# Usability Evaluation of University Websites

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## 1. ABSTRACT

If the company doesn't have a website, it is losing out on great opportunities for its business. A website itself can be used to accomplish many different marketing strategies to help the business grow. Companies can benefit from having a website. Websites are nowadays used not only as a sales method and information tool, but also as a communication tool in marketing. (Kvasnicova, Kremenova, Fabus, 2015)

Schools and universities have a special place in the market. They offer education opportunities in particular areas. The educational institutions market is huge and extremely competitive. Although the reputation and the quality of institutions is a major advantage, they must think about the target group, who are young people spending several hours per day browsing websites. Schools and universities should have their own web pages, which represent them and perform many functions: information, communication, publications, cultural, and social, among other activities. University websites are intended for employees, high school students interested in studying, school partners, public authorities and the general public. (Kvasnicova, Kremenova, 2015)

The most important is that the web pages are usable – it means it is easy to use the website, user find what are looking for. Otherwise, visitors leave them and click on the competitor's website.

The word usability has become the most inflected in the design and management of web sites and applications worldwide in recent years. Nielsen (1993) defined usability as a quality attribute - something that is easy to use.

We are able to evaluate the usability. One of the common tool is System Usability Scale (SUS), which provides a "quick and dirty", reliable tool for measuring the usability. (Brooke, 2013) It consists of a 10 item questionnaire with five response options for respondents; from strongly agree to strongly disagree. Originally created by John Brooke in 1986, it allows us to evaluate a wide variety of products and services, including hardware, software, mobile devices, websites and applications.

We examined how the current situation in Slovakia is. There are no statistics for measuring and evaluating the usability of university websites. To fill this information gap, we conducted several interviews with administrators of schools websites. The interviews have shown that such a usability test have not been made. Therefore we formulated the research problem: Usability evaluation of universities websites and decided to find out the current situation. Research determine how many of universities in selected countries (Slovakia, Czech Republic and Finland) evaluate the usability of their web pages. We expect: More than 90% of schools do not evaluate the usability of their web pages.

Due to the existence of information gaps and our concern for them to be completed, it was a plan of the research project in two main steps. Step 1: We ask administrators from all universities and colleges in 3 selected countries to fill in a questionnaire. The main question will answer our research problem.

Step 2: We ask high school students to evaluate university websites by using SUS tool. The period of our research is from beginning of February to the end of May 2017.

The results offer insight into the current state of usability of universities website in selected countries. We can identify the weaknesses of websites and propose to remove them. Thanks to the results we are be able to improve website usability, make it more comfortable and easier for users.

## 2. INTRODUCTION

Humanity, while in existence, is still looking for ways to improve the processes and things that serve it. Today, we can imagine neither work, nor a common life without the Internet. According the Internet world stats (2017) nearly 50% (49.6 %) of world population are internet users. Companies understood the advantage of online presentation really quickly and in many cases had change offline sales to online. Also governments are trying to use e-government applications to save money and time, and also to provide more comfortable services to the public. In the same way, universities have developed website to inform applying students about study programmes, current students and employees about daily topics and to provide other e-services, and also to other institutions and organizations. The educational institutions market is huge and extremely competitive. Although the reputation and quality of institutions is a major advantage, they must think about the target group, who spend several hours per day browsing websites, and try to reach their attention.

There are over 1 billion websites on the World Wide Web today. But only a small percentage of these websites reach the basic level of visitor satisfaction. Customer satisfaction, efficiency, and effectiveness are three aspects of usability. Usability answer the question: how easy is something to use.

