ANALYSIS OF THE FIVE-YEAR CYCLE OF RE-ACCREDITATION OF HIGHER EDUCATION INSTITUTIONS

Agency for Science and Higher Education

1. Introduction

The Agency for Science and Higher Education (ASHE) is the national body for evaluation, quality assurance and accreditation. In order to fulfil this role, ASHE conducts procedures of external evaluation in the system of science and higher education in the Republic of Croatia. These evaluation procedures differ according to the sector (higher education and science), and to the type of procedure (external audit, re-accreditation, initial accreditation and thematic evaluation. All procedures are applied to both sectors – higher education and science, with the exception of external audit. After these procedures are completed, ASHE performs individual, annual analyses of their expediency, outcomes and the satisfaction of stakeholders in the system of higher education and science.

This report covers the re-accreditation of higher education activity for all higher education institutions (HEIs), and scientific activity for those HEIs that are licenced to carry out such activity. The Republic of Croatia conducted similar procedures before, but they had never been systematically performed for all higher education institutions according to the same criteria. That is why it is expected that this procedure will have a profound impact on the system of higher education. Its importance is also reflected in the procedure's goals – to ensure the minimum academic requirements, which in this accreditation cycle were mostly quantitative, but also to grade and monitor quality improvement. This procedure is furthermore important because of the extensiveness of the process, which was conducted for all HEIs and their study programmes. If we look at its scope, this process is more extensive than similar procedures of external evaluation of academic quality that are performed in other European countries. The reason lies in the need to systematically collect information on HEIs and their programmes, which had not existed until now. Publishing and analysing re-accreditation results is important for the entire higher education system in the sense of coming up with suggestions for the development of appropriate policies as well as instruments for their implementation. The need for public availability of data on HEIs, their study programmes and procedure outcomes also arises from the lack of a single database on the national level that would be available to policymakers, researchers and other system users.

Furthermore, it must be emphasised that the analysis of the first complete re-accreditation cycle includes the analysis of the procedure's impact and expediency. This analysis was performed by using the questionnaire method on a sample of main stakeholders (HEI management, teachers, students, future students and employers). Such an approach was designed to get a more complete picture of the needs of the higher education system as well as changes that have been

caused by re-accreditation. The result of the analysis confirmed the fitness for purpose of this procedure and pointed out its advantages and disadvantages, or rather the elements that should be incorporated in the next re-accreditation cycle in order to improve its functionality.

Finally, the aim of this analysis is to give a structured overview and analysis of data on HEIs that was collected during the re-accreditation procedure. That data is presented cumulatively, within the context of Croatian system of higher education and science.

2. About the re-accreditation procedure

The re-accreditation model that is used in Croatia includes checking the compliance with the quality criteria necessary for performing higher education activity and carrying out study programmes, but also giving a quality grade with recommendations for quality improvement which are an integral part of the re-accreditation report. Re-accreditation is regulated by the Act on Quality Assurance in Science and Higher Education (OG 45/09)[1]. The process of checking compliance with the necessary requirements is based on criteria that are prescribed by the Ordinance on Conditions for Issuing Licence for Scientific Activity, Conditions for Re-accreditation of Scientific Organisations and Content of Licence (OG 83/2010)[1]. The quality grade is based on the Criteria for the Assessment of Quality of Higher Education Institutions within Universities[2] and the Criteria for the Assessment of Quality of Polytechnics and Colleges[3]. This first five-year re-accreditation cycle began in the academic year 2010/2011, and ended in 2015/2016.

The re-accreditation procedure entails several stages – 1. writing and delivering HEI's self-evaluation report, 2. site visit, 3. writing the expert panel's final report and issuing the accreditation recommendation, and 4. follow-up.

The self-evaluation report is written in accordance with instructions for writing the self-evaluation, which differ[4] according to the Criteria for Higher Education Institutions within Universities and Criteria for Polytechnics and Colleges. Site visit to the higher education institution enables the expert panel[5] to write a report in line with the criteria for quality grade for the type of HEI that is evaluated. Expert panels[5] deliver their reports to the Accreditation

[1] Regulations https://www.azvo.hr/en/about-us/regulations/regulations (accessed on 21 December 2016)
[2] https://www.azvo.hr/images/stories/vrednovanja/reakreditacija_vu/Kriteriji_sveucilista_2013.pdf (accessed on 21 December 2016)
[3] https://www.azvo.hr/images/stories/vrednovanja/reakreditacija_vu/kriteriji_veleucilista_visoke_skole_2013.pdf (accessed on 21 December 2016)
[4] Re-accreditation of higher education institutions https://www.azvo.hr/en/evaluations/evaluations-in-higher-education/re-accreditation-of-higher-education-institutions (accessed on 21 December 2016)
[5] Accreditation scheme https://www.azvo.hr/hr/?option=com_content&view=article&id=664:akreditacija-shema&catid=64/#a2 (accessed on 21 December 2016)

Council, which issues an accreditation recommendation[5]. This evaluation workflow corresponds to the practice in other European countries, and has been applied to all higher education institutions in the Republic of Croatia – faculties, art academies and university departments as well as polytechnics and colleges, both public and private.

Each of these stages results in documents which have the same structure, but are different for each evaluated HEI. Table1 gives a brief overview of these documents.

Table 1. Overview of evaluation procedure documents according to the stages, the name of the document and the competent body.

STAGE	DOCUMENT	COMPETENT BODY
Writing the self-evaluation	Self-evaluation	HEI
Expert panel visits the HEI	Criteria for the quality grade	Expert panel
	Expert panel's re-accreditation report	Expert panel
Writing the expert panel's final report and issuing the accreditation recommendation	HEI comments on the expert panel's re-accreditation report	HEI
	Accreditation recommendation	Accreditation Council
Follow-up	Action plan	HEI

3. Analysis of documents included in the re-accreditation procedure

1. Self-evaluation of higher education institutions;
2. Criteria for the quality grade;
3. Expert panels' reports;
4. Accreditation recommendations.

The biggest part of this report is based on the analyses of information submitted in the self-evaluation documents, and their further elaboration. Expert panels' reports were analysed

concurrently with the data from the self-evaluation, and follow them textually in line with the divisions used in this document. Accreditation recommendations, which are legally-binding documents whose outcome is very important for higher education institutions, were analysed on the level of the number and content of outcomes.

The analysed documents are presented in accordance with three divisions that relate to: a) HEI type and category – public universities, private and public polytechnics, private and public colleges and private universities, b) scientific area – scientific areas of technical sciences, biotechnical sciences, social sciences, humanities, natural sciences, biomedicine and health, arts and the field of Economics, c) and standards that are incorporated in all mentioned documents, except accreditation recommendation – HEI management, study programmes, students, teachers, scientific and professional activity, mobility and resources. Due to its specific features and a very large number of HEIs, teachers and students, the field of Economics was analysed separately, outside the area of social sciences. The analysis of data pertaining to colleges and private universities does not include the division according to the scientific area because of the small number of programmes in each scientific area that are delivered by those HEIs. That is why there was no need for a parallel analysis according to scientific areas.

3.1. Self-evaluation reports of higher education institutions

Re-accreditation of an institution begins when it delivers the self-evaluation document to ASHE and enters the data into the information system which supports ASHE's procedure of evaluating study programmes – Module for higher education institutions and the Agency for Science and Higher Education (Mozvag)[6]. The Mozvag system is used in the re-accreditation procedure for the purpose of checking the compliance with minimal requirements prescribed by the Ordinance on Conditions for Issuing Licence for Scientific Activity, Conditions for Re-Accreditation of Scientific Organisations and Content of Licence (OG 83/2010)[1].

The self-evaluation document contains answers to questions and data presented in tables which follow the *Criteria for the Assessment of Quality of Higher Education Institutions within Universities*[2], or the *Criteria for the Assessment of Quality of Polytechnics and Colleges*[3]. It is important to point out that self-evaluation reports of faculties within universities differs from those of polytechnics and colleges. The difference lies in the scientific activity standard which is

[6]MOZVAG – information system which supports the evaluation of study programmes, facilitates communication between the Agency, HEIs and reviewers of study programmes. (ASHE – Information system which supports the evaluation of study programmes http://mozvag.srce.hr/ , accessed on 1 February 2017)

obligatory for faculties, but not for polytechnics and colleges unless they are entered in the Register of Scientific Organisations[7]. Polytechnics and colleges are evaluated only by their professional activity (instead of scientific).

The self-evaluation report of an institution is structured according to the following categories:

1. Higher education institution management;
2. Study programmes;
3. Students;
4. Teachers;
5. Scientific and professional activity;
6. Mobility;
7. Resources.

[7]Register of Scientific Organisations http://public.mzos.hr/Default.aspx?art=5489&sec=2167 (accessed on 21 December 2016)

8.

Categorisation of information from the self-evaluation reports

In order to get the most complete picture of Croatian higher education institutions, and in order for that data to be comparable, the analysis of self-evaluation reports' content was approached from multiple aspects: according to HEI type, scientific area, and basic HEI category – teachers and students, scientific activity, mobility and finances.

I Types of higher education institution

1. Public universities – non-integrated[8] universities (which consist of faculties) are not evaluated as a unit; the subject of the evaluation is the constituent. Integrated public universities[9] (which consist of departments) are also evaluated multiple times, same as non-integrated universities, but each visit is focused not on a constituent (which in this case would be a department), but on all study programmes in a particular scientific area (e.g. all humanities study programmes).
2. Polytechnics and colleges[10] that deliver professional study programmes are presented according to scientific areas in which they deliver study programmes, and according to the type of ownership (public or private), followed by basic HEI categories – teachers and students, scientific activity, mobility and finances.
3. The three private universities are presented separately; they are younger and significantly smaller than their public counterparts, both in the number of students and study programmes, as well as the number of teachers, which is why they were evaluated as one unit. After its evaluation, University North became a public university, but at that time it was still a private one and is thus shown in this category. Since private universities are a relatively new phenomenon in the Croatian system of higher education, their structure is not yet as elaborate as that of public universities. That is why they had to write only one self-evaluation report, and why their data has been presented is the same way.

