I like this school. I like design, and also very well provided information."

From the responses, it can be seen that a normal user can detect a number of usability errors and respond very sensitively to them, which subsequently affects his / her satisfaction with the given service interface.

The results of the usability assessment using the SUS method, which focuses on finding satisfaction, in our case of secondary school pupils with university websites in Slovakia, is as follows: The highest score was 85 points, the lowest 40 points, the average grade for all universities in Slovakia is 60.36 points, the median is 60, modus 54. The methodology says that all results below 68 points are below the level and above 68 points, above the level of usability (Galovicova, 2017).

It can be assessed that six websites of Slovak universities have reached an excessive level and the remaining 23 are under the average. More detailed interpretations of the results are considered with a scale that evaluates the level of usability of the interface as horrible (under 25 points), significantly weak (below 38 points), OK (below 52 points) – it was achieved by 5 schools, good (53 - 72 points) 20 schools,

excellent (73-84 points) – achieved by the 3 schools (with a small number of ratings: 1 or 2) and excellent (85 points and more) - one school (but only for one rating).

The research team of the Portal of Slovak Universities surveyed the content management systems - CMS at universities. Whole school CMS were considered, as well as, CMS used at particular faculties. The result is shown in the table.

Table 6 **CMS used at the universities**

<i>CMS</i>	<i>Whole school solution</i>	<i>Only faculties</i>
Contao	1	
DotNetNuke / DNN Platforl	1	
Drupal	4	4
Frontpage	1	
Joomla	4	7
Plone	1	1
Typo3	2	
WebGui		1
WordPress	4	2
custom	15	11

Source: Tothova, Orszaghova and Hornyak-Greganova, 2017.

Surprisingly, 15 universities resolve their CMS on contract through supplier. These are different CMS systems from different suppliers.

When using CMS, the User support is important. It means responsibility of the organization and operation of the IT infrastructure of each organization (Olahova, 2015).

4 Conclusion

The result of the research is an overview of the tools used to create university websites and the level of usability reached by university websites in Slovakia - up to 24 (83%) of university websites have achieved good level of usability (83% > 60%). Nevertheless, we believe that the results are not positive for Slovakia, because it is necessary to focus on the average of the results (68 points) that was reached only by 6 schools (21%), the remaining 23 (79%) achieved only sub-standard level. It is clear from the site administrators' replies that they often do not have sufficient knowledge, education or experience in the field of usability assessment, or due to a number of other obligations, they do not deal with this issue.

Websites of universities are based on diverse web content management systems, representing a diverse range of approaches to presenting information. All universities have mainly presented current events on the main sites, the possibility of studying either directly study programs or hyperlinks with more detailed information about them. Fortunately, they do not use modern technology not to enter content several times - into their academic information system, the Portal of Universities, and their website. This would eliminate, on the one hand, the various information presented, the errors caused by out-of-date content, but also the time of text editors.

Universities must be more careful about eliminating out-of-date content and links to non-existing documents at all locations in the site. This fact was confirmed by other authors too, Jedličková (2010), Šilerová et al. (2017), Tóthová, D.-Országhová, D. and Hornyák-Gregáňová, R. and others.

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