SK ANTIPLAG IS BEARING FRUIT

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Abstract: Slovakia made a unique and significant step forward in the fight against plagiarism at higher education institutions in April 2010. At this time, the SK ANTIPLAG system (a central repository of theses and dissertations, a plagiarism detection system, a comparative corpus, local repositories of theses and dissertations) started routine operation after a preparatory phase. Pursuant to the amendment to the Higher Education Act from October 2009, the use of SK ANTIPLAG (including uniform collection methodology of theses and metadata) is mandatory for all Slovak higher education institutions operating under the Slovak legal order. It is an unparalleled and unprecedented implementation of such a system on a national level. A relevant milestone has been built not only on the Slovak scale, but also worldwide.

1 Introduction

1.1 The History

In 2001, the only private HEI in Slovakia used a plagiarism detection system (PDS). Later, in 2009, two public HEIs started to use a PDS, too. The nationwide implementation of SK ANTIPLAG in 2010 was really a breakthrough, a big step forward. At that time, the unanswered question was the readiness of HEIs to use the SK ANTIPLAG system. The readiness situation is illustrated in Table 1 and in Figure 2. In May 2010, 78.8% of HEIs (26 out of 33) were already using SK ANTIPLAG.

All state HEIs were ready in May 2010, all public HEIs were ready in September 2010 and all private HEIs were ready in March 2011.

In 2011, two private HEIs were established and, in 2012, one more private HEI was established. The new HEIs started to use SK ANTIPLAG at the moment when their students handed over their theses and dissertations to the local repositories (May and June 2014). Nowadays, all Slovak higher education institutions (36) use SK ANTIPLAG routinely. There are four more HEIs in Slovakia, but they do not operate under the Slovak legal order.

The basic motivation that led to the birth of SK ANTIPLAG as a nationwide plagiarism barrier at HEIs was the uncontrolled proliferation of plagiarism that has been facilitated on one hand by technological progress (personal computer and Internet penetration) and, on the other hand, by the situation in higher education characterised by enormous growth in the number of students, HEIs and disproportionate growth of teachers (Figure 2). Accompanying factors were low awareness of academic integrity, ethics, intellectual property rights and plagiarism.

The first official joint effort against plagiarism at HEIs was recorded in September 2006. The Slovak Rector's Conference (SRC) approved two documents related to academic ethics. The first one "Measures to Reduce Ethical Violations of Standards for Preparation and Presentation of the Bachelor's, Master's and Dissertation Theses"[1]

[1]In original: Opatrenia na odstránenie plagiátorstva pri spracovaní a prezentovaní bakalárskych, diplomových a dizertačných písomných prác

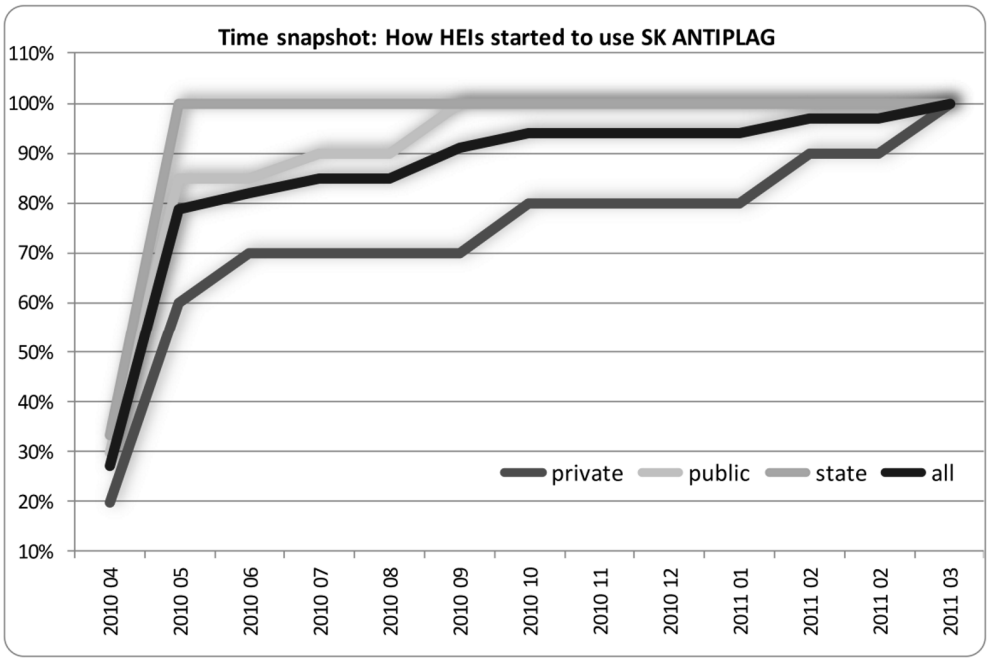

Figure 1. Readiness of HEIs to use SK ANTIPLAG

Table 1

The history of PDS and readiness of HEIs to use SK ANTIPLAG

Implementation	Year	Number of higher education institutions							
				public HEIs		state HEIs		private HEIs	
		cumulative	percentage	cumulative	percentage	cumulative	percentage	cumulative	percentage
Individual systems	2001	1	3.0%	0	0.0%	0	0.0%	1	10%
	2009	3	9.1%	2	10.0%	0	0.0%	1	10%
SK ANTIPLAG	May 2010	26	78.8%	17	85.0%	3	**100.0%**	6	60%
	Sep 2010	30	90.9%	20	**100.0%**	3	100.0%	7	70%
	Mar 2011	33	**100.0%**	20	100.0%	3	100.0%	10	**100%**
	Jun 2014	36	**100.0%**	20	100.0%	3	100.0%	13	**100%**

was addressed to students and the second one "Code of Ethics for Higher Education Institutions Employees"[2] to the teaching staff. The documents were of national importance, but with a minimal influence on the academic community. It was necessary to inhibit the spread of plagiarism by a measure that will be fully respected in the everyday practice. That measure was SK ANTIPLAG.

