

## Digital Barriers for Students With Visual Impairments at Universities in the Slovak Republic

Vojtech Regec<sup>1,a,\*</sup>, Milan Regec<sup>2,b</sup>

<sup>1</sup>Institute of Special Education Studies, Faculty of Education, Palacký University in Olomouc, Czech Republic

<sup>2</sup>Department of Library and Information Science, Faculty of Philosophy, Comenius University in Bratislava, Slovak Republic

<sup>a</sup>vojtech.regec@upol.cz, <sup>b</sup>milan.regec@gmail.com,

\*Corresponding author

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**Abstract.** The aim of this paper is to point out important aspects of the digital barriers that students with visual impairments are facing at universities. Besides the legislative framework of the accessibility of digital information we also present some of the concrete findings from the environment of higher education in the Slovak Republic. We have concluded that in between years 2007 and 2013 none of the universities could be evaluated as fully accessible to the individuals with visual impairments. Almost half of the evaluated institutions demonstrate more serious deficiencies in compliance with national legislation as well as international standards. Actual analysis of the selected deficiencies and their consequences is presented in the realm of largest institution - Comenius University in Bratislava.

### 1. Introduction

In the recent years, there has been massive increase in the volume of information stored and presented in digital environment of the universities. Electronic form has grown to become the main way of effective communication between school and its students as well as perspective candidates. This, undoubtedly a positive trend, more often than not turns to be an exact opposite for the people with visual impairments. Despite the fact that an electronic communication has much higher potential to provide information readily in an accessible form for the impaired students, due to lack of respect to the basic principles of accessibility or just plain ignoring thereof, universities create even greater barriers than the students had to face in pre-digital age.

### 2. Legal framework

The first enactment that determined compulsory requirements for accessibility in Slovakia was the Act No. 275/2006 Coll. on Public Administration Information Systems. Edict No. 1706/M-2006 defined requirements for e-Accessibility of public administration. As compulsory requirements for accessibility we listed selected Web Content Accessibility Guidelines 1.0 and Blind Friendly Web 2.3 guidelines. Currently in force is the Edict No 312/2010 Coll. on standards for public administration information systems, which lists compulsory requirements under § 14 "Accessibility of web sites". More detailed information on accessibility including practical examples to this legal norm is published in a document named *Methodology to Edict No. 312/2010* (Regec; Pastieriková, 2013).

The biggest issue with current legislation for digital accessibility from the point of view of visually impaired persons is the defined scope of enacted documents mentioned above. Act No. 275/2006 Coll. on Public Administration Information Systems does not apply to the electronic environment of the universities, while it does apply do primary and secondary schools. As of today, any public university is not subjected to the rules, which quite specifically describe requirements for accessibility of information. Therefore, our recommendation for praxis is to:

- **Clearly define obligation for universities to provide electronic information to students with visual and other disabilities in accessible forms through the adoption of standards in line with international standards** (e.g. ISO / IEC 40500:2012) and the European Commission Directive (Proposal for a Directive of the European Parliament and of the Council on the accessibility of public sector bodies' websites "COM (2012) 721 final.

Despite what we have stated above about the legislation directly dealing with accessibility of information systems, it is incorrect to assume that universities can ignore digital barriers they have created or that they can choose to address only selected issues at their free will. Legislation protecting individuals against discrimination in the form of Act no. 365/2004 Coll. on Equal Treatment in Certain Areas and Protection Against Discrimination (Antidiscrimination Act) states in § 2a, that discrimination due to "*disability shall also mean the discrimination due to a previous health impediment or the discrimination of a person in the event in which based on external signs of a person it would be possible to presume that the person has a disability*" (Section 11).

Adding to this, specific Act no. 131/2002 Coll. on Universities in § 100 clearly states universities provide "*the support of students and of applicants with special needs*". In this context it is important to understand not only the term "**accessibility**" but also what defines a student with "**special needs**".

- In Section 1 "University creates generally accessible academic environment also by creating appropriate study conditions for students with special needs without lowering performance requirements for their studies."
- In Section 2 "For a student with special needs is considered a student:
  - with the sensory, physical and multiple disabilities,
  - with a chronic disease,
  - with health impairment,
  - with mental illness,
  - with autism or other pervasive developmental disorders,
  - with learning disabilities." (Act no. 131/2002 Coll. on Universities, § 100)

Regulation of the Ministry of Education, Science, Research and Sport of SR n. 458/2012 coll. of Laws on minimal rights of students with special needs is specific about requirements of the students with visual impairment, dividing them into two main groups: blind students and visually impaired students, however only for the purpose of physical orientation on the premises.