It is important to pay attention to usability of university website and to improve the level of visitor satisfaction. Hence, it is necessary to evaluate usability. The best known studies are two by the US Company Nielsen Norman Group. In the first study, they evaluated 109 university websites and then developed a guideline with 78 recommendations. In the second research, 57 universities had been evaluated and research team developed a design guide with 10 major recommendations. (Sherwin, 2016) Another bigger evaluation was in the United Kingdom of Great Britain and Northern Ireland, where research team evaluated 110 university websites by using big data. (Alqurashi and Wang, 2014) Smaller studies were also conducted in the USA (Andrews and Walsh, 2006), Malaysia (Jabar, Usman, Awal, 2013), Spain (Fernandez, Insfran, Abrahao, 2011) and Turkey (Sengel, 2013, Peker, Kucukozer, Cagiltay, 2015). The following tools were used for evaluating level of usability: user testing, questionnaire –SUS, WAMMI, graphic presentation, guideline, and systematic mapping. Findings from different studies inform us about poor usability of university websites. The main usability problems were: wrong context, inappropriate design, weak navigation, bad terminology, poor attractiveness, poor functionality, poor accessibility, lacking of drop-down main menu structure, irrelevant location of desired information, and bad usage of external files.

## 3. LITERATURE REVIEW

The word usability has become the most inflected in the design and management of web sites and applications worldwide in recent years. Usability is defined in ISO 9241-11: "Usability is the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use". Nielsen (1993) defined usability as a quality attribute - something that is easy to use. More particularly it relates to how quickly a person can learn something used as effective in use, such as the use memorable as prone to making mistakes and how happy "to" users use (Nielsen, Loranger, 2006). Krug (2006) as a basic rule for creating web pages considers that the creators of pages do not force users to think. In the web interface is therefore necessary to provide the user with an environment with which will have to learn to work. You cannot require users to study manuals guide when they are only interested in specific information. The user interface must be intuitive and frugal. Usability theory has been developed and numerous usability evaluation tools have been introduced during the last 30 years.

Methods of usability evaluation can be categorized into expert based approach – include evaluators and user based approach - include representative users. Expert based approach methods are: 1. Model based (GOMS, MUSiC, DRUM, AIDE, QUIM, GUIDe, TAM), 2. Expert evaluations, 3. Personas and

Scenario, 4. Analytics, 5. Others (Case study, Card sorting, A/B testing, Brainstorming, Benchmarking). User based approach methods are: 1. User testing evaluation, 2. Pluralistic Walkthrough, 3. Interview, Questionnaire, Focus group, Workshop, 4. Questionnaire based methods (SUS, WAMMI, QUIS, SUMI, ASQ, PSQ, PSSUQ). (UsabilityNet, 2006)

We introduce some of the methods more detailed below.

Remote usability testing allows researcher to conduct user research with participants in their natural environment by employing screen-sharing software or online remote usability vendor services. In general, tests should be about 15–30 minutes long made up of about 3-5 tasks. (usability.gov, 2017) Tests can be "moderated", where is real time communication between the researcher and the participant, or "un-moderated" where participants complete the tasks independently.

System Usability Scale (SUS) provides a "fast and dirty" but reliable tool for measuring usability. The questionnaire consists of 10 questions with scale responses; from I strongly agree to strongly disagree. The list of questions is below:

1. I think that I would like to use this website frequently.

2. I found the website unnecessarily complex.

3. I thought the website was easy to use.

4. I think that I would need the support of a technical person to be able to use this website

5. I found the various functions in this website were well integrated.

6. I thought there was too much inconsistency in this website.

7. I would imagine that most people would learn to use this website very quickly.

8. I found the website very cumbersome to use.

9. I felt very confident using the website.

10. I needed to learn a lot of things before I could get going with this website.

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. Scoring is complex - the participant scores on each question are converted to a number, the points are added together and the sum is then multiplied by 2.5, which will help to convert the original score 0-40 to 0-100. Based on the research, the SUS score over 68 points is considered above average and anything below 68 points is below average. The result is served by the scale (25 = terrible, 38 = weak, 52 = OK, 72 = good, 85 = excellent, 92 = best). (Brooke, 1986, Sauro, 2011, Brooke, 2013)