[2]In original: Etický kódex zamestnancov vysokých škôl

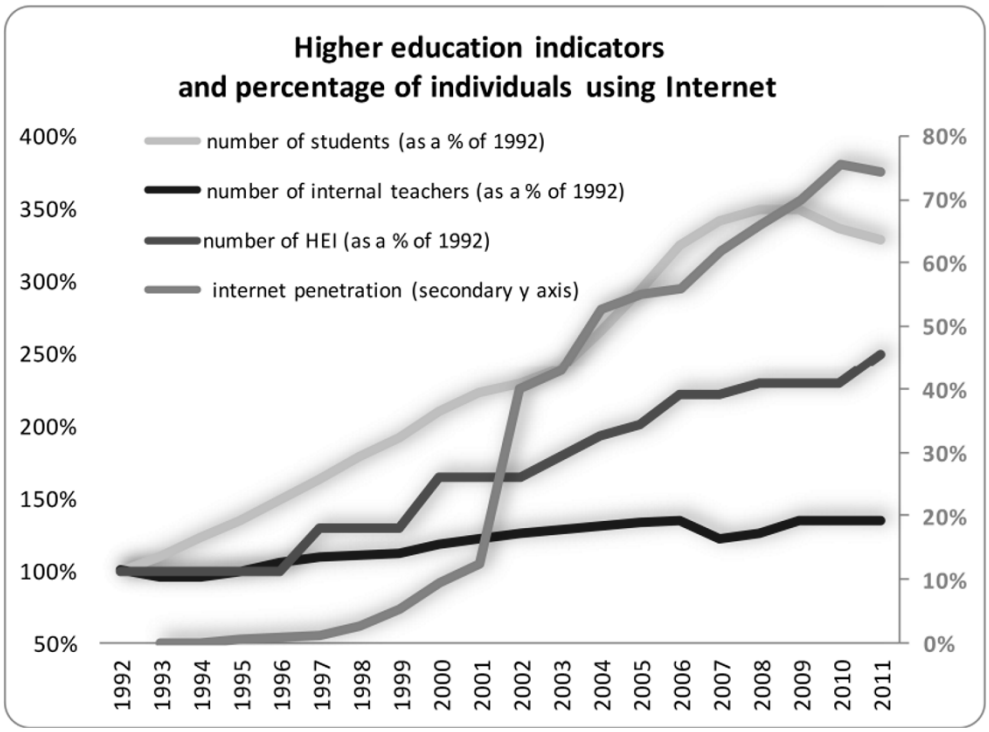

Figure 2. Growth characteristics

The time necessary to put SK ANTIPLAG into routine use was relatively short. The basic milestones were (see the paper Strategies and responses to plagiarism in Slovakia (2013) for detailed information):

- The Slovak Rector's Conference asked the Ministry of Education, Science, Research and Sport (MinEdu) in February 2008 to coordinate the activities related to the acquisition of the plagiarism detection system.
- MinEdu decision in 2008: The system on a national level will be acquired to cover the collection, processing and originality check of the specified HEI theses to inhibit the spread of plagiarism.
- The Higher Education Act Amendment approved in October 2009 made mandatory for all Slovak HEIs operating under the Slovak legal order to send five types of theses for collection in the nationwide central repository before their defense

(bachelor's, master's, dissertation, rigorous[3] and habilitation[4] theses) in order to be checked for originality by the plagiarism detection system.

- MinEdu published the Methodological Guidelines concerning requisites of theses and dissertations, their bibliographic registration, originality verification, storage and access in August 2009.
- SK ANTIPLAG started its routine operation in April 2010.
- The theses registered in the CR from the September 1st, 2011 are publicly accessible (metadata and full text) according to a licensing agreement.

1.2 How Does It Work?

An important step was made by defining the uniform theses and dissertation collection methodology. There are defined metadata, licensing agreements and five types of theses (bachelor's, master's, dissertation, rigorous and habilitation) for all Slovak HEIs that will be accepted by the Central Repository of Theses and Dissertations (CR).

The author of the thesis has the obligation to submit the thesis, metadata and a licensing agreement to the local repository of theses and dissertations (LR) at HEI. LR collects theses, metadata and licensing agreements from authors and prepares the batches that are uploaded by CR in regular time intervals. HEI is the only channel for the delivery of the thesis to the CR. The thesis is stored in the CR for the period of 70 years from the date of its registration.

Manual for the Disclosure of Final, Rigorous and Habilitation Theses[5] (2011) is describing disclosure procedures. In the licensing agreement, the author has the right to postpone the disclosure of the thesis by the CR by 12 months without giving a reason. The Dean or Rector has the right, based on the author's justified request, to postpone the publication of the thesis by the CR by further 24 months. In case the thesis or its part was published (printed) before it was sent to the CR, the CR will disclose only its unpublished part at the request of the author. In case the thesis or its part was published (printed) after it was sent to the CR, the author has the right to require that the disclosure of the thesis or its part will be stopped by the CR. If the thesis was disclosed by the CR, but "the thesis affected improperly the rights and legitimate interests of a third party, especially if intellectual property rights of a third party were infringed, or improper handling of classified facts or personal data, confidential information or trade secrets of a third party was identified", then the author or MinEdu can require that the disclosure by the CR will be stopped. The thesis may contain, for example, a trade secret – then the relevant part of the thesis (i.e. non-public documents) subject to the trade secret is not sent to the CR.

[3] A rigorous thesis or "small doctorate" can be received by a person with a master's degree. It requires that a candidate passes rigorous examination and defends his/her rigorous thesis; rigorous thesis is less valuable than dissertation; it is closer to master thesis than to dissertation.

