Ministry of Education

“Higher Education and Research for Innovation and Competitiveness”- (HERIC) project

Advisor for prevention of plagiarism

Ref. No. MNE-HERIC-81180-P122785-IC-CS-16-1.2.1.6.

Feasibility study on the proposed tailor-made system(s) for the prevention of plagiarism in Montenegro

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September 23, 2016

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When you steal from one author, it's plagiarism; if you steal from many, it's research.

Wilson Mizner

"Copy from one book = plagiarism;"

"Copy from two books = an essay;"

"Copy from three books = a compilation;"

"Copy from four books = a dissertation."

Wilson Mizner

Contents

1. Introduction

Working on such sensitive issue such as plagiarism is challenging but more than inspiring task. Plagiarism has devastating consequences for science. It can ruin reputation not only of academic and research performing institution, but also students, teacher and researchers.

Plagiarism cannot be completely eradicated in any society. There are several reasons for this. The first reason is that people tend to achieve some goals, even if these goals are unattainable for them because of their personal capacities. The second, much more dangerous reason is that the academic and scientific environment in some occasions expect from people unrealistically high results in short period of time. Of course, there are many more reasons. No matter what the reason is concerned, because of the innate human tendency to take the path of least resistance, people turn to plagiarism. So fight against plagiarism it should not be only fight with plagiarism but also fight for environment in which student and researchers will not fill necessity to do that.

Therefore, even the primary aims of this study is prevention of plagiarism, the study deals with a much broader concept of academic integrity.

The study has six chapters. After this introductory chapter, analysis of relevant systems on prevention of plagiarism in Europe and potential application in Montenegro is presented. On the beginning of chapter definitions of relevant concepts are explained. Also classifications of plagiarism and plagiarism detection engine is given.

Further, in the same chapter, is given extensive review of computer aided plagiarism detection systems. This review concludes by comparing their characteristics.

Finally, chapter two ends with review of European strategies for fighting with plagiarism. these strategies will be basis for Montenegrin strategy.

Chapter three reviews relevant legislation and documents related to the plagiarism prevention in Montenegro. It covers laws on national level and statutes and Rule books on institutional level.

Chapter four analyses the current limited activities in Montenegro related to the plagiarism prevention and available resources. It covers legislation, human resource and equipment.

Chapter five represents draft proposal of tailor-made system(s) for the prevention of plagiarism in Montenegro. This chapter describes in detail, element by element, Montenegrin structures for academic integrity governance. Chapter ends with tables of involved actors and timetable.

The study ends with the used literature list and a small glossary.

This study would never have been written without selfless help and patience of people working on HERIC project. I want to thank to all of them, but special thanks to Lidija Vučković and Vladimir Djurković.

2. Analysis of relevant systems on prevention of plagiarism in Europe and potential application in Montenegro

2.1. Plagiarism

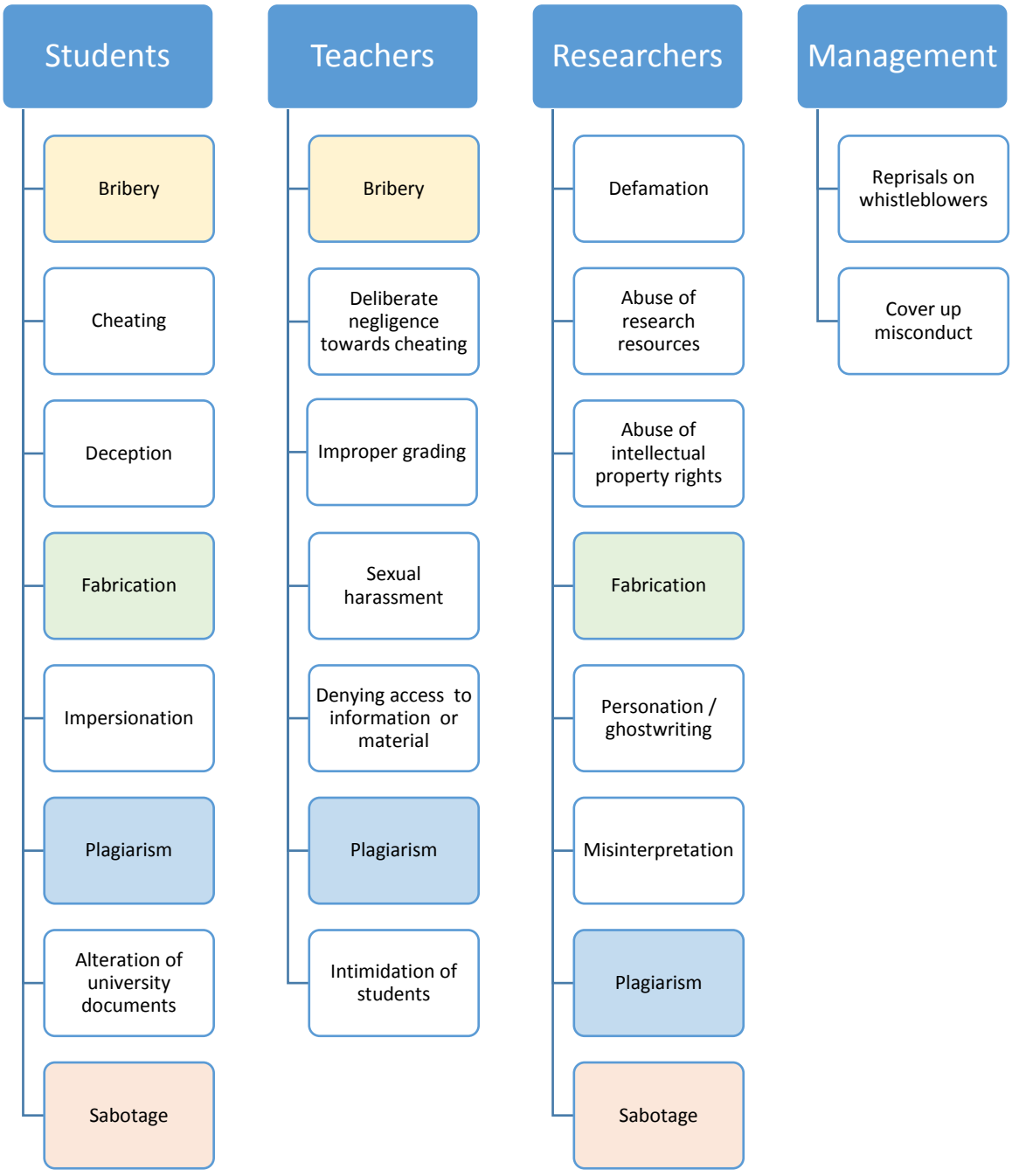
2.1.1. Introduction to academic misconduct

In the academic environment it is possible to meet different participants, such as students, teachers, researchers, management and administrative staff. Some of these participants have often different roles. For example, PhD students can be considered as researchers if they doing research or teachers if they teach younger undergraduate students. Also, most of teachers / professors are in the same time researchers too, but it is possible to have managerial role. Term “academic misconduct” is usually related to what individuals do in the role of students, teachers and researchers.

There are many definitions of academic misconduct. Here, only one will be presented.

Academic misconduct is any action or attempted action that may result in creating an unfair academic advantage for oneself or an unfair academic advantage or disadvantage for any other member or members of the academic community [27].

Next picture illustrates types of academic misconduct related to respective roles. It is obviously that certain misconducts occur in all roles. One of them is plagiarism.


Students
Bribery
Cheating
Deception
Fabrication
Impersionation
Plagiarism
Alteration of university documents
Sabotage
Teachers
Bribery
Deliberate negligence towards cheating
Improper grading
Sexual harassment
Denying access to information or material
Plagiarism
Intimidation of students
Researchers
Defamation
Abuse of research resources
Abuse of intellectual property rights
Fabrication
Personation / ghostwriting
Misinterpretation
Plagiarism
Sabotage
Management
Reprisals on whistleblowers
Cover up misconduct

The most common forms of academic misconduct are plagiarism and ghostwriting. Both forms of misconduct are equally dangerous for education and science. Also, widely used is the term 'research misconduct' and it is related to processes in research. The term 'research misconduct' embraces many things, including insufficient care for the people, animals or objects that are the subject of or participants in research; breaches of confidentiality, violation of protocols, carelessness of the kind that leads to gross error and improprieties of publication involving conflict of interest or appropriation of ideas [24].

While plagiarism is equally presented in student works and scientific papers, ghostwriting is more presented in student work. Some definitions of plagiarism include ghostwriting as a type of plagiarism. The scope of this study is only plagiarism, but some anti plagiarism measures may repress ghostwriting too.

There are many type of plagiarism, such as plagiarism in industry, in journalism, in music and many other fields. In this study we will cover only academic plagiarism. Academic plagiarism includes student plagiarism and scientific (scholarly or research plagiarism) plagiarism.

2.1.2. Definition

There are many definitions of term "plagiarism". Here, we will quote only a few.

According to Dictionary.com [2] unabridged plagiarism is "an act or instance of using or closely imitating the language and thoughts of another author without authorization and the representation of that author's work as one's own, as by not crediting the original author"[1]. Merriam-Webster dictionary define verb "plagiarize" as ": to steal and pass off (the ideas or words of another) as one's own: use (another's production) without crediting the source"[2] .

It is widely believed that plagiarism only applies to written works. But, thanks to the Internet and digital media, plagiarism has spread to other areas. Hence, website Plagiarism.org [3] define an extensive list of what can be considered as plagiarism[3]:

- turning in someone else's work as your own
- copying words or ideas from someone else without giving credit
- failing to put a quotation in quotation marks
- giving incorrect information about the source of a quotation

[1] Dictionary.com Unabridged. Retrieved June 18, 2016 from Dictionary.com website http://www.dictionary.com/browse/plagiarism

[2] Merriam-Webster.com. Retrieved June 18, 2016 from Merriam-Webster website http://www.merriam-webster.com/dictionary/plagiarize

[3] Plagiarism.com. Retrieved June 18, 2016 from Plagiarism website http://www.plagiarism.org/plagiarism-101/what-is-plagiarism

- changing words but copying the sentence structure of a source without giving credit
- copying so many words or ideas from a source that it makes up the majority of your work, whether you give credit or not
- copying media (especially images) from other websites to paste them into your own papers or websites
- making a video using footage from others' videos or using copyrighted music as part of the soundtrack
- performing another person's copyrighted music (i.e., playing a cover)
- composing a piece of music that borrows heavily from another composition.

Plagiarism is considered primarily as ethical offense, but in some case it can constitute copyright infringement.

Plagiarism prevention is set of strategic measures with the aims to prevent the appearance of plagiarism.

Plagiarism detection, also known as plagiarism check, is a process that examines the similarities of submission with another works. Result of this process is list of similar works, if any, as well as parts of works where similarities are detected. The similarity can be expressed a percentage value.

It is important to note that discovered similarity does not necessarily mean that it comes to plagiarism.

2.1.3. Classification of plagiarism

It is possible to classify plagiarism on different bases. If we look at the attitude of the author toward plagiarism in his work, one can say that there are:

- unintentional (unconscious) plagiarism and
- deliberate plagiarism.

Unintentional plagiarism is typically occurring unconsciously and can happen for several reasons:

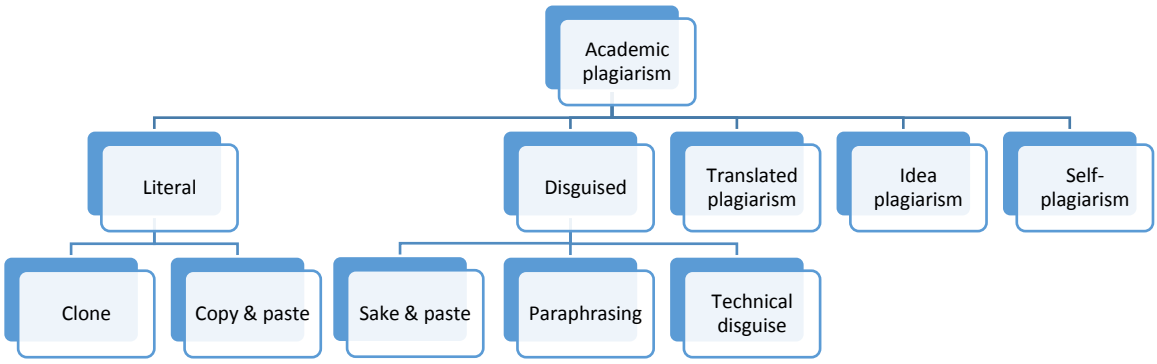
- The author does not even know that it is necessary referencing sources. This is typical for young students who are not educated in academic writing. They are not told that referencing of sources is obligatory in academic writing.
- The author does not know the rules for referencing sources. In this case author made references but in an improper way. There are many example of this, but most common wrong or incomplete bibliographic data of source or referencing of web sites without date of access to the website

- The author has made incidental (unconscious) mistake in referencing sources. Example of this can be when author make mistake by misspelling title of referenced paper or name of an author.
- Cryptomnesia of the author. The term "cryptomnesia" signifies the existence of memories which are hidden from consciousness [5]. Author believes that recalled entity from his memory is his own original idea (sentence, song, image or similar entity). In other words, Cryptomnesia is a psychological memory bias that can cause humans to unconsciously attribute foreign ideas to themselves [4].

Deliberate plagiarism is case when author intentionally take somebody else's work or idea and presets it as his own.
A good strategy for the fight against plagiarism should minimize not only deliberate but also unintended plagiarism.
There are many forms of plagiarism, but still they can be classified [4] in five main groups as:

- Literal plagiarism
- Disguised plagiarism
- Translated plagiarism
- Idea plagiarism and
- Self-plagiarism.

Definition of individual forms of plagiarism is borrowed from [4], but some new forms are added.



Literal plagiarism describes the undue copying of text with very little or no disguise.

- Clone is plagiarism form when author presents complete another's work as a whole and presented it as his own.
- Copy and paste (c&p) is the most common form of literal plagiarism and is characterized by adopting text verbatim from another source.

Disguised plagiarism refers to cases of plagiarism when the author in different ways conceals copied text. It is possible to distinguish three forms of disguised plagiarism:

- Shake and paste (s&p) refers to the copying and merging of text segments with slight adjustments to form a coherent text, e.g. by changing word order, by substituting words with synonyms, or by entering or deleting filling words
- Paraphrasing is the intentional rewriting of foreign thoughts in the vocabulary and style of the plagiarist without acknowledging the source (Clough, 2000; Lancaster, 2003).
- Technical disguise refers to techniques that exploit weaknesses of current detection methods to make plagiarised content non-machine detectable. Examples include substituting characters with graphically identical symbols from foreign alphabets or inserting random letters in white font

Translated plagiarism is the manual or automated conversion of text from one language to another with the intention of hiding its origin (Weber-Wulff, 2010).

Idea plagiarism encompasses the use of a broader concept without due acknowledgement of the source. Examples are the appropriation of research approaches, argumentative structures, or background sources (Maurer et al., 2006).

Self-plagiarism is the partial or complete re-use of one's own writings without these being justified. Presenting updates or providing access to a larger community may justify re-publishing one's own work, but still requires appropriate acknowledgement of the previously published work (Bretag & Mahmud, 2009). Unjustified reasons include trying to artificially increase one's citation count (Collberg & Kobourov, 2005).

Another classification can be conducted based on **source** of plagiarized content. It is possible to distinguish plagiarism depending on whether the source of plagiarized content is taken over from:

- digital sources on the Internet (web pages, pdf document on web, e-book, e-journals..)
- digital sources not accessible on the Internet (books or encyclopedias on CD)
- paper sources (classical book, journal, reports or other sources not yet digitalized)
- student essays not previously archived in paper or digital form.

2.1.4. Plagiarism detection

Plagiarism can be found in all area of human intellectual and artistic work. Plagiarism is first encountered, although rare, in the high school age, when children are not able to write their essays or do their assignments. Most cases of plagiarism relating to student works such as essays, projects, paintings, reports, graduate thesis and master thesis. Somewhat less frequently, but often enough, plagiarism is encountered also in the scientific and professional career of people.

There are two general methods to detect plagiarism:

- manual – detected by human
- computer aided – detected by computer (and human)

Manual plagiarism detection requires a lot of knowledge, memory and skills. However, in the Internet age with an exponentially growing number of publications, it is not realistic to expect that the evaluator can effectively detects plagiarism. Therefore, it is very important that the evaluator knows the author's capacity and to evaluate whether the author made work without plagiarism. Still, there are manual methods that easily detect plagiarism. One is interview when evaluator asks questions to the author of the works. Experienced evaluator will easily detect gap between what is written and what author can reproduce. Another proven method is "missing word" method. Evaluator should randomly delete some word from text asking author to write them once again. With this method it is easy to detect not only plagiarized work, but also ghostwriting or essay mils works.

Computer aided plagiarism detection uses programs – plagiarism detection engines - to detect similarities between submitted document and documents in digital repositories such as: web pages, documents published on the web, journal archives, institutional repository of student's works, archived web content and others. Those documents are assumed to be genuine. Effectiveness of computer aided plagiarism detection is incomparable with manual detection in finding similarities. With computer, it is possible to compare submission with millions of document for a few seconds. Sophisticated algorithms are capable to recognize similarities even with substantial changes in original. Nevertheless, given that **similarity does not always mean plagiarism**, evaluation of an evaluator is necessary step in order to confirm plagiarism. Evaluators have to know that all plagiarism detection engines are capable only to identify potentially non-original material but, that in some cases, they do not discover non-original parts of a submission.

In order to understand why decision what is and what is not plagiarism should be left to human beings, it is necessary to explain results of computer aided plagiarism detection. An ideal plagiarism detection engines will mark some parts of submission as plagiarized and rest of submission as original. Results that denote identified plagiarized parts are so-called "True positive", and results that denote identified original parts are so-called "True negative".

	Plagiarism	Non-plagiarism
Identified	True positive	False positive
Not identified	False negative	True negative

Because the plagiarism detection engines are not perfect, there are two types of unwanted results: false positive and false negative.

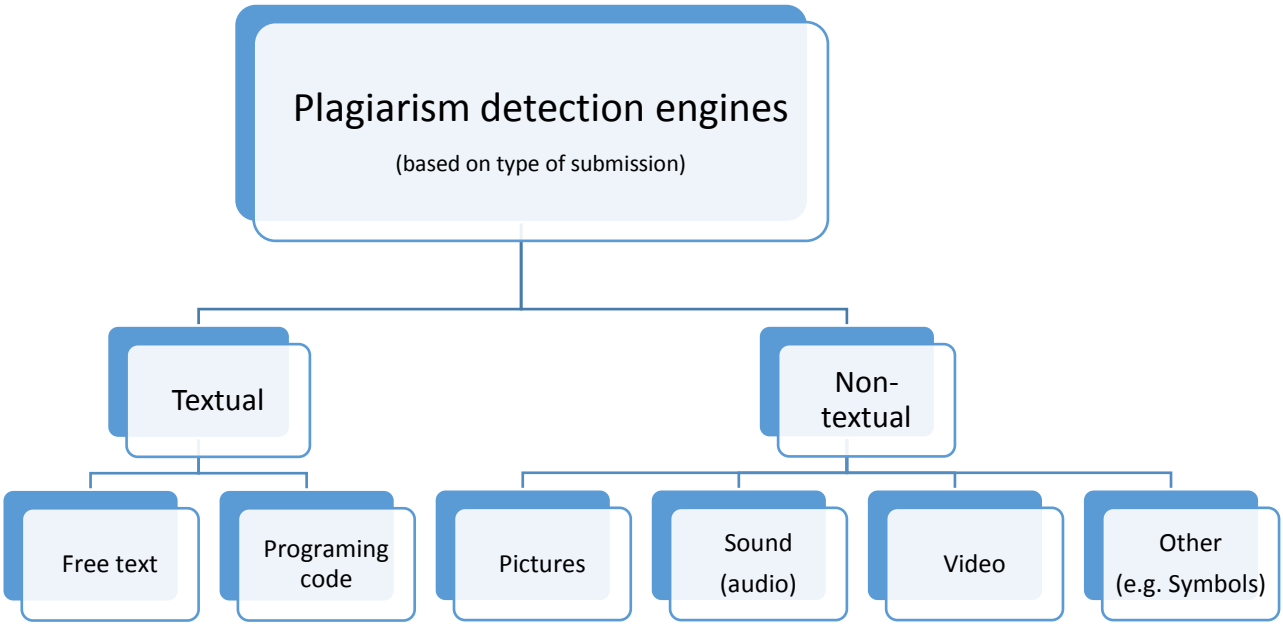
False positive is a term that denotes the case when the plagiarism detection engine marked element of the text as similar with another source, although it is original text of the author [16]. The errors from false positives are important because if human criteria are not applied, damage could be caused to the reputation of the authors of the work under analysis [17]. Therefore, humans are the only ones who can detect non-verbatim plagiarism and are the only one who can make determinations about the likelihood that the matches are coincidence and the whether the attribution was adequate or not [18].

Contrary, **false negative** is a term that denotes the case when the plagiarism detection engine did not find element of the text as similar with another source although it is not original. In this case, the plagiarism detection engines acknowledges false originality to the author.

2.1.5. Classifications of plagiarism detection engines

In the word of antiplagiarism software which compares submission with other sources and thus detect similarities is called plagiarism detection engine. One of extensive classification of plagiarism detection engines is published in [5]. The paper proposes a new and alternative set of classifications based primarily around the types of the metrics the engines use.

One of classification may be based on type of submission. Majority of plagiarism detection is in the field of textual documents, but it is possible to compare similarity of pictures, sounds [6,7], videos or others type of submissions. For example, Google offer free search of pictures similar to submitted one.



This study deals only with free text plagiarism detection.

Another classification me be based on **location of processing**, or more specifically on location of machine at which the process of comparison is carried out. Based on this, plagiarism detection engines can be:

- Local, when comparison is carried out on local machine (e.g. your desktop PC or laptop)
- Web based, when it is necessary to upload submission to remote computer where submission will be compared (e.g. plagiarism detection service provider).

Local plagiarism detection engine may also use Web content published elsewhere on the Web to process submission on local machine.

Web based plagiarism detection engines can be with free access to service or paid.

One of classification of plagiarism detection engines is on number of documents which they compare in one session. Some engines can compare only two documents, but some can compare more than two.

Plagiarism detection engines applied different methods (or metrics) to detect similarity [5]. From that point of view plagiarism detection engines can be classified as these that use:

- **Superficial metrics** - no knowledge of the linguistic features of natural language is necessary
- **Structural metrics** – requires knowledge of the linguistic features of natural language

In practice, the latter provide much better results.

2.2. Crossref Digital Object Identifiers

At the beginning of 2000, the world's leading scholarly publishers joined to form the non-profit, independent organization, Publishers International Linking Association, Inc. (PILA), which operates Crossref [13].

Among the visitors to the Frankfurt Book Fair in October of 1999 who witnessed the demonstration of the DOI-X project, there were several representatives of the leading scientific, technical, and medical publishers. Recognizing that this prototype of a lookup system based on the Digital Object Identifier (DOI) held the key to a broad-based and efficient journal reference linking system, they took the unusual step of joining together as the non-profit, independent **Publishers International Linking Association Inc**. (PILA), which was incorporated in January 2000 and Crossref went live as the first collaborative reference linking service in June 2000 [13].

Crossref's general purpose is to promote the development and cooperative use of new and innovative technologies to speed and facilitate scholarly research. Crossref's specific mandate is to be the citation linking backbone for all scholarly information in electronic form. Crossref is a collaborative reference linking service that functions as a sort of digital switchboard. **It holds no full text content, but rather effects linkages through Crossref Digital Object Identifiers** (Crossref DOI), which are tagged to article metadata supplied by the participating publishers. The end result is an efficient, scalable linking system through which a researcher can click on a reference citation in a journal and access the cited article [13].

CrossRef is the official DOI registration agency for scholarly and professional publications, including journals, books, and other content types. CrossRef provides primary publishers with the organizational and technological backbone to facilitate linking by associating DOIs with publisher metadata. There is no centralized repository of abstracts or full text involved. Membership is open to publishers in all content areas [14].