In the aforementioned studies were used SUMI and QUIS. SUMI (Software Usability Measurement Inventory) is a method, which was created in 1993 at the University of Cork. The questionnaire contains 50 questions. In 1996/1997, in cooperation with Nomos Management AB in Stockholm, the original methodology was modified and developed to the new version called WAMMI (Website Analysis and MeasureMent Inventory). WAMMI uses a 20-questions questionnaire. WAMMI finds the satisfaction of website visitors. Visitors are asked to compare their expectations with their real site experiences. Today it has an online version with a graphical view of the results and is offered commercially. (Kirakowski, Corbett, 1993, Kirakowski, Cierlik, 1998, WAMMI, 2017)

The last method based on the use of a questionnaire and user satisfaction ratings were developed in collaboration with psychologists, is called QUIS (Questionnaire for User Interaction Satisfaction). The QUIS 7.0 is the current version. It contains a demographic questionnaire, a measure of overall system satisfaction along six scales, and hierarchically organized measures of nine specific interface factors (screen factors, terminology and system feedback, learning factors, system capabilities, technical manuals, on-line tutorials, multimedia, teleconferencing, and software installation). Each area measures the users' overall satisfaction with that facet of the interface, as well as the factors that make up that facet, on a 9-point scale. The questionnaire is designed to be configured according to the needs of each interface analysis by including only the sections that are of interest to the user. (Chin, 1988, University of Maryland Office of Technology Commercialization, 2017)

## 4. METHOD

We divided our study into two steps as we describe below.

Step 1: We asked administrators from all universities and colleges in 3 selected countries to fill in a questionnaire. Our research problem was: Usability evaluation of university websites. We decided to find out the current situation. Research determine how many of universities in selected countries (Slovakia, Czech Republic and Finland) evaluate the usability of their web pages. Our expectation is: More than 90% of schools do not evaluate the usability of their web pages.

Table 1 shows the total number of universities by countries. Total number of universities is 142 in all three countries.

**Table 1: Number of Universities by countries**

| Country | Slovakia | Czech Republic | Finland |
|---|---|---|---|
| Number of Universities | 35 | 69 | 38 |

We chose a margin error of 10% (Δ=0.1) and a confidence level of 95%. Then t = 1.96. ð = ∫ (p*(1-p)). We have to emphasize that we are aware that we use the calculation of the standard deviation for the alternative division. We used this formula to calculate representative sample size for each country:

**Formula 1: representative sample size**

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

Require sample size for Slovakia is: n = 24 respondents. Require sample size for Czech Republic is: n = 40 respondents. Require sample size for Finland is: n = 26 respondents.

We sent questionnaire by emails to all universities, either communication managers, or administrators. The questionnaire has introduction and four parts. In the introduction we introduce our study and give the main information how to fill in the questionnaire. The first part contains of questions about how the website was created. The questions in the second part ask if the website has be ever evaluated, what kind of methods were used during evaluation and what were the results of evaluation. The third part of the questionnaire ask if they utilize data from Google Analytics, if so, what kind of data and how it helped improve the website. The last part has identification question.

Step 2: We asked high school students to evaluate university website. The period of collecting answers was from February to May 2017. We decided to use combination of methods – SUS questionnaire and adjusted remote evaluation. Questionnaire has online version and was distributed through online channels as emails and Facebook. We sent emails/messages to 14 high schools - directors or teachers of informatics, in region of Zilina in Slovakia. The target group for our questionnaire were high school students, who will admitting to maturity this year and want to continue at University. They are the main group of visitors to the university website.

**Table 2: Number of graduating students at high schools in Zilina region in year 2017**

| region | Zilina |
|---|---|
| number of graduating students at high schools | 6237 |

Total number of graduating students at high schools is 45358 in Slovakia and 6237 (Table 2) in selected region (Table 2). We chose a margin of error of 5% (Δ=0.05) and a confidence level of 95%. Then t = 1.96. ð = ∫ (p*(1-p)). We have to emphasize again, that we are aware that we use the calculation of the standard deviation for the alternative division. We used formula 1 to calculate representative sample size. Require sample size is: n = 177 respondents.