[8] University of Zagreb, University of Split, University of Rijeka, Josip Juraj Strossmayer University of Osijek
[9] University of Zadar, University of Dubrovnik, Juraj Dobrila University of Pula
[10] There are 15 polytechnics and 25 colleges in Croatia

II Scientific areas

The collected and analysed data is not limited only to scientific areas that are used in Croatia[11], but are distributed across the following areas:

1. Technical sciences;
2. Biotechnical sciences;
3. Social sciences;
4. Humanities;
5. Biomedicine and health;
6. Natural sciences;
7. Arts;
8. Interdisciplinary and transdisciplinary area;
9. Economics (independent, not part of social sciences).

Due to objective circumstances, the order in which re-accreditation procedures were conducted did not follow the structure of scientific area classification. Higher education institutions from the field of Economics were evaluated and, in this analysis categorised, separately. Specificity of the scientific field of Economics as part of the scientific area of social sciences is a large number of HEIs, study programmes and students, especially in the first year of study. The field of Economics was followed by faculties that deliver programmes in the technical and biotechnical areas, and social sciences and humanities. During the last year, the evaluation procedure focused on institutions that deliver study programmes in natural sciences, biomedicine and health, as well as the area of arts. The evaluation of polytechnics and colleges was spread through the entire five-year cycle, depending on their scientific area. We have to emphasise that this division is not completely accurate, since more and more study programmes are delivered in interdisciplinary scientific areas (Table1).

The distribution of institutions by scientific areas was done according to the content of the majority of study programmes that they deliver. Institutions were also evaluated according to this distribution, and that evaluation was performed by expert panel members who are experts in the given fields. Some institutions will be presented only in one scientific area, even though

[11]Scientific areas of technical sciences, biotechnical sciences, social sciences, humanities, biomedicine and health, natural sciences, interdisciplinary area and arts (Ordinance on the Scientific and Artistic Areas, Fields and Branches, NN 118/09, https://www.azvo.hr/hr/o-nama/propisi, accessed on 1 February 2017)

such presentation will not cover the whole range of their activities. That is why some faculties are shown in several areas. Since such institutions do not have an overview according to scientific areas, ASHE used summary information presented for different areas. Institutions that are interdisciplinary and transdisciplinary by the nature of their study programmes have been shown separately.

When this was possible, higher education institutions within public universities in the same area were evaluated in the same academic year. If that was not the case, this information was stated in the analysis, which is also important from the aspect of changes that have been made to the criteria during the re-accreditation cycle.

Departments that deliver study programmes in interdisciplinary and transdisciplinary areas, as well as departments that deliver study programmes in more than one scientific area, are presented separately. The presentation of such departments is available only for HEIs within public universities, and it differs from the presentation of public universities' faculties only in the category of students; in this category, the data for each department is presented separately.

III According to basic information categories

Teachers and students

Most of the data presented in this report refers to the basic information on the number of teachers and students, and scientific work or rather productivity. Such presentation of data on evaluated institutions precedes the analysis of the reports.

The percentages for all employees of evaluated institutions are shown separately, as is the percentage of teachers elected to scientific-teaching and teaching grades. In case of the presentation of data on HEIs within universities that have both the teaching and scientific component, information on teachers elected to scientific-teaching grades is elaborated in greater detail for each HEI.

The number of students according to the type of study programme has been presented for each HEI within a scientific area. This basic information is followed by the teacher/student ratio, the average age and the percentage of teachers by grades. The teacher/student ratio was calculated from the number of students and teachers given in the self-evaluation reports, or rather in the Mozvag system that is used in the re-accreditation procedure. Information in the Mozvag system is entered by HEIs themselves during the evaluation process.

The overview of information for private universities, polytechnics and colleges includes an additional chart that depicts the relation between full-time employees and external associates. This overview is presented numerically, and for each group of teachers separately. The chart only shows information for those employees who take part in the teaching process, while the number of support, technical and administrative staff is not shown.

Scientific activity

Within every area, the analysis gives quantitative information on the scientific activity of teachers from all HEIs, in the form of the number and ratio of publications (per teacher elected in a scientific-teaching grade per year) and the number of scientific projects funded from different sources.

Information on scientific projects is divided into three basic categories according to sources of funding:

- Projects financed by the Ministry of Science and Education (MSE) and the Croatian Science Foundation (CSF);
- Internationally-funded projects;
- Other sources.

The analysis gives the total number of funded projects without their names.

Scientific publications are categorised according to the usual categories in the Croatian science system, in the same way that HEIs presented them in their self-evaluation reports. Information on scientific publications is divided into eight different categories:

- Scientific papers published in journals indexed in the CC, WoS (SSCI, SCI-expanded and A&HCI) and Scopus databases;
- Other reviewed papers represented in databases that are recognised for the purpose of election into scientific grades;
- Authorship of books published abroad;
- Authorship of books published in the country;
- Papers published in national journals with an international review;

- Peer-reviewed papers published in the proceedings of foreign and international conferences;
- Papers published in national journals with national peer review;
- Professional papers;
- Chapters in reviewed books;
- Peer-reviewed papers in the proceedings of national scientific conferences;
- Editing foreign books;
- Editing national books;
- Number of papers published in in-house journals.

For the arts, the following categories are used:

- Number of works of art defined as excellent, internationally-significant achievements;
- Number of works of art defined as excellent, nationally-significant achievements;
- Number of premiere presentations of works of art at internationally-important manifestations;
- Number of premiere presentations of works of art at nationally-important manifestations;
- Number of premiere presentations of works of art with published reviews;
- Number of premiere presentations of works of art;
- Authorship of books published abroad;
- Authorship of books published in the Republic of Croatia.

For each of these categories, HEIs entered the number of publications for the last five years. The other important information given in the analysis is the ratio of the number of publications and the number of scientists employed at an institution during the last five years. Most HEIs provided this ratio in their self-evaluation; if not, the ratio was calculated from the number of scientific publications and the number of scientists provided in the self-evaluation reports. It is important to note that not all of these categories of publications have equal importance for all scientific areas.

Mobility

Information on incoming and outgoing mobility of teachers and students is shown for each area.

Information on mobility differs by academic year; for the first two years of re-accreditation (2010/2011 and 2011/2012), the data for mobility is not shown because it is incomplete. During those two years, the required data concerned sources of funding, while the category of mobility duration (up to three months, between three and six months, and more than six months) was introduced later.

Data on mobility was collected for all employees of an institution – from scientists and teachers to the administrative staff. Information on student mobility was collected in the same way.

Finances

As an important segment of HEI activity, the analysis presents basic data on institutions' finances on the level of the scientific area. Information on revenue is also shown through the share of each of the following categories in the total revenue:

- State budget resources;
- Own source revenue: tuition fees – specialist graduate professional, research projects, professional projects, rent revenue;
- Regulated income: tuition fees – professional, additional knowledge or skills testing (if implemented in addition to the matriculation exam), enrolment fees, publishing activity, administrative fees (charging for various forms, diplomas, certificates, etc.).

3.1.1. Analysis limitations and disadvantages

Since the Agency for Science and Higher Education did not collect information via a single database, but HEIs submitted their data in the form of the self-evaluation document, the responsibility for data authenticity lies with the HEIs, or rather HEI management. This approach has led to certain limitations and disadvantages of the analysis, which are described further bellow.

The information was submitted by different HEIs in different academic years, so that it does not represent current situation at HEIs, but the situation at the moment of finishing the self-evaluation. In the meantime, some HEIs underwent significant changes, both in the number of students and study programmes. In some cases, the number of employees elected into teaching grades was also changed in relation to the academic year when a HEI was evaluated. This is especially true for institutions that were evaluated at the beginning of the cycle. We believe that the data for institutions evaluated in the last academic year underwent smaller changes. It is difficult to reliably compare institutions evaluated in different academic years, even though their data is presented together. For example, the level of student mobility in Croatia in the academic years 2010/11 and 2015/16 is significantly different due to different mechanisms used to stimulate that process at the time.

Furthermore, the possibility of a wrong entry or a misunderstood question was slightly higher in the early years of re-accreditation, because this method of evaluation was new to both ASHE staff and HEI employees. When such mistakes were discovered, they were left out of further analysis.

The choice of information that was included in the analysis was made on the basis of their availability and clarity. That is why the choice fell on quantitative data that is provided in all self-evaluation reports, and which is also considered as a reference value for presenting the quality of higher education institutions and the entire system. Although HEIs entered more information into their self-evaluation reports than just the data from the mentioned tables, we only showed and analysed basic information for each HEI within a scientific area. Such presentation and analysis enable the logical continuation of the qualitative analysis of expert panels' reports that rely on the mentioned quantitative indicators.

Finally, since these evaluations were conducted over a five-year period, there were minor changes in the presentation of data (part of it is presented in tables, part in charts, and some information is explained in the text), which was taken into account during their analysis.

The presented data was taken from several relevant tables:

1. Number of students of study programmes;
2. Number of teachers employed at HEIs according to their grades;
3. List of scientific projects at HEIs;
4. Number of scientific publications at HEIs;
5. Mobility of students and teachers;
6. Finances.

3.2. Reports of the expert panels

Reports of the expert panels in the re-accreditation procedure were subject to qualitative analysis in accordance with the aforementioned categorisation of HEIs. Such report analysis is complementary to the analysed data, and follows after the quantitative data. Qualitative information for public and private universities was analysed on the level of a scientific area and in categories of expert panels' findings, recommendations for HEIs, the university and MSE according to the seven categories that correspond to seven quality standards (HEI management and quality assurance, study programmes, teaching staff, students, scientific and professional activity, mobility and international cooperation, and financial and physical resources). Expert panels' findings and recommendations for polytechnics and colleges were analysed cumulatively for all areas and standards, and allocated to the competent body that can ensure their implementation.