Table 1. Selected minimum requirements of the students with special needs (visually impaired and blind category, Regulation No. 458/2012 Coll.).

Environmental requirements for the blind student	Environmental requirements for the visually impaired student
Providing support in training of the orientation, independent and safe movement on the premises of the university.	-
Barrier-free, unassisted access to the information related to the study. <sup>1</sup>	Barrier-free, unassisted access to the information related to the study. <sup>1</sup>
Barrier-free work with academic information system.	Barrier-free work with academic information system.
Barrier-free access to the information and materials provided by the academic library. <sup>1</sup>	Barrier-free access to the information and materials provided by the academic library. <sup>1</sup>
<sup>1</sup> With the use of assistive technologies.	

From the Table 1 it is clear, that under barrier-free access it is understood **access to the information related to the study without outside assistance, with the use of assistive technologies only**. Logically, previous statement determines that electronic environment of universities must not contain digital barriers for the visually impaired and blind students and that every serious breach of accessibility can be interpreted a violation of applicable legal standard (in this case Regulation No. 458/2012 Coll.)

### 3. Digital barriers of the electronic environment of the universities in Slovakia during the years 2007–2013.

As a background for quantification of the overall accessibility level and accessibility rating we used calculation model developed by Regec (Regec, 2010; Regec, 2012). This model has been verified in 2008 and is implemented in the official methods and guidelines for accessibility monitoring at a national level in Slovak Republic. The current version from December 2011 is available at the website of Ministry of Finance of the Slovak Republic:

[http://informatizacia.sk/ext\\_dok-metodika\\_hodnotenia\\_pristupnosti\\_2011/13320c](http://informatizacia.sk/ext_dok-metodika_hodnotenia_pristupnosti_2011/13320c)

In the research during the years 2007-2009 (Regec, 2010), author came to the conclusion that only 3 out of 34 universities could be, based on the evaluated areas in the electronic environment, evaluated as highly accessible to the visually impaired persons. In contrast, electronic environment with low and very low level of accessibility was recorded in 15 universities. Especially alarming was the accessibility level of the most frequently used Academic Information System (AiS2), then used by over half of the subjected universities. The determined level was at very low level of accessibility. Practical implications of this were that student with visual impairment could not, without the help of an assistant, enroll in a new school term, look up his schedule, grades, sign-up for exams etc. Among other problems identified by Regec (ibid.) were also electronic study texts and other compulsory materials inaccessible to the visually impaired students or published in the form not suitable for conversion to the format accessible by the supportive technologies such as text magnifiers and screen readers (Regec; Pastieriková, 2013).

While analyzing accessibility ratings for the individual years we found out that overall level of accessibility has decreasing trend (Fig 1).

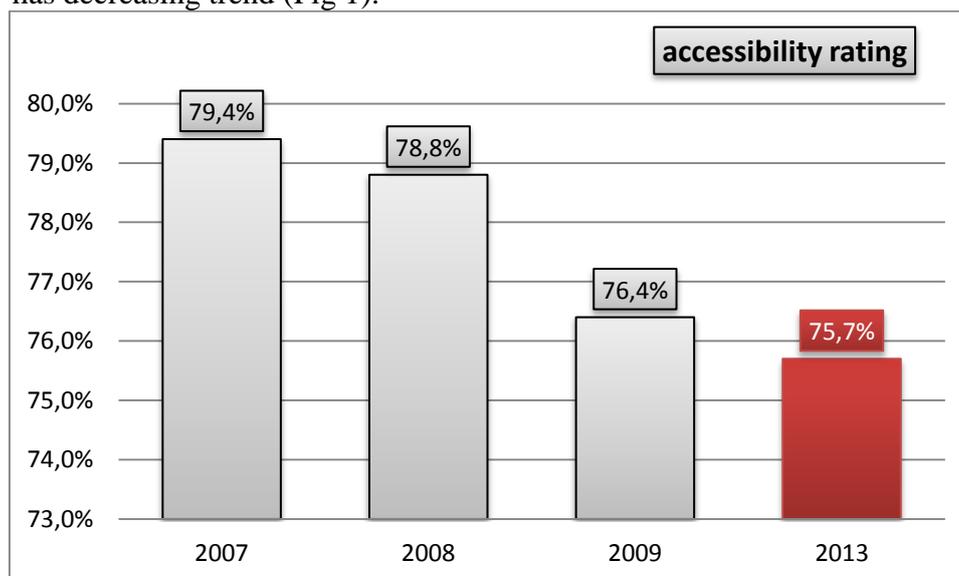


Fig 1. Overall accessibility rating of the universities in Slovakia in the years 2007–2013 (higher is better, n=34).