The questionnaire has introduction and three parts. In the introduction we introduce our study and give the main information how to fill in the questionnaire. In the first part we ask identification questions –actual school name and rate computer skills on scale 1 to 5 (beginner to expert). In the second part participants can choose one of all universities in Slovakia and evaluate its website. Adjusted remote evaluation had run as simple task. Participants were asked to find study programs on the website and if they were successful, they evaluate on the scale 1 to 5 (very easy to very difficult)

how easy it was to find study programs. The last part of questionnaire contains SUS questionnaire. SUS helps us to discover the level of satisfaction of website visitors. We used the original SUS questionnaire, which consists of 10 questions with scale responses; from "strongly agree" to "strongly disagree". We only changed the word "system" to "website" in all questions. We added one open question at the end, where participants can write their own opinion of website.

## 5. RESULTS

The results of the study are presented in two parts according the steps of study.

Step 1: A total of 28 universities from Slovakia and 35 from Czech Republic participated in the survey. Because of postponed start of survey in Finland to the end of April 2017, the survey runs in Finland till end of August 2017. Hence, the results of Finnish part of the study are not presented in this paper.

The first part of questionnaire contains of question about how the website was created. As shown in Table 3 almost half of Slovak universities created the website internal, by own department or employee and the second half used the services from external company. Similar results have been recorded from universities in Czech Republic.

**Table 3: How was the website created?**

|  | Slovakia | Czech Republic |
|---|---|---|
| Internal – department/employee | 46.40% | 48.60% |
| External company | 53.60% | 51.40% |

The next questions asked if the website has been ever evaluated, what kind of methods were used during evaluation and what were the results of evaluation. Table 4 shows that from Slovak participated universities almost 29% of websites have been evaluated and 64% have never been evaluated for usability. The 7% of participants answered they do not know this information. In Czech Republic 25.7% universities evaluate their websites for usability and 74.3% do not. The graphical view is on the Figure 1. Our expectation that: More than 90% of schools do not evaluate the usability of their web pages – has not been confirm.

**Table 4: Has the website ever been evaluated for usability?**

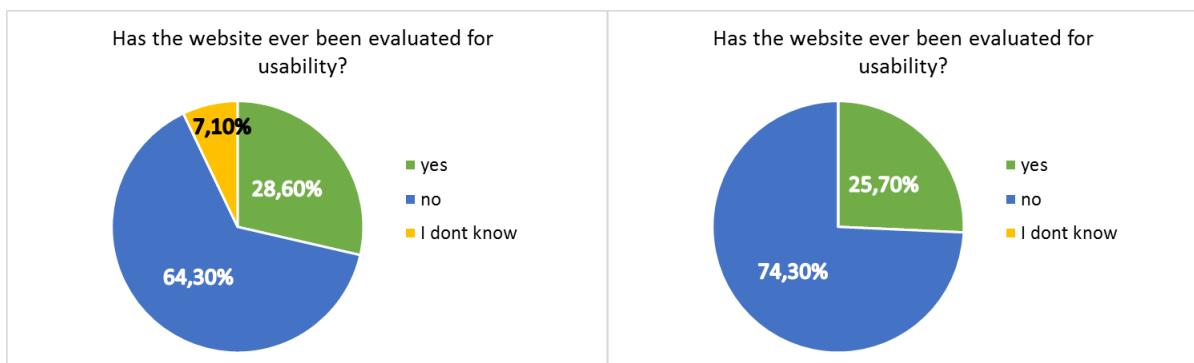|  | Slovakia | Czech Republic | Expectation: 90% do not evaluate |
|---|---|---|---|
| yes | 28.60% | 25.70% |  |
| no | 64.30% | 74.30% | < 90% |
| I do not know | 7.10% | 0% |  |



**Figure 1: Usability evaluation? (Left – results from Slovakia, right – results from Czech Republic)**

The most used methods were: user testing, click mapping, A/B testing, questionnaire, and 2 schools used eye tracking. During usability evaluation were found some issues: poor viewable on mobile devices; responsiveness; speed of orientation. But also a few participants answered that no issues were found during evaluation.