3.3. Accreditation recommendations

The analysis of accreditation recommendations[12] as the outcomes of evaluation prior to the follow-up phase is shown in Table1:

Academic year	The number of evaluated HEIS	Outcomes[13] on the level of HEI
2010/2011 Field of Economics	18	Confirmation: 4 Letter of expectation: 12 Denial: 7
2011/2012 Technical area	32	Confirmation: 35 Letter of expectation: 12 Denial: 1
2012/2013 Biotechnical area and private HEIs	20	Confirmation: 5

[12] Accreditation scheme, https://www.azvo.hr/hr/?option=com_content&view=article&id=664:akreditacija-shema&catid=64/#a7 (accessed on 1 February 2017)
Based on the conducted re-accreditation procedure, and with the previous opinion of the Accreditation Council, the Agency issues an accreditation recommendation for the Minister in charge of higher education:

- issuing confirmation on compliance with conditions for continued activity or part of activity;
- denial of license for activity or part of activity;
- issuing a letter of expectation with the deadline for resolving deficiencies up to three years.

Accreditation recommendation that is sent to the Minister also contains a quality grade for the higher education institution, and recommendations for improvement.
[13]The total number of outcomes differs from the number of evaluated HEIs because every evaluated HEI can have more than one outcome, if they are different – for the institution or programme(s)

		Letter of expectation: 11 Denial: 3
2013/2014 Humanities and social sciences	25	Confirmation: 3 Letter of expectation: 30 Denial: 1
2014/2015 Natural sciences, arts, biomedicine and health, the field of law	44	Confirmation: 20 Letter of expectation: 20 Denial: 3

4. Results

In this report we bring the most important results obtained through the analysis of HEIs' self-evaluation documents, expert panels' reports, and Accreditation Council's decisions. This structure follows all types of HEIs: public universities, private universities, colleges and polytechnics. Within every group of HEIs, we tried to adhere to the division by scientific areas. Also, as much as possible, or rather as much as the limitations of data gathered through self-evaluation reports allowed, we tried to equalize the indicators.

4.1. PUBLIC UNIVERSITIES

4.1.1. ANALYSIS OF DATA FROM SELF-EVALUATION REPORTS

Based on the analysis of data from the self-evaluation reports of Croatian public universities, in this part of the document we bring the data on students, teachers, teacher/student ratios, scientific work, finances and mobility.

4.1.1.1. STUDENTS

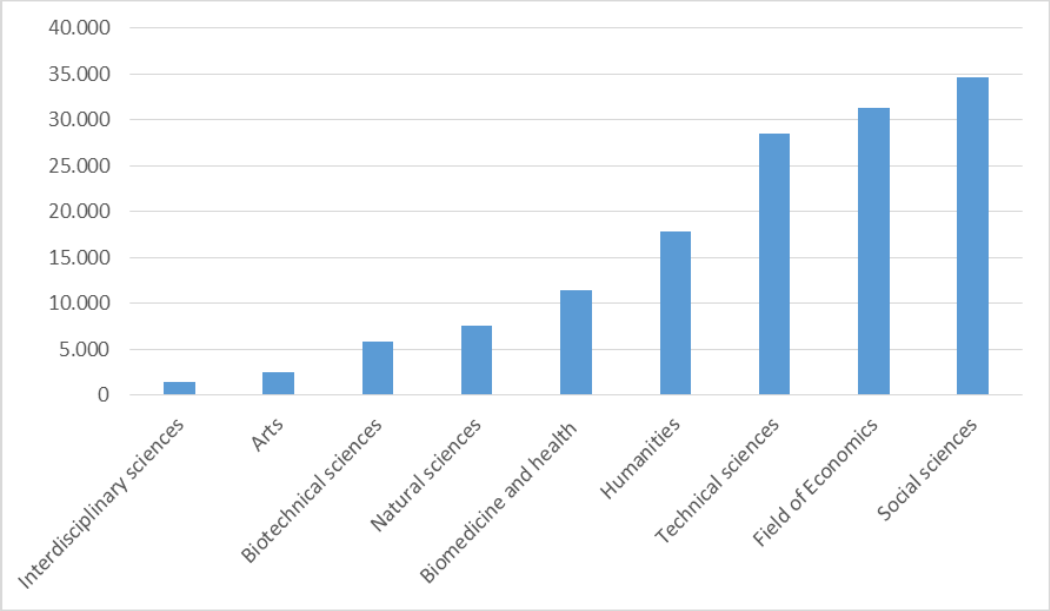


Chart 1. Number of students by scientific areas and the field of Economics

Chart 1 enables the tracking of the number of students in different scientific areas. Due to extremely large number of students in the field of Economics, this field is shown separately in order to get a better perspective. The lowest number of students study in the area of interdisciplinary sciences (1433) and arts (2544 students). The biggest number of students can be found in social sciences (34594) and the field of Economics within this area (31285 students).

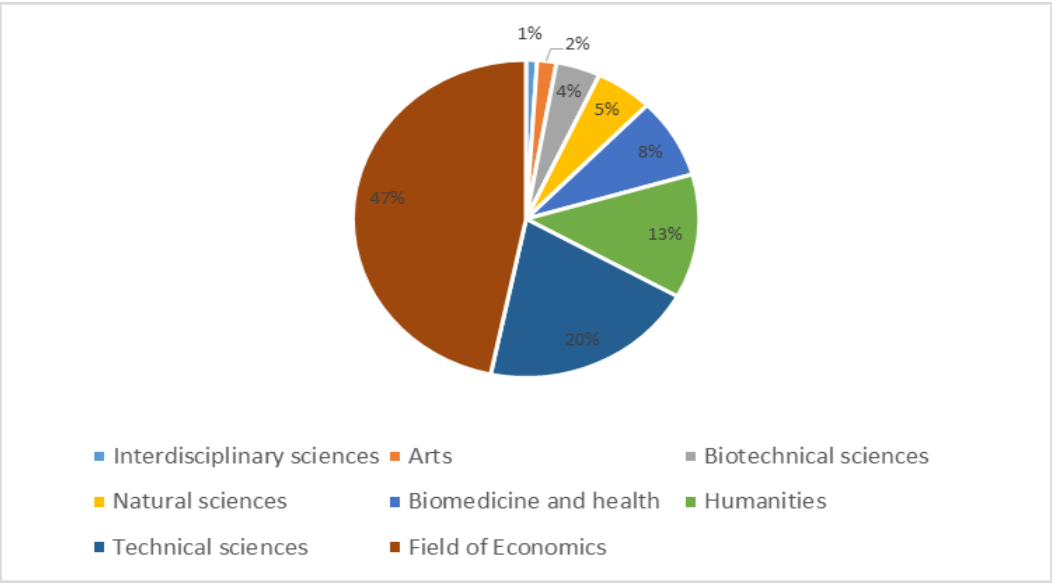


Chart 2. Percentage of students in different scientific areas

Almost half of all students in the Republic of Croatia study social sciences (47%). This is twice as many students than in the technical area (20%), and six times more than the percentage of students in biomedicine and health (8%). The percentages of students of natural and biotechnical sciences are similar (4% to 5%), but the total number of students in these two areas does not exceed 10%.

Biomedicine and health							
Type and level of study programme	Number of full-time students	Number of part-time students	Number of final year [14]students	Total	Percentage of full-time students	Percentage of part-time students	Percentage of final year students
Undergraduate professional studies	184	547	45	776	24%	70%	6%
Undergraduate university studies	793	226	119	1138	70%	20%	10%
Graduate university studies	114	260	41	415	27%	63%	10%
Integrated undergraduate and graduate studies	6831	37	111	6979	98%	1%	2%
Postgraduate specialist studies	290	948	0	1238	23%	77%	0%
Postgraduate university (doctoral) studies	634	280	58	972	65%	29%	6%
Biotechnical sciences							
Type and level of study programme	Number of full-time students	Number of part-time students	Number of final year students[15]	Total	Percentage of full-time students	Percentage of part-time students	Percentage of final year students
Undergraduate professional studies	212	73	-	285	74%	26%	-
Undergraduate university studies	3001	166	-	3167	95%	5%	-
Graduate university studies	1639	134	-	1773	92%	8%	-

[14] Translator remark: the term final year students is used for simplification purposes for the students who have finished all courses and who are eligible for their degree finals

[15] In the academic year when these HEIs were evaluated

Postgraduate specialist studies	69	58	-	127	54%	46%	-
Postgraduate university (doctoral) studies	267	216	-	483	55%	45%	-
Social sciences							
Type and level of study programme	Number of full-time students	Number of part-time students	Number of final year students	Total	Percentage of full-time students	Percentage of part-time students	Percentage of final year students
Pre-Bologna undergraduate studies	0	8	568	576	0%	1%	99%
Undergraduate professional studies	1902	3533	769	6204	31%	57%	12%
Specialist graduate professional studies	81	681	0	762	11%	89%	0%
Undergraduate university studies	6041	866	329	7236	83%	12%	5%
Graduate university studies	3829	534	651	5014	76%	11%	13%
Integrated undergraduate and graduate studies	9195	4474	424	14093	65%	32%	3%
Postgraduate specialist studies	0	237	71	308	0%	77%	23%
Postgraduate university (doctoral) studies	52	270	79	401	13%	67%	20%
Social sciences – field of Economics							
Type and level of study programme	Number of full-time students	Number of part-time students	Number of final year students[14]	Total	Percentage of full-time students	Percentage of part-time students	Percentage of final year students
Undergraduate professional studies	2249	1377	0	3626	62%	38%	-
Specialist graduate professional studies	136	232	0	368	37%	63%	-