Publishers International Linking Association Inc. is a not-for-profit association of about 2000 voting member publishers who represent 4300 societies and publishers, including both

commercial and not-for-profit organizations. Crossref includes publishers with varied business models, including those with both open access and subscription policies. Crossref does not provide a database of fulltext scientific content. Rather, it facilitates the links between distributed content hosted at other sites [15].

Crossref interlinks millions of items from a variety of content types, including journals, books, conference proceedings, working papers, technical reports, and data sets. The expense is paid for by Crossref Member publishers. Crossref provides the technical and business infrastructure to provide for this reference linking using Digital Object Identifiers (DOIs). Crossref provides deposit and query service for its DOIs [15].

In addition to the DOI technology linking scholarly references, Crossref enables a common linking contract among its participants. Members agree to assign DOIs to their current journal content and they also agree to link from the references of their content to other publishers' content. This reciprocity is an important component of what makes the system work [15].

Non-publisher organizations can participate in Crossref by becoming affiliates. Such organizations include libraries, online journal hosts, linking service providers, secondary database providers, search engines and providers of article discovery tools [15].

The **DOI**, or **digital object identifier**, serves as a persistent, actionable identifier for intellectual property online. DOIs can be assigned at any level of granularity, and therefore provide publishers with an extensible platform for a variety of applications. And DOI links don't break. Even if a publisher needs to migrate publications from one system to another, or if the content moves from one publisher to another, the DOI never changes. This means that all the links to that content that have already been made still function. Hence, one key insight of the DOI model is persistence; the other is actionability. One click on a properly implemented DOI gets the reader to the location of the material they want [14]. With publications registered in the CrossRef database, over 4500 participating organizations – other publishers, A&I databases, aggregators, and libraries – will be able to link automatically to registered content.

2.3. Systems for plagiarism detection

This chapter provides information and a description of the most important systems for plagiarism detection. All systems are represented uniformly using the table with the same fields. In this way systems can be easily compared.

The descriptions of the presented systems for plagiarism detection are taken (extracted) from respective website of the company that offer a specific product or service.

Data about Pros, Cons, Report and Usability are taken from web site http://plagiat.htw-berlin.de/ which is one of the best source to analyze and compare available plagiarism detection systems. This Plagiarism Portal [9] is edited by Prof. Dr. Debora Weber-Wulff, from University of Applied Science, Hochschule für Technik und Wirtschaft Berlin. Professor Weber-Wulff since 2004. performs comprehensive periodic test of systems for plagiarism detection. Presented data are from last published test conducted in 2013 - „Results of the Plagiarism Detection System Test 2013” [9].

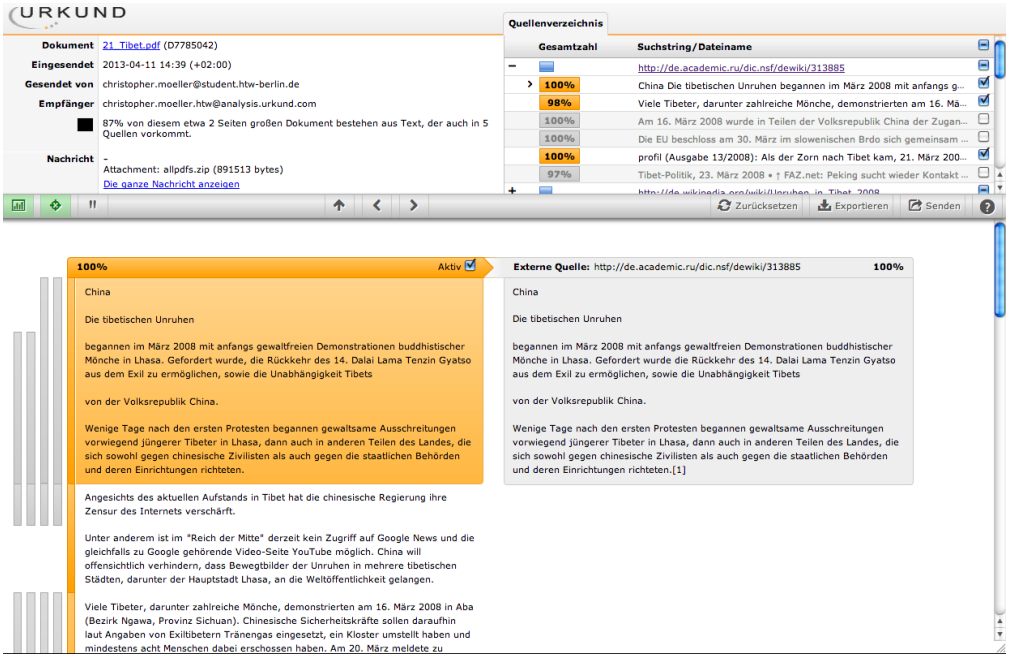
There are different methods of **pricing**: subscription based and per use. Companies that sells products for academic use calculate subscription price per student per year. Prices are negotiable and depend on number of students at the university. Prices ranges from 0,5 to 5 € per student per year. In this case customers may have unlimited number of check. This method is more convenient for institution with massive needs for checking.

Another method for pricing is per use. In this case service providers offer checking for some amounts of words or characters. It is worth to know that one typical A4 Word page with top, bottom, left and right margins of 2.54 cm written with font Arial 11 contains approximately 3800 characters with spaces, 3200 characters without spaces or 580 words. However, most providers account to **one page of text has an average of 250 words**.

2.3.1. Urkund

Product	Urkund
Company	PrioInfo AB Prio Infocenter AB Primusgatan 20, 7 tr 112 62 Stockholm email: info@prioinfo.se telephone: +46 8 738 52 00
Web site	http://www.prioinfo.se/en/ http://www.urkund.com/en/
Comparison to	• Free access current web content • Free access archived web content • Open access scholarly articles • Paid access scholarly articles (URKUND has formed strategic partnerships with a number of leading information providers, such as DIVA (Digital Scientific Archive), Iustus, Nationalencyklopedin, ProQuest, Historiska Media, Kumlatofta förlag, Leopard förlag, MBM Förlag, Nordiska Ministerrådet, Remus förlag, SERUM, Sine Metu Productions, SLFF, Stockholm University Press, Volante, Bookhouse Publishing, Bromberg Bokförlag AB, Casewood Publikationer, Folkuniversitetet Akademiska Press, Förlag1, Förlags AB Björnen, I.C at Once, Kabusa Förlag, Langenskiöld, BL-info and Björn Lundén Information AB.) • Archived student papers in repository of service provider (over 11,5 million. June 2014) • Archived student papers in repository of institution
Location of processing	• Web based
Format of submission	• MS Word • Word XML • Open Office (sxw) • Microsoft Works Word Processor • PostScript • PDF • HTML • RTF • HWP • Plain text • OpenDocument Text (.odt) • Mac Pages • MS PowerPoint.
Pricing	The cost depends on the number of students. The price ranges from €2.50 per student per year down to €0.65, depending on the numbers of students

Description	Since 2000 PrioInfo owns and develops URKUND. URKUND is a plagiarism prevention service which is in use at universities and in schools all over the world with an emphasis on the Nordic countries and France. URKUND is performing plagiarism checks on documents in route from the pupils/students and their educators and is both effective and very easy to use. Because of these factors the usage levels of the system are very high at all of the universities with a license for URKUND today. URKUND offers a fully-automated system for handling plagiarism. In short, the students send their documents to their teachers by e-mail. Along the electronic route between student and teacher, the documents are checked against three central source areas: Internet, published material and student material. If any document displays similarities with the content in the three sources, the system will flag it for possible plagiarism. An analysis overview is generated and sent by e-mail to the teacher concerned. The analysis overview presents in a simplified form the information needed by the teacher in order to determine if plagiarism has occurred. URKUND is very straight forward to use via e-mail, and many of clients choose this method to check work for potential plagiarism or to enhance learning. However, system can also be used as an integrated part of a school's chosen digital learning tool. Integrating URKUND with an existing learning management system (LMS/VLE) extends the value a school already receives without adding complexity whilst increasing the value of the LMS/VLE itself. There are already integrations with more than 20 commonly used LMS/VLEs such as Moodle, Blackboard, SchoolSoft, D2L, Canvas, SharePoint and more. In cases where a learning management system brand does not already have integration with URKUND, developers can create one. URKUND offers a full developer's kit for established suppliers of digital learning environments – both commercial and academic - along with the ability to assist in the process. The average time to build an integration with URKUND's developer kit is two weeks and our specifications are consistently regarded as clear and logical by those who have used them.
Pros	• URKUND does not require any software installation, no use of complex interfaces and no login to any website; neither for the student nor the teacher. This means that the service is very easy to use and introduce into an organization. • Straight-forward plagiarism prevention with minimum workload of teachers. • Urkund's plagiarism analysis showed the best results of the entire test 2013, although it only received 73% of the possible points. It found most sources and was able to deal with Hebrew characters and Hebrew sources. It also accepts small ZIP files.
Cons	• Although Urkund finds many plagiarized passages in small documents, it only finds a smaller number of sources in large documents. This shows that the analysis of long documents e.g. dissertations through Urkund can be problematic. • As with many other systems, Urkund does not find sources from

	Google Books.
Report	The report view in Urkund is a positive aspect of the system. It offers a side-by-side view and shows detailed information. In comparison to earlier tests, Urkund shows changes that were made to the original text (such as replacing or deleting a few words). Its side-by-side view is the only one in test 2013 that compares the uploaded text to a number of different sources. Other systems only compare the text to one source. There are many elements of the interface that are not easily understandable, although one can still focus on the text parallels identified while ignoring the elements. Users can choose to exclude certain sources and text passages from the calculation of the overall percentage, a possibility that is offered by a few other systems. Urkund reports what percent of a text passage was copied from the original source. However, these percentages are often completely unclear, as it is not clear what the basis for the percentage is. 
Usability	Overall, Urkund has a positive usability. The report view offers an appealing design and many interesting possibilities. A few negative aspects exists nevertheless: The upload page has an extremely unappealing design and is very difficult to use. Other aspects might confuse users: The term „Search“ is used to describe the page where documents can be uploaded. „Nicht verwendete Quellen“ (English: „sources not used“) are shown in the report view. What exactly these unused sources are is not explained. An email from Urkund clarified that these sources have less than 4% similarity with the uploaded text.

2.3.2. Turnitin

Product	Turnitin
Company	iParadigms, LLC, 1111 Broadway, #3, Oakland, CA 94607, USA International Office: iParadigms Europe Ltd., 6-8 Charlotte Square, Newcastle, NE1 4XF, UK
Web site	http://www.turnitin.com
Comparison to	• Free access current web content • Free access archived web content • Paid access web content • Open access scholarly articles • Paid access scholarly articles • Archived student papers in repository of service provider
Location of processing	• Web based
Format of submission	• MS Word • Word XML • WordPerfect • PostScript • PDF • HTML • RTF • HWP • Plain text • MS PowerPoint.
Pricing	There are different license models, a campus License or a departmental license. The costs depend on the number of students, but in general it is around 5 US$ per student per year for the whole university. Maximum document size is 100 pages.
Description	Company iParadigms LLC, based in Oakland, California, has three products: iThenticate, Turnitin and WriteCheck. The company was founded in 1996 by a group of students from the University of California, Berkeley, it currently employs over 150 persons world-wide and is one of the largest companies. Turnit in is designed for graded students and their teachers at the universities and high schools. The Turnitin system is not free, the costs are not given on the web site, as they are negotiated individually with each institution [9]. Turnitin offers two services: Feedback Studio and Revision Assistant. **Feedback Studio** helps teachers to check students works against plagiarism and grade and comment their assignments. **Revision Assistant** is a collaborative tool which allows teachers to spread writing assignments to students and offers online revision tool for students. Turnitin then reads and provides students with feedback comments regarding the use of language, focus, organization, and evidence. Also, it allows for students share their work and revisions with teachers. It is available for purchase by educational

	institutions. More than 15,000 institutions from 140 countries with over 30 million students are using Turnitin. Submissions are compared with different resources including over 60 billion web pages, 600 million student papers and 154 million journal papers, periodicals and books.
Pros	• Results are rapid for small texts, making it useful for smallish term papers. The system is easy to use despite the daunting array of menus and parameters. Turnitin was able to find the correct source for the Hebrew test case, as it was able to deal with Japanese characters in the 2010 test. As one of only two systems in the test, it was able to deal with homoglyphs. • Since the company offers modules that connect a school account with popular learning management systems, it is easily integrated into the submission process. It is also possible to offer the use of Turnitin in a formative manner, permitting the students to submit their papers to Turnitin and receive feedback, enabling them to fix their papers before handing them in to their instructors
Cons	• The system was much less effective with large files, taking hours to complete the report and then even missing plagiarisms that were easily found in the smaller test cases. The terms of use are also quite problematic, as the company is given the right to store and use the papers. There are ways to stop Turnitin from storing the papers, but they are hidden and not well named. It should be crystal clear on any overview which papers are stored and which are not. The name for the function for storing papers, „Studentenarbeitsablage verwenden“, is completely misleading. The German version of the system still suffers from strange terms („Echtheitsbericht“ or „Aufgabeneingang“) that are not clear to German users. • Often, the system will give preference to copies of the Wikipedia and not to the Wikipedia itself as the source for a portion of text. Some of these copies are used to sell erotic material that might not be good to be viewed on government computers. • The most maddening problem is the excessive number of pages that flag plagiarism, but are no longer available on the web at the address given. That makes the use of the system quite frustrating, as plagiarism can be seen, but not properly documented. • One specific test was made to see if Turnitin can identify sources that are in journals that have been stored with CrossCheck, another product of the company that serves scientific journals. Indeed, it was able to find the source, as advertised. • Turnitin offers another product called WriteCheck that is designed for students to check their work. WriteCheck basically gives students the ability to check their written work against the products' shared database, allowing students to perfect their plagiarism enough to avoid Turnitin's detection upon submission to instructors.
Report	Only the old version of the report has a sort of side-by-side version, and that

	is only available online. The printed version of the report does not have this option, as far as we could see. The newer online interface has „flying windows“ that are problematic in their use, as they slide under each other. The text copied appears in this flying window, making it very difficult to copy it for a written report. This is the major criticism, as the written reports are not useful for German examination boards that want clear documentation of the plagiarism without having to consult external sources.
Usability	The usability of the system was found to be good, despite the missing printed side-by-side report and the strange terms in German.

2.3.3. iThenticate

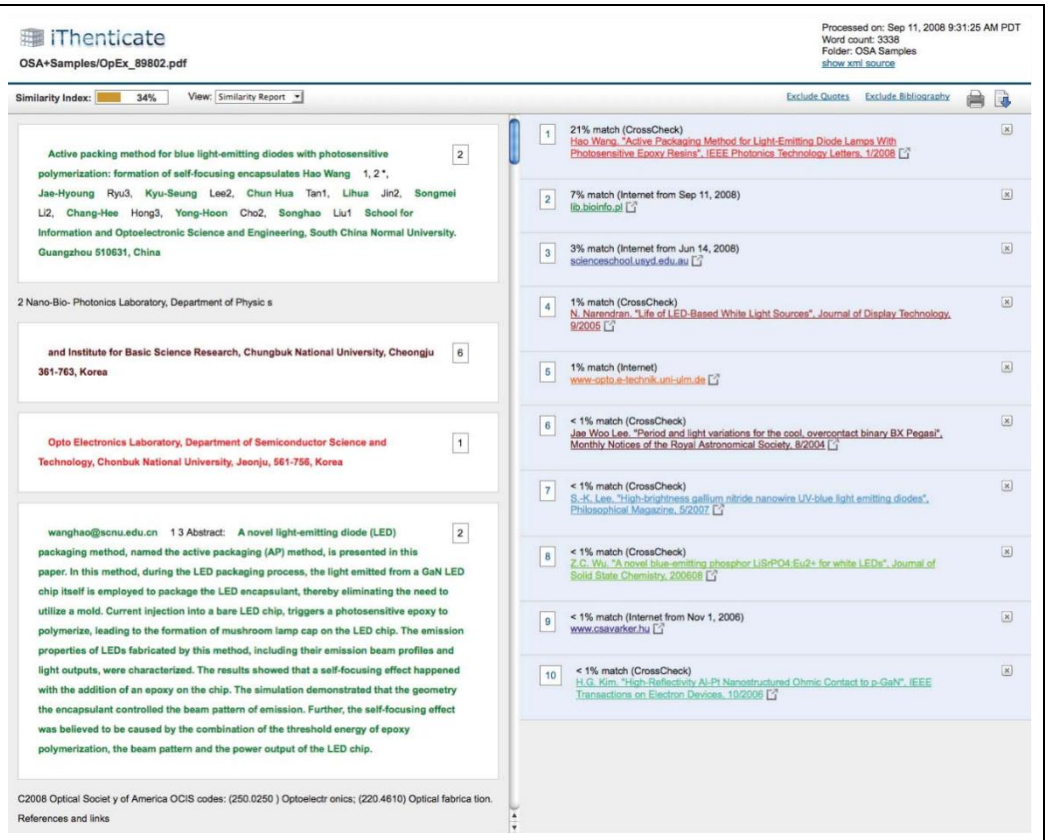
Product	iThenticate
Company	iParadigms, LLC, 1111 Broadway, #3, Oakland, CA 94607, USA International Office: iParadigms Europe Ltd., 6-8 Charlotte Square, Newcastle, NE1 4XF, UK
Web site	http://www.turnitin.com

Comparison to	• Free access current web content
	• Free access archived web content (60 billion archived web pages in last 10 years)
	• Paid access web content. Online and offline subscription content and research titles from 30 leading aggregators, databases and content providers, including:
	  ○ ABC CLIO
	  ○ Cengage Learning
	  ○ EBSCOHost: 2.7m periodicals, biographies, brochures, encyclopedias, magazines, journals, books, and abstracts
	  ○ Emerald Journals
	  ○ Gale: 86m articles
	  ○ Pearson, McGraw-Hill and Wiley: 2,000+ academic textbooks
	  ○ ProQuest: 300,000+ theses and dissertations
	  ○ PubMed/MedLine: 1.4m abstracts and citations; medical resources
	  ○ SAGE Reference: 160+ encyclopedia titles
	• Open access scholarly articles
	• Paid access scholarly articles (115,000 scientific, technical, and medical journals). Some of publishers are:
	  ○ American Chemical Society
	  ○ American Institute of Physics
	  ○ American Physical Society
	  ○ Elsevier
	  ○ IEEE
	  ○ Institute of Physics
	  ○ Lippincott Williams & Wilkins
	  ○ Nature Publishing
	  ○ Ovid
	  ○ Oxford University Press
	  ○ Sage Publications
	  ○ Springer
	  ○ Taylor & Francis
	  ○ Wiley Blackwel
	• Archived documents in repository of institution

Location of processing	• Web based
Format of	• MS Word

submission	• Word XML • WordPerfect • PostScript • PDF • HTML • RTF • HWP • Plain text • MS PowerPoint.
Pricing	Pricing is based on number of submissions per year. The higher numbers of submissions the lower price per paper. For example, price for 1 submission is €89, while 1000 submissions during one year is €6500 or €6.5 per one submission. One submission is up to 25.000 words. Maximum document size is 400 pages. After user submits his document once, he may resubmit it a maximum of five times. If revised manuscript is substantially different than the first submission, iThenticate may ask user if he would like to submit the revision as a new manuscript.
Description	Company iParadigms LLC, based in Oakland, California, has three products: iThenticate, Turnitin and WriteCheck. The company was founded in 1996 by a group of students from the University of California, Berkeley, it currently employs over 150 persons world-wide and is one of the largest companies. iThenticate is primarily intended to the publishers who want to prevent plagiarism in published work. iThenticate and Turnitin use the same plagiarism detection engine, so test result for them are the same. The difference is in report and source of documents for comparison. Submissions are compared with different resources including over 60 billion web pages, 600 million student papers and 154 million journal papers, periodicals and books. Private institutional comparison databases can be created based on institutions' needs and allows for document-to-document comparison. Also ProQuest dissertations are available for comparison. iThenticate searches for content matches in the following 30 languages: Chinese (simplified and traditional), Japanese, Thai, Korean, Catalan, Croatian, Czech, Danish, Dutch, Finnish, French, German, Hungarian, Italian, Norwegian (Bokmal, Nynorsk), Polish, Portuguese, Romanian, Serbian, Slovak, Slovenian, Spanish, Swedish, Arabic, Greek, Hebrew, Farsi, Russian, and Turkish. Please note that iThenticate will match text between text of the same language.
Pros	• Results are rapid for small texts, making it useful for smallish term papers. The system is easy to use despite the daunting array of menus and parameters. It was able to find the correct source for the Hebrew test case, as it was able to deal with Japanese characters in the 2010 test. As one of only two systems in the test, it was able to deal with homoglyphs.

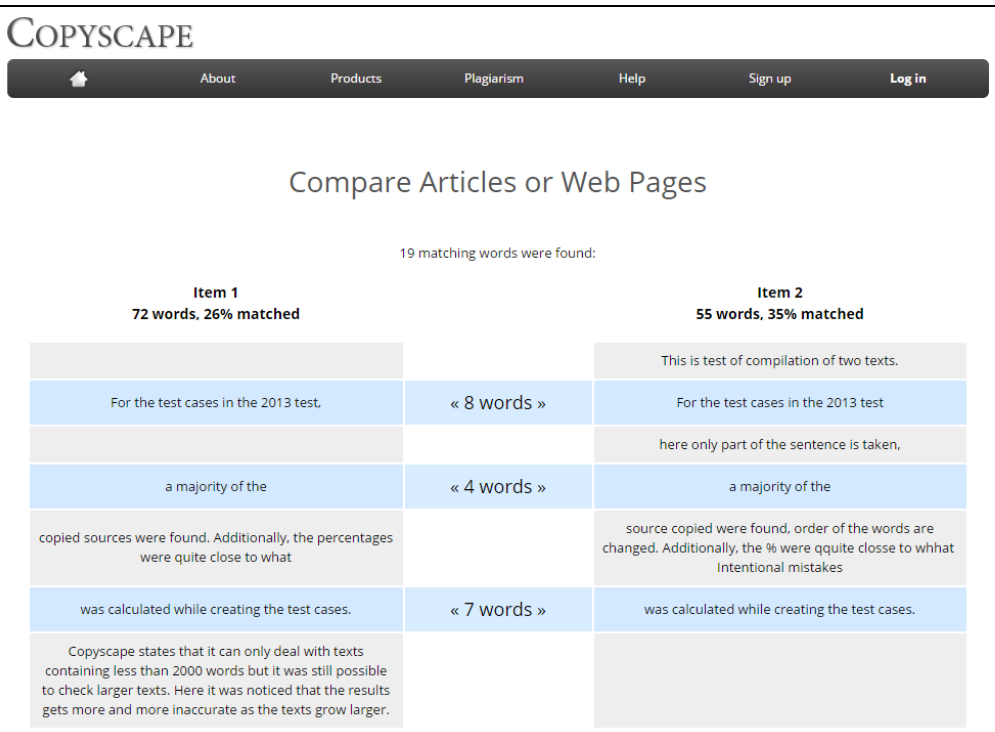
	• Submissions will not be added to iThenticate database • Exhaustive comparison resources
Cons	• Pricing policy is rigid. Users paid in advance for fixed number of submissions. I case that they submit less, there is no refund. • The system was much less effective with large files, taking hours to complete the report and then even missing plagiarisms that were easily found in the smaller test cases. • Often, the system will give preference to copies of the Wikipedia and not to the Wikipedia itself as the source for a portion of text. Some of these copies are used to sell erotic material that might not be good to be viewed on government computers. • The most maddening problem is the excessive number of pages that flag plagiarism, but are no longer available on the web at the address given. That makes the use of the system quite frustrating, as plagiarism can be seen, but not properly documented.
Report	'Match overview' shows the most relevant sources found to match the document by the iThenticate algorithm or view a list of all the sources found to match the document within the system. 'Summary' report provides a high-level overview of matched content in the document. 'Largest matches' shows where the sources and text of the largest content matches in the document (only available in the Text-only mode). Effective 2013, customers have the unique benefit of viewing results in two different modes: Document Viewer and Text-Only. The Document Viewer mode displays matches within the document's original format, including images, tables and graphs. In both modes, users get a side-by-side comparison of the document to matched sources in the database and in-depth analytics that provide visibility into content submissions and levels of originality over time. Only the old version of the report has a sort of side-by-side version, and that is only available online. The printed version of the report does not have this option, as far as we could see. The newer online interface has „flying windows" that are problematic in their use, as they slide under each other. The text copied appears in this flying window, making it very difficult to copy it for a written report. This is the major criticism, as the written reports are not useful for German examination boards that want clear documentation of the plagiarism without having to consult external sources.