The third part of the questionnaire ask if they utilize data from Google Analytics (GA), if so, what kind of data and how it helped improve the website. Table 5 shows that from Slovak participated universities more than 64% utilize GA data and almost 36% do not, and from Czech Republic participated universities more 80% utilize GA data and 20% do not.

**Table 5: Do you utilize data from Google Analytics?**

|     | Slovakia | Czech Republic |
|-----|----------|----------------|
| yes | 64.30%   | 80.00%         |
| no  | 35.70%   | 20.00%         |

They analyse number of visitors, demographic data, locations, visitor´s behaviour, bounce rate, site search, site speed, average session duration, page views, device category and traffic. These analyses helped them: "optimize the page; the most visited pages and their data are better accessible; the structure of the information on faculty pages has been unified; helping us to design new websites for the university; the analysis of individual indicators is based on building a new portal; they confirmed the need to create a Ukrainian site mutation; based on the track used by browsers, we can determine which technologies we can and cannot use on the site; In the case of highly visited or searched pages, we improve access to them (the number of clicks from the landing page); helped to speed up page view; do a better visitors segmentation; change the content and move the most visited parts at the home page".

Step 2: A total of 189 students responded the questionnaire. As it is presented at Figure 2 below, most of the high school students (88.9%) found study programs on the website. But there is a small group of students (11.1%), who did not find them. Also 9% of student who found study programs, later answered, it was difficult to find them.
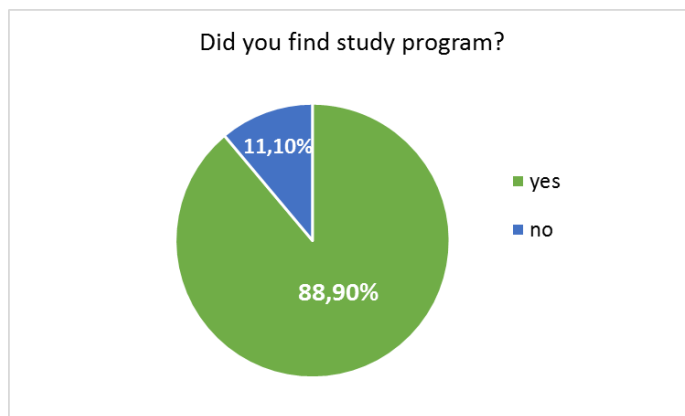