[4] A prerequisite for the granting of the scientific-pedagogical degree "docent" (assistant professor) is a PhD title, a habilitation lecture, and submission and defense of the habilitation thesis.

[5] In original: Manuál k sprístupňovaniu záverečných, rigoróznych a habilitačných prác

The author of the thesis decides if the thesis can be downloadable as a PDF file or he/she can require that the thesis cannot be downloadable and it can be visible only in the picture format.

After a batch of theses is uploaded by CR, the theses are registered and processed. Processing means that the theses are stored in the CR, their plain texts are sent to the comparative corpus, and they are checked for originality by PDS against the comparative corpus. The selected internet sources are a part of comparative corpus. After the originality check, the Originality Check Protocols are sent to HEIs and to the authors. The originality check protocol is a document that supports the decision-making. The examination committee decides whether a thesis is a plagiarism or not. All these steps have to be made before the defense of the thesis. After the defense, the thesis is publicly accessible (metadata and full text) according to the licensing agreement.

1.3 Fruit

The international research project "Impact of Policies for Plagiarism in Higher Education Across Europe" (IPPHEAE, EU funded, 2010–2013, Project Lead Partner: Coventry University, United Kingdom) carried out a survey in all EU countries. Country reports for 27 EU countries are accessible on the internet site http://ippheae.eu/project-results. The report "Plagiarism Policies in Slovakia" reads as follows:

> "There were some notable differences between the Slovak surveys and the EU average. Almost all Slovak students (99%!) become aware of plagiarism before or during their bachelor studies. The EU average shows that 20% of students become aware of plagiarism during their masters/PhD degree or are still not sure about it."
> "... Slovak students are the most aware of plagiarism among all EU countries."
> "The most outstanding example of good practice is definitely the existence of national repository of theses. As it is run centrally and universities are obliged to upload their theses, students from all institutions have theoretically the same conditions. The other aspect is that the software tool provides just a protocol for matching with other sources. The decision about whether a given case is plagiarism or not lies with teachers and/or the examination committee and these may not always follow the same procedures."
> "Compared to other countries, Slovakia should be praised for its achievements. And it already was: The European Commission has awarded the Slovak Centre of Scientific and Technical Information the European Prize for Innovation in Public Administration."
> "The responses from Slovak students demonstrated the highest level of understanding about plagiarism within the whole Europe. Their unwillingness (in comparison with other countries) to receive more training on plagiarism is therefore understandable. The research team of the IPPHEAE project would also like to praise Slovakia for existence of national repository of theses and built-in plagiarism detection tools."

Peta Lee underlined in the University World News (2014): "Student plagiarism might be alive and well and sprouting up in campuses around the world, but in Slovakia, at least, measures put in place in 2010 are bearing fruit."

The representatives of HEIs in Slovakia stated positive benefits of SK ANTIPLAG on the academic community and on the public on the whole. See the paper Strategies and responses to plagiarism in Slovakia (2013) for more details.

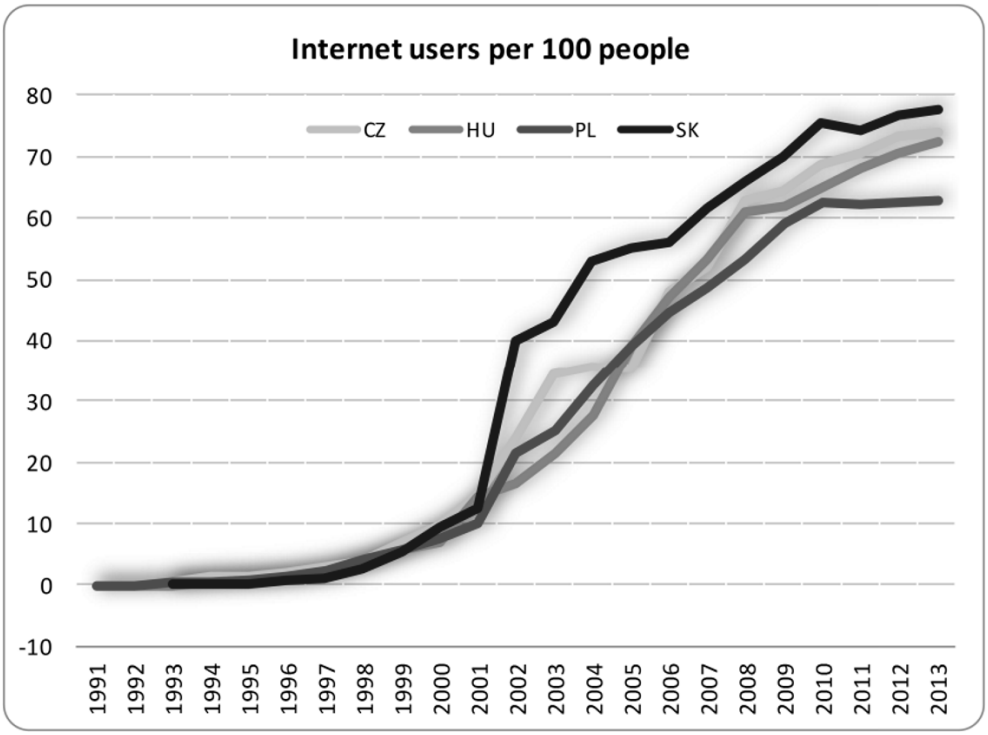

Figure 3. Internet users per 100 people (World Bank)

2 V4: ICT indicators

V4 countries[6] are close to each other, not only geographically but also in terms of penetration of information and communication technologies (ICT). The following graph is based on the World Bank's World Development Indicators Database (2014). The indicator is the number of Internet users per 100 people. Internet users are individuals who have used the Internet (from any location) in the last 12 months and have used Internet via a computer, mobile phone, personal digital assistant, games machine, digital TV etc. Rapid growth began after the year 2001 in all V4 countries and it was especially steep in Slovakia.