	
Usability	The usability of the system was found to be good, despite the missing printed side-by-side report and the strange terms in German.

2.3.4. Copyscape

Product	Copyscape / Copyscape Premium
Company	Indigo Stream Technologies Ltd. Israel and Gibraltar
Web site	http://www.copyscape.com/
Comparison to	• Free access current web content • Free access archived web content
Location of processing	• Web based
Format of submission	• HTML • Copy of text
Pricing	Copyscape's plagiarism detector provide a limited number of results in the free service. User who needs more, should sign up for Copyscape Premium, which reports many more results than the free Copyscape service. Each Premium search costs $0.05. Premium credits are purchased in advance by credit card or PayPal and can be bought as and when they are required.
Description	Copyscape is the web application for detecting online plagiarism. Copyscape Premium provides a more powerful plagiarism checker than the free service. With Copyscape Premium, you may also search for copies of offline content by copying and pasting your text into the search box. Copyscape Premium also provides the Batch Search feature, a private index for your offline content, team management tools, an API for integrating in your work flow, and case tracking to manage your responses to multiple instances of plagiarism of your online content. Copyscape Premium provides more powerful plagiarism detection than the free service, allowing more results for each search, instead of only 10 with the free service. Copyscape allows to identify sites that have copied your content without permission, as well as those who are quoting your site. You can use Copyscape to check for plagiarism of your corporate website, online publication, blog, marketing materials, or any other online content which is valuable to you. Copyscape uses Google as a search provider, under agreed terms. Search providers send standard search results to Copyscape, without any post-processing. Copyscape uses complex proprietary algorithms to modify these search results in order to provide a plagiarism checking service. Any charges are for Copyscape's value-added services, not for the provision of search results by the search providers. The free Copyscape service is very easy to use. Simply enter your URL and Copyscape will instantly scan the entire Web to check for duplicate content of your page. Copyscape shows you the top results for your search, and you can click on a result to see a word-by-word comparison with the content on your site. In this comparison, colored highlighting is used to show blocks of text that match the text on your site. The Copyscape Premium service allows you to check for copies of your offline

	content. Simply copy and paste your text directly into the search box and Copyscape Premium will search for copies of the text. Copyscape offers a free comparison tool which lets you easily compare any two pieces of online or offline content. Simply paste in the URL or the text for each piece of content, and this will show you matching areas side by side, along with word counts and other summary statistics. For sites with up to 25,000 pages, you can use Siteliner which check if there are duplicated content on your web site (website analysis tool). For larger sites, you can use the private index functionality of Copyscape Premium. Copyscape can handle web pages written in all common world alphabets and languages, except those that use ideograms, such as Chinese hanzi, Japanese kanji and Korean hanja. You may instruct Copyscape to refrain from checking for copies of certain parts of your web page. This is done by adding a <!--copyscapeskip--> tag at the beginning of the section you want excluded, and adding a <!--/copyscapeskip--> tag at the end of that section. Note: This skipping works in one direction only – it will not prevent Copyscape from finding this content on your page when searching for copies of other pages.
Pros	• Overall, this system is very fast which makes it useful for spontaneous checking of short texts.
Cons	• The problem is that the system does not accept files at all. The texts have to be copied into a textfield as plain text, or the URL to the file is entered into a field. This makes it unusable for cases where the user wants to upload a whole set of documents. • One general problem of Copyscape is that the user is not able to see the reports of the searches after the browser window has been closed, because the reports are not stored in a database. One must pay again to have the text re-checked if the report is to be viewed again.
Report	For the test cases in the 2013 test, a majority of the copied sources were found. Additionally, the percentages were quite close to what was calculated while creating the test cases. Copyscape states that it can only deal with texts containing less than 2000 words but it was still possible to check larger texts. Here it was noticed that the results get more and more inaccurate as the texts grow larger. The report of Copyscape cannot be exported, it can only be viewed directly in the browser. Still, the user can save the report as HTML but this is not an individual feature of Copyscape since it can be done with every existing webpage. The format is not very readable, however. As with many of the other systems, Copyscape was not able to find plagiarism from Google Books.

	
Usability	The website itself is well structured and clear. The main features of the system are easy to find for the user. Copyscape is a system with a minimalistic approach because it only offers a simple plagiarism search without fancy and irrelevant features.

2.3.5. PlagAware

Product	PlagAware
Company	Sitelift Internet Services Dirk Malthan, Ruländerweg 14 89075 Ulm Tel.: +49 731 9214253 email: info@plagaware.de
Web site	http://www.plagaware.de, http://plagaware.com
Comparison to	• Free access current web content (All documents and texts of supported file types publicly accessible in the world wide web) • Open access scholarly articles of supported file types • All reference documents uploaded to customer's personal library (optional, free of charge) • All texts of performed or scheduled plagiarism scans (optional, free of charge)
Location of processing	• Web based
Format of submission	• MS Word • Word XML • PDF • HTML • RTF • Plain text (.txt) • Direct text submission by copy & paste
Pricing	The services of PlagAware which are subject to a fee are charged using so-called "ScanCredits". As a rule of thumb, one page of text scanned for plagiarisms will results in costs of one ScanCredit. More precisely, PlagAware are charging 1 ScanCredit for each 250 words or part thereof. The exact amount of ScanCredits required to scan a given text will be displayed after document upload. It is possible to choose one of 4 flexible license models: **A) Immediate Plagiarism Scan without Contractual Obligations** For individuals or **incidental** plagiarism assessments, we are offering Scan Credit Packs without contractual obligations, minimum terms or subscriptions. Customers can select one of ScanCredit Packs (S, M or L) and they are ready to perform plagiarism scans immediately. • ScanCredit packet S (250 Credits) à EUR 8,99 = EUR 8.99 incl. VAT • ScanCredit packet M (1000 Credits) à EUR 24,99 = EUR 24.99 incl. VAT • ScanCredit packet L (5000 Credits) à EUR 99,99 = EUR 99.99 incl. VAT **B) Subscription models for text and website monitoring** Tailored to suit the needs of continuous monitoring of texts and web sites, PlagAware are offering three subscription license models (light, standard and

premium). All models are equipped with a defined amount of ScanCredits which can be automatically used to perform continuous plagiarism scans on texts of a web site or on your private text library.
The PlagAware subscription model includes a **monthly** volume of ScanCredits which can be used for text monitoring purposes and plagiarism scans. This subscription license models are particularly feasible for continuous monitoring of web pages and other texts.
The PlagAware subscription license models are differing regarding the included ScanCredit volume per month and the resulting costs per ScanCredit. Additionally, owners of a PlagAware subscription benefit from discounted ScanCredits which can be purchased in addition to the ScanCredit volume included in the subscription license.

Subscription Rate	Light	Standard	Premium
Included Credits / Month	150	500	1000
Cost per 100 ScanCredits	EUR 2.00*	EUR 1.80*	EUR 1.60*
Recommended for *	1-150 URLs / Texts	151-500 URLs / Texts	above 500 URLs / Texts
Additional ScanCredits*	150 Credits (EUR 2.99)	500 Credits (EUR 8.99)	1000 Credits (EUR 15.99)
Monthly Costs	EUR 2.99*	EUR 8.99*	EUR 15.99*

* Incl. VAT

C) Flatrate for Plagiarism Assessment in Schools
Especially for schools, PlagAware is offering a **yearly** flat rate for plagiarism assessments for **289 EUR**. The very reasonably priced license can be applied to up to 250 user accounts and provides the possibility to perform an **unlimited** amount of plagiarism scans on all text created within the licensing organization (e.g. homework, theses, etc.).
The unlimited plagiarism scans apply to all texts and documents that have been created at the licensing organization, e.g. home works, presentations or theses. The plagiarism scan of other third-party texts, e.g. textbooks, websites, electronic articles is not permitted. The starting time of the license can be freely chosen.

D) Individual licenses for Universities, Institutes, Organizations and Companies
Starting from a minimum plagiarism scan volume of just 5000 text pages per year, PlagAware is offering individual license models to suit your requirements for plagiarism assessment or text monitoring tasks. PlagAware corporate licenses are available from 5000 ScanCredits (approx. 5000 pages of plagiarism scans, 250 words each page) at a rate of **EUR 99.99** incl. VAT.
Together with the PlagAware license, users receive a license key to unlock an unlimited number of PlagAware accounts. The PlagAware license can be administered and managed by a dedicated administration account. Administration tools include:

- creation of usage statistics and reports,
- end user and account management,
- limitation of plagiarism scan volumes for user groups (quota settings)
- specification of scan engine und report settings for all associated users.

Description	It is focused on academic use, but also offers its customers a tool for finding **sites that are using copies** of content already available online. PlagAware offers comprehensive functions for the plagiarism assessment of home works, seminar papers, manuscripts, editorial articles and other written texts. These functions are based on the central PlagAware technology, the search for identical contents in the World Wide Web. Thereby the text of the home work or academic manuscript is divided into individual segments, which are rated on the base of a language statistics. For selected segments analogies are searched in the internet and analyzed on the grade of analogy. PlagAware is a pure web application. Thus, no installation is necessary on your workstation and no demands are made on end user devices and operating systems. PlagAware can be used on all systems provided one of the supported web browsers is available (Microsoft Internet Explorer, version 9, Microsoft Edge, Mozilla Firefox version 4, Opera Software Opera version 15, Apple Safari version 5 and Google Chrome 7 or later). Plagiarism scan duration depends on server workload and text length and ranges between few seconds up to several hours. Maximum text length is 750.000 characters (approx. 350 pages). Maximum size of submitted file is 15 MB per file. Maximum number of parallel file uploads is 50. It is possible to edit results of plagiarism scans by exclusion of not relevant sources, selection of reporting area, editing of meta information (e.g. description, author, project). Sharing of plagiarism scans results is possible by download as PDF report or by permanent link for external reviewers. PlagAware enables graphical comparison of two or more given texts.
Pros	PlagAware returns results rapidly, and offers a colored side-by-side report. It is not possible to upload ZIP archives, Word Perfect and PostScript. PlagAware has excellent policy for protection and safety of uploaded documents. Users have control over their own documents. To protect users data and to assure data privacy, they have implemented a number of technical and organizational measures including Encryption of Data Transmission, Intrusion Detection System, Application Firewall and Parameter Vulnerability Assessments.
Cons	The system has a low threshold for text copying, however, and will mark many typical phrases as suspicious, although they actually are not. For example, it marked the phrases „as a reaction to“ and „in violation of the“ as copying; weeding out all of these similarities is very time consuming. As with many of the other systems in the test, PlagAware was able to deal with the German umlauts but not with text in Hebrew. PlagAware was also unable to find text that was available on Google Books.
Report	The PlagAware report is clearly laid out. Colored bars show which part of the text was copied from which source, for each source there is a side-by-side view with the matching text colored in the same colors, much like the result one would get by using a highlighter to mark up a text on paper. It is not trivial to find the link to this view, however, as it is well-hidden. One useful property is the ability to exclude sources from the report, and this is clearly marked on the web page, but it is not made clear why some of the sources are automatically excluded by the

	system. A major problem with the report is that the non-plagiarized portions of the text are elided with […], making it hard to find the plagiarism in the source. It also gives the impression of a highly-plagiarized text, even though there may only be a few portions that were copied. And since only a couple of different marking colors are used, it can sometimes be confusing trying to decode which colored portions match, especially if the copy moved portions of the text around. The effectiveness of the system is not good; it was just barely underneath the passing grade at 58% of the points.
Usability	The usability of the PlagAware system was judged as „good“, especially regarding the reports. Some of the functions are difficult to find and some of the symbols and names are misleading. For example, the system speaks of zitierte Worte (cited words) but actually means words copied, that is, those that are possibly plagiarized and not cited. PlagAware finds some plagiarism and the appropriate sources, but it also misses a lot. It was one of the best systems in the area of usability with a grade of B-. There is still room for improvement, especially with respect to file uploading and the reports.

2.3.6. Strike Plagiarism

Product	Strike Plagiarism / Internet Antiplagiarism System
Company	Plagiat.pl Sp. z o.o. Sebastian Kawczynski, PhD E-Mail: skawczynski@strikeplagiarism.com contact@strikeplagiarism.com Telephone: +48 22 100 11 11 ul. Wróbla 8 02-736 Warsaw
Web site	http://www.plagiat.pl http://strikeplagiarism.com/en_GB/
Comparison to	• Free access current web content • Open access scholarly articles • Archived student papers in repository of service provider • Archived student papers in repository of institution
Location of processing	• Web based
Format of submission	• MS Word • Word XML • PDF • Plain text • OpenDocument Text (.odt)
Pricing	**For academic institution** Costs are negotiated separately with each client according their tailored needs. The subscription license is generally determined based on the number and volume of submitted documents per annum. **For individual users** To check a text of 20.000 characters users needs to buy one Token. The price of one token is 2,09 EUR incl. VAT.
Description	Plagiat.pl is Polish company which is owner of few brand including the international brand StrikePlagiarism.com. Their main product is Internet Antiplagiarism System dedicated for checking the originality of texts submitted by PhD. candidates, students before their Bachelor and Master's degree examination and High School pupils. A variety of other institutions benefits from this tool, i.a. Publishing Houses, aiming to protect the copyrights. Unlike other systems, the time for obtaining the report is long. The results, presented in a Similarity Report are available within 24 hours of submitting the document. In case of individual users, the results are available within 24 hours of receiving payment. At periods where the volume of document verification is particularly high (such as during the winter and summer examination sessions) the results may take longer to process.

	Internet Antiplagiarism System can be simply accessed via the website or easily integrated with an existing LMS used by the university and therefore accessed through it. The client is given the possibility to add documents to the University Database and to join the Inter-Universities Database Exchange Programme. This enables protecting the previously verified works from being copied in the future. Each analyzed paper is compared with those previously submitted, stored in the database. Plagiat.pl is the leader of the markets of Poland and Romania, and, with the StrikePlagiarism.com brand, is active in Kazakhstan, Azerbaijan, Ukraine, Moldova, Germany and Colombia. More than 260 universities are using their Internet Antiplagiarism System. Plagiat.pl, has established strategic cooperation with Paperity. Thanks to it, Paperity will share the bibliographic data of all the aggregated articles, current and future ones with Plagiat.pl. Consequently, Plagiat.pl's database of reference works will expand by nearly one million documents at once now, and even more in the future, making Plagiat.pl's antiplagiarism software even more efficient. Paperity is the first multidisciplinary aggregator of scholarly journals and papers published in Open Access. It gives readers easy access, in one place, to articles from a large number of journals encompassing all scholarly disciplines. The collection is growing continuously. Currently Paperity indexes 1/3 of newly published Gold Open Access papers and aims to index ultimately all open literature. What is especially valuable is that Paperity indexes literature in many languages. Therefore, it will enrich multi-lingual anti-plagiarism checks, which are provided by Plagiat.pl in eleven languages, including English, Spanish, Ukrainian, and Russian.
Pros	• Can be easily integrated with Learning Management Systems and is connected to Moodle • Detailed Similarity Report with list of sources of borrowings • Safety of the data • Alert function to mark attempts of distorting of the antiplagiarism analysis • Scanning the resources on the Web and institution's database • Detection of similarities with advanced algorithm based on N-gram analysis • Advanced language analysis, including normalization and flexion analyzing • Multilanguage analysis
Cons	• The time for obtaining the report can be greater than 24 hours • The user has to upload one file at the time and can submit up to five papers at the same time for checking. It is then not possible to check any other documents until these are finished.
Report	Result of scanning uploaded document is Similarity Report. Crucial elements of the Similarity Report are:

<table>
<tr>
<td></td>
<td>

Two Similarity Coefficients which indicate the percentage of the analyzed document identical to the identified sources
A list of sources of the fragments marked as copied
The full text of the analyzed document with visible marking of the detected borrowings
Alert informing about text distortions, such as alphabet switch, suggesting a cheating attempt

Similarity Report
<table>
<tr><td>Title:</td><td>21_Tibet.pdf</td></tr>
<tr><td>Author:</td><td></td></tr>
<tr><td>Date Of the Report:</td><td>2013-06-06 14:36:04</td></tr>
<tr><td>Similarity Coefficient 1:</td><td>97,4%</td></tr>
<tr><td>Similarity Coefficient 2:</td><td>84,4%</td></tr>
<tr><td>Phrase length for Similarity Coefficient 2:</td><td>15</td></tr>
<tr><td>Number of words:</td><td>655</td></tr>
<tr><td>Number of characters:</td><td>4 623</td></tr>
<tr><td>Skipped URL addresses:</td><td></td></tr>
</table>
>> Longest Fragments Identified as Similar
>> Documents Containing Similar Fragments: From the Internet
</td>
</tr>
<tr>
<td>Usability</td>
<td>The design of the system is user-friendly in general, but could be improved in terms of visual design. It is annoying for the user that the system takes a good bit of time for the analysis of the documents and that it is not possible to upload multiple documents. The user has to upload one file at the time and can submit up to five papers at the same time for checking. It is then not possible to check any other documents until these are finished.</td>
</tr>
</table>

2.3.7. PlagScan

Product	PlagScan
Company	PlagScan GmbH Lichtstrasse 30 50825 Cologne Germany Email: info@plagscan.com Phone: +49 221 75988994 Fax: +49 221 75988996 PlagScan GmbH 720 University Avenue Suite 100 Palo Alto, CA 94301 United States Tel.: +1-(650)-804-3970
Web site	www.plagscan.com/
Comparison to	• Free access current web content • Open access scholarly articles • Archived documents in repository of service provider • Archived documents in repository of institution
Location of processing	• Web based
Format of submission	• MS Word • Word XML • Microsoft Works [.wps] • WordPerfect [.wpd] • Open Document Text (LibreOffice) [.odt] • Open Document Text [.ott] • OpenOffice.org 1.0 Text Document [.sxw] • StarWriter 5.0 [.sdw] • PDF • HTML • RTF • Plain text • MS PowerPoint • Microsoft Excel [.xlsx] • zip-archive
Pricing	PlagScan offers three different billing schemes for: private users, organization, business. Costs are determined by the number of words in a document. PlagScan settles this via a credit point system, in which 1 PlagPoint allows the analysis of 100

<table>
<tr><td></td><td>words or fraction thereof are consumed per document (1-1000 words = 10, 1001-1100 words = 11, 1101-1200 words = 12 PlagPoints, etc.).

Individual users can buy scanning packages without a subscription. They can pay $5.99, $12.99, $24.99 or $49.99 with their credit card or via PayPal, which immediately loads credits onto their PlagScan account. next table gives an overview of how many words or pages these account for, assuming an average of 250 words per page.

<table>
<tr><th>Price</th><th>PlagPoints</th><th>Amount per PlagPoint</th><th>Words | Pages</th></tr>
<tr><td>$5.99</td><td>65</td><td>10¢</td><td>6500 | ca. 26</td></tr>
<tr><td>$12.99</td><td>250</td><td>5.2¢</td><td>25000 | ca. 100</td></tr>
<tr><td>$24.99</td><td>625</td><td>4.0¢</td><td>62500 | ca. 250</td></tr>
<tr><td>$49.99</td><td>1500</td><td>3.3¢</td><td>150000 | ca. 600</td></tr>
</table>

For higher education institution (universities) PlagScan applies subscription per students (total number of students at the university). Price is 1.2$ per student per year, but minimum annual price is 600$. The price includes unlimited plagiarism checks, Premium support, Student upload portal, Unlimited number of accounts for teaching staff, Unlimited storage time for documents and plagiarism reports.

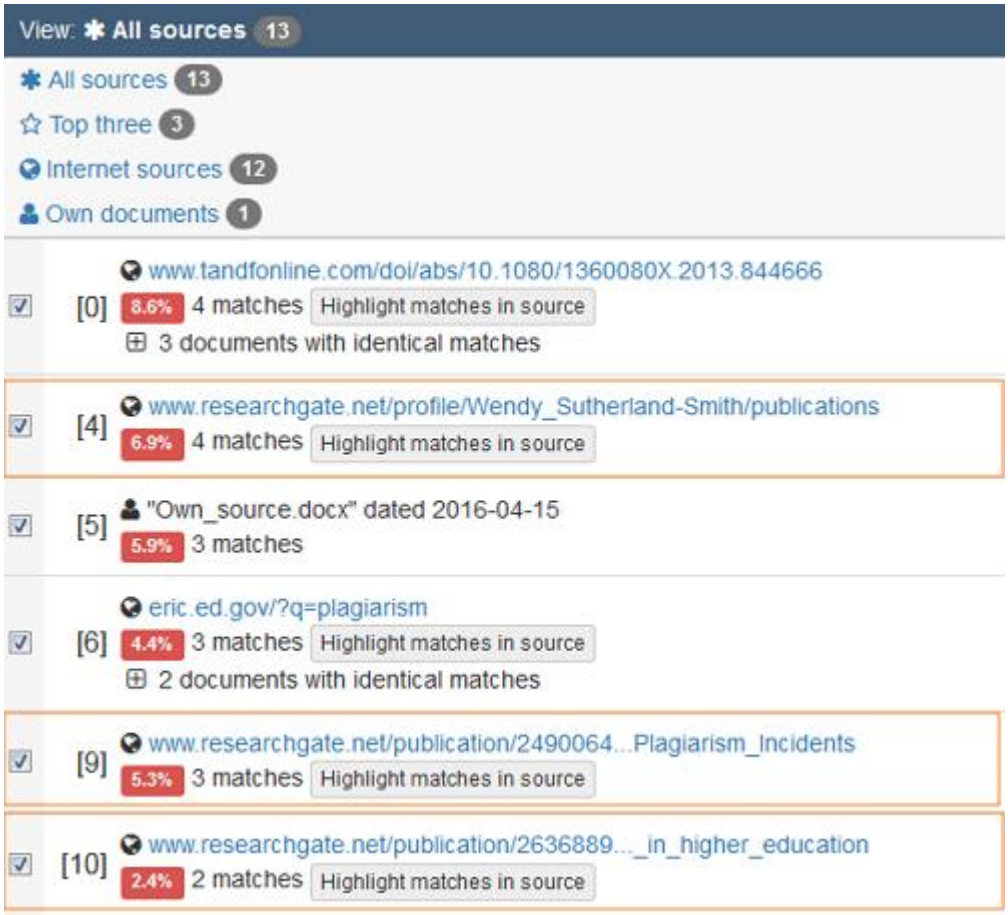
Pricing plan for business is based on monthly subscription.</td></tr>
<tr><td>Description</td><td>PlagScan is German based company that offer an entirely browser-based web service PlagScan which verifies the authenticity of documents. Files can be uploaded in all common file formats (MS Word, PDF and many more). Alternatively, users can paste text directly into PlagScan and check for authenticity. Aside from the internet, PlagScan also searches internal databases for possible plagiarism. Those databases are established by the user, i.e. documents the user has uploaded, documents your organization has enabled for comparison, and documents voluntarily added to the PlagScan database by all other PlagScan users globally.