**Figure 2: Successful rate of finding study programs**

The second part of questionnaire was a SUS method. All participated students evaluated minimum one of all universities website, according their interest. The Figure 3 shows the results of evaluation. On line x we can see how many evaluations were done, on line y we can see average scores for all Slovak Universities - the result from SUS evaluations. According the results showed in the Figure 3 we can summarized that no website has terrible usability (25 points), 4 websites have weak usability (26-51 points – red colour), 20 websites have good usability (52-72 points – orange colour), 3 websites have above good usability (green colour), and only one has excellent usability (85 points – dark green colour). The average score in our study is 60 points, modus is 60, maximum score is 85 and minimum score is 40. The SUS score over 68 points is considered above average usability – only 6 websites have more than 68 points; and 23 websites are below 68 points what means below average.
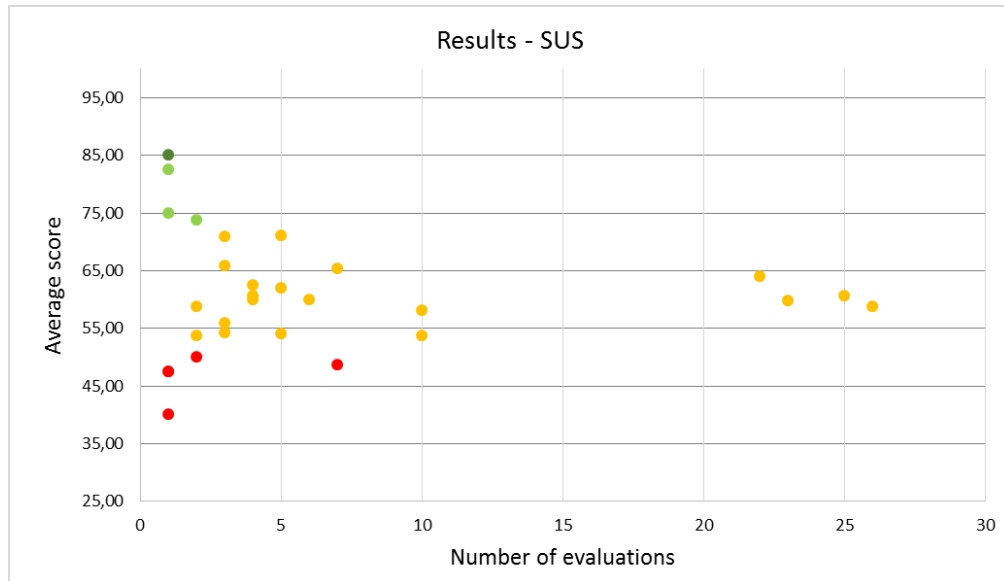
**Figure 3: Results of SUS evaluations**

In the last question students can write their own opinion on the website. Below are some examples of negative opinions:

"It is difficult to find basic information." "You need to download a document with programs, unnecessarily complicated, no description of programs." "The website design is awful, it looks like it's from 90's. IT team should really work on the website graphics." "I don't like the squares layout. It's confusing. I actually preferred the old website. The website also forces you to read their news, and I'm not particularly interested in that." "I think the main problem is that there are too many information at one part. The user get lost at first." "Information is stored in documents and not directly on the page." "Complicated, complex, I had to read about 13 pages for my application." "Totally good but the information is too inflated." "So ... I did not find a study plan .... The page was unclear ... a lot of text on one side ..." "its fine ... just the font is small." "The page is unclear. I would have to visit it more often to known it better." "Small font, too complicated. Too much news on the main page."

## 6. CONCLUSION

There are many audiences for a university website. As well as prospective students (main audience group), we may also need to cater for research collaborators, the general public, parents, alumni who might be looking at the site for different reasons. Even within the prospective student audience group there are very distinct groups with different informational needs e.g. international students, undergraduate vs postgraduate. Universities are very complex organisations and there are so many people involved who might want to publish content which does not consider the needs of the users. Academic staff may want to present their course or research in a way that is completely inaccessible for a 17 year old student trying to decide which university to go to and this can be a challenge for web team. (Kucharszyk, 2017)

Also, because a university website is so huge, we often find that people with limited web expertise are responsible for managing web content and structure for their area of the site, rather than having the whole site managed by a central web team. This can make things very inconsistent and result in an information architecture that reflects the internal structure of the organisation, rather than having information structured in a way that is logical for users (e.g. by task, or by audience).

The results of our study show current state of usability evaluations of university websites in Slovakia and Czech Republic. Only about 28% of universities websites have been evaluated for usability. More than 64% universities in Slovakia and 80% in Czech Republic utilize Google analytics data. Despite the fact that a few university administrators answered that during evaluation did not find any issues to improve, more than 11% of students did not find study programs on the website. Also it is clear from the SUS results only 6 evaluated websites have score over 68 points, what is considered above average

usability, and 23 websites are below 68 points, what means below average. But it is necessary to do usability evaluations to improve the level of usability. We recommend to use combination of usability evaluation methods, and especially to ask users for their opinion, to do user testing. Many audiences for a university website means that web team has to do a lot of careful segmentation when planning evaluations and user testing, and have many personas.

## 7. ACKNOWLEDGEMENTS

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