Undergraduate university studies	8987	3308	0	12295	73%	27%	-
Graduate university studies	2817	549	0	3366	84%	16%	-
Integrated undergraduate and graduate studies	6419	1582	-	8001	80%	20%	-
Postgraduate specialist studies	0	3202	-	3202	0%	100%	-
Postgraduate university (doctoral) studies	0	427	-	427	0%	100%	-
Humanities							
Type and level of study programme	Number of full-time students	Number of part-time students	Number of final year students	Total	Percentage of full-time students	Percentage of part-time students	Percentage of final year students
Undergraduate professional studies	48	25	19	92	52%	27%	21%
Undergraduate university studies	8966	19	785	9770	92%	0%	8%
Graduate university studies	5107	80	1371	6558	78%	1%	21%
Integrated undergraduate and graduate studies	1022	9	155	1186	86%	1%	13%
Postgraduate specialist studies	0	19	0	19	0%	100%	0%
Postgraduate university (doctoral) studies	186	0	15	201	93%	0%	7%
Interdisciplinary scientific areas							
Type and level of study programme	Number of full-time students	Number of part-time students	Number of final year students	Total	Percentage of full-time students	Percentage of part-time students	Percentage of final year students
Undergraduate university studies	590	138	2	730	81%	19%	0%
Graduate university studies	470	0	67	537	88%	0%	12%
Integrated undergraduate	52	0	0	52	100%	0%	0%

and graduate studies							
Postgraduate specialist studies	30	0	0	30	100%	0%	0%
Postgraduate university (doctoral) studies	84	0	0	84	100%	0%	0%
Natural sciences							
Type and level of study programme	Number of full-time students	Number of part-time students	Number of final year students	Total	Percentage of full-time students	Percentage of part-time students	Percentage of final year students
Pre-Bologna undergraduate studies	0	0	175	175	0%	0%	100%
Undergraduate university studies	3858	0	38	3896	99%	0%	1%
Graduate university studies	1695	0	105	1800	94%	0%	6%
Integrated undergraduate and graduate studies	919	0	12	931	99%	0%	1%
Postgraduate specialist studies	24	0	0	24	100%	0%	0%
Postgraduate university (doctoral) studies	677	44	0	721	94%	6%	0%
Technical sciences							
Type and level of study programme	Number of full-time students	Number of part-time students	Number of final year students[14]	Total	Percentage of full-time students	Percentage of part-time students	Percentage of final year students
Short professional studies	20	0	-	20	100%	0%	-
Undergraduate professional studies	1364	642	-	2006	68%	32%	-
Specialist graduate professional studies	0	119	-	119	0%	100%	-
Undergraduate university studies	15589	2020	-	17609	89%	11%	-
Graduate	6537	308	-	6845	96%	4%	-

university studies							
Postgraduate specialist studies	124	264	-	388	32%	68%	-
Postgraduate university (doctoral) studies	704	768	-	1472	48%	52%	-
Arts							
Type and level of study programme	Number of full-time students	Number of part-time students	Number of final year students	Total	Percentage of full-time students	Percentage of part-time students	Percentage of final year students
Undergraduate university studies	1219	21	44	1284	95%	2%	3%
Graduate university studies	582	14	59	655	89%	2%	9%
Integrated undergraduate and graduate studies	566	0	39	605	94%	0%	6%

In the area of biomedicine and health, the biggest number of students in the Republic of Croatia is enrolled in integrated studies (6979), and mostly have the status of full-time students (98%). The study programme in question is the integrated study of medicine. The lowest number of students is enrolled in a graduate university study (415), and those are mostly part-time students (63%). The biggest percentage of part-time students can be found at undergraduate professional studies (70%) (study of nursing) and postgraduate specialist studies (77%) (specialisations in medicine). In this area, the share of final-year students in the total number of students is relatively small and averages from 0% to 10%. A relatively large percentage of full-time students can also be found at doctoral studies (65%); the area of biomedicine and health has only 29% of part-time doctoral students.

On all levels of biotechnical sciences, full-time students make up more than half of all students – between 54% and 92%. The biggest share of full-time students in biotechnical sciences can be found at undergraduate (95%) and graduate university studies (92%). The percentage of full-time students in biotechnical sciences averages between 54 and 95%.

In social sciences, levels of higher education at which the percentage of full-time students exceeds those of part-time students are integrated studies (65%), graduate university studies (76%), and undergraduate university studies (83%). At all other levels, there are more part-time than full-time students, and their percentage varies between 0% and 89% on all levels of higher education. Most part-time students study at the level of specialist graduate professional studies

(89%), postgraduate specialist studies (77%), and postgraduate university (doctoral) studies (67%). This area also has a relatively high number of final-year students who make up almost one quarter (22%) of the total number of students in social sciences (34594); these are students of pre-Bologna studies.

In the field of Economics, the biggest percentage of full-time students can be found at graduate university (84%) and integrated studies (80%). All students at postgraduate specialist and university (doctoral) studies are part-time.

Humanities have an average of 67% of full-time students and 22% of part-time students. On all levels of tertiary education there is more than 78% of full-time students. The exceptions are undergraduate professional studies (27% of part-time students) and postgraduate specialist studies (100% of part-time students). Doctoral studies have an extremely large percentage of full-time students (93%).

Natural sciences have an almost negligible percentage of part-time students (only doctoral studies have 6% of part-time students). The percentage of full-time students is very high and varies according to the level of education between 94% and 100%. The biggest percentage of part-time students can be found at the doctoral level, and it amounts to only 6%. Almost identical data can be applied to the interdisciplinary area; the percentage of full-time students is very high (average of 94%), while part-time students can be found only on pre-Bologna studies (19%).

In technical sciences, the percentage of full-time students is higher than that of part-time students on the following levels – undergraduate professional studies (68%), undergraduate university studies (89%), and graduate university studies (96%). There are more part-time than full-time students at specialist graduate professional studies (100%) and postgraduate specialist studies (68%), while the doctoral level has an almost equal distribution (48% of full-time and 52% of part-time students).

In the artistic area, almost all students study full-time (over 90%), mostly at undergraduate university studies (1284). The percentage of part-time students is negligible (0-2%), while the percentage of final-year students is less than 10% on all levels.

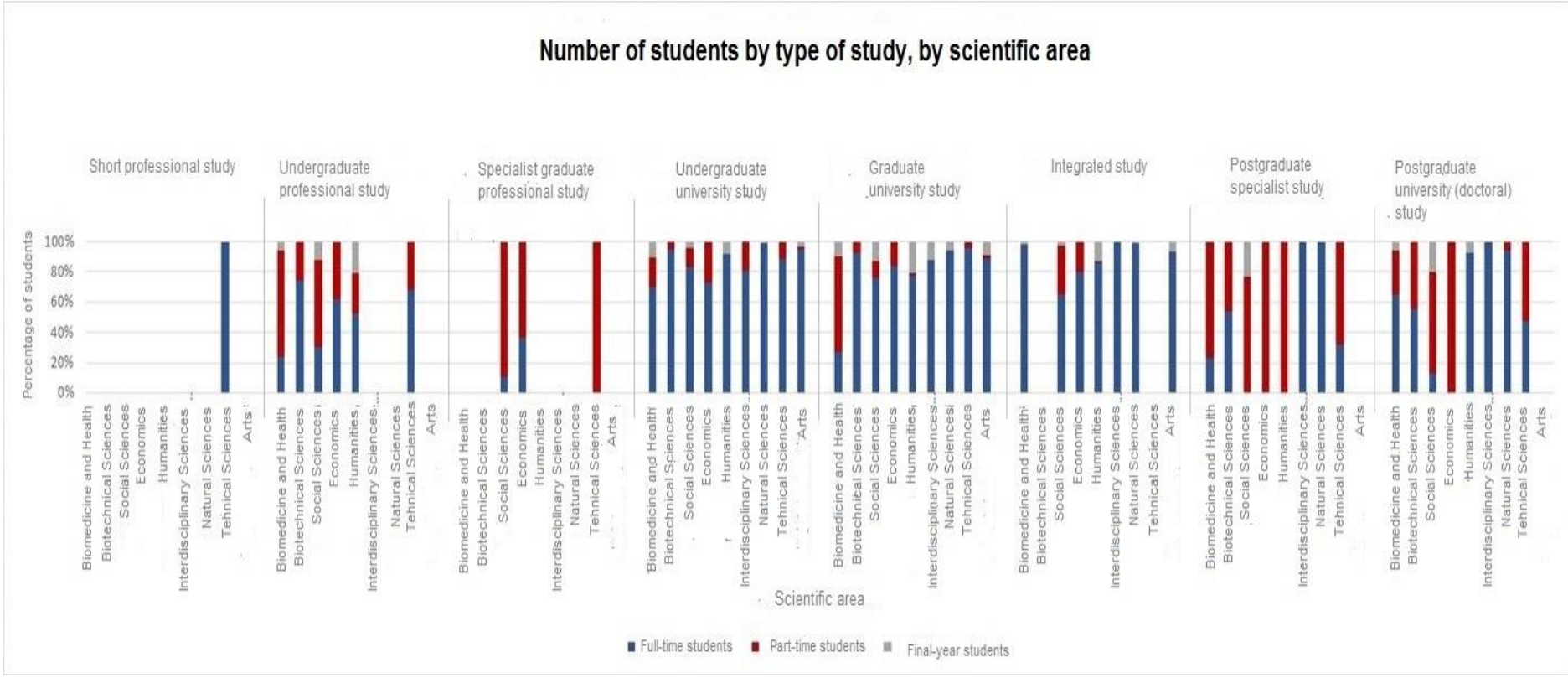
Finally, if we consider the data in a wider context, according to the latest Eurostat reports[16] (which were, unfortunately, last updated in 2009), the average percentage of part-time students

[16]Part-time students in tertiary education by age (ISCED 5 and 6), 2009, from Key data on education in Europe 2012, http://bookshop.europa.eu/en/key-data-on-education-in-europe-2012-pbECAF12001/?CatalogCategoryID=QN4KABste0YAAAEjFZEY4e5L (p. 83), accessed on 1 February 2017

in Croatia is 62.6%[17], while the European average is 32.4%[18] of part-time students out of the total student population.