Especially for universities PlagScan offers PlagScan-Pro which:

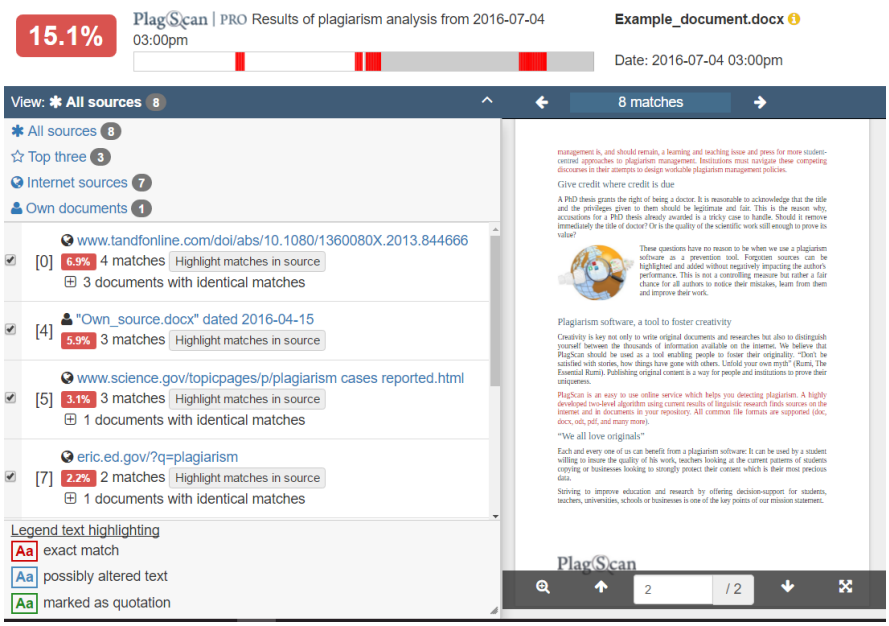
Check documents from year to year and between peer groups to prevent copying in the classroom
Allows students to submit their papers independently online using institution's plagiarism portal
Gives to every student a code to log in to PlagScan in order to upload their documents into their teacher's account.
Automatically start when a submission deadline arrives, checking all the submitted documents with each other and optionally with other sources.
Send to teaching staff member student's works directly annotated with the results in multiple report forms, after the scan is completed.
</td></tr>
</table>

	PlagScan can process any language. Plagiarism scanning works for any language that uses international UTF-8 encoding (UNICODE). This means that text of any language containing Latin, Arabic or Cyrillic characters can be checked for plagiarism. PlagScan provides an Application Programming Interface (API), which allows users to integrate PlagScan functionality in their existing LMS system. For example: After the student submits a document in to the LMS, analysis takes place in the background. When the teacher accesses the paper for grading, the annotated version is already present. That way possible plagiarism can be considered during the teacher's normal grading routine and no extra work is necessary. The service employs a highly advanced two-step algorithm based on the latest research in computer linguistics. PlagScan accesses billions of documents for the detection of plagiarism. The search index is updated and expanded on a daily basis. More than 1 million documents are tested each year, including 300,000 research papers. More than 1000 organizations are already using PlagScan. PlagScan has developed a statistic method in order to search for thematically related documents. The search is based on Internet sources and optionally your own database, as well as the PlagScan database. Time may vary for the analysis of text, depending on the size of the document. Usually this takes just a few minutes and larger documents are completed the following day at the latest. The sources used for comparison during the plagiarism scan are determined by the subject of the document and its related documents within the database. The sources are meticulously scanned for similarities with your text. Three consecutive word matches are used to detect plagiarism, such that plagiarism can be found despite the text being reordered and containing synonyms. For indexing document archived in PlagScan or users repository they use their own indexing technology which is built on Apache Solr. Solr is the popular, blazing-fast, open source enterprise search platform built on Apache Lucene [10]. Solr is a standalone enterprise search server with a REST-like API. It receives documents in it (called "indexing") via JSON, XML, CSV or binary over HTTP. It queries it via HTTP GET and receive JSON, XML, CSV or binary results. Solr enables powerful matching capabilities including phrases, wildcards, joins, grouping and much more across any data type. For web document PlagScan is using Bing Search, which is based on the index of Microsoft. Privacy and legal compliance are top priorities at PlagScan. They handle users documents with complete confidentiality and never share them without consent. Users remain in full control of their data at all times and determine who can access their documents. It is up to users to decide when their data and documents will be deleted - no hidden copies of documents are retained.
Pros	• It is possible to upload several documents at once

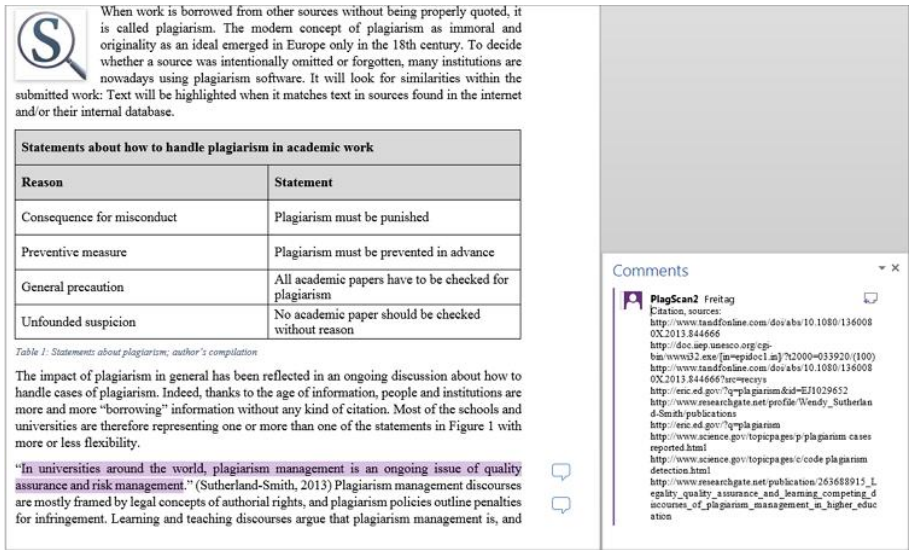
	• There are four types of reports including Word document (docx) with highlighted text • Good privacy and legal compliance • Upload documents or entire zip archives using Drag & Drop • Large number of document formats
Cons	• Time for checking large documents can be long • The system was able to find plagiarisms in short files, but identical texts were not flagged when incorporated in a larger document. This may cause false negatives for master's theses and doctoral dissertations. Short phrases such as „would help clarify the role of the" were often marked as plagiarism, inflating the total score. The system was not very effective, as it only achieved 55% of the total possible points. • PlagScan was not able to work with the Hebrew test cases, in general any non-Latin characters cause trouble. The system was also unable to find Google Books sources. • The users need to be aware that all tests are deleted without warning after six months, unless the user has paid extra to store the reports.
Report	User can select one of four forms of reporting: Plug level, Results level, Interactive browser report and Document Highlighting (MS Word). The **Plag Level** is a rough estimate of how much content within a document is plagiarized. In order to indicate if a document requires in-depth investigation, PlagScan calculates the percentage of plagiarized content. However Plag Level does not indicate if the content has been quoted and cited correctly. 0% 0-1%Due to the low percentage, your document is unlikely to contain plagiarism (from the internet or local databases). 1% 1-5%A closer look at the document report is recommended. 5% 5-100%The document most likely contains plagiarism - an in depth look at the report is required. The **Results list** displays all the potential plagiarism matches within the document and their corresponding sources. This enables you to quickly determine the passages the program has recognized as being potential plagiarism and the extent to which a source has been copied. The example below shows couple of suspicious matches to a webpage: *www.researchgate.net*. For a more extensive comparison with the source, user should click on **highlight matches in source**. This will open the indicated source and the suspicious matches can be compared directly.



The **Interactive browser** report enables users to view matches detected directly in the text. The potential matches from the plagiarism scan are highlighted in one of three colors, depending on their significance. The interactive browser report also allows you to mark specific matches as quotations or plagiarism, or delete them.
With the arrow keys on keyboard users can navigate through the matches and their respective sources. The corresponding sources are displayed in the source display window above the text in bold lettering.
Users can delete specific marks that have been placed in the text by PlagScan. Mark a paragraph as a quote if it has not been recognized, or mark a paragraph as plagiarized.



User can select forth type of report - **Document Highlighting** by clicking the button Word docx with annotations. Then PlagScan creates a Word document identical in content to user's original document with the matches marked and annotated. The document highlights the potential matches and includes details about the sources. This type of report offers an elegant and comfortable solution, as the original formatting of the document does not change. Furthermore, this kind of report saves an enormous amount of time - simply view, detect and determine plagiarism while proofreading a hard copy printout or the document on your screen.



When work is borrowed from other sources without being properly quoted, it is called plagiarism. The modern concept of plagiarism as immoral and originality as an ideal emerged in Europe only in the 18th century. To decide whether a source was intentionally omitted or forgotten, many institutions are nowadays using plagiarism software. It will look for similarities within the submitted work: Text will be highlighted when it matches text in sources found in the internet and/or their internal database.

Statements about how to handle plagiarism in academic work	
Reason	**Statement**
Consequence for misconduct	Plagiarism must be punished
Preventive measure	Plagiarism must be prevented in advance
General precaution	All academic papers have to be checked for plagiarism
Unfounded suspicion	No academic paper should be checked without reason

Table 1: Statements about plagiarism; author's compilation

The impact of plagiarism in general has been reflected in an ongoing discussion about how to handle cases of plagiarism. Indeed, thanks to the age of information, people and institutions are more and more "borrowing" information without any kind of citation. Most of the schools and universities are therefore representing one or more than one of the statements in Figure 1 with more or less flexibility.

"In universities around the world, plagiarism management is an ongoing issue of quality assurance and risk management." (Sutherland-Smith, 2013) Plagiarism management discourses are mostly framed by legal concepts of authorial rights, and plagiarism policies outline penalties for infringement. Learning and teaching discourses argue that plagiarism management is, and

Comments

PlagScan2 Freitag
Citation, sources:
http://www.tandfonline.com/doi/abs/10.1080/1360080X.2013.844666
http://doc.iiep.unesco.org/cgi-bin/wwwi32.exe/[in=epidoc1.in]/?t2000=033920/(100)
http://www.tandfonline.com/doi/abs/10.1080/1360080X.2013.844666?src=recsys
http://eric.ed.gov/?q=plagiarism&id=EJ1029652
http://www.researchgate.net/profile/Wendy_Sutherland-Smith/publications
http://eric.ed.gov/?q=plagiarism
http://www.science.gov/topicpages/p/plagiarism cases reported.html
http://www.science.gov/topicpages/c/code plagiarism detection.html
http://www.researchgate.net/publication/263688915_Legality_quality_assurance_and_learning_competing_discourses_of_plagiarism_management_in_higher_education

Usability	The system for setting up user accounts and moving PlagPoints between them is quite well suited to a university environment and the overview page is well structured, even if it does look quite old-fashioned.

2.3.8. Compilatio

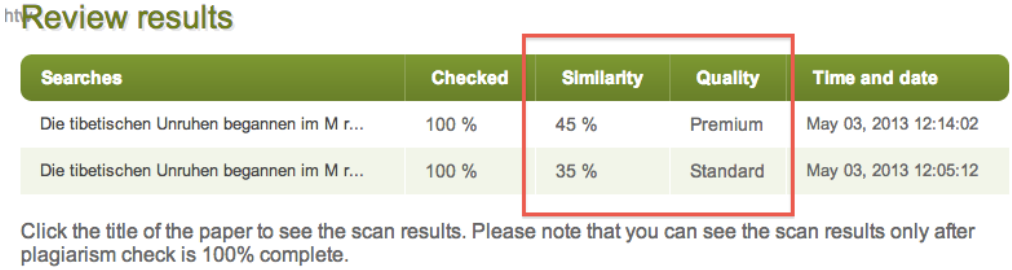
Product	Compilatio
Company	Compilatio SAS 276 rue du Mont-Blanc 74540 Saint-Félix- France E-Mail: contact@compilatio.net
Web site	http://www.compilatio.net
Comparison to	• Free access current web content • Open access scholarly articles • Archived documents in repository of service provider • Archived documents in repository of institution
Location of processing	• Web based
Format of submission	• MS Word doc, docx • Word XML • PDF • HTML, php, asp • RTF • Plain text • MS PowerPoint ppt, pptx • MS Excel xls, xlsx.
Pricing	On demand, based on number of teachers and number of students.
Description	Compilatio is offered by the French company Compilatio SAS and has been sold since 2005. Two versions are available. The first, Compilatio Magister, is for teachers in higher education, while Compilatio Studium is marketed to students. Magister by Compilatio.net provides the following results: • global similarity percentage • passages from the document that were found identically • the sources that reappear in the document Studium by Compilatio.net provides the following information: • global similarity percentage • the sources that reappear in the document Consequently, Studium does not provide the passages from the document that were found identically – and this to prevent dodging (cheating) the Magister tool. The Compilatio.net tool is available in several languages: French, Italian, Spanish, German and English. The similarity analysis can be carried out in more than 40 languages (including all the Latin languages). Unfortunately, some languages are **not available yet**: Chinese, Japanese, Arabic, the **Cyrillic** alphabet…

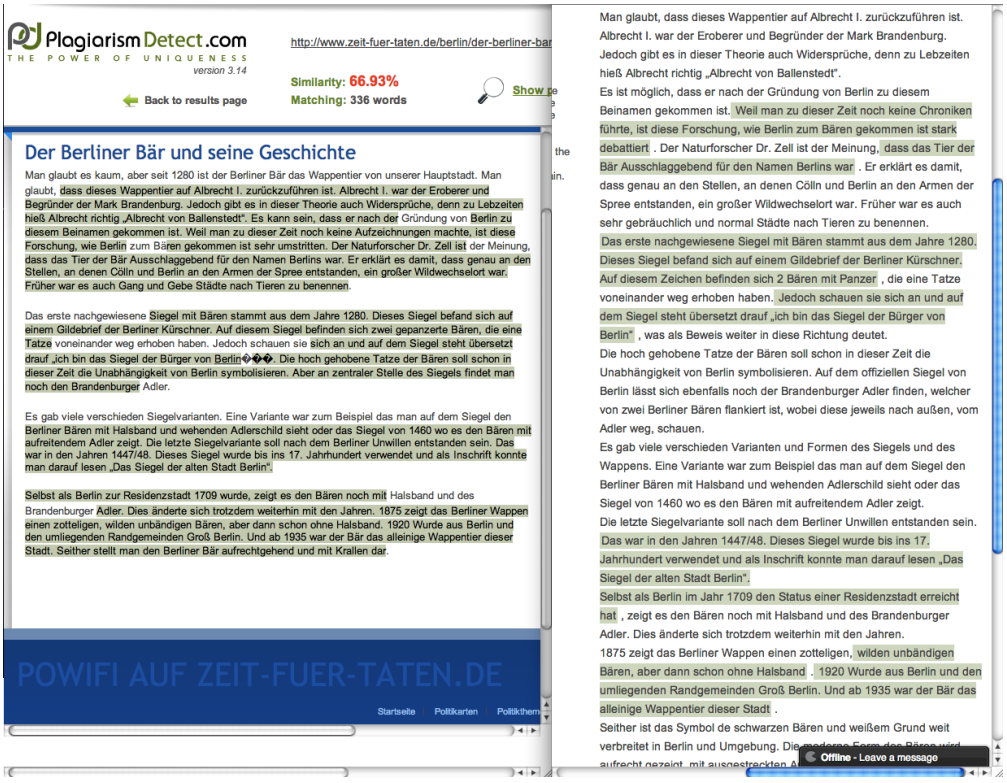
	In order to provide you with as many results as possible, Compilatio.net carries out a complex process to search sources. On top of its own databases, the Compilatio.net software functions like a meta-motor: it interrogates various search tools and centralizes the results that were obtained. To find a source, Compilatio.net uses the same path as the one used by the author of the analysed document. If the author was able to find the document, Compilatio will find it too! Document uploaded in Compilatio.net is accessible only to the user who uploaded it, never to another user. However, all documents of an institution can be compared with each other in the analysis, on explicit request. They can even be compared with all the documents of the Compilatio base. But even in these cases, the confidentiality of the original document is preserved in its entirety: a user never has access to a document that has not been charged in his account.
Pros	• Compilatio was able to identify sources from Google Books, something many other systems were unable to do. It was also able to properly locate the source for the Hebrew test case. • The system does accept all document types with the exemption of ZIP files.
Cons	• The usability is the major problem for those who do not speak French, as the system will revert to French quite often. • Finding the upload function is not easy, as the menu structure is not intuitive. • As the user has to agree to the terms of use before a document can be uploaded, uploading multiple documents takes some time. • The similarity analysis cannot be carried out for document written in Cyrillic.
Report	Comiplatio offers a side-by.side view, which shows only those fragments marked as plagiarism. Since there is no indication that text has been left out, not looking closely at the report can give the impression that much more of the text is plagiarized that is actually the case. But other than this the reports are well-laid out and are easily understandable. They can also be saved to the user's computer. A few other aspects are confusing: Compilatio divides the calculated scores into „identical similarities" and „assumed similarities". The former contains sources that match word for word, the latter are text portions that have been changed in some way or another. For the scoring in this test only the „identical similarities" were used. Compilatio also divided sources into probable and non-problable sources. However, as most of the sources given are documents from other users which are not accessible, they can not be analyzed and therefore are in general not very helpful. Compilatio additionally allows users to ignore certain sources which are then

	not included in the overall plagiarism percentage. This is useful for the exclusion of citations.
Usability	The reports are offered only on one long page that makes scrolling an issue.

2.3.9. PlagiarismDetect

Product	PlagiarismDetect
Company	No company data on web site
Web site	http://www.plagiarismdetect.com/
Comparison to	• Free access current web content
Location of processing	• Web based
Format of submission	• MS Word [.doc, .docx] • Open Document Text (LibreOffice) [.odt] • Plain text
Pricing	Besides free trial PlagiarismDetect offers two services: Standard and Premium. Users should by credits in order to conduct scans. There are special discounts for students, educators and corporate, ranging from 5 to 20%. Also, it is possible to get discount from 5 to 20% depending of amount of credits purchased. **Standard plagiarism scan** This is basic plagiarism detection. You will be able to review the similarities in your text, check the sources of similarities, download the report. Standard plagiarism scan is the best choice for students - it's fast, cheap and detects the main sources where similarities can be found. It is 100% safe to check for plagiarism with PlagiarismDetect. Texts are not saved anywhere, so there is no chance user's works will show up as plagiarized because of the service. One credit for Standard plagiarism scan is ¢5 and it enables scanning of one page with up to 275 words. **Premium plagiarism scan** PlagiarismDetect.org uses SMART technology, as well as multi-layered scanning, which helps detect plagiarism in the most accurate manner. A paid account makes users 99,9% sure that there is nothing wrong with their text in terms of academic honesty. The scan report states the total plagiarism level of the text. For convenience, the parts containing plagiarism will also be highlighted on the source where the match was found.

	Users can always come back to their previously scanned works and their respective plagiarism reports. Users can also download an .html version of a report. One credit for Premium plagiarism scan is ¢25 and it enables scanning of one page with up to 275 words.
Description	PlagiarismDetect is a service created for plagiarism checking, which works by SMART multi-layer technology and search algorithm developed by a group of our IT professionals. This newest technology can spot the slightest similarities between a submitted text and all the sites on the web. PlagiarismDetect offers two services: Standard Plagiarism Scan for students and Premium Plagiarism Scan for universities. PlagiarismDetection can only check texts in English and Spanish.  Review results Searches | Checked | Similarity | Quality | Time and date Die tibetischen Unruhen begannen im M r... | 100 % | 45 % | Premium | May 03, 2013 12:14:02 Die tibetischen Unruhen begannen im M r... | 100 % | 35 % | Standard | May 03, 2013 12:05:12 Click the title of the paper to see the scan results. Please note that you can see the scan results only after plagiarism check is 100% complete. An API has been developed and can be customized to suit users' needs. In addition to being a vital tool for anyone in need of text originality checking, PlagiarismDetect is super simple and easy to use. PlagiarismDetect is a SaaS – Site as a Service, which means that you don't need to install any additional software, all the work is made right on the website. There are two ways of checking texts for plagiarism: • Just copy text and paste it to the corresponding field. • Upload a text from a file
Pros	• One of the advantages of PlagiarismDetect is speed of checking- the process will take you less than 15 seconds.
Cons	• PlagiarismDetect.org doesn't check the texts in languages other than English or Spanish. • Doesn't recognize mathematical or other special characters. The only characters that the system recognizes are letters "A" through "Z" and numbers "0" through "9". • The system does not accept ZIP files
Report	The report that users receive states the overall similarity percentage and highlights the parts that are potentially plagiarized. Also it contains links to the sources where the similarities were found.

	The system processes the documents in a very short time. This is good if only a few documents have to be checked, but once the user wants to upload multiple documents it takes much longer because the system does not accept ZIP files but only txt, doc and odt. In the report, there is no side by side view and multiple sources are not marked with different colors, which makes it hard to differentiate the sources. It also complicates the report view and the usability because the user has to click on each reference to see what was found. Then, the system redirects to the source website and marks the found text. Furthermore, it is confusing that PlagiarismDetect does not show the document title or a clear identification but the beginning of the contained text which makes it hard to search for a particular document in a set of texts. 
Usability	There is a difference between the standard and premium quality of plagiarism search. With standard quality one may not find all the relevant sources for the document. Thus, it is recommended to use the premium quality if possible whereas both of the different searches are returning satisfying results. The system is not convincing, neither in terms of results nor in usability of the website. The used credit system might be useful for users who want to check a small set of documents. For users with high amounts of texts, this might lead to very high costs which is a negative aspect of the system.