Besides the observed negative trend of the overall accessibility, since the 1.9. 2013 when Act no. 131/2002 Coll. on Universities was enacted, it is arguable that almost 80 % of universities in Slovakia violate § 100 on providing support to students with special needs, while almost 15 % of universities

have severe digital barriers rendering most of the electronic environment completely inaccessible to the blind and visually impaired students.

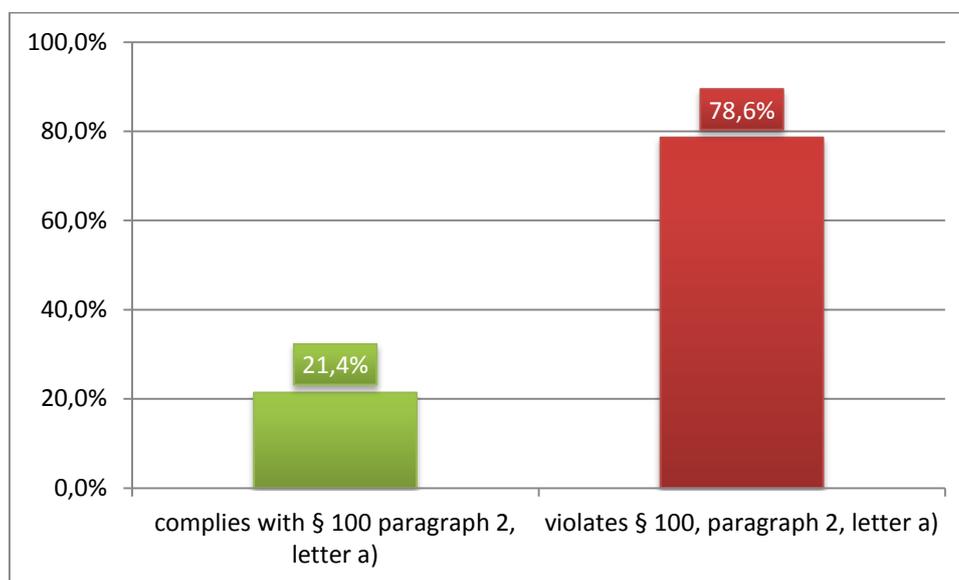


Fig 2. Ratio of universities in compliance with Act no. 131/2002 Coll. on Universities, § 100 on creating accessible environment for the students with special needs (n=34).

#### 4. Demonstration of digital barriers on the example of Comenius University in Bratislava.

Electronic environment of the Comenius University in Bratislava (CU) is among those not fully accessible to the visually impaired students. While despite the shortcomings web attains higher than average accessibility rating of 85,3 %, implemented Academic Information System v. 2 reaches only 66,6 % with some functionality completely inaccessible to the students with special needs.

In the following sections we present most frequent accessibility violations in relation with corresponding accessibility rules and further materials. This violations are typical for many of the evaluated universities and are not unique to the Comenius University, which is here used mostly for the demonstration purposes. All violations have been documented during the most recent testing in the period from February to April 2013.

##### 4.1 Graphic and other non-text elements

Related documents:

- WCAG (*Web Content Accessibility Guidelines*) 1.0: Check point 1.1;
- WCAG 2.0: Success Criteria 1.1.1;
- BFW (*Blind Friendly Web*) 2.3: Rule No. 1.

Accessibility of graphic and other non-text elements is the source of long ongoing and often heated debate. Technically, the issue has been solved with the birth of the first accessibility rules, however it is difficult to find balance between sometimes labor intensive tagging of elements visually impaired person finds mostly no interest in (e. g. photo galleries) and proper presentation of important information, such as navigation or scanned documents, often containing information on how to use or how to do something. Unfortunately, arguing about non-text elements often diverts attention from the overall accessibility of the website or application and undermines the “real, practical accessibility” as it is perceived by the actual users with special needs.

Example of providing hyperlink in the form of graphic element without text alternative is demonstrated on Fig. 3.



Fig. 3. Inaccessible hyperlink to the information material for students and other web site users. (<http://www.fedu.uniba.sk/index.php?id=4047>)

Source code snipped from the element highlighted in Fig. 3. Text alternative is missing:

- `<a href="fileadmin/user_upload/editors/KSPEC/uchadzacom/Ustav__specialnopedagogickych__studii.swf" >`

Other examples of incorrect presentation of graphic elements are demonstrated on Fig. 4 to Fig. 7.