The data in the following two figures show ICT indicators extracted from the Eurostat database (2014). Figures 4 and 5 provide insights on students using computers daily and on students who use Internet daily. We can assume that the year 2012 in Figure 4 is a data collection error for the Czech Republic. Daily internet access by students became "standard" in V4 region in 2010, in 2004 was this indicator very low. The period 2004–2010 is characterized by the rapid growth of daily Internet use by students, which is likely to be reflected in the growth in the spread of plagiarism.

[6]See http://www.visegradgroup.eu/about

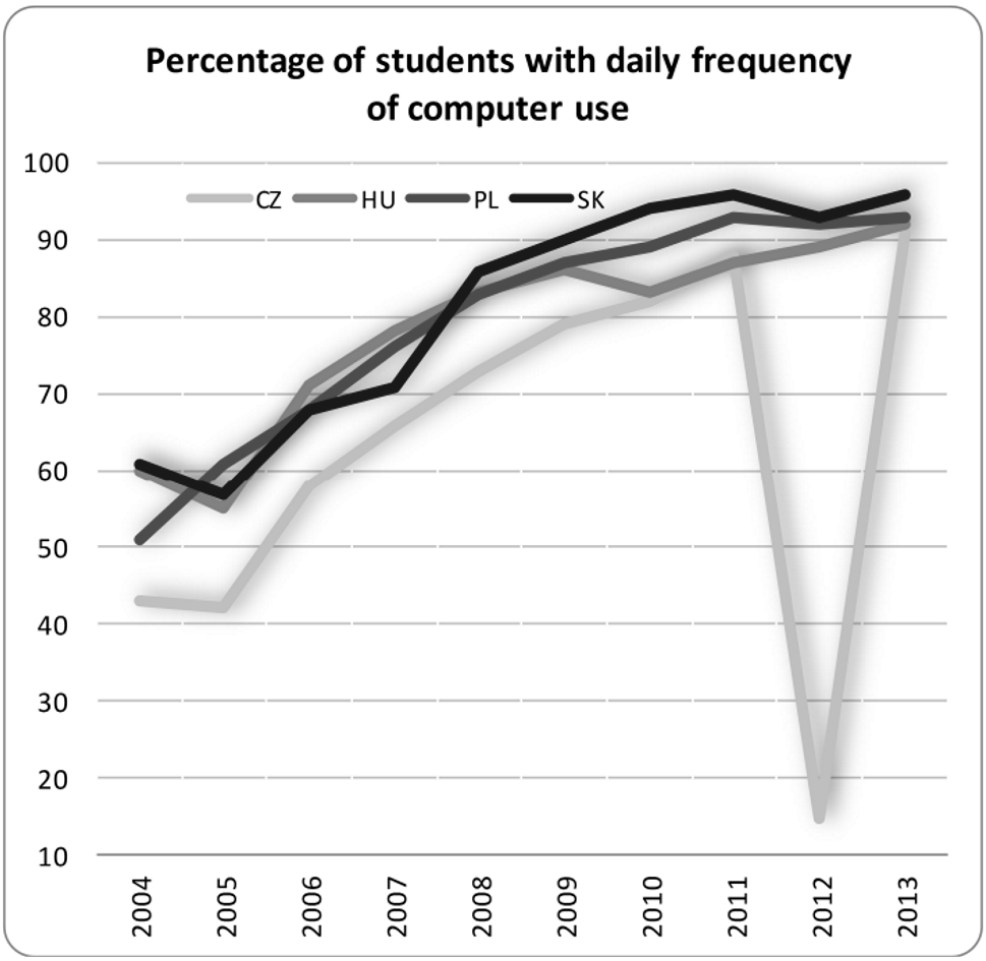

Figure 4. Percentage of students with daily frequency

3 The Fight Against Plagiarism: V4 and the Others

There are many measures that inhibit plagiarism. Plagiarism detection by means of ICT is one of them. In countries with plagiarism detection systems used, their use by HEIs varies widely.

In Slovakia, there is a strict definition what has to be sent for storage in the CR (theses, metadata, licensing agreements, thesis reviews). All theses incoming in the only CR are checked for originality by the only plagiarism detection system – this obligation for all Slovak HEIs is anchored in the Higher Education Act amendment. In general, repeated uploads of theses are not allowed to prevent ghost-writers from using repeated uploads to deliver better texts. In the academic year 2013–14, there were 4.06% repeated uploads. Theses and dissertations that were registered in the CR on