2.3.10. Docoloc

Product	Docoloc
Company	Docoloc UG & Co. KG Methfesselstraße 2 38106 Braunschweig Germany email: info@docoloc.de Telephone +49-531-3495570 Authorized Executives (Geschäftsführer): Dr.-Ing. Jens Brandt
Web site	http://www.docoloc.de
Comparison to	• Free access current web content • Archived documents in repository of service provider • Archived documents in repository of institution
Location of processing	• Web based
Format of submission	• MS Word (.doc and .docx) • Word XML • PDF • HTML • RTF • Plain text
Pricing	The number of user accounts which can be authorized with a license key depends on the volume of the license. The smallest license which Docoloc offers to institutions include processing of 5000 pages per year at costs of 288 Euro per year excl. tax. You can use this license via your browser with up to 25 user accounts on Docoloc. For a higher page volume or a higher number of user accounts we provide an individual offer. A user can create her or his own Docol©c account. After entering a valid license key, the user account is authorized and can be used immediately. A user account must only be used by the person who applied for it and must not be used by other persons. Schools, universities, agencies, chambers, publishing houses or other legal persons may get licenses. Subsidiaries or otherwise connected enterprises are not allowed to use the license without further agreements. It is also not allowed to sell the license to others. In case of capacity constraint no new customers can be accepted. This offer is subject to confirmation.
Description	Docoloc is offered by the German company Docoloc UG & Co., located in Braunschweig. It is offered in a free demo version and a paid professional one. In the free version, only a small portion of the file is actually checked, the

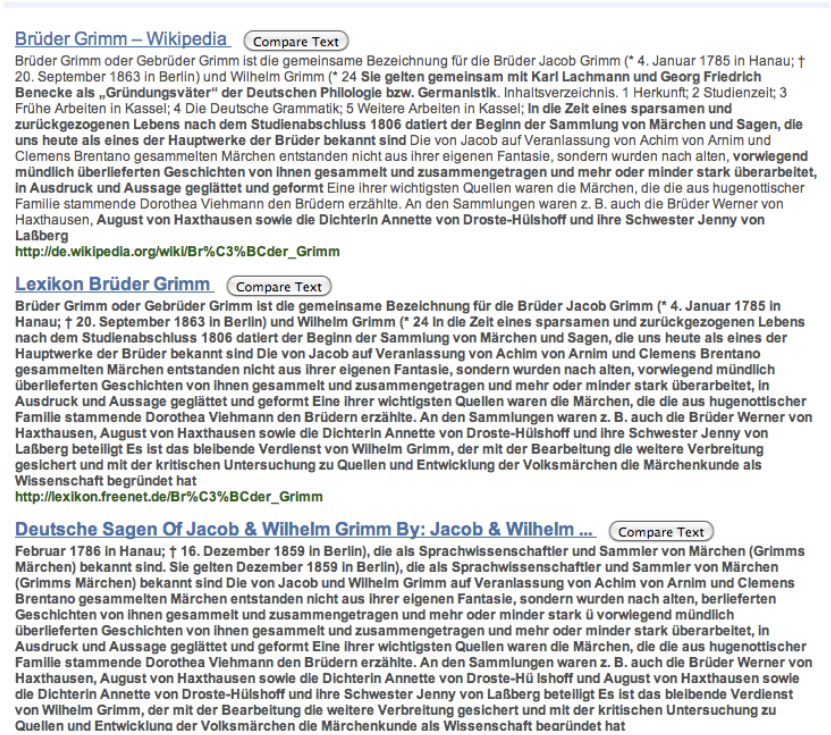
	premium version is said to test the entire document. The system is only available to educational institutions, not for individual use so that students cannot use it. Docoloc is used as the search engine by the Open Access Plagiarism Search service (OAPS). Docoloc itself can use that database, as well as its own. It does not give information on the size of the database on the web page. Documents for checking can be uploaded through Docoloc web site. With Firefox, Safari or Chrome (but not with MS Internet Explorer) it is possible to upload several files with one click. Also it is possible to check web documents (e.g. web pages). Web documents to be reviewed can be reached via the protocols http://, https://, or ftps://.  For comparison Docoloc is using web content, but it can also us customer's repository of documents (e.g. students papers). All documents submitted to Docol©c are deleted when the check is finished. Only the Docol©c-Report is stored in the corresponding user account until the user deletes it. For system monitoring as well as for statistical analysis anonymised data about checked documents as well as found text fragments is stored. New documents are never checked against other submitted documents. More than 70 universities in Germany and 27 universities worldwide, as well as more than 85 schools in Germany, Austria and Switzerland are using Docoloc.
Pros	• It is possible to upload multiple files at once and they can be in any format. The user can also delete files that have already been checked

Cons	• The design of the site is reminiscent of Google but not well thought out. • There is also some German/English confusion, as clicking on a link that is in English will occasionally bring up a German page and vice versa. • The system does not report any percentages, but only the number of sentences that could contain plagiarism. • The Hebrew source was not found, neither could the system find a source from Google Books. • It identified more plagiarized sentences in the large files than in the smaller files, although the text of the plagiarism was identical in both. • Docol©c uses search technologies provided by various companies, which can be switched off or fail anytime. The Docoloc KG does not provide any guarantees for service availability. Transient failures do not entitle to a reimbursement.
Report	The report is extremely confusing. First, a long list of potential sources is given with the number of sentences that were found in that source listed. Sometimes the same source is listed twice with a different number of sentences found, which is quite confusing. Clicking on the source now opens up a page with marked sentences. Little flying windows open up over the marked sentences. Even if only a portion of the sentence is in the source given, the entire sentence is highlighted. The sources are only linked in the flying window; they must be opened separately. Since there is no marking in that document and more of the sentence is potentially marked than is found in the source, it can be very trying to document the plagiarism. The report cannot be stored; this makes it quite useless as documentation for an examination board.

	
Usability	The system is quite confusing to use. Although the files are uploaded rapidly, it takes a good bit of time for the reports to be generated. The interpretation of the results is not easy to understand and quite difficult to navigate. The system switches between English and German at times. The system also logs users out after a certain amount of time, something that is just irritating.

2.3.11. DupliChecker

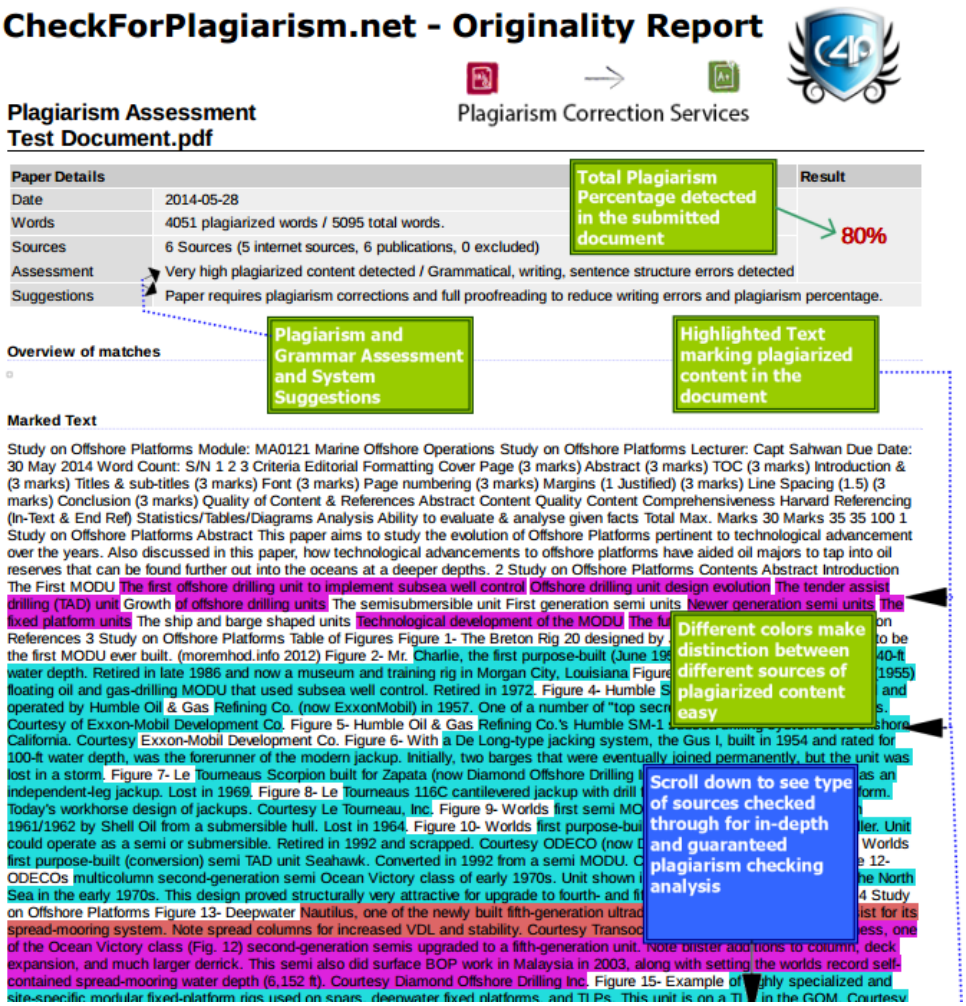
Product	DupliChecker
Company	N/A
Web site	http://www.duplichecker.com/
Comparison to	• Free access current web content
Location of processing	• Web based
Format of submission	• MS Word • HTML • RTF • Plain text
Pricing	Free with registration
Description	According to the web site, DupliChecker has been offered since 2006. It is a free, online web page for checking texts that are 1500 words or less for plagiarism. The site does not state who runs the site, the domain is registered through a proxy so the true owner is completely unknown. This is a major impediment for using the system in an educational setting. Duplichecker analyzes each sentence entered in the text box. The text can be entered either ways; copy-paste users text into the text box, enter the URL of the content destination required to be checked, or upload a text file.
Pros	• The system was able to find some sources, and was able to deal with the Hebrew tests.
Cons	• It was only possible to upload small documents up to 50 KB in .doc or .txt format, or to copy up to 1500 words into an online window. Interestingly, for some files there was no plagiarism found when the file was uploaded, but when the same text was copied into the window sources were found. • The user interface is very bad because the Web page contains many banners with advertisements.
Report	When a plagiarism is found, the position is marked and a link is given to the source. The copied portion is then marked on that page, but since there is no side-by-side view, it is easy to get confused about what portion was taken from which source in plagiarisms that are from multiple sources. Each source has to be inspected individually.

	
Usability	The system is very minimalistic and not usable for large documents. Only one document at a time can be checked. There is no side-by-side view available.

2.3.12. CheckForPlagiarism

Product	CheckForPlagiarism
Company	Academic Paradigms, LLC United States
Web site	http://www.checkforplagiarism.net/
Comparison to	• Free access current web content • Open access scholarly articles
Location of processing	• Web based
Format of submission	• MS Word (doc and docx) • Word XML • WordPerfect • PDF • HTML • RTF • Plain text (.txt)
Pricing	CheckForPlagiarism.net offers three subscription schemes: Students, Teachers and Professionals. Prices are in term of submission slots. **Students** can buy 5 submission slots for 20$. With one submission slot they can check document up to 25.000 words. Checking is through limited databases. For 39.95$ students can get 15 submission slots with 30.000 words limit per slot. In this case checking is through full databases. For **teachers** there are two possible offers: Individual teacher and Academic account. **Individual teacher** scheme cost **350$** and allows submission of 400 documents for the subscription period of 1-Year, with 25,000-words limit per document. **Academic account** is suitable for most Schools, Colleges, Universities, and Polytechnic Institutes. One-year subscription is **1188$** (99$ per month). It allows unlimited document submissions and free user accounts for faculty and students. **Professionals** scheme is aimed at writers, bloggers, researchers, and organizations. **Monthly** access costs 95$ and it allows 20 document submissions / every 24-hrs with 30 days validity period and 25,000-words limit per document. Yearly access costs 850$ and it allows 20 document submissions / every 24-hrs during 365 days with 50,000-words limit per document.
Description	CheckForPlagiarism.net provides a service for students, teachers, researchers, and professionals to check their documents, articles, papers, assignments, thesis, dissertations etc for originality using a patented

	sentence structure and synonym checking technology approach. Also it check for grammatical errors present in submitted documents are analyzed. System can check documents in most western and eastern scripts: English, French, German, Spanish, Italian, Danish, Portuguese, Chinese (simplified and traditional), Japanese, Korean, Hindi, Arabic, (and over 80 other western and Eastern scripts), etc. Basically, all languages written in UTF-8 encoding can be checked through system. CheckForPlagiarism.net was created by dedicated professionals, teachers and students to combat both, online and offline based plagiarism. It is now with established presence across thousands of universities, colleges, schools, and companies across Europe, United States, Middle East, and Asia. Academic Paradigms, LLC. was formed in 2004 and is a brainchild of distinguished professors, teachers, and students who colluded to bring forth a CheckForPlagiarism.net - Academic Plagiarism Checking and Document Correction Services product which will help combat plagiarism while maintaining students' intellectual property and privacy. Their goal is not just to identify plagiarism but is rather an effort to educate students about what constitutes plagiarism and how to avoid it. Initially launched as a closed project for a few major universities in USA, CheckForPlagiarism.net has evolved as an independent and reliable service for professionals and students alike, with established presence across thousands of universities, colleges, schools, and companies across Europe and the United States. Using cutting edge sentence structure assessment and synonym identification technology CheckForPlagiarism systems checks submitted documents through billions of books, articles, magazines, academic and professional journals, academic and professional databases, in addition to, cached and live internet sources (public PDFs, blogs, forums, web sites, etc.). Our results are reliable and guaranteed to identify even the subtlest attempts at either intentional (deliberate) or unintentional (erroneous) plagiarism. In addition to plagiarism checking, system also assesses grammatical errors detected in submitted documents in English. CheckForPlagiarism.net takes privacy seriously. Document checking engine will match user submitted documents through patented algorithm, without divulging the contents of submitted document. Additionally, none of submitted documents are ever retained in CheckForPlagiarism database or shared with any third-party. Service for teachers provide students with the account login information which are created when signing up. Students enter login details on CheckForPlagiarism web portal to access a folder, specifically created for their school or class. Following this, the process of comparing documents with publications, books, journals and other sources starts. The system will send to teacher an e-mail/sms/text alert, as soon as the plagiarism scan is

	completed. Following the alert, teacher can then login to his/her account to download the reports.
Pros	• Results are backed by a full money back warranty.
Cons	• High price for service • It is possible that same service is offered on the site iPlagiarismCheck.com . The reason for this is not clear. • Sometime, from some unknown reason the web site does not respond at all.
Report	The reports show WHAT has been plagiarized from WHERE, thereby, highlighting plagiarized content in submitted documents, as well as marking all detected sources. Additionally, grammatical errors present in submitted documents are analyzed and marked in the report. 

	Relevant Sources (Web Matches) [1] http://petrowiki.org/History_of_offshore_drilling_units (4036 Words, 79.2%) [2] http://petrowiki.org/PEH%3AOffshore_Drilling_Units (3740 Words, 73.4%) [3] http://petrowiki.org/MODU_riser_and_mooring_systems (33 Words, 0.6%) [4] http://www.catrog.com/oil/0462.Atwood-Oceanics-Inc-lists-of-oil-rig-positions-for-general-labor.html (41 Words, 0.8%) [5] http://fataways.com/rigjob/0046.Atwood-Oceanics-Inc-can-general-labor-work-on-oil-rigs-with-no-ex... (48 Words, 0.9%) **Detected Publications Matches (Database Matches)** JSTOR Emerald Insight OnePetro Elsevier Journals ScienceDirect Journals IJPE 
Usability	The plagiarism scanner itself is simple to use; clear instructions take the user through the process step-by-step and scans usually take less than a minute (for smaller documents). In tests, it detected straightforward 'copy and paste' plagiarism and a plagiarised pdf. It also spotted the plagiarism of a website where some of the words had been changed, but not from a website where some words had been removed. It also failed to detect paraphrased work and an e-book which had been plagiarised. [12]. Sometime, from some unknown reason the web site does not respond at all.

2.4. Reviews of systems for plagiarism detection

It is possible to find on the Internet several comparative analysis of the system for prevention of plagiarism. Some of them are obviously written to promote one of them. There are few that are based on some evidences or tests.

One of the best is test conducted at the Hochschule für Technik und Wirtschaft Berlin under leadership of Prof. dr Debora Weber-Wulff. Staring from 2004, she periodically publishes reports on Plagiarism Detection System Test. It is possible to find on http://plagiat.htw-berlin.de/software-en/ test results from 2004, 2007, 2008, 2010 and 2013. Here will be presented only comparative summary table from 2013 report [20]. Full report can be found in appendix A.

The following table lists the point values awarded, although it should not be considered an absolute ranking for which a system can advertise “best in test”. Rather, it shows a relative ranking for effectiveness that must be considered together with the usability aspects. There are two columns given for this, one is for the number of properties on the usability checklist that were visible in the product, and the second column is a subjective usability score that represents the subjective feeling the testers had for how well the system works in an academic context.

Legend (% of total points, according to the ECTS grading scale):

Very Good	90% or higher
Good	80-89%
Adequate	70-79%
Poor	60-69%
Unacceptable	Under 60%

Test results [20]

Number	Test System	Effectiveness (Max. 130)	Percent	Usability Checklist (Scale: 1-27)	Subjective Usability Score Scale: 1-15 (Letter grades)
S13-06	Urkund	95	73%	12.5	10 (C+)
S13-03	Turnitin	87	67%	15.5	12 (B)
S13-19	Copyscape	87	67%	15	7 (D+)
S13-05	Ephorus	76	58%	19	9 (C)
S13-01	PlagAware	75	58%	19	11 (B-)
S13-18	Strike Plagiarism	75	58%	17	10 (C+)
S13-07	PlagScan	72	55%	17	9 (C)
S13-08	Compilatio	72	55%	15	4 (F)
S13-13	PlagiarismDetect Premium	72	55%	12	5 (D-)
S13-04	Docoloc	70	54%	13	4 (F)
S13-13	PlagiarismDetect Standard	65	50%	12	5 (D-)
S13-12	Duplichecker	63	48%	12	5 (D-)
S13-17	PlagTracker	41	32%	12	7 (D+)
S13-02	Plagiarisma	39	30%	7	2 (F)
S13-09	OAPS	39	30%	11	6 (D)
S13-10	PlagiarismFinder	38	29%	19	11 (B-)

The grading of the systems was done according to the ECTS grading categories that are used in universities for assigning grades to students. A “very good” is given to systems with 90% or more of the possible points, anything below 60% is considered unacceptable [20].

There are three systems in the “partially useful” category, Urkund, Turnitin, and Copyscape. While Urkund received a few more points than the other two systems, there were still some usability issues and the amount of points would still only be considered “adequate” on the ECTS scale. Turnitin was given a “good” overall usability grade, while Copyscape only scored “poor” on this aspect. All three systems, however, did not fare very well on the usability checklist [20].

The second group, the marginally useful systems with only between 48% and 58% effectiveness, includes eight systems. PlagAware scored “good” on the subjective usability and Ephorus, PlagScan, and StrikePlagiarism were deemed “adequate” in that respect. With regards to the usability checklist, Ephorus and PlagAware reached the “adequate grade”, with StrikePlagiarism and PlagScan passing with a “poor” mark [20].

The last group, the systems deemed useless for academic purposes, found practically no plagiarism, even if the systems such as PlagiarismFinder were actually graded “good” with respect to the usability [20].

Because of this extremely mixed result, it is not possible to recommend the use of a particular system, most particularly as there are many different use cases for the various systems and some are particularly useful for specific purposes, but not generally [20].

Another useful list of **Top 10 FREE Plagiarism Detection Tools for Teachers** is presented by Christopher Pappas, owner of blog eLearning Industry [22]. The article was originally written and published in November 2013. Thanks to useful suggestions of site readers and following of the latest developments article is updated in October 2015. Unfortunately, there is no explanation on criteria used for ranking. Of course, the ability of these services cannot be compared with paid services. However, these services can be very useful for occasional checks. The following is the complete list taken from [22].

---

1. **DupliChecker**
   - **Pros:**
     - 100% free.
     - Extremely easy to use.
     - Has the options of copy-pasting the text, entering the URL of the content destination required to be checked, or uploading a text file.
     - Registered users can perform 50 searches per day.
   - **Cons:**
     - Unregistered users can perform only 1 search per day.
   - **Paid Version:**
     - Not available.
2. **CopyLeaks**
   - **Pros:**
     - Offers entire website plagiarism scan.
     - Finds content duplication in more than 60 trillion pages over the internet.
     - Support of multiple file formats in any language.

        - CopyLeaks API allows you to integrate CopyLeaks service and include it as part of your product.
    - **Cons:**
        - Only for online content.
        - You need to create an account to use it.
    - **Paid Version:**
        - Free of charge at the moment, will soon add premium subscription to the service.
3. **PaperRater**
    - **Pros:**
        - Offers 3 tools: Grammar checking, plagiarism detection, and writing suggestions.
        - It is developed and maintained by linguistics professionals and graduate students.
        - Readability statistics.
        - Title validation.
    - **Cons:**
        - Cannot save reports.
    - **Paid version:**
        - Accepts longer documents (up to 6000 words).
        - Faster processing.
        - No banner ads.
        - Ability to upload documents.
        - $7.95/mo (with annual payment).
4. **Plagiarisma**
    - **Pros:**
        - Offers a free download of plagiarism software for Windows.
        - 190+ languages supported.
        - Searches website content from a URL.
    - **Cons:**
        - The report is for exact matches only.
        - The Synonymizer tool (rewrites sentences with synonyms to generate unique text) facilitates plagiarism.
        - Even when registered you cannot scan documents for more than 3 times per day.
    - **Paid version:**
        - Unlimited plagiarism checker with task scheduler.
        - Starts at $5.00 per month.
5. **PlagiarismChecker**
    - **Pros:**
        - 100% free.
        - Easy and detailed instructions.
        - Ideal for educators to check whether a student's paper has been copied from the internet.
        - The "Author" option allows for checking if others have plagiarized your work online.
        - Does not require any download or installation.

- **Cons:**
  - It searches phrases separately, which means that you need to hit “Enter” after each phrase.
- **Paid Version:**
  - Not available.

6. **Plagium**
   - **Pros:**
     - Very easy to use (via copy paste).
     - Scans up to 5,000 words at a time.
     - Perfect for a quick search on the web or social media.
   - **Cons:**
     - Free features are limited (e.g. you need to pay to upload files).
   - **Paid Version:**
     - From $0.004 to $0.08 USD by 1,000 characters for Quick search, Deep search, File search, or Alert.
7. **PlagScan**
   - **Pros:**
     - Updates you about the progress continuously.
     - Does not require any download or installation.
   - **Cons:**
     - Scan is limited to 1000 at a time.
     - Rather complicated interface.
   - **Paid Version:**
     - Variable plans for private users, schools, universities, and companies.
8. **PlagTracker**
   - **Pros:**
     - Very quick to scan more than 20 million academic works for any plagiarized copy.
     - Clear instructions on how to use it.
     - Offers report with details about your work.
   - **Cons:**
     - Not 100% accurate; you may need to use an extra plagiarism detection tool to make sure your content is authentic (note: Never check through only one service anyhow).
   - **Paid Version:**
     - Checks a larger database of documents.
     - Grammar check.
     - $14.99 USD per month.
9. **Quetext**
   - **Pros:**
     - 100% free.
     - Easy to use interface.
     - Unlimited usage without having to create an account or download software.

- **Cons:**
  - You cannot upload files, only copy and paste text.
- **Paid Version:**
  - Not available.

10. **Viper**
    - **Pros:**
      - 100% free.
      - Scans your document through more than 10 billion resources such as academic essays and other online sources.
      - Offers side-by-side comparisons for plagiarism.
      - Scans against essays on your computer.
    - **Cons:**
      - Requires a download.
      - Is available to Microsoft Windows users only.
    - **Paid Version:**
      - Not available.

2.5. Review of antiplagiarism policy

2.5.1. European level strategies

Problem of research misconduct on European level is not regulated by the law that applies to all European Member States, but by Code of Conduit. The work of the European Science Foundation (ESF) Member Organisation Forum on Research Integrity together with All European Academies (ALLEA) produced the consensus document "The **European Code of Conduct for Research Integrity**", launched at the Second World Conference on Research Integrity held in July 2010. The code addresses good practice and bad conduct in science, offering a basis for trust and integrity across national borders [24].

This Europe-wide code offers a reference point for all researchers, complementing existing codes of ethics and complying with national and European legislative frameworks. It is not intended to replace existing national or academic guidelines, but represents agreement across 30 countries on a set of principles and priorities for self-regulation of the research community. It provides a possible model for a global code of conduct for all research [24]. The European Code of Conduct for Research Integrity says that researchers, public and private research organisations, universities and funding organisations **must** observe and promote the principles of integrity in scientific and scholarly research. These principles include:

• honesty in communication;

- reliability in performing research;
- objectivity;
- impartiality and independence;
- openness and accessibility;
- duty of care;
- **fairness in providing references and giving credit**; and
- responsibility for the scientists and researchers of the future.

Code of Conduct [24] mentions plagiarism in two places:

“Plagiarism is a violation of the rules of responsible conduct vis-à-vis other researchers and, indirectly, harmful for science as well. Institutions that fail to deal properly with such wrongdoing are also guilty. Credible allegations should always be investigated. Minor misdemeanours should always be reprimanded and corrected.”

“A third category of misdemeanour is plagiarism in proposing, performing, or reviewing research, or in reporting research results. Plagiarism is the appropriation of another person’s ideas, research results or words without giving appropriate credit. The precise wording of an idea or explanation or illustrative material (such as original figures and photographs, as well as lengthy tables) in textbooks or popular material are protected by copyright laws, but nevertheless can be subject to plagiarism. Plagiarism is of a different order since it is supposed to be more injurious to fellow scientists than to science as such. However, we have seen that openness is one of the basic integrity principles, and that progress in science depends on communication and discussion among fellow scientists and on a well-functioning peer-review system. And if scientists would hesitate or even refuse to practice this openness and communication for fear of not being recognised as devisor or author the quality of science would suffer as well.”

When a country or an institution adopt a code of conduct for research integrity, then it is necessary to provide support of his compliance. In order to ensure compliance of the national / institutional Code of Conduct for Research Integrity by the research community, and thus counteract the research misconduct, the ESF Member Organisation Forum on Research Integrity proposed framework for research integrity governance in document titled „Fostering Research Integrity in Europe” [25]. In fact, this document present guidelines for setting-up **national structure for research integrity governance**. Because of the great importance of this document for the system for the prevention of plagiarism in Montenegro, hereafter will be presented proposed framework in more detail. Entire text is taken from [25].