Fig. 4. Graphic elements as navigation links without text alternative. (<http://www.jfmed.uniba.sk/index.php?id=3150>)

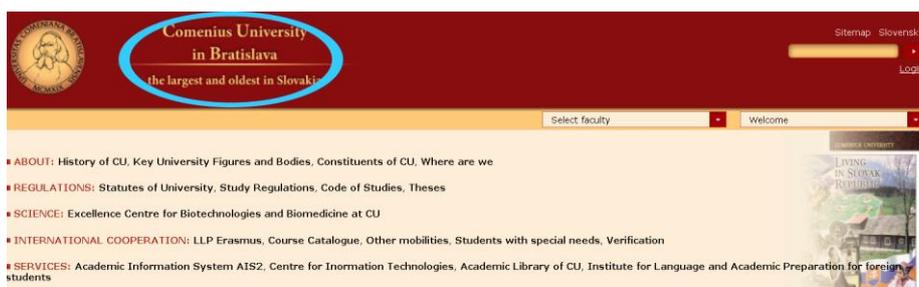


Fig. 5. Hyperlink on the homepage page of the English version of the web portal of the CU without text alternative (<http://www.uniba.sk/index.php?id=921>)

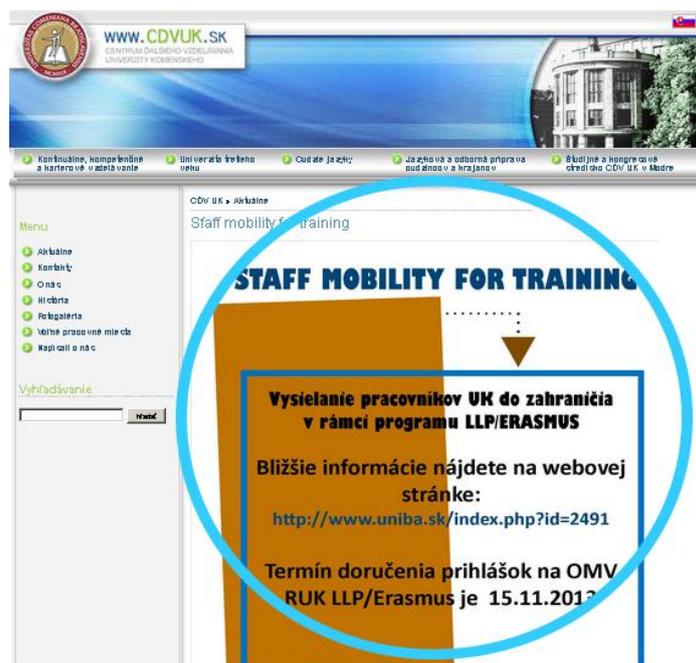


Fig. 6. Information on mobility opportunities for the employees of the CU presented only as an image without corresponding description. (<http://cdvuk.sk/blade/index.php?c=3380&sfaff-mobility-for-training>)



Fig. 7. Form completely inaccessible to the blind and severely visually impaired users because of improper implementation of CAPTCHA (Completely Automated Public Turing Test to tell Computers and Humans Apart). (<http://archeologia.fphil.uniba.sk/index.php?page=napistenam>)

## 4.2 The use of colors

Related documents:

- WCAG 1.0: Check point 2.1;
- WCAG 2.0: Success Criteria 1.3.3 (level A) and 1.4.1 (level A);
- BFW 2.3: Rule No. 8.

Some visually impaired users perceive colors in altered way or are not able to distinguish between them, therefore it is necessary to ensure that all information conveyed with color is also available without color, for example from context or markup. It is considered an accessibility violation if compulsory fields in a form are distinguished only through different color, but Academic Information System (AiS 2) brings this challenge right at the registration to an unimaginable level. Visually impaired and blind users hit the wall here and face a totally inaccessible puzzle (Fig. 8.).

<b>Y</b>	<b>r</b>	<b>2</b>	<b>2</b>	<b>R</b>	<b>3</b>
<b>m</b>	<b>X</b>	<b>B</b>	<b>f</b>	<b>W</b>	<b>Y</b>
<b>v</b>	<b>S</b>	<b>Z</b>	<b>w</b>	<b>a</b>	<b>v</b>

Type green signs from left table in the order of the rows (case sensitive)

Fig. 8. Registration form renders the process of electronic enrollment at CU totally inaccessible for the applicants with severe visual impairment. (<https://e-prihlaska.uniba.sk/>)

Explanation to the Fig. 8: Applicant with severe visual impairment is processing the information in a linear order and cannot distinguish between the left and the right side of the table. Also, it is an accessibility violation to require from user to make selection based only on the color of the letter (Type green signs from left table in the order of the rows (case sensitive)).