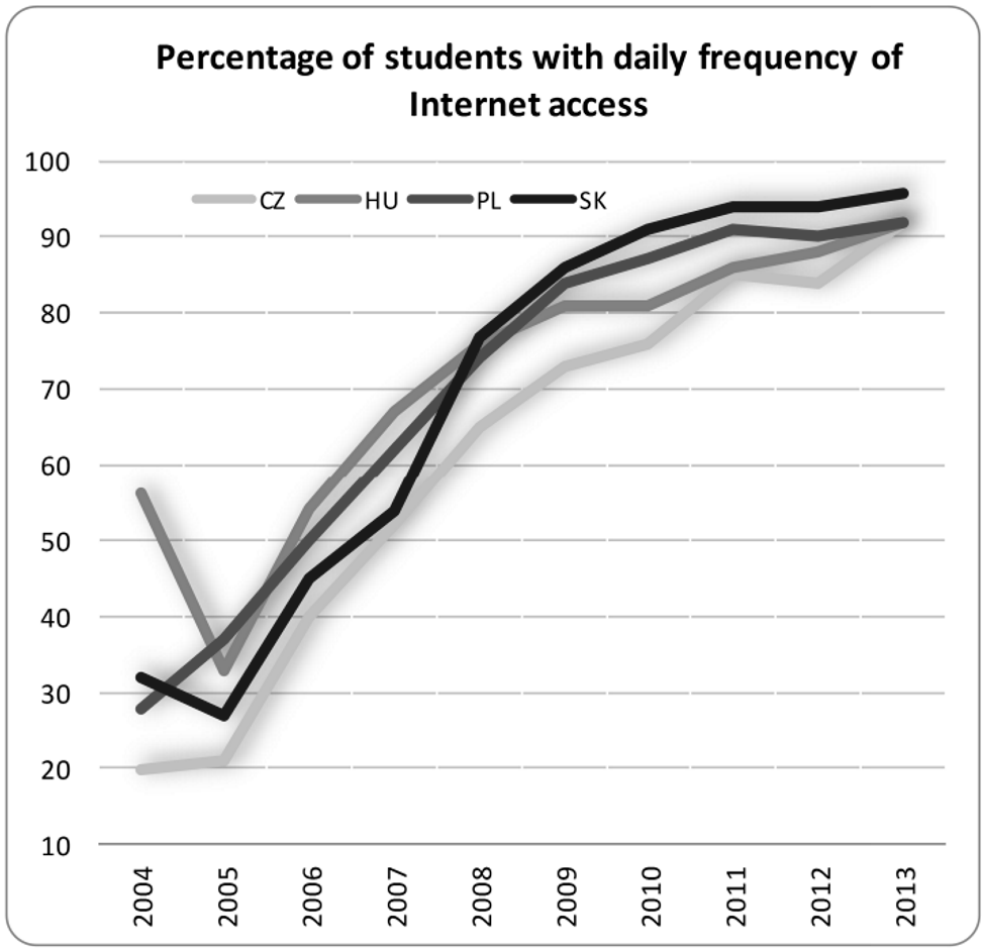

Figure 5. Percentage of students with daily frequency of computer use of Internet access

September 1st, 2011 and later are publicly accessible. The acquisition costs, operation costs and further development costs are covered by MinEdu.

In the Czech Republic, there is the system theses.cz (2014) in operation. The system is developed and administered by Masaryk University in Brno. The system is used to store theses in the register of theses (bachelor's, master's and dissertation) and all the related information (their names, names of their authors, etc.). It also searches for traces of plagiarism in the theses. The project started in 2008 and now 50% of the Czech HEIs use this system – 36 out of 72. The national registry of theses is publicly accessible. In comparison with the Slovak system, the use of theses.cz is voluntary and theses can be submitted repeatedly. Czech MinEdu supports this project.

In Poland (situation before October 1st, 2014), there is the system plagiat.pl (2014) used by 176 out of 444 HEIs, but in different ways. 21.6% of all HEIs (96) check all the

theses, 5.6% (25) of HEIs check theses produced only in some departments of HEIs and 18.0% of HEIs check theses otherwise. 73 (16.4%) HEIs deliver the theses to a common repository.

The Higher Education Act amendment that entered into force on October 1st, 2014 should substantially change the situation. A central repository of theses will be created, but mainly thesis supervisors will have access to it. "The amendment came into force, but the originality check will apply from the beginning of next academic year" (plagiat.pl, 2014). According to new rules, immediately after the defense, HEIs have the obligation to send to the central repository the texts of all theses (bachelor's, master's and dissertation) with the defined metadata. By the end of 2016, HEIs are obliged to deliver to the central repository all theses defended after the September 30th, 2009. According to PAP (Feb, 2015) in the emerging national repository of theses is already about half a million documents.

There are two main differences compared to the Slovak system: the theses will not be publicly available in Poland (Hołdyńska, 2014) and the theses will not be checked for originality by one plagiarism detection system.

Similar activities like in Slovakia, in the Czech Republic and in Poland cannot be found in Hungary. On the website of the Institute for Computer Science of the Hungarian Academy of Sciences, there is the information about the possibility to test the plagiarism search system. The statistical information from 2009 says that there are 10,000 users and that some university faculties use KOPI Plagiarism Search Portal on a regular basis (SZTAKI KOPI, 2014).

In three V4 countries, there is a visible tendency to create nationwide central repositories and to check every incoming thesis for originality. According to our knowledge, this approach cannot be seen in other parts of the world, even though it would seem so at the first glance.

The introduction of the paper by Rashid (2012) states that Turnitin – a plagiarism detection system – was disseminated to all public and private sector universities across Pakistan. It sounded like Slovakia has a doppelganger. However, the plagiarism detection tool did not cover all HEIs or all students.

In 2001, the UK decided to fund a project "Plagiarism Advisory Service" that later evolved into PlagiarismAdvice.org, which came into being in late 2002.

> "The service's aim was to establish a national strategy to allow UK higher and further education institutions to check the authenticity of student work. Universities and colleges were given access to the Turnitin text matching software, virtually unknown in the UK at that point, at no charge for an initial three years." (PlagiarismAdvice, 2013)

The UK approach is presented in the same source:

> "In the UK, Turnitin is currently used by over 98%[7] of higher education institutions and over 44% of further education colleges and a growing number of schools.... models of use in UK institutions vary widely, with some institutions using the software as a wholly summative tool to confirm allegations of academic malpractice on the part of a student, and with the Originality Report providing vital case processing evidence, in the majority

[7] A 95% value can be found in the publication Weber-Wulff (2014), False Feathers: A Perspective on Academic Plagiarism, p. 148, where Barrie (2008) is cited.

Table 2
Languages by the type of thesis

Thesis type	SK	CZ	EN	HU	Other
Bachelor	91.84%	3.89%	2.26%	1.43%	0.59%
Master	92.18%	2.68%	3.34%	1.04%	0.76%
Rigorous	93.96%	3.06%	1.06%	0.90%	1.02%
Dissertation	86.74%	0.84%	8.87%	0.62%	2.93%
Habilitation	81.99%	5.26%	8.59%	–	4.16%

> of institutions the value of the tool as a formative aid to support teaching and learning as part of the assessment process . . . "

The information that Turnitin is used by over 98% HEIs in the UK seemed unreliable for us. We started to examine it and we found that there are 161 public HEIs in the UK (Higher Education Statistic Agency, 2014). The report Privately Funded Providers of Higher Education in the UK (2013) mapped privately funded HE providers.