The challenge in developing a nationally relevant framework for research integrity governance is to ensure that **global principles can be translated into national policy and practice**. The starting point in each country will be different but there is scope to enhance all existing systems. All systems need:

• A **mandate**: a clear and authoritative national statement, charter or legislative support to underpin research integrity governance structures. In devising such a mandate countries can draw on the experiences of others;

• **Fair and transparent processes** at both local and national level and a balance between prevention and sanction, with the emphasis on prevention, in whatever processes are adopted;

• Clearly-assigned **roles and responsibilities** for prevention, investigation and imposition of sanctions at local and national level.

In addition, there are a number of **core requirements** that should apply at an operational or functional level including [25]:

Core requirements for embedding principles of good research practice and research integrity into research culture include:

- **Mechanisms for prevention, education and awareness** at all levels. These include, but are not confined to, training in GRP from the start of a career in science or scholarship and making research integrity an integral component of supervision and mentoring;
- Robust procedures for **data management**, training in good practices in relation to data collection and centralised storage;
- **Guidance** for researchers and other stakeholders and tools for information sharing on training materials, guidelines and misconduct scenarios;
- Agreed procedures for **sharing** case information to establish a body of data on research misconduct locally, nationally and across Europe and to improve current procedures.

Core requirements for individuals and institutions where allegations of malpractice or poor research conduct have been made include:

- **Procedures for investigation** that are legally robust and enshrine minimum legal standards for the protection of the individual;
- Clear **procedures for allegations**, including agreement about who can raise a concern and how they can do this (anonymous, named), the form in which it should be raised (verbal, written) and the authority to whom concerns should be addressed;
- Agreement at the outset on the **transparency and/ or confidentiality** of misconduct investigations and clarity about when to reveal outcomes to third parties (press, national oversight bodies, funders) and under what circumstances;
- Decisions on **procedures for appeal**, and the types of appeal, for example, concerning either the scientific or the procedural elements of an investigation;
- Decisions on **sanctions** that can be imposed, appropriate to the level of departure from codes of GRP;
- **Protection for whistleblowers**, in law if necessary, since the success of research integrity governance structures depends on their willingness to step forward.

The OECD Global Science Forum sponsored an international consultation of government-designated officials and experts, based on an initiative from the Delegations of Japan and Canada. On February 22-23, 2007, in Tokyo, the Global Science Forum and the Ministry of Education, Culture, Sports, Science and Technology of Japan (MEXT) held the Workshop on **Best Practices for Ensuring Scientific Integrity and Preventing Misconduct** [30].

The goal of the OECD Workshop was to deepen the understanding of the underlying phenomena, to identify the range of possible solutions and, based on experience, to enumerate the pros and cons of various practical measures, lessons learned and good practices. One of the results of the workshop is report which summarises the deliberations that took place in Tokyo. Report contains review of misconducts and propose strategies to prevent it. Following table, taken from the report [30] classifies types of misconduct by scientists.

<table>
<tr>
<td>Core “Research Misconduct”
• Fabrication of data
• Falsification of data
• Plagiarism
FFP normally includes:
• Selectively excluding data from analysis
• Misinterpreting data to obtain desired results (including inappropriate use of statistical methods)
• Doctoring images in publications
• Producing false data or results under pressure from a sponsor</td>
<td>Research practice misconduct
• Using inappropriate (e.g., harmful or dangerous) research methods
• Poor research design
• Experimental, analytical, computational errors
• Violation of human subject protocols
• Abuse of laboratory animals</td>
</tr>
<tr>
<td>Data-related misconduct
• Not preserving primary data
• Bad data management, storage
• Withholding data from the scientific community

NB: The above applies to physical research materials as well</td>
<td>Publication-related misconduct
• Claiming undeserved authorship
• Denying authorship to contributors
• Artificially proliferating publications (“salami-slicing”)
• Failure to correct the publication record</td>
</tr>
<tr>
<td>Personal misconduct
• Inappropriate personal behavior, harassment
• Inadequate leadership, mentoring, counselling of students
• Insensitivity to social or cultural norms</td>
<td>Financial, and other misconduct
• Peer review abuse e.g., non-disclosure of conflict of interest, unfairly holding up a rival’s publication
• Misrepresenting credentials or publication record
• Misuse of research funds for unauthorised purchases or for personal gain
• Making an unsubstantiated or malicious misconduct allegation</td>
</tr>
</table>

It is obvious that plagiarism, together with fabrication and falsification, represents one of most important type of misconduct. Hence, these three misconducts are called "**core misconduct**". Therefore, they are always representing basic topics in the code of conduct.

2.5.2. European level practice

European Union through the Education and Culture manages and monitors academic integrity. Under the framework of Lifelong Learning Programme, between October 2010 and September 2013, the project Impact of Plagiarism in Higher Education Across Europe was funded [29]. This project aimed to establish how the difficult and growing problem of student plagiarism was being tackled by Higher Educational Institutions (HEIs) across the European Economic Area and beyond. An of project activity was conducting "state of the play" survey in 27 EU member states. The survey concerned investigating policies for plagiarism in higher education and involved participants from all member states of the EU in order to achieve a comprehensive understanding of the current "state of play" across Europe. The Phase 1 survey focused on:

- Policies and procedures for detecting and handling cases of student plagiarism;
- Whether the current policies and procedures were working;
- What was being done to prevent student plagiarism;
- How policies and procedures were determined, monitored, reviewed and updated;
- Management and teaching staff perspectives;
- Student perspectives;

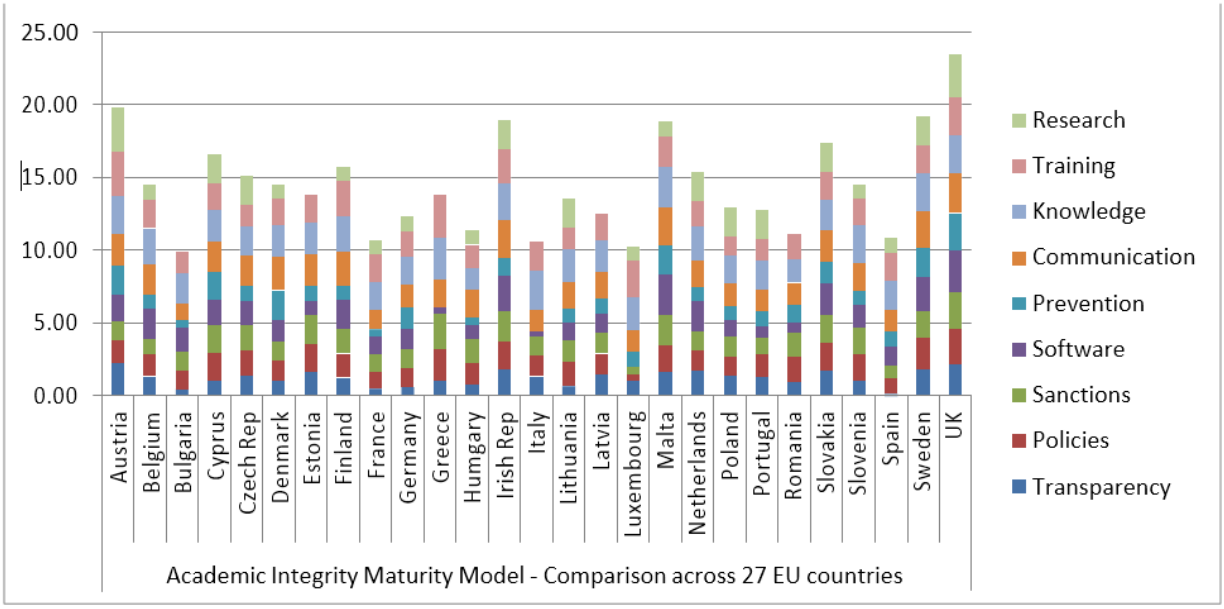
Based on the survey, A report was prepared for each of the 27 EU member states surveyed, detailing relevant findings and making recommendations for future developments, institutionally and nationally. The reports were made available through the project web site http://ippheae.eu . The project team developed the **Academic Integrity Maturity Model** (AIMM) prototype, which was applied for each EU country, based on all aspects of the IPPHEAE survey data collected for on country.

The AIMM prototype was based on a number of metrics derived from survey responses, using both qualitative and quantitative data. For each country a "maturity level" score in the range 0-4 was calculated for each category. These scores were then combined using a weighted average to provide the overall AIMM score for each country. These national scores were based on **nine categories**:

- Transparency in academic integrity and quality assurance;
- Fair, effective and consistent policies for handling plagiarism and academic dishonesty;
- Standard range of standard sanctions for plagiarism and academic dishonesty;
- Use of digital tools and language repositories;
- Preventative strategies and measures;
- Communication about policies and procedures;
- Knowledge and understanding about academic integrity;
- Training provision for students and teachers;
- Research and innovation in academic integrity.

The AIMM profile for each country, in the form of a Radar Chart, is provided with the national summaries that follow in Section 3 of this report. The combined AIMM scores were based on the mean of the scores for the 9 categories for each country, giving a measure of the maturity of responses to academic integrity for each country. It is clear from the survey responses that there are great differences between institutions within each country in terms of the maturity and effectiveness of policies and procedures for academic integrity. Further refinement of the AIMM prototype is needed to adapt this tool for assessing the maturity of institutions rather than countries [29].

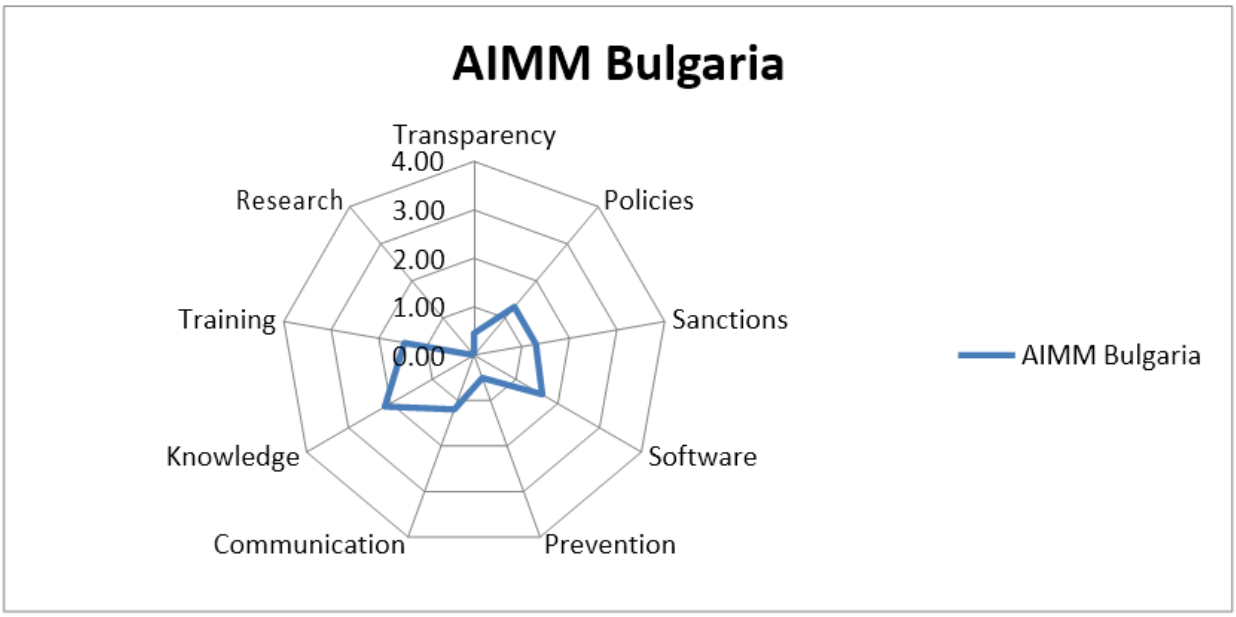
According to the report, best performing country is United Kingdom, followed by Austria and Sweden. The worst performing country is Bulgaria.



Hereinafter, as an illustration, the results are shown for UK and Bulgaria.

Bulgaria

Academic Integrity Maturity Model



Strengths, opportunities

- Some institutions are beginning to use digital tools for detecting cases of plagiarism
- Some Bulgarian academics have worked and studied overseas and would like to implement policies they have seen working elsewhere.

Weaknesses, threats

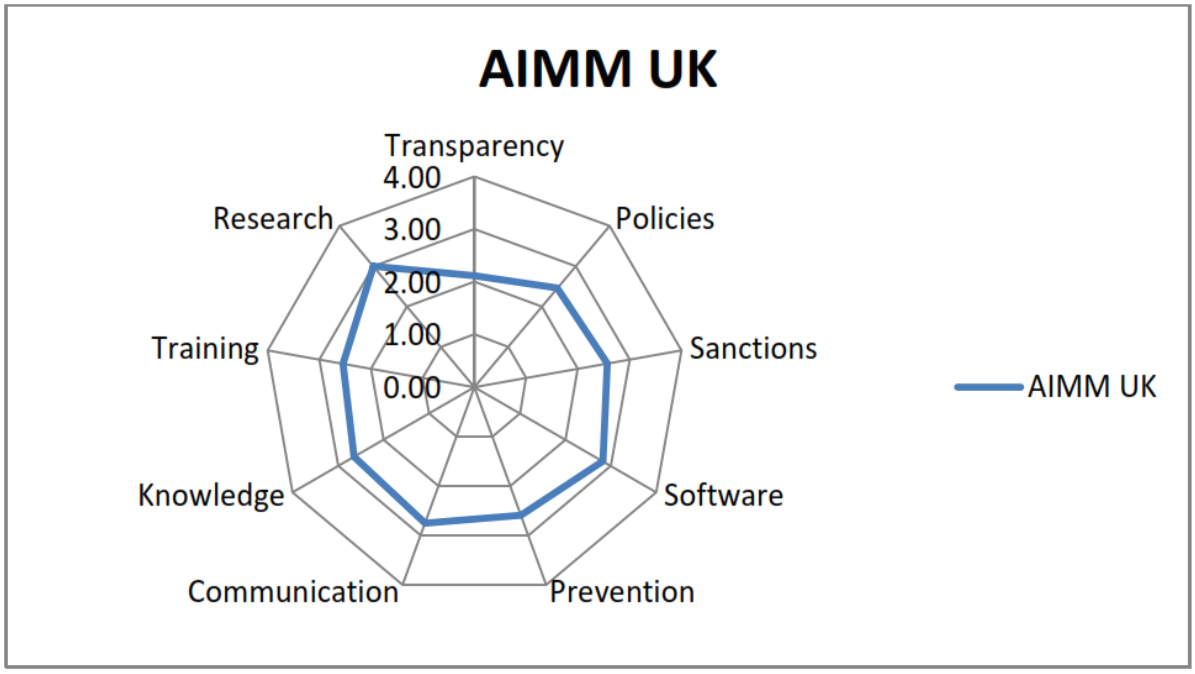
- There is a reluctance to discuss plagiarism in academic circles and more enlightened approaches to discouraging or penalising dishonesty are discouraged
- No research has been conducted about academic integrity in Bulgaria
- Penalties for academic misconduct are generally very lenient or not applied
- Although there are no statistics available, respondents report that student plagiarism and other forms of academic misconduct are common in Bulgaria
- There is no repository in the Bulgarian language for academic theses and papers or for collecting student work
- There is a culture of blaming teachers for poor student performance, which discourages reporting or applying penalties for plagiarism or cheating.

Overall AIMM score 9.91/36, ranking is 27th out of 27 countries surveyed

Notes

The results are based on responses from 93 students, 6 teachers, one senior manager and one national interview from a total of 5 different organisations and institutions.

United Kingdom



- A considerable amount of research into plagiarism and evaluation of policies and systems has been conducted by academics from across the UK since about 2001. The findings from this research have been disseminated as papers and guidance notes, available globally
- A culture of oversight in the UK through national quality auditing and external examining systems has helped to raise transparency of assessment systems and processes, which directly impacts on accountability for decisions on academic misconduct and plagiarism
- **All UK HEIs use some form of software tool for aiding the detection of plagiarism; increasingly more institutions have introduced a policy and system for systematic use of such tools**
- Many institutions have implemented sophisticated techniques to counter plagiarism, by "designing out" plagiarism or through formative use of software tools in the classroom
- Institutional policies in many institutions are designed to ensure quick, consistent and fair responses and outcomes after accusations of academic misconduct
- The Office of the Independent Adjudicator (in England and Wales) handles student complaints about unfair practice and makes public the judgements

Weaknesses, threats

- Not all UK HEIs have transparent and fair institutional systems
- Ghost writing is a growing threat to academic standards, but can be difficult to prove

Overall AIMM score 23.49/36, ranking 1st out of 27 countries surveyed

Notes

- The results were based on responses from 338 students, 52 teachers, 8 senior managers, 2 student focus groups and 26 interviews.

The US, Denmark, Norway, Finland, Australia, Canada and Germany are among the small number of countries with established national research integrity procedures or guidelines and national offices to oversee their application. These offices vary in size and authority, with the most developed structures found in the US and the Nordic Countries [25]. Yet in these countries, although in smaller numbers, are occurring cases of research misconduct. It is therefore necessary continuous improvement of the established nationally relevant framework for research integrity governance.

For example, the **Netherlands** has decided to start an ambitious project to deal with academic misconduct and the reproducibility crisis. One major thrust of the project is a 5 million € grant called "Fostering Responsible Research Practices" that will include a nationwide survey. An additional 3 million € will be invested for encouraging replication studies [21].

The survey is intended to ask every scientist if they have ever committed research misconduct or "sloppy science". One of the driving forces behind the initiative Prof. Lex Bouter, professor of Methodology and Integrity from the VU Amsterdam.

There have been a number of high-profile cases of academic misconduct in the past few years, both in Denmark and in Sweden. The **Swedish** government has just issued a directive requesting that an independent examiner look at the necessity of changing the rules for investigating cases of academic misconduct in research. They request that a proposition be made for a timely and legally secure process for dealing with accusations of academic misconduct [22].

Denmark is a bit further along in the same process. They have had quite a number of scandals, so the UVVU (the Danish organization that looks at accusations of academic misconduct) has already prepared their own suggestions [22].

In addition to the national structure for research integrity governance, it is necessary that every academic and research institutions have its own policy of combating plagiarism and other issues of academic misconduct. Most of Western-country universities and institutes have on their web site web page(s) dedicated to academic misconduct. All information that students, teacher and researchers have to know about academic misconduct are published there. As an example of good practices is Academic Integrity web page of the USA based Skidmore College. Besides information on https://www.skidmore.edu/advising/integrity/ they offer Academic Integrity Handbook https://www.skidmore.edu/advising/documents/AcademicIntegrityHandbook_Web.pdf which help people not to violate academic integrity.

In order to monitoring and advising on standards and quality in **UK** higher education Quality Assurance Agency for Higher Education (QAA) is developed as the independent body[28]. QAA safeguards standards and support the improvement of quality for students - whether they study at a university or college in the UK or in any other location worldwide where courses lead to UK higher education qualifications. QAA's review work is done under contract with the funding councils (the public bodies that help fund UK higher education), and QAA guidance is developed through close working with the providers themselves. QAA acts independently of both the funding councils and the higher education sector. The main areas of QAA works include [28]:

- publishing and maintaining the UK Quality Code for Higher Education
- conducting evidence-based **external reviews** of higher education providers and reporting findings publicly
- investigating concerns about academic quality and standards
- conducting research and sharing information about **good practice** to improve quality
- involving students in quality assurance work, governance, and reviews
- consulting and working with all those who have an interest in the quality of UK higher education
- working internationally with other agencies on common criteria for standards and quality
- providing **training** and events to help higher education providers develop and improve their own quality assurance processes
- advising government on applications for degree awarding powers and the right to be called a university in the UK
- regulating the Access to Higher Education Diploma which provides an alternative route into higher education for adults.

2.5.3. Antiplagiarism policy in the region of Western Balkan

Cases of plagiarism in the Western Balkans are very common. They are not given adequate attention, so it seems that plagiarism is not prevalent. Most cases are not prosecuted at all, and if it comes to that, the accused is acquitted.

Cases of plagiarism offers adequate attention only when the accused politicians. Such cases were happened in Croatia, Serbia and Bosnia and Herzegovina. In almost all cases of political influence processes are interrupted and the accused were not punished.

This suggests that the academic integrity of the countries of the Western Balkans at a very low level. No country has adopted a strategy for academic integrity governance. Also, no one country has anti plagiarism strategy in place.

In Croatia, all universities have ethical codes, but there is no national wide strategy for fighting plagiarism. However, there are faculties that are a good exception. For example, School of Medicine, University of Zagreb has its own Committee for Academic Integrity and well developed rules for good academic practices. In Croatia, only few universities have access to service for plagiarism detection and they are using iThenticate.

Macedonia also does not have national antiplagiarism policy. However, most universities have their own code of ethics, which, more or less, treated plagiarism. All universities have access to the plagiarism detection service Plagijati (http://plagijati.mon.gov.mk/) provided by Macedonian government.

Despite of many cases of plagiarism, even in the PhD thesis, Serbia has no national antiplagiarism strategy nor national plan for improvement of the academic integrity. Some state faculties (only few) and one private university have access to the service for plagiarism detection (iThenticate). These services are used exclusively for checking of scientific papers,

but not for students work. The students are not educated on academic integrity at all. Instead, all measures concern to the punishment of the students after misconducts.

Bosnia and Herzegovina has no national strategy for plagiarism prevention. Most of universities has ethical codes by which regulate plagiarism issues. Only one university (Pan European University Aperion) has access to the plagiarism detection service. They are using Ephorus system which is recently acquired by the Turnitin company.

3. Relevant legislation and documents related to the plagiarism prevention

3.1. National legislation

The area of science and higher education in Montenegro are regulated with the Constitution of Montenegro and two laws: Law on Scientific-Research Activity and Law on Higher Education.

Article 27 of the Constitution of Montenegro from 2007 contains provisions concerning dignity of a human being with regard to the application of biology and medicine. Last part of article 27 explicitly says that it is prohibited to perform medical and other experiments on human beings, without their permission.

Article 76, which refers to the freedom of creation especially underline importance of authorship in the field of science, technical invention and art. It says that “authors shall be guaranteed the moral and property rights”.

Finally, article 77 points State as responsible for protection of the scientific, cultural, artistic and historic values.

Article 27: Bio-medicine

The right of a person and dignity of a human being with regard to the application of biology and medicine shall be guaranteed. Any intervention aimed at creating a human being that is genetically identical to another human being, living or dead shall be prohibited. It is prohibited to perform medical and other experiments on human beings, without their permission.

Article 76: Freedom of creation

The freedom of scientific, cultural and artistic creation shall be guaranteed. The freedom to publish works of science and arts, scientific discoveries and technical inventions shall be guaranteed, and their authors shall be guaranteed the moral and property rights.

Article 77: Science, culture and arts

The state shall encourage and support the development of education, science, culture, arts, sport, physical and technical culture. The state shall protect the scientific, cultural, artistic and historic values.

Law on Scientific-Research Activity [32] tackles the issue of ethics, and thus indirectly the research misconduct, only in article 4. It relates to the principles of scientific research activity and in paragraph 6 and 7 it says:

Article 4

Scientific research activity shall be based on the principles of:
……..
6) Freedom and autonomy of scientific creation which needs to be morally and intellectually independent from any political authority and economic power and which is performed with respect for ethical standards and **principles of scientific truth** and critical thinking;
7) **Ethics and responsibility** of persons performing scientific research work for the consequences of their work;
…….
10) Protection of person and dignity of individuals who perform scientific research work;
…….

The law does not explicitly treated research misconduct nor plagiarism. Also, the law does not mention the by-laws that would more closely regulate these issues

The **Law of Higher Education** [31] in the article 5 explicitly recommends that higher education institution establish Code of ethics.