Examples of other common violations in using color to convey information on universities' websites:

- "Office hours on days marked with **bold** are for external students."
- "Fields in **red** are compulsory."
- "Students that have passed the exam have their student number in green **color**."

Further examples from the CU on the information conveyed in color only are on the Fig. 9 and 10.

Čo znamená, ak je predmet zobrazený **červenou farbou** v **zápisnom liste**?

Fig. 9. "What does it mean, if the subject is displayed in red on enrollment list?" (<http://www.uniba.sk/index.php?id=2665>)

**REGISTRAČNÝ DOTAZNÍK**

Vyplňte prosím všetky požadované polia. Chybné vyplnené polia sú označené červenou farbou.

**OSOBNÉ INFORMÁCIE**

Meno:  Priezvisko:  Titul:  Štátna príslušnosť:

Dátum narodenia:  Rodinný stav:  Zdravotný stav:

Adresa trvalého bydliska:

Telefón:  Mobil:  E-mail:  Fac:

Fig. 10. Registration form at the Center for Continuing Education CU has incorrectly filled fields outlined with red color. ([http://www.cdvue.sk/blade/modules/reg\\_form/index.php](http://www.cdvue.sk/blade/modules/reg_form/index.php))

### 4.3 Other aspects of accessibility

Besides major findings stated in the previous chapters, it is important to point out other risks and deficiencies that create barriers in the electronic environment of universities. One of the most common is the failure to provide information in a semantically structured form at least at the most basic level (i. e. headings are not properly tagged), failure to provide keyboard access to the

controlling elements, hyperlinks opening in new browser windows, forms where description and its field are not properly linked and not surprisingly missing or incorrect language definition for the web page etc.

## 5. Conclusion

This article has demonstrated the most common digital barriers for people with visual impairment in the electronic environments of universities in Slovakia. During the past 6 years we have recorded through regular and consistent monitoring a steady decrease in the average overall accessibility level. This decrease can be related to growing amount of information provided in digital form as well as more complex applications; however shown examples demonstrate persisting and repeated violations of the most basic accessibility rules, even in static websites and basic documents. While the total number of inaccessible websites had decreased, many website presentations and information systems ignore the basic accessibility principles.

There is a wide discrepancy between the issue of “real accessibility”, applicable legislative framework and practice, where almost 80 % of the evaluated universities in Slovakia violate laws related to accessibility of information and discrimination of people with disabilities. Since the first legislative document on accessibility was enacted 6 years ago, there has not been a case of single sanction being imposed on any public institution up until today..

Because of a legislative loophole, Act No. 275/2006 Coll. on Public Administration Information Systems and related edicts do not apply to the universities, even though they do apply for lower education institutions and other public bodies. In spite of related legislation (Act on Universities, Antidiscrimination Act and Regulation No. 485/2012 Coll.) effectively requiring universities to remove their digital barriers and provide accessible environment to all of its students, it is necessary to clearly define obligation for universities to provide electronic information to students with visual and other disabilities in accessible forms, through the adoption of norms in line with international standards. While overall accessibility of the universities decreased by more than 3 % during the duration of monitoring, other websites, such as those of government institutions, increased their accessibility up to 15 % in the same time frame.

All of the universities have advanced technologies enhancing the accessibility and with related information freely available on the internet, which makes it even more saddening to see that the most basic and easily avoidable barriers are still present and repeatedly created. Because of this it is necessary to immediately start educating content contributors and other university staff on the issue of accessibility and to increase their competencies in this field.

Our monitoring showed that a systematic approach to accessibility evaluation contribute to the identification and removal of the digital barriers, however the same approach is now required for securing mechanisms for effective removal of barriers also in the universities’ electronic environment. Where legislative tools fail and effective market competition is absent, educating and empowering students with special needs can create another factor that can help persuade universities to not ignore accessibility issues any longer and to implement effective solutions nationwide in case of Academic Information System as well as locally, down to the department levels. Only this way it will be possible to stop ongoing discrimination and marginalization of visually impaired and blind students in university-level education in Slovakia.

## 6. Acknowledgement

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