> "Our mapping research has identified a total of 674 named privately funded HE providers operating in the UK. This figure is a minimum estimate for the total number of providers, anticipating that some providers may not have been identified through the research process."

This information shows that there is no exact statistics concerning private HEIs in the UK and that 98% estimate is biased. The size of the bias was not known. To be better informed, we contacted iParadigms Europe with the question whether the 98% included both public and private HEIs. The response was that the percentage relates only to public HEIs.

4 SK ANTIPLAG: A Valuable Data Source for Analyses

This part of the paper discusses the academic year 2013–14, i.e. the theses registered in the CR from 1 September 2013 to 31 August 2014. In the examined year, the CR contains 91.9% theses in Slovak, 3.2% in Czech, 2.9% in English and 1.2% in Hungarian. The remaining 0.8% comprises theses in other languages. Table 2 shows languages by the type of thesis. The relative number of theses in Slovak drops below 90% for dissertation and habilitation theses with an increase in the relative number of theses in English.

From the total number of theses in the examined academic year, there are 0.84% art theses for which the originality check protocol is not prepared. Hence, the CR contains 70 216 theses that underwent the originality check. At public and state HEIs, the proportion of bachelor's and master's theses is almost equal; the share of bachelor's thesis at private HEIs is a little bit higher.

A uniform methodology for the collection of theses and the relevant metadata that is binding for all Slovak HEIs opens possibilities for various analytical outputs in such detail that other systems (that are not based on a uniform methodology for the collection of theses and metadata) are unable to provide. Some examples include: identical thesis titles (by supervisor, by HEI, by all Slovak HEIs), the number of

Table 3
Central repository by HEI type and thesis type

HEI type	Number of theses	Theses ratio	Type of thesis by HEI type					
			Bachelor	Master	Rigorous	Dissertation	Habilitation	Other
Public	52 789	74.6%	46.6%	45.1%	3.3%	3.9%	0.6%	0.4%
Private	16 618	23.5%	54.1%	40.6%	4.2%	0.9%	0.2%	0.0%
State	1 403	2.0%	48.0%	44.3%	2.4%	5.1%	0.1%	0.1%
Grand total	70 810	100.0%	48.4%	44.0%	3.5%	3.2%	0.5%	0.3%

Table 4
Types of theses by HEI types and similarity index

Thesis type	HEI type			
	Public	Private	State	All types
Bachelor	5.31%	13.88%	6.80%	7.61%
Master	5.66%	11.60%	6.72%	6.98%
Rigorous	11.55%	15.81%	9.70%	12.74%
Dissertation	4.36%	6.01%	7.58%	4.67%
Habilitation	3.51%	13.83%	0.00%	4.26%

theses pertaining to one supervisor, the percentage (index) of similarity of theses by supervisor, by field of study, by department, faculty, HEI, by types of HEIs etc.

The similarity of two texts is a statistical parameter of coexistence of similar words in these texts. A similar word is the same word in different forms (gender, number, case, etc.), a synonym in different forms, etc. Index (percentage) of similarity is the ratio between the number of characters of the text identified as similar to the total number of characters of a thesis. Pictures are not evaluated. Tables are evaluated only if in the text form. Theses are evaluated as a whole.

The spectrum of specialisations that can be studied at HEIs varies from HEI to HEI, so we do not consider average similarity percentage relevant for the comparison of HEIs. A table of average values for different types of theses by HEI type shows that except for dissertations, private HEIs show peaks. This is probably related to the fact that private HEIs are focused mainly on social and humanistic sciences, as well as health care and nursing care. Rigorous theses have the highest average similarity percentage at all types of HEIs. This is probably related to the fact that a rigorous thesis is often an enlargement of the master's thesis.

For further analyses, we monitored the *percentage of theses with the similarity index greater than 25%*. We first considered a 33.33% threshold; however, we rejected it

Table 5
Type of theses by HEI type and percentage of theses with the similarity index greater than 25%

	HEI type			
Thesis type	Public	Private	State	All types
Bachelor	5.69%	22.11%	6.98%	10.05%
Master	5.89%	16.01%	8.20%	8.14%
Rigorous	15.72%	22.89%	15.15%	17.76%
Dissertation	3.34%	2.72%	5.63%	3.37%
Habilitation	2.71%	18.52%	–	3.88%

because it generated more cases of zero frequency which complicated the comparison. Higher values of this indicator may be to some extent an indicator of the quality of the educational process at HEIs. The peaks of this indicator are reached at private HEIs for all types of theses except dissertations.

Rigorous theses have the highest proportion of theses the similarity index greater than 25% for all types of HEIs. Dissertation and habilitation theses have the lowest proportion.

Fields of study by type of thesis are a homogeneous group. For illustration, in the first step, we selected bachelor's theses and fields of study with a high proportion of theses with the similarity index greater than 25%; we then detailed it to the level of HEIs. The table can be further refined the level of faculties, departments and supervisors. The table shows the quality of work with students during the preparation of bachelor's theses. There are large differences among HEIs in the same field of study.