Code of Ethics

Article 5

The code of ethics of higher education institutions defines the essential and general value principles based on ethical rights and obligations within higher education, as well as protects the highest values of higher education through the application of adequate norms regulating academic relationships within the university community.

Article 36, paragraph 6 of the Law of Higher Education stipulates that the issue of the adoption of a Code of Ethics should be defined by the Statute of the HE institution.

Statute of Institution

Article 36

The statute of an institution determines in more detail the following:

…….

6) method of adopting the code of ethics of academic staff;

……..

The Law of Higher Education relates explicitly to the plagiarism. The article 78 defines how to treat plagiarized work and what are consequences for researchers. The law does not define penalties for researcher. It is not clear if this article relates also to the student's work.

Protection against Plagiarism

Article 78

An authorised work (professional, scientific or artistic) identified as plagiarism by a competent body shall be nullified, along with grades, awards, titles obtained by a person using plagiarism on the basis of such work.

An institution shall nullify all grades, awards, titles obtained by the person referred to in paragraph 1 of this Article at that institution, on the basis of such work.

The procedure of identifying plagiarism shall be determined by statute of an institution, in compliance with a **special law**.

What is very important is that the article says: “The procedure of identifying plagiarism shall be determined by statute of an institution, in compliance with a special law. “ .

Here also is not clear which **special law** refers this paragraph.

Finally, article 102, paragraph 2, connects students with the principles of academic ethics, but in very ambiguous form. It implies that all HE institutions should have Code of Ethics which cover student’s behavior.

Agreement on Studying

Article 102

A student and an institution shall conclude an agreement on studying, closely defining their reciprocal rights and obligations.

In addition to the agreement on studying, **students shall also sign statements with regard to meeting the principles of academic ethics**.

Contents of the agreement for public institutions referred to in paragraph 1 of this Article shall be determined by the Ministry and published on its website.

Agreement referred to in paragraph 1 of this Article shall include the obligation of an institution to provide continuance and completion of education in case of discontinuing the work of an institution or a study programme.

3.2. University regulations

Montenegro has three universities, of which one is state university and two are private. As a part of University of Montenegro, there are two institutes. Also, there are ten independent faculties, of which one is state owned.

All three universities have their own ethical codes introduced by their Senates. According to these codes, academic staff in their work, actions and behavior is obliged to respect ethical principles, principles of scientific truth and criticism. Beside this, research and teaching activities at the university must be morally and intellectually independent of all political authority and economic power. Codes of Ethics provides that the Court of Honor establish responsibility and impose measures for violation of ethical principles.

3.2.1. University of Montenegro

The Code of Ethics and Statute of the University of Montenegro are available on the university's website, allowing both students and academic staff to be well-informed.

The Statute of **University of Montenegro** contain several articles concerning ethical issues and plagiarism. On the beginning of Statute, in article 3, paragraph two is written: “University regulates the basic moral and professional principles of academic and other staff by the Code of Ethics.”

Article 32, paragraph 25 says that Senate regulates the procedure for proving plagiarism, in accordance with the special law. This paragraph is referred to a “special law”, which is mentioned in Article 78 of the Law of Higher Education, that was never adopted.

In Chapter 5 of the Statute, which relates to academic staff of the university, is defined procedure in case of academic misconduct and specially in the case of plagiarism.

Article 102

Ethics Code contains standards of conduct customized for activities of the University, as well as the standards of unacceptable behavior, including protection against **plagiarism**.

The process of determining plagiarism is carried out by a special commission appointed by the Senate.

The procedure referred to in paragraph 2 of this Article shall be expeditious and is conducted with due respect for the rights of all participants. The knowledge and information gathered during the proceedings shall be confidential until its completion.

Based on evidence collected in the previous proceedings, which conducts the committee referred to in paragraph 2 of this Article, the Senate makes the decision.

From this article, it is not clear under which rules of proceedings the process of determining plagiarism is carried out. Also, criteria of what is plagiarism and what is not missed. Since this article is in chapter dedicated to Academic staff, it is not clear if it relates to student’s plagiarism. There is no other article in Statute regulating student’s plagiarism. Article 103 also relates only academic staff with the Code of Ethics.

Article 103

Academic staff is obliged to in its work, activities and behavior at the University adheres to the Code of Ethics and to protect the reputation of the University.

The Senate adopts the Code of Ethics on the proposal of the commission appointed by the rector.

Commission referred to in paragraph 2 of this Article consists of one representative of the academic staff of each organizational unit of the University.

Code of Ethics defines the principles and rules of conduct of academic staff to be observed in order to preserve and improve the dignity and reputation of the University, according to the mission of the University, as well as procedures in case of violation of ethical principles.

When the students are concerned, the statute does not explicitly mention plagiarism as misconduct, but uses other, wider, terms. Articles 148 defines violations of the obligations of students. Among other things, this article is defined as a serious offense gross violation of morality and code of conduct. It is not clear which document defines code of conduct or morality.

The **Code of Ethics of the University of Montenegro** is a comprehensive and well-written document. Contrary to the Statute, the Code of Ethics, in the preamble, states that academic and other staff and **students** should abide by code. In the Article 6 is defined, as illegal operations, the vast majority of widely recognized academic misconduct, as well as plagiarism. The only drawback of this code is that there is no precise definition of plagiarism.

Second part of the Code of Ethics defines procedure in the case of violation of professional and moral principles.

3.2.2. University of Donja Gorica

The Code of Ethics and Statute of the University of Donja Gorica are not available on the university's website, so both students and academic staff cannot be easily informed of their rights and duty.

3.2.3. Mediterranean University Podgorica

The Code of Ethics and Statute of the Mediterranean University are available on the university's website, allowing both students and academic staff to be well-informed.

The **Statute** in his first article, paragraph 16, says that statute defines the way of making the Code of Ethics of the **academic staff**. It implies that Code of Ethics is not valid for students. Further, Article 41 defines that one of duty of Senate is to adopt a code of ethics.

The code of academic ethics is defined in the article 85.

Article 85

Academic Ethics Code contains standards of conduct customized for activities of the University, as well as the standards of unacceptable behavior, including protection against plagiarism.

The process of determining **plagiarism** is determined by the Senate.

The way of managing of the process and decision referred to in paragraph 2 of this Article shall be determined by the Statute in accordance with the **special law**.

The institution is obliged to declare null and void all ratings, awards, rank and title of the person who used plagiarism acquired on the basis of such work.

Academic staff is obliged to take in their work and behavior at the University to comply with the Code of Academic ethics and to protect the reputation of the University.

Code of Academic Ethics adopted by the Senate on the proposal of the commission appointed by the rector.

Commission referred to in paragraph 2 of this Article consists of one representative from among the academic staff of each organizational unit of the University.

Code of Academic Ethics defines the principles and rules of conduct of academic staff who must followed in order to preserve and improve the dignity and reputation of the University, according to the mission of the University, and the procedure in case of violations of ethical principles.

As in the case of University of Montenegro, paragraph 3 refers to not defined “special low”.

The article 110 of Statute defines consequence in the case of academic misconduct, including plagiarism.

Article 110

A person who has acquired a certain level of education and qualification degree can be by the decision of the Governing Board of the University, at the proposal of the Senate, take away qualifications acquired for a certain level of education and diplomas in cases of fraud or deception, including **plagiarism** and stealing at someone else's authorship, copyright infringement and other unethical practice in the preparation of the master thesis, dissertation or another written works.

It is obvious that no one article concerns to the issue of student plagiarism. However, the "Mediterranean University" has Rules book on disciplinary proceedings and disciplinary responsibility of students. This Ordinance in Article 11 provides for penalties for cases of misconduct of students including cheating. Also, Rules book of doctoral studies in article 31 says that: “PhD student is obliged, when submitting the dissertation, to sign a statement of authorship. Authorship of finished work has to be checked by software.”

The Mediterranean University adopted **Code of Academic Ethics** in 2013. The code governs only the behavior of academic staff. The behavior of students is not regulated by this document. Article 6 concerns plagiarism and it says: “Academic and professional staff should not use someone else's work or ideas without citing sources.” Rest of the code deals with other academic misconduct.

Code of Academic Ethics does not explicitly define procedure in the case of violation of ethical principles written in the code. Instead, Article 23 promotes Ethics committee. Article 24 defines that rules of proceedings should be in line with Rules of Procedure of the Ethics Committee.

4. Analysis of the current limited activities in Montenegro related to the plagiarism prevention and available resources

There is evidence of individual attempts to prevent plagiarism in some cases. But, such activities are not efficient because of lack of knowledge and access to services.

4.1. Legislation and university regulations

According to facts presented in chapter 3 of this study it can be said that there is a good legal basis developed in the period 2010-2016, but with limited usability, both at national level and at the university level.

The problem at the national level is the incompleteness of the legal framework that treats plagiarism. The biggest problem is lack of “special law” which is mentioned in article 78 of the **Law of Higher Education**. This law supposed to define procedure for identifying plagiarism. Unfortunately, this law is not adopted. As a consequence, all university rulebooks have ambiguities.

Second serious problem of the Law of Higher Education is that it does not pay enough attention to issue of students’ ethics.

The **Law on Scientific-Research Activity** does not explicitly treated research misconduct nor plagiarism. Also, the law does not mention the by-laws that would more closely regulate these issues. It means that research institutes that do not belong to universities is not cover by any law in the field of research misconduct.

Analysis of university regulations shows that all universities respect the Law of Higher Education in the field of Ethics. They do define method of adopting the code of ethics of academic staff in their statutes. Also, all universities have ethical codes. The main drawback of all code of ethics is that they do not cover students’ behavior and hence students’ plagiarism.

Some of code of ethics do not precisely define procedures in the case of violation of ethical principles, as well as consequences and penalties.

4.2. Human resources

All three universities in Montenegro have human resource which are in line with national legislation in quantitative and qualitative sense. This is especially true for academic staff.

According to field research universities have not organized trainings on academic misconduct and academic good practices. The same is true for training on proper way of providing references and giving credits and preventing plagiarism.

Majority of academic staff is not familiar with methods and existing tools for plagiarism detection.

4.3. Equipment and services

All universities in Montenegro have necessary computer equipment for preventing plagiarism. Majority of services for detecting plagiarism require only PC (or laptop or tablet) with Internet connection and web browser installed.

For efficient detection of similarities in the scientific papers it is necessary to have access to service which enable comparison with paid journals. At the moment, no one university in Montenegro has access to such service.

5. Proposal for tailor-made system(s) for the prevention of plagiarism in Montenegro

5.1. The scope of proposal

The scope of this study is system for the prevention of plagiarism in Montenegro. Plagiarism is only one form of misconduct in the processes of scientific and scholarly research. Other forms, like ghostwriting, fabrication, falsification or essay mills are also very often and as dangerous as plagiarism. Sometimes these forms of misconduct are overlapping making prevention, detection and handling of plagiarism more difficult. Also, there is no clear boundaries between academic and research work. Very often the same person changes roles during the day, from PhD student to teacher and to researcher. Hence, it is possible to use term academic misconduct taking into the account that this term also covers research misconducting. In this study the term academic misconducting will be used in the sense that it includes processes both in scientific and scholarly research.

Therefore, this study proposes **national structure for academic integrity governance** as a comprehensive framework for suppression of **academic misconduct**. Proposal is in line with ESF recommendation, hence compatible with similar EU structure. In the first phase structure will allows fight against plagiarism and other core misconducts, but later Montenegrin society may use the same structure for suppression of other more specific forms of academic misconduct.

5.2. Montenegrin structure for academic integrity governance

The basic premise in the design of the Montenegrin structure for academic integrity governance (**MOSAIG**) is that its primarily aims is to prevent academic misconduct, but if it does happen there are mechanisms for the corrective actions. Hence, national structure for academic integrity governance consists of three building blocks:

a) Fundamental elements
b) Preventive elements
c) Processing elements

Fundamental elements make up a necessary condition that the structure for academic integrity governance can be built at all. They should help to embed principles of good research practice and research integrity into research culture. **The purpose of the fundamental elements is to create conditions that will permanently raise the level of academic and research integrity in Montenegrin society and thus over time reduce the number of cases of plagiarism.** Those elements should be generally agreed and accepted at national level. There are three fundamental elements:

- Code of Conduct
- Good academic practice

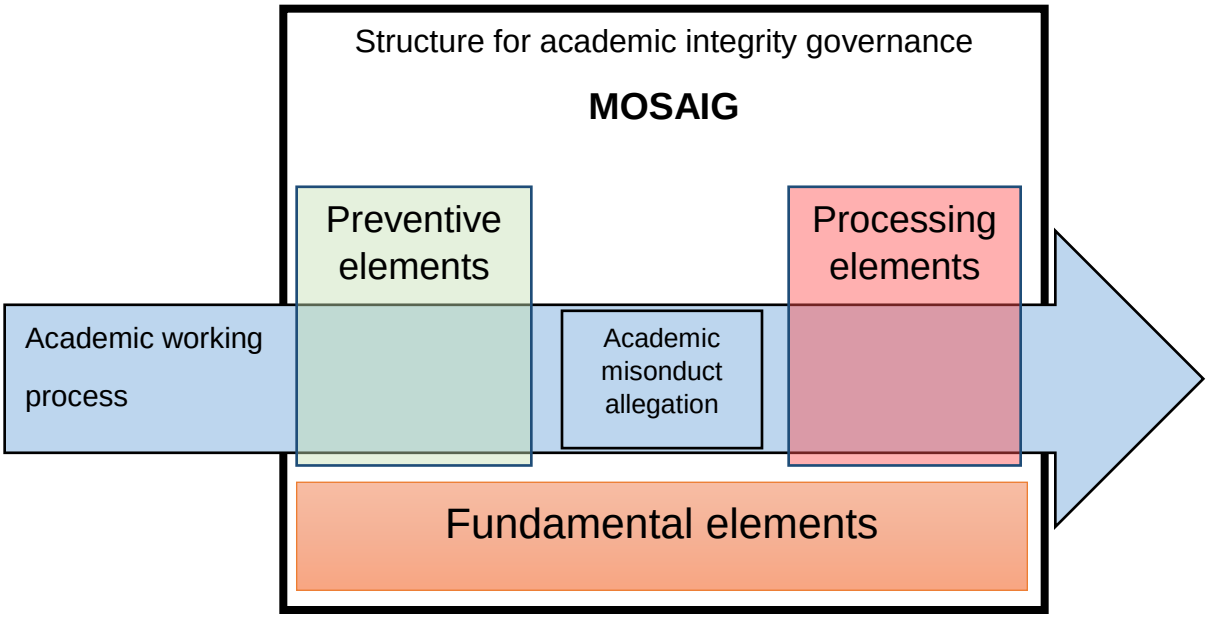
- Law on Academic Integrity

Preventive elements aim to create the conditions, at the national level, that will demotivate people to do academic misconduct. If these elements are well done, they can raise the reputation of the academy and sciences and to save a lot of effort and money. There are four preventive elements:

- Academic and research culture
- Procedures and equipment for data management
- Guidelines and training materials
- Procedures for pooling case information

Processing elements are used in the aftermath of allegations regardless of whether academic misconduct really occurred or not. They have to be based on consistent compliance with national laws. There are two processing elements:

- Consistent compliance with national laws
- Mechanism for monitoring and reporting



Hereinafter is given a closer description of these elements.

5.2.1. Code of Conduct

Before any activity in building Montenegrin structure for academic integrity governance, Ministry of Education and Ministry of Science of Montenegro should organize meeting of all important stakeholders including, but not limited to : Ministry of Education, Ministry of Science, universities, Montenegrin academy of science and arts, Council for Higher Education, National Library of Montenegro. The aim of the meeting is to decide which institution / body will coordinating activities which will lead to the finished structure for academic integrity governance. Also, time frame and responsibilities for all stakeholders should be defined.

The first step in the building of Montenegrin structure for academic integrity governance should be national-wide consensus on definition of academic integrity and academic misconduct, as well as their scope. The initiative should come from the Ministry of Science and Ministry of Education. Initial proposal should be discussed by all relevant stakeholders: universities, Montenegrin academy of science and arts, Council for Higher Education and other. Coordinating institution for activities of adopting Montenegrin Code of Conduct should be Council for Higher Education.

The European Code of Conduct for Research Integrity [25] developed by the ESF (European Science Foundation) and ALLEA (All European Academies) should be used as starting material (the boiler plate text) to prepare first proposal for public discussions. The first proposal of Code of Conduct should certainly be adjusted to the Montenegrin specifics, but, because of international scientific cooperation and implementation of EU project, adopted definitions and scopes should not be significantly different from ESF definition.

Initial text of Code of conduct is given below. He is fully in line with the recommendations of the ESF, but the minor changed to accommodate the needs of Montenegrin society.

Montenegrin Code of Conduct for Research Integrity

Science, including natural and social sciences as well as humanities, is the systematised knowledge obtained through observation and experimentation, study and thinking. Scientific and scholarly research is carried out to determine the nature and principles of what is being studied. Despite their differences in content and methods all sciences have a common characteristic: they depend on arguments and evidence, i.e. observations of nature or of humans and their actions and products.

Researchers, students, universities, independent faculties, Montenegrin academy of science and arts, research institutes, Ministry of Science and Ministry of Education commit themselves to observe and to promote the principles of scientific integrity. These include: honesty in reporting and communicating, reliability in performing research, objectivity, impartiality and independence, openness and accessibility, duty of care, fairness in providing references and giving credits, and responsibility for future science generations. All academic and research institution, as well as ministries and other actors in the field of scientific and academic research have to adhere to appropriate standards for data management and preservation of records and data and to high ethical standards in dealing with research participants.

Research employers (universities, institutes and other research performing organisations) also have a responsibility to ensure that a culture of research integrity prevails. This includes clear policies and procedures, training and mentoring of researchers and students at all stages of their careers, and robust management procedures to ensure that high standards are observed and any transgression is identified at an early stage.

Fabrication and falsification, including misrepresentation and deliberately omitting unwelcome facts or data, are among the most serious violations of the ethos of science. Also plagiarism is an unacceptable form of misbehavior, and a violation against other researchers.

Research performing institutions that fail to deal properly with such wrongdoing are also guilty of dereliction of duty. All allegations should be properly assessed, and credible allegations should be investigated fully, with corrective actions taken if allegations are confirmed.

Minor misdemeanours, reflecting only poor performance by researchers as opposed to serious misconduct – some adjustment or selecting of data or 'adaptation' of a figure – may not give cause to a formal charge. Minor misdemeanours by students or junior researchers should however always be reprimanded and corrected by teachers or mentors. Minor misdemeanours by more experienced researchers that leads to misrepresentation may be treated more seriously, and if repeated should be considered as misconduct.

In addition to the violation of the fundamental principles of responsible science many other forms of poor and inappropriate practices in science research deserve attention. These include poor data practices and inadequate data management, inappropriate research procedures, including questionable procedures for obtaining informed consent, insufficient respect and care for participants in the research, improper research design and carelessness in observation and analysis, unsuitable authorship or publishing practices, and reviewing and editorial derelictions. Some of these are very serious and discreditable, e.g. abuse of ethical requirements and of trust in relation to the public, research subjects or other participants in the research. However, unlike the fundamental principles of scientific integrity and the violation thereof, which have a universal character, such practices may be subject to different national traditions, legislative regulations or institutional provisions. A required system of regulations of good practice in research should, therefore, (except for gross violations of ethical principles or the law) not be part of a universal Code of Conduct, but should be developed in the form of national Good Practice Rules, that would recognise the legitimate differences between national or institutional systems. The enclosed list of recommendations should be used as a guideline for the formulation of such national Good Practice Rules.

Investigations of research misconduct allegations should be consistent with national laws of the country in which the investigations are conducted. What is required is a due and fair process, that is uniform and sufficiently rapid, and leads to proper outcomes and sanctions. The investigations must be carried out in accordance with the highest standards of process integrity, uniformity within one domain of jurisdiction, and fairness to all parties. Confidentiality should be observed as much as possible, unnecessary detriment to reputations should be avoided, and a proportionate action should be taken against persons found to have committed research misconduct. Wherever possible precaution should be taken to ensure that investigations are carried through to a conclusion. They should not cease, leaving questions unresolved, merely because the defaulter has left the institution.

In international collaboration partners should agree to conduct their research according to the same standards of research integrity, and to bring any suspected deviation from these standards, in particular alleged research misconduct, to the immediate attention of the project leader(s) (and of the senior responsible officer in the university or institute (employer), in order for it to be investigated according to the policies and procedures of the partner with the primary responsibility, while respecting the laws and sovereignty of the States of all participating parties. In large scale, funded international projects the promotion of good practice and the handling of possible cases of misconduct, as recommended by the coordinating committee of the OECD Global Science Forum, should be followed. The boiler plate text, recommended by this committee, should be embodied in the formal documents that establish the collaborative project.

5.2.2. Good academic practice

While Code of Conduct cover mainly universal core academic misconduct such as fabrication, falsification or plagiarism, good academic practice should address other, more sophisticated and more specific form of academic misconduct. Good practices may be subject to cultural differences: definitions, traditions, legislative regulations and institutional provisions, may vary over nations or regions, sometimes also over disciplines. A required system of regulations of good practices in research should, therefore, not be part of a universal Code of Conduct [25]. It should rather be developed in the form of national or institutional Good Practice Rules, recognising the legitimate differences between national, disciplinary or institutional systems.

According to [25] some of academic misconduct have serious moral or legal consequences, others may create nuisance, discontent or procedural dissension. Many of them may undermine public trust in science same as basic infringements of scientific integrity, and should therefore be taken seriously by the scientific community. The following categories may be distinguished:

1. Data practices, including data management and storage, placing data at the disposal of colleagues who want to replicate the findings, adequate preservation of original data.

2. Research procedures. Deviations from desired practices include insufficient care for research subjects, insufficient respect to human subjects, animals, the environment, or cultural heritage; violation of protocols; failure to obtain informed consent; insufficient privacy protection; improper use of laboratory animals; or breach of trust (e.g. confidentiality). Improper research design, carelessness in experimentation and calculations that lead to gross errors, may also be classified under this heading, although the partition wall between incompetence and dishonesty may be rather thin here.

3. Publication-related conduct, including authorship practices. It is unacceptable to claim or grant undeserved authorship and to deny deserved authorship, or to inadequately allocate credit. Breaching of publishing rules, such as repeated publication, salami-slicing of publication, no or a too long delay in publication, or insufficient acknowledgement of contributors or sponsors, fall within this category as well.

4. Reviewing and editorial issues, including independence and conflict of interests, personal bias and rivalry, appropriation of ideas.

Nacional Council for Higher Education, together with research performing institution and ministries should prepare Guidelines for good academic practice. These guidelines should be respected on national level, but in the same time they can serve as a basis for institutional Code of Ethics. Again, in preparing the initial text of Good Academic Practice, the Council for Higher Education should use Guidelines for Good Practice Rules [25]. They should adopt, amend or supplement these recommendations in accordance with its Montenegrin legislative requirements and traditions. Guidelines for Good Practice Rules is given below.

Guidelines for preparing Montenegrin Good Practice Rules

1. Good data practices: availability and access

- All primary and secondary data should be stored in a secure and accessible form.

- Original scientific or scholarly research data should be documented and archived for a substantial period (at least 5 years, and preferably 10 years).

- Research data should be placed at the disposal of colleagues who want to replicate the study or elaborate on its findings.

- Freedom of movement of scientists, the right to peaceably and voluntarily associate with other scientists, and the freedom of expression and communication should be guaranteed.

2. Proper research procedures

- All research should be designed and carried out in a careful and well considered manner; negligence, haste, carelessness, and inattention should be avoided, so as to prevent human errors.

- Researchers should try to deliver what has been promised in the application for support or funding.

- Researchers must seek to minify any harmful impact on the environment, and should be aware of the need for sustainable management of resources; this implies an efficient deployment of the (financial and other) resources, and minimisation of waste.

- Clients and/or sponsors should be alerted to the ethical and legal obligations of the researcher, and to the possible restrictions this may imply.

- Clients and/or sponsors should be made aware of the vital importance of publication of the research findings.