[17]Part-time students in tertiary education by age (ISCED 5 and 6), 2009 (EU: 18-23 years – 16.2%; 24-29 years – 57.6%; 30-34 years – 87.6%; 35-39 years – 89%) http://bookshop.europa.eu/en/key-data-on-education-in-europe-2012-pbECAF12001/(p. 83), accessed on 1 February 2017

[18]Part-time students in tertiary education by age (ISCED 5 and 6), 2009 (EU: 18-23 years – 12.4%; 24-29 years – 27.3%; 30-34 years – 41.4%; 35-39 years – 48.5%) http://bookshop.europa.eu/en/key-data-on-education-in-europe-2012-pbECAF12001/(p. 83), accessed on 1 February 2017


Number of students by type of study, by scientific area
Short professional study
Undergraduate professional study
Specialist graduate professional study
Undergraduate university study
Graduate university study
Integrated study
Postgraduate specialist study
Postgraduate university (doctoral) study
Percentage of students
100%
80%
60%
40%
20%
0%
Biomedicine and Health
Biotechnical Sciences
Social Sciences
Economics
Humanities
Interdisciplinary Sciences
Natural Sciences
Tehnical Sciences
Arts
Scientific area
Full-time students
Part-time students
Final-year students

If we look cumulatively at the percentage of students by the level of the programme and the study mode in different scientific areas, it becomes clear that undergraduate professional studies at public universities are not delivered in interdisciplinary and natural sciences, nor in arts. The percentage of part-time students in biomedical and social sciences exceeds the percentage of full-time students. Programmes at the second level of professional studies at public universities are delivered only in technical and social sciences, and have mostly part-time students. Most full-time students are on the university vertical, at the undergraduate and graduate level. The areas of natural, biotechnical and technical sciences, humanities and arts have a relatively small share of part-time students (0% to 10%). Most part-time students at the graduate university level (60%) study in the areas of biomedicine and health. These are studies of Nursing and Physiotherapy. In social sciences and the field of Economics there is a slightly larger percentage of part-time students than in other scientific areas (11% to 16% of part-time students from the total number of students at that level in social sciences and the field of Economics).

Integrated studies are almost completely (over 90%) made up of full-time students of biomedicine and health, humanities, interdisciplinary and natural sciences and arts. Part-time students of integrated studies mostly study social sciences (20%) and the field of Economics (35%). In biotechnical and technical sciences there are no integrated studies.

At specialist postgraduate studies most students are part-time, and their percentage is higher than 50% in biomedical, biotechnical, technical and social sciences. All students are part-time students of Economics and humanities. In the area of interdisciplinary and natural sciences at the postgraduate specialist level, all students study full-time.

It is significant to note that, at the third, doctoral level, in all scientific areas except social sciences and Economics, more than 50% of all students study full-time. All doctoral students in the humanities, interdisciplinary and natural sciences are also full-time, while all students in the field of Economics are part-time.

4.1.1.2. TEACHING STAFF

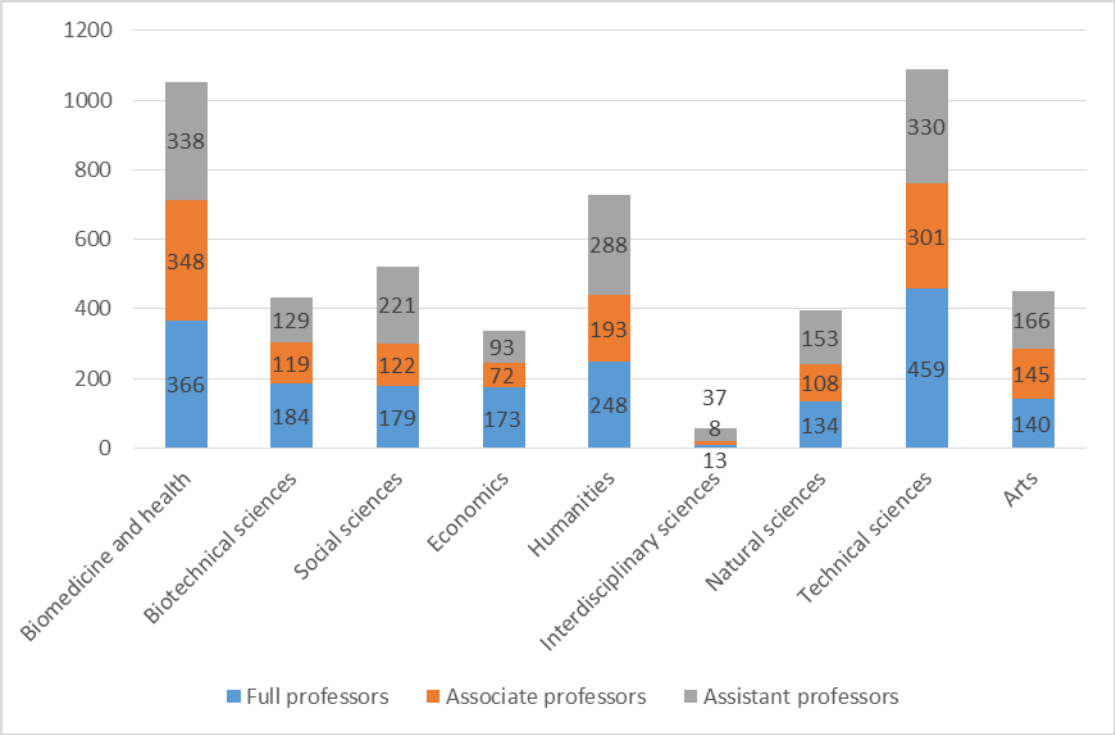


Chart 3. Number and distribution of teachers by scientific-teaching grades in different scientific areas and the field of Economics

The total number of teachers in scientific-teaching grades is the highest in the technical area (1090, Chart 3), and the lowest in the interdisciplinary area (58). The area of biomedicine and health employs a total of 1052 teachers in scientific-teaching grades, and the area of humanities 729 teachers.

The number of teachers in the areas of biotechnical, social and natural sciences, as well as arts and the field of Economics ranges between 338 (in Economics) and 522 in social sciences.

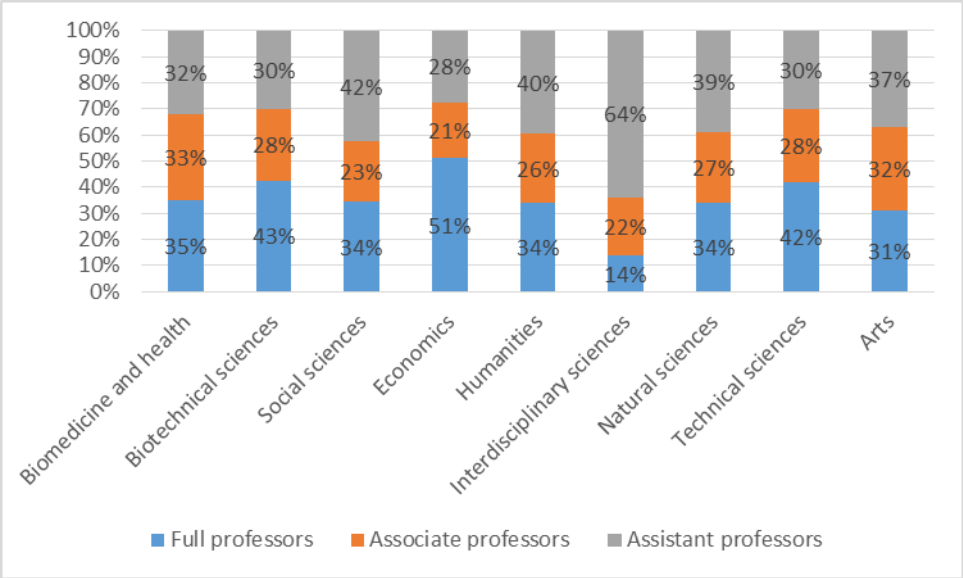


Chart 4. Percentage of full professors, associate professors and assistant professors in the total number of teachers by scientific areas and the field of Economics

The percentage of full professors out of the total number of teachers in this area is the highest in the field of Economics (51%), biotechnical area (43%) and technical area (42%). In other areas, the numbers are around one-third (31% to 35%) of staff elected into scientific-teaching grades. Associate professors make up the lowest percentage out of the total number of teachers in scientific-teaching grades in all sciences, around 21% to 28%. The exception are associate professors in the area of biomedicine and health (33%) and in the arts (32%).

The percentage of assistant professors in all areas is higher than 30% of the total number of employees elected in scientific-teaching grades. The biggest percentage is present in social sciences (42%), humanities (40%) and natural sciences (39%). The smallest percentage of assistant professors can be found in the field of Economics (21%), and biotechnical and technical areas (30%), while interdisciplinary sciences have an almost double percentage of assistant professors (64%).

From the distribution of teachers in scientific-teaching grades it is evident that, if we look cumulatively at the number of teachers by areas, the pyramidal structure (the smallest percentage of teachers in highest grades, and the biggest percentage of teachers in the lowest grades, Arimoto, Teichler, et al., 276:2016) is present only in the artistic area. The biggest deviation, meaning the structure of an inverted pyramid, is present in the field of Economics where more than half of teachers (51%) are elected in the scientific-teaching grade of full

professors. A similar structure, but with more balanced, almost identical percentages (35%, 33%, 32%) of teachers in scientific-teaching grades can be found in the area of biomedicine and health.