We expected that there is a relation between HEI ranking and similarity index. The Academic Ranking and Rating Agency (ARRA) assesses annually (for the tenth time in 2014) the quality of HEI faculties in Slovakia. It prepares their ranking on the basis of a comparison of indicators of quantity and quality of education and research. The criteria are divided into five basic groups – education, the attractiveness of study, research, doctoral studies and grant success. The publication Evaluation of HEI faculties 2014 – Ranking of HEI faculties based on the comparison of indicators of quantity and quality of education and research[8] (ARRA, 2014) evaluates 112 faculties or one-faculty HEIs, comprising 104 public faculties and 8 faculties of private HEIs, in 11 groups of specialisations (it does not evaluate state HEIs). Below is a list of groups of faculties and HEIs according to the publication (ARRA, 2014), pages 14–19. Groups of faculties:

Technical Sciences (TECH) – civil engineering, electrical engineering, computer science, electronics, mechanical engineering and other technical fields;

Natural Sciences (PRIR) – mathematics, physical, chemical and biological sciences, earth and environmental sciences;

Medical Sciences (MED) – general medicine and stomatology, clinical medicine, pharmaceutical sciences, nursing and health care;

[8]In original: Hodnotenie fakúlt vysokých škôl 2014 – Ranking fakúlt vysokých škôl v SR na základe porovnania ukazovateľov kvantity a kvality vzdelávania a výskumu

Table 6
Bachelor theses by specialisation, by HEI (HEIs are omitted) and percentage of theses with the similarity index greater than 25%

Field of study	Theses percentage with similarity index >25%
Health and safety protection at work	25,00%
Health and safety protection at work	40,00%
Health and safety protection at work	13,33%
Health and safety protection at work	13,43%
Health and safety protection at work	**23,41%**
Protection of persons and property	8,96%
Protection of persons and property	26,63%
Protection of persons and property	27,54%
Protection of persons and property	16,76%
Protection of persons and property	**22,66%**
Agricultural and forestry technology	31,58%
Agricultural and forestry technology	33,33%
Agricultural and forestry technology	**32,61%**
Land construction	50,00%
Land construction	3,13%
Land construction	22,69%
Land construction	**22,70%**
Social work	100,00%
Social work	33,33%
Social work	31,58%
Social work	16,78%
Social work	16,84%
Social work	50,00%
Social work	**21,81%**

Agricultural Sciences (AGRO) – agriculture, forestry, veterinary medicine and related fields;

Economic Sciences (EKONOM) – economic faculties;

Other Social Sciences (OSTATNE SPOL) – faculties of social sciences with a focus on public administration, international relations, political and economic science, mass media communication and other related fields;

Philosophical Sciences (FILOZOF) – philosophy, history, languages, literature and other related fields;

Legal Sciences (PRAV) – faculties of law;

Pedagogical Sciences (PEDAGOG) – faculties of pedagogy;

Table 7
Significant correlations between the percentage of theses with the similarity index greater than 25% and ARRA ranking

Group of faculties	Correlation coefficient between percentage of theses with the similarity index >25% and ARRA ranking	*p* significance of the correlation coefficient	Number of faculties
TECH (technical sciences)	–0,5247	0,0175	24
PRIR (natural sciences)	–0,9669	0,0016	7
OSTATNE SPOL (other social sciences)	–0,6480	0,0311	13

Theological Sciences (TEOLOG) – theological faculties; and
Art (UMEL) – faculties focused on music, drama, film and visual arts.

This classification to some extent "homogenises" the material for comparison, although the homogeneity of these groups is lower than the homogeneity of groups by fields of study. This distribution was applied to the year under review and we attempted to verify the hypothesis that the ranking of faculties by those groups will be correlated with the ranking of faculties based on the percentage of theses with the similarity index greater than 25%. Hence we assumed that a higher percentage of theses with the similarity index greater than 25% may mean a lower ranking by ARRA (negative correlation).

The hypothesis was confirmed for natural sciences faculties and technical sciences faculties and for one group of social sciences faculties:

- mathematics, physical, chemical and biological sciences and earth and environmental sciences (PRIR)
- civil engineering, electrical engineering, computer science, electronics, mechanical engineering and other technical fields (TECH)
- social sciences faculties with a focus on public administration, international relations, political and economic science, mass media communication and other related fields (OSTATNE SPOL).

5 In Conclusion

The fight against plagiarism on a national level is bearing fruit. SK ANTIPLAG contributed to a significant increase in students' awareness of plagiarism, as confirmed by the international survey, where the Slovak students placed first among all European Union countries. The theses are under multiple control: control of the supervisor, opponents, the examination committee and public control. However, we lack feedback from HEIs regarding the number of theses suspected of plagiarism and how they are handled. Although the percentage of these theses in with the similarity index greater than 40% is relatively low – 2.7% – it is almost 10,000 theses in absolute terms (from April 2010 to early April 2015).