- Confidentiality of data or findings should be respected by the researcher when it is legitimately required by the client or employer.

- Proper account will be given to the sponsor in case a grant or co-funding was received for the research.

3. Responsible research procedures

- All research subjects, be they human, animal, cultural, biological, environmental or physical, should be handled with respect and care.

- The health, safety or welfare of the community, or of collaborators and others connected with the research, should not be compromised.

- Sensitivity to age, gender, culture, religion, ethnic origin and social class of research subjects should be evinced.

- Human subject protocols should not be violated: this implies complying with the requirement of informed consent on the basis of adequate and appropriate information, and to voluntary agreement to participate, treating personal information with highest possible confidentiality, avoiding unnecessary deception, and using the obtained information only for the purpose of the investigation.

- The use of animals in research is acceptable only if alternative ways to achieve the results have been investigated and have been found inadequate; any harm or distress to be inflicted on an animal must be outweighed by the realistic expected benefits and must be minimised as much as possible.

4. Publication-related conduct

- Researchers should publish the results and interpretations of their research in an open, honest, transparent and accurate manner.

- Researchers should strive to ensure the earliest possible publication of the results of their research, unless commercial or intellectual property considerations (e.g. patent application) justify delay.

- Authorship should only be based on a creative and significant contribution to the research (i.e. contribution to the design, data collection, data analysis, or reporting, not for general supervision of a research group or editing of text). Guest authorship (i.e. listing authors who do not qualify) or ghost authorship (i.e. omitting individuals who meet authorship criteria) are not acceptable. All authors are fully responsible for the content of the publication, unless it is specified they are responsible only for a specific part of the study and publication.

- Sequence of authors should be agreed by all authors, ideally at the start of the project or the initiation of the article/monograph, and may follow national and/or disciplinary codes. The criteria for deciding the order of authors should be agreed at the start of the project or writing.

- The work and contribution of collaborators and assistants should be acknowledged if appropriate, with their permission.

- All authors should declare any relevant conflict of interest, which may be financial, commercial, personal, academic, or political.

- Important work and intellectual contributions of others that have influenced the reported research should be appropriately acknowledged. Related work should be correctly cited. References should be restricted to (paper or electronically) printed publications and publications 'in print'.

- In communication with the general public and in popular media the same standards of honesty and accuracy should be maintained; any attempt to exaggerate the importance and practical applicability of the findings should be resisted.

- Publication of the same (or substantial parts of the same) work in different journals is acceptable only with the consent of the editors of the journals and where proper reference is made to the first publication. In the author's CV such related articles must be mentioned as one item.

- Financial or other types of support for the research and its publication should be properly mentioned and acknowledged.

5. Reviewing and editorial issues

- An editor or reviewer who has a relevant potential conflict of interest – which may be personal, academic, political, commercial or financial – should, ideally, with- draw from involvement in any publication decision. If the conflict is considered minor or unavoidable it should be disclosed to the readership.

- Reviewers should provide thorough, accurate, objective, and justifiable assessments in a timely manner.

- In the review of a manuscript, confidentiality must be maintained.

- Reviewers and editors shall not make any use of the data or interpretations presented in submitted manuscripts without the author's permission.

- The same standards and rules apply in the review process with regard to projects or programmes submitted for funding, rewards or reconnaissance purposes.

- The same standards and rules apply in the review process of individuals or institutions for appointments, promotion, awards or other forms of recognition.

5.2.3. Law on Academic Integrity

In order to underpin Montenegrin academic integrity governance structures, Ministry of Education, and Ministry of Science should propose Law on Academic Integrity. Such a law is mentioned in the Law on Higher Education (article 78) as a special law. The law should be written in line with Montenegrin Code of Conduct and Montenegrin Good Academic Practice.

This law should cover all common academic misconduct. Also, it should consist of both prevention measures and sanction for academic misconduct. It should make basis for other bylaws and institutional rule books, code of conduct and code of ethics.

It is very important that the law provide conditions for **fair and transparent processes** after an academic misconduct allegation an national and institutional level. As stated in [25], otherwise there is a risk that stakeholders will refrain from accepting the authority of and cooperation with the relevant institutional actors. It is critical to strive for a balance between prevention and sanction. More emphasis needs to be placed on prevention, so that whatever processes are adopted will be perceived as supportive of a system to ensure good research and scholarly practice and not as isolated punitive action.

There needs to be clearly define **procedures for making and receiving allegations**. This includes agreement about who can bring forward an allegation and how they can do this (anonymous, named), in what form a concern should be raised (verbal, written) and to whom allegations/ concerns should be addressed [25].

Different procedures may apply in different countries and institutions. It is important that in cases of cross-national and cross-institutional research collaborations these differences are made explicit to all parties concerned [25].

Any research integrity governance framework should seek to achieve a proper balance between transparency and confidentiality; this means an appropriate protection of the reputation of the individual against whom allegations have been made. Guidelines should comprise clear statements about the desirability or obligation to reveal outcomes to third parties (press, national oversight bodies, funders) and about the circumstances under which a specific course of action can or must occur [25]. Hence, at list one chapter of the Law of Academic Integrity should be dedicated to issue of **transparency of misconduct investigations**.

Quite apart from the damage that research misconduct inflicts on the scientific record and, potentially, on society, it can directly harm individuals when they are subjected to practices derived from and building on tainted datasets; the reputation of host institutions of such research and of entire disciplines is at risk. Another delicate matter is threats to the careers of

whistleblowers who may be subjected to undue sanctions, or damage to the reputation of individuals who have fallen victim to vexatious and untrue allegations. Therefore, any framework for the implementation of research integrity governance structures has to enshrine within it the **rights of the individual** to fair and equitable treatment and should make reference to the applicable legal standards concerning **protection of the individual**.

In order to protect the authors of the false accusations which are based on the manipulation of data and/or published scientific results, the law should provide for the sanctioning of malicious people who fabricated false evidence.

The issue of **whistleblowers** is a particularly important one to address when developing research integrity governance structures. It has been observed that research students, post-doctoral researchers and junior staff are the most likely to observe misdemeanours. However, these staff are in the most vulnerable positions and a complaint, even when justified, may risk ending their research career. They may also be reluctant to complain to senior staff within their institution, out of loyalty or because they may not feel their allegations and observations will be given a neutral and impartial reception.

Therefore, it is critical that whistleblowers are afforded protection, in law if necessary, since the success of research integrity governance is utterly and crucially dependent on the willingness of individuals to step forward even though they are part of the same higher education and research structures [25].

The seriousness of these issues requires that the Law on Academic Integrity defines in detail the way of protecting individual rights, with special attention to the protection of whistleblowers.

It is furthermore recommended that awareness raising measures deal proactively with the potential threats to the dignity and career prospects of individuals, including among the requests that minimum legal standards for the protection of individuals involved in such cases are guaranteed, wherever such measures should not be in place [25].

As in all legal and quasilegal proceedings, there should be an instance of **appeal.** The permissibility of appeals, the types of appeals, for example concerning either the scientific or the procedural elements of an investigation, and the processes for appeal should be clearly stated in any procedures [25].

Therefore, the Law on Academic Integrity should define appeal procedures not only on national but also on institutional level, make it compatible (for example, a system with multiple instances).

There needs to be a statement on the types of **sanctions** that can be imposed, ensuring that they are appropriate to the level of digression from codes of good academic practice. Ideally, an agreement should be reached among the institutions (and countries) that deliberately examine their measures for compatibility of proposed sanctions; this becomes more important in cases of cross-national and cross-institutional research collaborations. There also needs to be agreement not only on types of sanctions, but on who can recommend them and who has responsibility for enforcing them [25].

Therefore, the Law on Academic Integrity has to clearly define issue of sanction taking into account previous recommendation.

The law should clearly define roles and responsibilities of all stakeholders for prevention, investigation and imposition of sanctions. This should be done for national and institutional level. need to be clearly assigned at both local and/or national level.

The law should specify the deadline by which the research performing institutions will adjust their regulations to be consistent with the law.

5.2.4. Academic and research culture

Academic and research culture is crucial in preventing academic misconduct. But, students, young researchers and even experienced researchers do not know too much about academic misconduct. Therefore, Montenegrin society needs global awareness campaign and continuous education. As a long term result national academic and research culture will rise its level.

This process should be national-wide and should involve all stakeholders including teachers, researchers, journals, research performing institution, Montenegrin academy of science and arts, Council for Higher Education, Ministry of Science and Ministry of Education.

Awareness campaign and continuous education should be directed towards all stages of an academic and researcher's career – undergraduate, postgraduate and temporary or permanent employee responsible for research. One should not allow anyone researching without having previously informed about the basic postulates. Also, any changes in national or institutional regulations in the field of academic integrity should be accompanied by adequate training.

Montenegrin academic institution should be obliged by Law of Higher Education to organize necessary training on academic integrity for all students on all study levels including undergraduate. It should be as earlier as possible in their career and training should be integral part of study programme.

5.2.5. Procedures, equipment, repositories and services

Experimental Datasets

Every experimental research (laboratory experiment, field research, public opinion research) results with data which are a basis for term papers, journal papers, PhD thesis or similar published works. The ability to repeat experiments and thereby verify (or falsify) claims made in the scientific literature are a key tenet of academic and scientific practice [25]. Therefore, research performing institution should be obliged by Law on Academic Integrity to hold data sets for a period of 5 years minim. According to new European initiatives (Open science, Open access journals, Open datasets), those datasets should be publicly accessible for all interesting parties.

Procedures for storing and accessing experimental data should be in place and in line with Law on Academic Integrity. Universities should establish and maintain repositories for experimental datasets.

Ministry of Education should financially support building such repositories.

Repository of research results

Scholarly and scientific research end up with some form of results. Usually results are in the form of reports, journal paper, chapter in book, book, monography, patents, master thesis, PhD thesis or similar. All those results represent priceless national treasure that needs to be carefully guarded and available to the academic and scientific community for the purpose of further research or collect and exploit knowledge. In the same time these results, regardless of whether they are in paper or electronic form, can be used for plagiarism.

Therefore, all research result should be stored in electronic form in one repository – National research repository of Montenegro. Such repository needs to be set up and maintained by the National Library of Montenegro. Data in repository should be accessible for the systems for plagiarism detection.

Research performing institution should be obliged by the Law on Academic Integrity to upload all results in the National research repository.

National Library of Montenegro should write procedures for storing and accessing research results. At the request of the author, the library should issue a certified copy of the work which is stored in the repository. This will disable later digital changes of the submitted work and malicious manipulation with them.

Ministry of Education and Ministry of Science should financially support building and maintaining such repository.

Experience of teachers shows that students and researchers who are looking for a source of their plagiarized works primarily in surrounding countries whose languages they understand. Typically, these are Croatia, Bosnia and Herzegovina and Serbia and to a lesser extent, Slovenia and Macedonia. Therefore, it would be wise to propose regional project with the aim to connect similar **repositories in South Eastern Europe** in order to of combating plagiarism. Such a project can be funded through EU ERASMUS programme.

Services

It is shown in chapter two that there are many providers of systems for plagiarism detection. Almost all systems are offered as web service, which means that users should not install any program on his computer. Instead users upload submissions and after checks obtain results on the screen or in document. Providers offer different charging schemes. Next table presents types of charging scheme for most important plagiarism detection services.

Charging scheme	Name of service
Per student per year	Urkund, Turnitin, PlagAware, PlagScan, Compilatio
Number of submission per year	iThenticate, Strike Plagiarism, Docoloc
Per submission with pre-paid credits but without time limits	PlagAware
Per submission	CopyScape

Per page	PlagiarismDetect
Per year but with unlimited service	CheckForPlagiarism
Free of charge	DupliChecker

Because the price of best services is very high and not affordable for massive check, it is necessary to create optimal strategy with the aims to provide necessary services for minimum amount of money.

Not all research results are of the same importance. They can be split in three categories:

1. **Low important** results which do not have essential research achievement, and probably will not be circulated in great extent or cited. These are scholarly research results, like essay, project, term work, seminary work or similar. Number of results is high.
2. **Medium important** results which have modest impact and probably will be cited in another thesis or conference paper. This category involves master thesis, conference papers or similar. Number of results is not big.
3. **High important** results which have great impact, they will be read in great extent, and probably cited in other journal papers or thesis. Their existence allows authors to be promoted or rewarded. In the case of plagiarism, the case will cause a great attention to the public and the reputation of science, institution and authors will be ruined. This category covers: journal papers, books, monographs, PhD thesis. Number of results is low compared with previous two categories.

Having this categorization in mind it is possible to propose three-layer system for computer assisted plagiarism detection (evaluators should also be trained for manual plagiarism detection).

First layer is designed for massive everyday checking of low importance results. This service should be free of charge and should show satisfactory results in the detection of similar texts. The only acceptable solution for this layer is DupliChecker (http://www.duplichecker.com/). This layer can be used for the fast pre check of some parts of text of results from second and third category.

Second layer of system for computer assisted plagiarism should offer more serious check but with low price. Ideally, charging scheme should eider per submission or yearly subscription with unlimited access. This layer should be used predominantly for medium important results, but it can be also used in the case of needs for additional checking of a low important result. Again, this layer can be used for the light pre check of text of results from third category. Best solutions for this layer are PlagAware and CopyScape. Proposed services, even for University of Montenegro, will cost less than 2000 Euro per year. For smaller universities, or faculties cost will be significantly less.

Research performing organization should cover the cost of this service from their budget.

Third layer of system for computer assisted plagiarism should of best possible comparison of submissions not only with open access content on the web, but also with paid access content of best scientific journals, monographs or conference papers. Unfortunately, in this category offer

of services is very limited. Only Urkund and iThenticate have access to respectable amount of paid scientific journals. Because much bigger repository for comparison, priority should be given to iThenticate. The price of both services is high but negotiable. It depends of quantity and it is less for bigger number of students or bigger number of submissions. Urkund charges per student per year. For university with 10.000 students yearly price will be around 6.500 Eur. iThenticate charges per submission but on yearly basis. For 1000 submissions in period of one year price would be also 6.500 Eur. With iThenticate there is a risk that paid submissions will not be used until the end of the year. Non spent submission cannot be transferred in the next year.

It is hardly to expect that universities can afford such expenses. Therefore, third layer service should be organized on national level. It will give access to all research performing organization to check high important research result. The service should be provided through Central University Library. Process should be supported by Rule book.

Service should be paid from the budget of Ministry of Education and/or Ministry of Science.

5.2.6. Guidelines and training materials

It cannot be expected from research performing institution to develop guidelines and their own training materials for research integrity on the beginning of the process. Hence, assistance should be provided by Ministry of Education, Ministry of Science and external experts. In order to share information, training material, example of good and bed practice, Central University Library should build **National academic integrity portal**. It should be one stop shop for research integrity issues. Through this portal interesting parties should have opportunity to access not only training material but also all other necessary information concerning research integrity

Research performing organization are obliged to publish the same training material on their own web site or through computer assisted learning system (distance learning system). All students, teaching staff and researchers should have free access to it.

5.2.7. Procedures for pooling case information

Besides training on academic integrity, sharing experience about misconduct cases is extremely important. It can help to provide easy access to best practice locally, nationally and internationally. Protecting research integrity, without stifling research creativity, is a constant learning process; the pooling of knowledge and experiences will build up a body of data on the extent of research misconduct and measures to deal with and prevent the phenomenon, locally, nationally, across Europe and beyond.

Networks such as ENRIO (European Network of Research Integrity Offices) offer an invaluable international forum for practitioners to share their experiences and to identify and debate issues around research integrity governance.

While there is a need to deal with privacy issues in the appropriate fashion, there is little doubt that publishing both positive and negative outcomes of investigations will help to raise awareness among the broader research community. Therefore, there should be agreement on sharing of knowledge between the ethics committees, consultative bodies at local and national levels, and between the national and the international level.

In order to achieve this goal Central University Library should provide **access** to authorized persons (member of ethical committee or IT professionals) to upload research misconduct cases information together with ethical committee decisions. All document should be uploaded on National academic integrity portal

Procedures to publish cases, with particular attention to the protection of privacy of researchers and whistleblowers, should be defined as a part of Law on Academic Integrity.

5.2.8. Consistent compliance with national laws

In terms of legislation to support research integrity governance structures nationally, care has to be taken not to create an overly legalistic framework which could then threaten to stifle creativity and the pursuit of knowledge [25]. Montenegro already has Law of Higher Education as part of its legal system that also partially cover elements of the handling of allegations of scientific misconduct. All universities have internal Rule books and Code of ethics. All these legal documents must be mutually consistent.

Hence, Law on Academic Integrity has to be written with respect of Law of Higher Education and Law on Scientific-Research Activity. **All internal document of research performing organization have to be adjusted with the new Law on Academic Integrity**. Special article of the Law on Academic Integrity has to define this procedure.

New legal framework should be respected from first day and brought to the knowledge of all actors in academia and science. In promoting and implementing locally and nationally Law on Academic Integrity should be identified as predating (superior) and overriding any internal research integrity guidelines.

5.2.9. Mechanism for monitoring and reporting

It is well known that there is no perfect law nor society that fully respects the laws consistently. In order to efficiently prevent plagiarism in Montenegro and in the same time rise level of research integrity, all elements of Montenegrin structure for academic integrity governance have to be in place. But, it is also important that the structure be maintained, respected and improved if necessary.

To accomplish this aims, mechanism for monitoring and reporting should be setup. It should include, but not limited to, following elements:

- research performing institution will report to the Ministry of Education once per year on every academic misconduct happened in previous 12 months,
- institutional Ethics Committee will report to the Ministry of Education once per year on every case processed in previous 12 months, together with all comments on the Law on Research Integrity
- Senate of university together with managing board will once per year reviewing previous reports.
- Council for Higher Education will once per year prepare national repot on state of research integrity in Montenegro and then report to Ministry of Education and Ministry of Science.
- In the case there is a need to amend the law, the ministries will initiate the appropriate procedure.

- National accreditation body will check, as a part of regular accreditation procedure, if universities educate students and researchers in academic integrity.

Consistent implementation of the mechanism for monitoring and reporting will ensure continuous improvement of the level of research integrity, and thereby minimize plagiarism.

5.3. Involved actors

Next table summaries actors and their responsibility in the process of plagiarism prevention. This is only proposal, which should be discussed on initial meeting of all stakeholders.

Actor	Responsibility
Ministry of Education	• Law on Higher Education • Law on Academic Integrity • Code of Conduct • Guidelines for good academic practice • Awareness campaign and continuous education • Funding • Monitoring
Ministry of Science	• Law on Scientific-Research Activity • Law on Academic Integrity • Code of Conduct • Guidelines for good academic practice • Awareness campaign and continuous education • Strategy for scientific-research activity • Funding • Monitoring
Montenegrin academy of science and arts	• Code of Conduct • Awareness campaign and continuous education
Council for Higher Education	• Code of Conduct • Guidelines for good academic practice • Monitoring • Accreditation of HE institution
Universities and other HE institutions	• Code of Conduct • Guidelines for good academic practice • Awareness campaign and continuous education • Storing Experimental Datasets • Upload research results • Provide Second layer of system for computer

	assisted plagiarism • Awareness campaign and continuous education • Monitoring and reporting • Funding
Senate of university	• Code of Ethics • Rules of Procedure of the Ethics Committee
Managing board of university	• Statute
Ethics Committee (Court of honor)	• Conducting of procedures and gives judgment
External experts	• Consulting • Guidelines and training materials • Training of librarians, IT professionals (trainers)
Central University Library	• Provide Third layer of system for computer assisted plagiarismNational academic integrity portal • Training of teacher • Training of researchers
National Library of Montenegro	• National research repository of Montenegro
IT support	• Administering of users of system for plagiarism prevention • Installation and maintenance of documents' repository
Teachers	• Awareness campaign and continuous education • Checks similarity • Respect for the Code of Ethics
Researchers	• Checks similarity • Upload research results • Respect for the Code of Ethics
Students	• Checks similarity • Upload research results • Respect for the Code of Ethics

5.4. Timetable

In order to synchronize activities which will lead to the functional Montenegrin structure for academic integrity governance, following timetable is proposed. Duration of activities is estimated based on expert experience and time may vary +/- 15 days.

However, time for writing and adoption of Law on Academic Integrity depends of many factors, and one of them is political situation and political will. It is well known that sometimes political relationships can ruin best idea even it is generally accepted. It can be expected that if all academic community of Montenegro clearly show unity and necessity for such a low, then the danger that the political will jeopardize process will be small. Still, the time for writing and adoption of Law on Academic Integrity has a great deal of uncertainty.

In order to come up as soon as the results, it is necessary to all activities begin as soon as possible. It is very important to initiate tendering procedure for Second layer of system for computer assisted plagiarism and provide service to academic community as soon as possible, but it would be good to organize it in the second month of the project. Users will need time to train in the use of services and the proper interpretation of the report. Just after finishing purchasing of Second layer, tendering procedure for third layer should be initiated.

In the case that this document will be adopted, this timetable should be further elaborated with more details.

Activity	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Preparatory activities – initial meeting of all stakeholders												
Public discussion on Code of Conduct for Research Integrity												
Adoption of Code of Conduct for Research Integrity												
Public discussion on Good academic practice												
Adoption of Good academic practice												
Writing and adoption of Law on Academic Integrity												
Awareness campaign												
Continuous education												
Establish and maintain repositories for experimental datasets												
Preparing and adopting procedures for storing and accessing research results												
Building and maintaining repository research results												
Training of trainers – Plagiarism and academic integrity												
Training of trainers – Methods for plagiarism detection												
Establish National academic integrity portal												
Publishing training material on National academic integrity portal												
Pooling case information on National academic integrity portal												
Training of academic staff and researchers - Plagiarism and academic integrity												
Training of academic staff and researchers - Methods for plagiarism detection												
Establish and maintaining First layer of system for computer assisted plagiarism												
Tendering procedure for Second layer of system for computer assisted plagiarism												
Establish and maintaining Second layer of system for computer assisted plagiarism												
Tendering procedure for Third layer of system for computer assisted plagiarism												
Establish and maintaining Third layer of system for computer assisted plagiarism												
Establishing Mechanism for monitoring and reporting												

5.5. Necessary financial resources

Realization of planed activities requires some expenses. Some of them can be covered by Ministry of education, while others should be paid by HE institutions. Also, some expenses are one-time, and some are periodic, typically on an annual basis.

Nonrecurring costs

Some activities on the beginning of project realization generate some expenses. These costs are summarized in following table.

Activity	Anticipated cost in EUR	Source of funding
Awareness campaign. Cost of advertising and printing flayers	2000	Ministry
Train of trainers. Two courses, 12 hours each	1200	Ministry or HE institutions
Establish and maintain repositories for experimental datasets (per institution)	1000	HE institutions
Building and maintaining repository research results	2000	Ministry
Establish National academic integrity portal	1000	Ministry

Yearly costs

Payment of plagiarism detection services are usually confining usually done on a annual subscription basis. These costs are summarized in following table.

Activity	Anticipated cost in EUR	Source of funding
Second layer of system for computer assisted plagiarism (per institution)	From 100 to 300 Eur	HE institutions
Third layer of system for computer assisted plagiarism	6500	Ministry

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7. Glossary

Collusion detection systems are plagiarism detection engines capable to look for similarities between papers in a group of papers. It is very useful for teachers to detect plagiarism inside group of students that have the same assignment.

Essay mills - or “contract cheating” – where students pay a third party to write assignments and then submit them as their own. It is similar with ghostwriting. Example web site “Seminarski rad” at http://www.seminarskirad.biz/besplatni-seminarski-i-diplomski-radovi.html

Ghostwriting – case of academic misconduct when someone hire another person (ghostwriter) to write anonymously a work for him.

Learning management system (**LMS**) is a software application for the administration, documentation, tracking, reporting and delivery of electronic educational technology (also called e-learning) courses or training programs. Examples of LMS are Blackboard, Moodle, Desire2Learn and Kannu.

Plagiarism detection engine - software that compares submissions with potential sources

Submission - work of authorship (original work) whose similarity to works of others is examined