Finally, average percentages for each of these three groups of teachers elected in scientific-teaching grades for all scientific areas in the Republic of Croatia show that the desired pyramidal structure[19] has not been achieved. There is an obviously significant percentage of full professors (35% on average) in the total number of scientific-teaching staff, and a relatively small number of associate professors (28%), which can be explained by the criteria for election into a higher grade that were met by more than one-third of teachers in the system (35% on average)[20]. The reasons for the insufficient representation of associate professors need to be further investigated. The percentage of assistant professors averages around 38%, which makes them the biggest population of teachers elected into scientific-teaching grades. Their percentage is lowest in the field of Economics (28%).

Table 2. Average age of teachers in scientific-teaching grades by scientific area

Scientific area	Full professors	Associate professors	Assistant professors	Average age
Biomedicine and health	57.65	49.2	44.07	**50.31**
Biotechnical sciences	54.92	45.71	41.47	**47.37**
Social sciences	58.1	47.36	40.91	**48.79**
Economics	57.44	51.42	40	**49.62**
Humanities	59.3	50.22	41	**50.17**
Interdisciplinary	59	53.9	43.2	**52.03**
Natural sciences	57.33	49.29	40.80	**53.31**
Technical sciences	58.1	48.38	41.85	**49.44**
Arts	57.72	51.04	43.56	**50.77**
Average age	**57.73**	**49.61**	**42.01**	**50.08**

The average chronological age of university teachers elected in scientific-teaching grades in the Republic of Croatia is relatively uniform across scientific areas and averages around 47 – 53 years. The highest average age is in the area of natural sciences (53), while the lowest is in biotechnical sciences (47). If we look at groups of teachers in scientific-teaching grades, the

[19] Direct measure which was the intended result of the proposed acts on higher education, science and the university; from the public discussion on proposed acts from the area of science and higher education (2011) http://public.mzos.hr/Default.aspx?art=11079&sec=3349 (accessed on 10 December 2016)

[20] Ordinance on Criteria for Election into Scientific Grades (Official Gazette, 84/05, 138/06, 42/07 - Constitutional Court decision, 120/07, 71/10, 116/10 and 38/1) – unofficial consolidated text https://www.azvo.hr/hr/o-nama/propisi, accessed on 12 December 2016.

average age of full professors in Croatia is 58. Full professors in biotechnical area are the youngest (55 on average), while the oldest work in humanities and the interdisciplinary area (59).

The average age of associate professors is 50, but this is exceeded by associate professors in the interdisciplinary area (54 years), humanities (50 years) and the arts (51 years on average), as well as the field of Economics (51 years). On average, the youngest associate professors work in biotechnical (46 years) and social sciences (47 years).

The average age of assistant professors in the Republic of Croatia is 42. Their average age is higher in the areas of biomedicine and health (44 years on average), arts (44 years) and the interdisciplinary area (average is 43 years), while assistant professors in the field of Economics (40 years), natural sciences (41), social sciences (41), humanities (41) and biotechnical sciences (41) are below the average age.

The difference between the average age of full professors and associate professors is around 10 years in all scientific areas. This difference is somewhat smaller in the field of Economics (6 years) and natural sciences (8 years). Unlike these two groups, the difference between the average age of assistant professors and associate professors is smaller (around 5 years).

Scientific area	Full professors		Associate professors		Assistant professors		Average age
Biomedicine and health	57,65	35%	49,2	33%	44,07	32%	50,31
Biotechnical sciences	54,92	43%	45,71	28%	41,47	30%	47,37
Social sciences	58,1	34%	47,36	23%	40,91	42%	48,79
Economics	57,44	51%	51,42	21%	40	28%	49,62
Humanities	59,3	34%	50,22	26%	41	40%	50,17
Interdisciplinary sciences	59	14%	53,9	22%	43,2	64%	52,03
Natural sciences	57,33	34%	49,29	27%	40.80	39%	53,31
Technical sciences	58,1	42%	48,38	28%	41,85	30%	49,44
Arts	57,72	31%	51,04	32%	43,56	37%	50,77
Average age	57,73	35%	49,61	27%	42,01	38%	50,08

Table 3. Average age and percentage for every group of teachers – comparative review

If we compare this data, we discover that in scientific areas in which the average share of full professors is lower than the average (35%), the average age is higher than the average age for all scientific areas (58 years) – as is the case in the humanities and social sciences. In some areas, e.g. biotechnical sciences, the share of full professors is higher than the average (35%), while the average age is lower than the average for all scientific areas (58 years).

The lowest share of associate professors who are also the oldest can be found in the field of Economics, the interdisciplinary area and humanities. Most assistant professors (64%) of an above-average age (42 years) work at public HEIs that deliver study programme in the

interdisciplinary area. Unlike this area, technical sciences employ more assistant professors than the average 38%, and their age is lower than the average of 42 years.

4.1.1.3. TEACHER/STUDENT RATIO

Table 4. Overview of average values of teacher/student ratio in all scientific areas and the field of Economics

Scientific area	Average ratio
Biomedicine and health	1 / 14.6
Biotechnical area	1 / 16.7
Economics	1 / 53.1
Social sciences	1 / 26.2
Humanities	1 / 19.7
Interdisciplinary area	1 / 13.8
Technical area	1 / 20.6
Arts	1 / 7.4
Natural sciences	1 / 12.5

Teacher/student ratio lower than 1 teacher per 30 students was one of the minimum requirements in the last re-accreditation cycle. The average value of this ratio by scientific area is below 1/20 for most areas; exceptions are the scientific area of social sciences (1/26) and the field of Economics in which the average number of students per teacher elected in scientific-teaching grade is double this average and amounts to 1/53.1. The lowest average ratio in natural sciences is 1/12.5.

4.1.1.4. SCIENTIFIC ACTIVITY

In this report, scientific activity at public universities and other HEIs registered for this activity is primarily monitored through published scientific results.

Table 5. Average annual number of publications per scientist by scientific area

Type of publication / scientific area	Interdisciplinary	Biomedicine and health	Biotechnical	Social	Economics	Humanities	Natural	Technical
Scientific papers (CC, WoS, Scopus)	2.30	1.74	0.83	0.46	0.34	0.44	1.25	0.75
Other reviewed papers indexed in databases that are recognised for election into scientific grades	1.71	0.24	0.49	0.86	1.43	0.65	0.30	0.32
Authorship of books published abroad	0.12	0.00	0.03	0.02	0.05	0.02	0.00	0.00
Authorship of books published in the country	0.96	0.11	0.06	0.20	0.25	0.21	0.05	0.08
Papers published in national journals with international peer review	1.08	0.64	0.29	0.36	0.54	0.27	0.23	0.23
Peer-reviewed papers published in the proceedings of foreign and international conferences	2.87	0.59	0.49	0.72	1.74	0.40	0.16	1.07
Papers published in national journals with national peer review	0.68	0.39	0.04	0.19	0.26	0.30	0.07	0.09
Professional papers	4.57	0.22	0.25	0.46	0.52	0.76	0.17	0.29
Chapters in reviewed books	0.65	0.54	0.12	0.49	0.43	0.39	0.18	0.10
Peer-reviewed papers in the proceedings of	1.01	0.17	0.13	0.17	0.32	0.18	0.05	0.19

national scientific conferences								
Editing foreign books	0.63	0.01	0.00	0.15	0.03	0.02	0.02	0.01
Editing national books	0.30	0.04	0.02	0.22	0.08	0.14	0.11	0.07
Number of papers published in in-house journals	2.85	0.36	0.15	0.45	-	0.24	0.41	0.15

Scientific communication in different scientific areas is realised via different types of publications. Although some scientific areas, especially humanities, put more emphasis on the importance of books in communicating research results, research conducted in Croatia unambiguously points to the importance of journals in social sciences and humanities (Jokić and Sirotić, 2015). Average values of the annual number of publications that scientists publish in different scientific areas, by the category of publication, show that the highest annual scientific production per scientist is in biomedicine and health. The lowest number of papers indexed in CC, WoS and Scopus databases is published by scientists in the field of Economics: the average is 1 paper per scientist every three years, which is lower even than in humanities (0.44 papers per scientist per year) in which this type of publication does not represent the primary type of scientific communication. Authorship of foreign books can be claimed by an almost negligible number of scientists, while national books are mostly published by scientists in the field of Economics (the average is 1 book per scientist every four years). Social sciences and humanities have an annual average of 0.20 books per scientist. Papers published in national journals with a national review are most common in biomedicine and health (average is 0.64 papers per scientist per year) and Economics (0.54 papers). Almost two reviewed papers in proceedings of foreign and international conferences are published each year per scientist in the field of Economics (average is 1.74 papers per scientist annually). Scientists in the technical area publish, on average, one reviewed paper in proceedings of foreign and international conferences. The highest average number of papers in national journals with a national review is published by scientists in biomedical area (average is 0.39 papers annually) and humanities (0.30 papers). This type of publication is almost unknown in biotechnical, natural and technical sciences – less than 0.1 papers per scientist per year. Professional papers are mostly published in humanities (average is 0.76 papers annually) and Economics (0.52 papers). In these disciplines, professional papers exceed even the number of papers indexed in CC, WoS and

Scopus databases. Professional papers in biotechnical sciences are the least common type of publication, with an average of 0.20 papers per scientist annually.

Chapters in reviewed books are most common in biomedicine and health (on average 0.54 publications annually) and social sciences (0.49 publications), while their number in biotechnical and technical area is almost negligible. Reviewed publications in proceedings of national scientific conferences are mostly published by scientists in the field of Economics (on average 0.32 publications annually per scientist). The number of foreign editorial books is almost negligible, except in social sciences (average is 0.15 publications annually), while national editorial books are present only in biotechnical (0.25 publications annually per scientist) and social sciences (0.21 papers). The largest number of authors who publish in in-house journals can be found in social sciences (the average is 0.45 papers per scientist annually).

If we look at scientific areas, the most common types of publications in technical sciences are reviewed papers in proceedings of foreign and international scientific conferences (1.07 papers per scientist annually) and scientific papers indexed in CC, WoS and Scopus databases (0.75 papers). Authorship and editorship of books is almost absent as a publication type in this area.