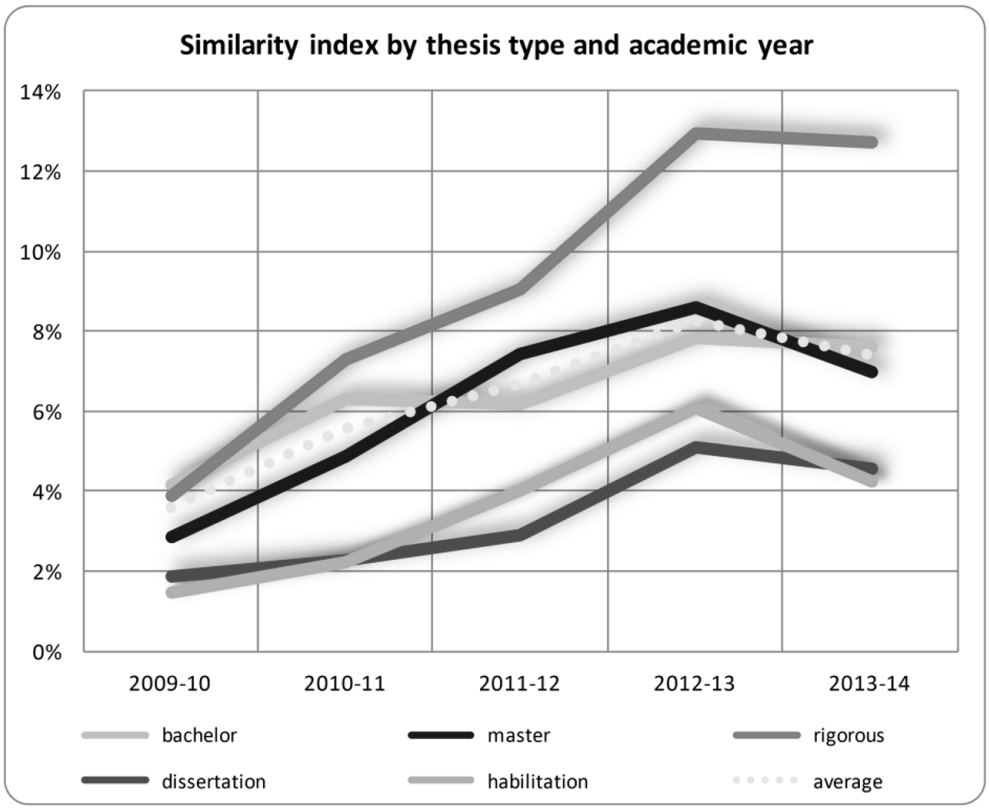

Figure 6. Similarity index by thesis type and academic year

The similarity index by thesis type and academic year shows a slight upward trend (except rigorous theses), which can be attributed to the widening of the comparative corpus (Figure 6). Rigorous theses recorded the highest growth, bachelor's and master's theses show about the same values; the same applies to the dissertation and habilitation theses with only slightly different values. The average is most affected by bachelor's and master's theses, whose share in the central repository is 92.4%.

The manner of implementation of the software to detect plagiarism in Slovakia is unique not only on the European, but also on the global scale. A uniform methodology for collecting theses and metadata provides us with a database that can produce outputs for the governing bodies that do not yet have equivalent in the world.

The issue of plagiarism is not just a matter of plagiarism detection systems, it should be seen in relation to academic integrity and good academic practices. We should encourage students to a higher level in this area. One of the solutions could be the implementation of a project whose output would be a methodological guidance for the area of academic integrity based on the best international practices, which would

then be implemented by HEIs in their internal policies. This could step up the fight against plagiarism and inadequate academic practices.

References

ARRA (2014). *Hodnotenie fakúlt vysokých škôl 2014 – Ranking fakúlt vysokých škôl v SR na základe porovnania ukazovateľov kvantity a kvality vzdelávania a výskumu*. Available at: http://arra.sk/sites/arra.sk/files/file/ARRA_Sprava_2014_27_11_2014.pdf [Accessed 18.11.2014] ISBN 978-80-89472-18-5

CFE et al., (2013). *Privately funded providers of higher education in the UK*. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/207128/bis-13-900-privately-funded-providers-of-higher-education-in-the-UK.pdf [Accessed 15.10.2014]

Eurostat (2014). *Your key to European statistics*. Available at: http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database [Accessed 25.8.2014]

European Commission, (2013). *European Prize for Innovation in Public Administration.* Available at: http://ec.europa.eu/research/innovation-union/index_en.cfm?section=admin-innovators&pg=home [Accessed 25.8.2014]

Higher Education Statistics Agency, (2014). Available at: https://www.hesa.ac.uk [Accessed 13.10.2014]

Hołdyńska, E. (2014). *E-biblioteka zamknięta dla żaków*. Available at: http://prawo.rp.pl/artykul/1132128.html [Accessed 25.10.2014]

IPPHEAE (2013). *Project results.* Available at: http://ippheae.eu/project-results [Accessed 25.8.2014]

Kravjar, J., Noge, J. (2013). *Strategies and responses to plagiarism in Slovakia,* PLAGIARISM ACROSS EUROPE AND BEYOND – Conference Proceedings, 2013, pp. 201–215 Available at: http://ippheae.pefka.mendelu.cz/files/proceedings.pdf. [Accessed 9.9.2014]

Lee, P. (2014). *Student anti-plagiarism measures reap rewards*. In: University World News, Issue 00329. Available at: http://www.universityworldnews.com/article.php?story=20140220172834959. [Accessed 31.7.2014]

MinEdu (2011). *Manuál k sprístupňovaniu záverečných, rigoróznych a habilitačných prác.* Available at: http://crzp.sk/dokumenty/prirucka_spristupnovanie.pdf [Accessed 12.12.2014]

MŠMT ČR, (2014). *Přehled vysokých škol*. Available at: http://www.msmt.cz/vzdelavani/vysoke-skolstvi/prehled-vysokych-skol [Accessed 19.8.2014]

PAP (2015). *MNiSW: w ogólnopolskim repozytorium już około 0,5 mln prac dyplomowych*. Available at: http://naukawpolsce.pap.pl/aktualnosci/news,403712,mnisw-w-ogolnopolskim-repozytorium-juz-okolo-05-mln-prac-dyplomowych.html [Accessed 7.2.2015]

plagiarismadvice.org, (2013). *A National strategy for addressing student plagiarism*. Available at: http://www.plagiarismadvice.org/resources/institutional-approaches/item/national-strategy [Accessed 10.9.2014]

plagiat.pl (2014). *Nowe przepisy antyplagiatowe*. Available at: https://www.plagiat.pl/webplagiat/main.action?menu=news&id=1300 [Accessed 25.10.2014]

SZTAKI KOPI, (2014). *KOPI Plagiarism Search Portal*. Available at: https://kopi.sztaki.hu/index.php?language=eng [Accessed 19.8.2014]theses.cz (2014). *Vysokoškolské kvalifikační práce.* Available at: http://theses.cz/ [Accessed 19.8.2014]

Weber-Wulff, D. (2014). *False Feathers: A Perspective on Academic Plagiarism*. Springer, 2014. ISBN 978-3642399602

World Bank's World Development Indicators Database (2014). Available at:
http://data.worldbank.org/indicator [Accessed 28.8.2014]

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