In the field of Economics, most publications are categorised as reviewed papers in proceedings of foreign and international conferences (average is 1.74 papers per scientist annually), and other reviewed papers in journals indexed in databases that are recognised for elections into scientific grades (1.43 papers). The lowest number of publications per scientist in the field of Economics is in the form of authorship or editorship of foreign and national books (average is up to 0.05 publications per scientist annually). The field of Economics has the lowest average number of papers published in CC, WoS and Scopus indexed-journals per scientist annually. Information on the number of papers in in-house journals of evaluated institution is not available, because in the academic year in which this field was evaluated, information for this type of publication was not collected.

In other social sciences, the most common type of publications are *other reviewed publications* published in journals that are indexed in databases which are recognised for elections into scientific grades (average is up to 0.86 papers per scientist annually), and r*eviewed publications in proceedings of foreign and international scientific conferences* (on average 0.72 papers per scientist per year). In this area, most papers are published in in-house journals (0.34 on average) per scientist annually. Scientists working in biomedicine and health annually publish almost two papers per year (average is 1.74) in journals indexed in CC, WoS and Scopus databases. The next

most common type of publication are chapters in reviewed books (average is 0.54 publications per scientist annually) and papers in national journals with an international review (0.64 papers).

In the area of biotechnical sciences, the biggest number of publications, on average 0.83 publications per scientist annually, are categorised as scientific papers published in journals indexed in CC, WoS and Scopus databases. These are followed by reviewed papers published in journals indexed in databases that are recognised for elections into scientific grades (average is 0.49 papers per scientist a year). The same percentage applies to *reviewed papers in proceedings of foreign and international scientific conferences*. In this area, the number of papers published in in-house journals is negligible.

Humanities have the biggest number of professional papers, 0.76 papers on average, followed by other reviewed papers in journals indexed in databases that are recognised for elections into scientific grades (0.65 papers per scientist per year). Editorial and authorial books published abroad are an almost negligible occurrence, with an average of 0.02 publications per scientist annually.

The area of natural sciences is dominated by scientific papers published in journals indexed in CC, WoS and Scopus databases, with an average of 1.25 papers per scientist annually. Scientists from public universities in natural sciences on average publish the lowest number of papers in national journals with a national review (0.07 papers), professional papers (0.17 papers) and papers published in in-house journals (average is 0.41 per scientist annually).

Results of the analysis of scientific and professional productivity of scientists employed by institutions that were, for the purpose of this analysis, grouped into interdisciplinary sciences, are not comparable. Namely, these are scientists/teaching staff who teach at one study programme, but are employed at a different entity within the university. Their scientific and professional productivity is included in the total number of publications for the whole institution, or rather their average values.

To sum up, by comparing the percentage of scientific publications by all scientific areas, it becomes obvious that reviewed papers in proceedings of foreign and international conferences are the most common type of publication in almost all areas, with an average of 0.49 papers per scientist annually. The only exception are scientists from the area of natural sciences who have an average of 0.17 papers in conference proceedings per year.

4.1.1.5. FINANCES

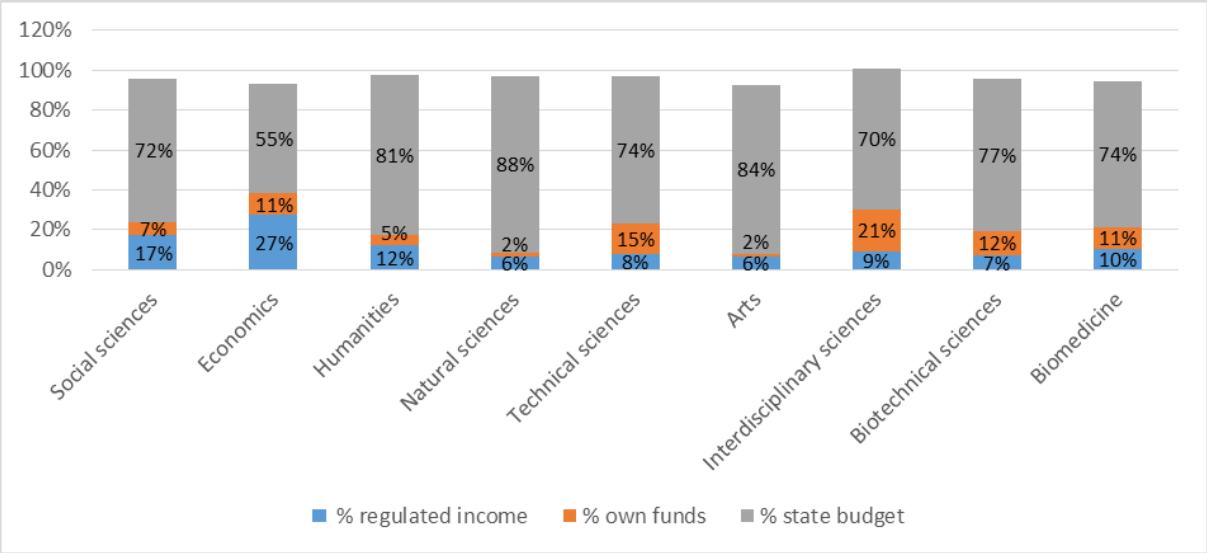


Chart 5. Share of funds in the total amount by type of funding

At higher education institutions within every scientific area, more than 75% of the budget of public higher education institutions within public universities comes from the state budget. The only exception are HEIs within the field of Economics, for which funding from the state budget makes up 55% of the budget. The biggest share of funds from the state budget (88%) can be found at HEIs within public universities that deliver study programmes in the scientific area of natural sciences.

The lowest average percentage of own source revenue[21] can be found at HEIs in the artistic area (2%), and the highest in interdisciplinary sciences. Own source revenue that makes up more than 10% of total revenue can be found at HEIs within technical sciences (15%), biotechnical sciences (12%), biomedicine and health (11%), and Economics (11%).

An average share of regulated income[22] is most important at HEIs within public universities that deliver study programmes in the field of Economics (27%). It is also significant for HEIs in social sciences (17%) and humanities (12%), as well as in biomedicine and health (10%).

[21] Own source revenue includes the following categories: tuition fees – postgraduate specialist, tuition fees – postgraduate doctoral, scientific projects, professional projects, rent revenue, other types of income.
[22] Regulated income includes the following categories: tuition fees – undergraduate, graduate, professional, additional knowledge or skills testing (if implemented in addition to the matriculation exam), enrolment fees, publishing activity, administrative fees (charging for various forms, diplomas, certificates, etc.) and other types of income.

4.1.1.6. MOBILITY AND INTERNATIONAL COOPERATION

OUTGOING MOBILITY

Teachers

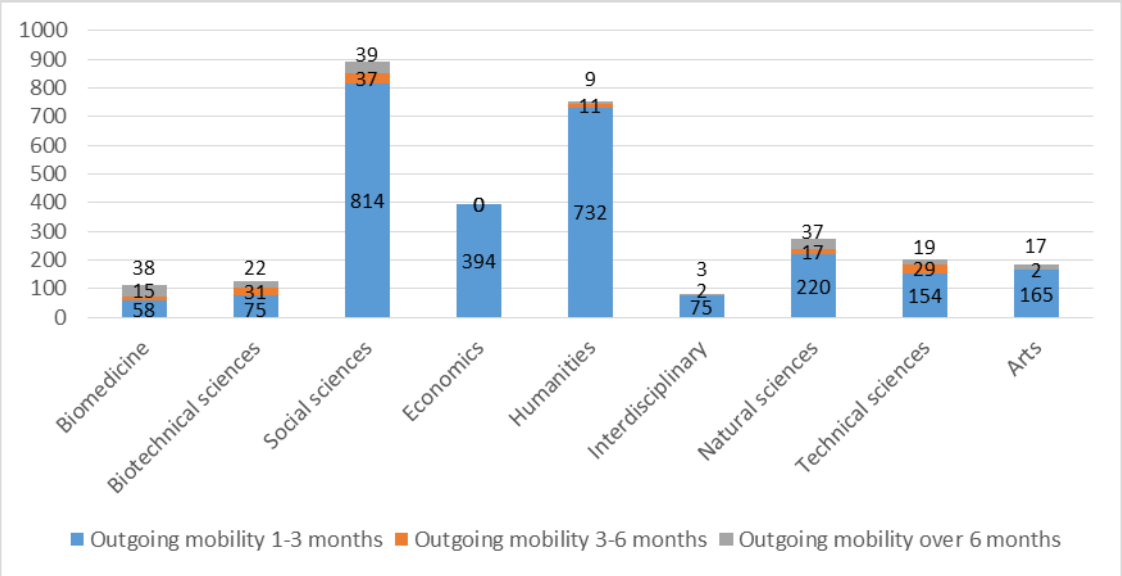


Chart 6. Information on outgoing teacher mobility by length of stay abroad and scientific area

Information on outgoing teacher mobility varies by different scientific areas. The reason can be attributed to the fact that programmes for teacher mobility began showing results just a little after the evaluation of first HEIs. Also, in some scientific areas teachers are traditionally more focused on longer mobility and going abroad.

The shortest visit abroad (between 1 and 3 months) represent the most numerous category of mobility in all areas. The highest number of such visits can be found in the field of Economics (394), other social sciences (814) and humanities (732). Longer mobility of teachers – more than 6 months, considering the total number of trips abroad, are more numerous in biomedicine and health (38), natural sciences (37) and biotechnology (22). The field of Economics has no examples of outgoing teacher mobility longer than 3 months.

Students

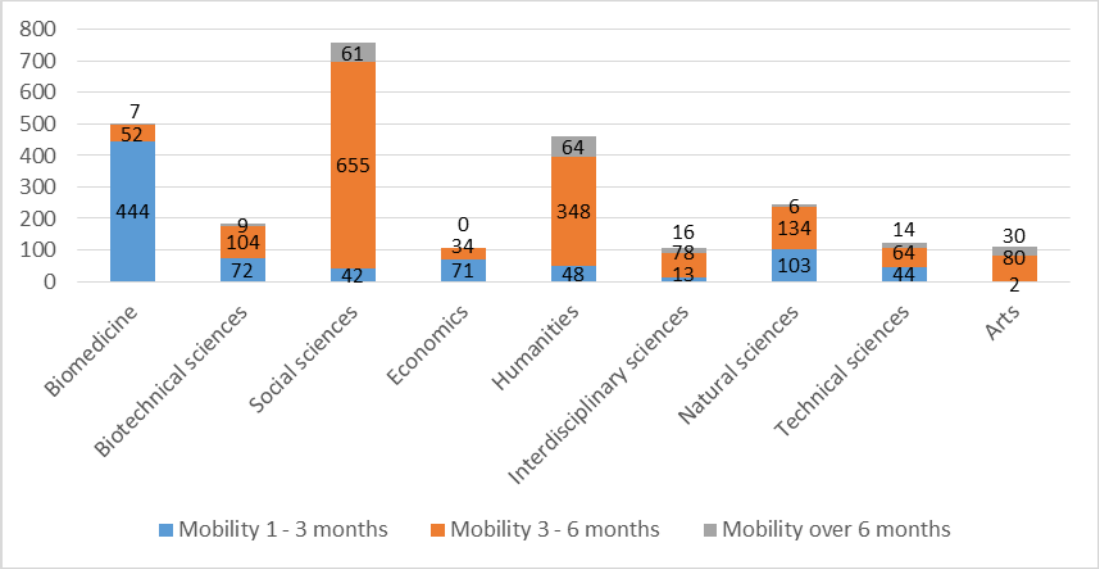


Chart 7. Information on outgoing student mobility by length of stay abroad and scientific area

The largest category of outgoing student mobility, in all scientific areas, are visits that last between 3 and 6 months. The exception are students of biomedical sciences whose visits are a bit shorter (1 – 3 months). The highest number of longest student visits (longer than 6 months) can be found in social sciences and humanities. An extremely low number of visits to foreign countries, especially those longer than 3 months, is noticeable in the field of Economics at higher education institutions within public universities.

INCOMING MOBILITY

Teachers

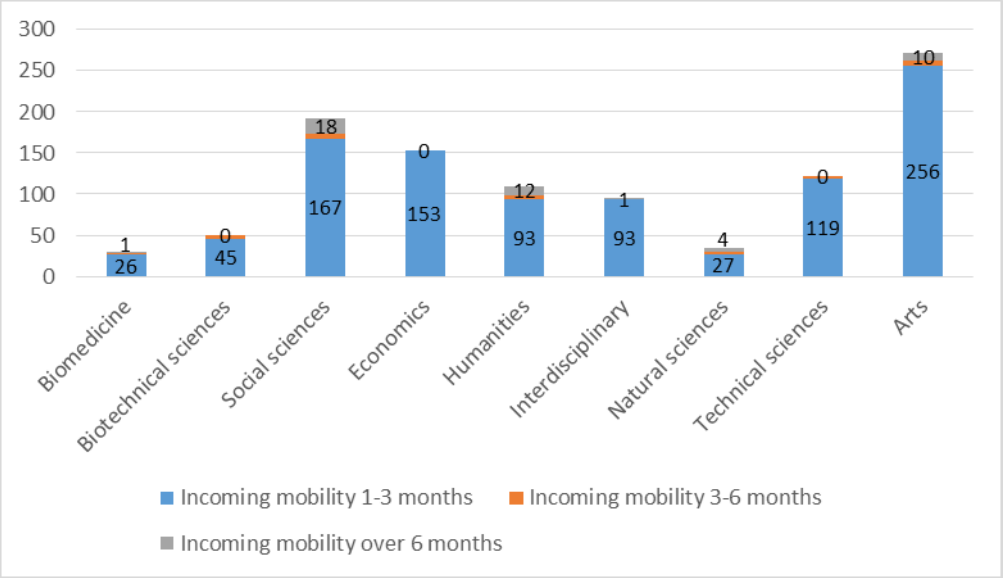


Chart 8. Information on incoming mobility of foreign teachers by length of stay and scientific area

Looking at the number of teachers who come to Croatian higher education institutions within public universities, we noticed that there is a very small number of visits longer than three months. Shorter visits of foreign teachers are more pronounced at higher education institutions in the artistic area (256), and the area of social sciences (167). The highest number of visits of foreign teachers that lasted longer than six months can be found in social sciences (18), humanities (12) and arts (10). There are no such visits in biotechnical and technical areas nor in the field of Economics.

Students

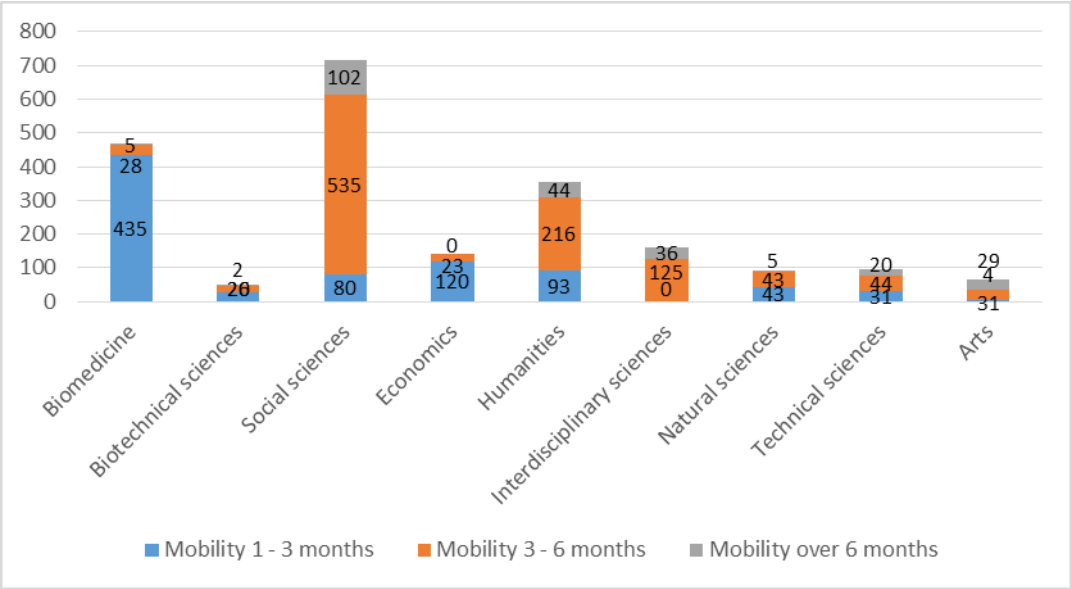


Chart 9. The number of teachers coming from abroad by the length of stay and scientific area

Incoming student mobility, according to the number of visits and the duration of the stay, is the highest in social sciences and biomedicine, and the lowest in biotechnical sciences and arts. The biggest number of longest stays of foreign students (longer than 6 months) is found in social sciences (102) and humanities (44).

4.1.2. ANALYSIS OF EXPERT PANELS' RECOMMENDATIONS

Scientific area of Biomedicine and Health

Categories	Activities	Findings	Recommendations	Relevant institution
Higher education institution management and quality assurance	Management		Institutions have developed effective organizational structures and processes. Strategic missions should be aligned with strategic plans.	Higher education institution
	Quality assurance	Monitoring the quality of scientific research is mainly based on the impact factor, which does not necessarily reflect the actual quality of the journals specializing in various fields.	To collect more quantitative data that can be used to monitor progress. Teaching quality monitoring should involve feedback from students and the formal evaluation of the teaching staff. The implementation of the strategic plan should be appropriately monitored by way of performance indicators, which include the number and quality of research projects, published articles and other publications, opinions from doctoral candidates on the availability of supervisors, and so on.	Higher education institution
	Strategic goals	Strategic programmes at the institutions received average scores, with the most common objection being that the strategic goals are too vague and abstract. Research strategies do not indicate clear research topics.	In relation to the strategic goals set, the expert panel has concluded that several researchers stand out at each institution, while others meet the minimum formal requirements. The impression is that the number of researchers required for the achievement of strategic goals is insufficient. It is necessary to develop exact indicators for monitoring the achievement of strategic objectives.	Higher education institution, MSE
	Ethics	HEIs have codes of ethics and mechanisms in place for monitoring unethical behaviour. All employees should be informed about the procedure.	Expert panel particularly commended the effectiveness of the system for preventing and monitoring student plagiarism at one faculty. To a greater or lesser extent, faculties have to expand their codes of ethics or make their staff and students more familiar with the concept and awareness of unethical behaviour.	Higher education institution
Study programmes	Enrolment quotas	Enrolment quotas for study programmes are aligned with the needs of society and possibilities for quality teaching.		Higher education institution, MSE
	Learning outcomes	Study programmes are aligned with the learning outcomes and international standards.	Adopting international frameworks for learning outcomes, which would encourage a more transparent, reliable and effective process of development and monitoring of syllabi. An initiative to define common learning outcomes for all medical schools in Croatia.	Higher education institution, university

			Defining a set of clinical skills that students must acquire after completing a study programme.	
	ECTS credits		Revising the allocation of ECTS credits so they would exactly reflect the workload of students in all courses.	Higher education institution
	Internship (practical work)		Community service, partnerships with industry (pharmaceutical industry) or cooperation with other higher education institutions (in the area of Medicine and Nursing) may represent opportunities for students to reinforce their knowledge.	Higher education institution, university
	Alumni		Maintaining contacts with alumni. Coordinating with the Croatian Employment Service in conducting a systematic analysis of the employment statistics and the data on professional achievements of graduates from higher education institutions in Croatia and abroad.	Higher education institution
	Enrolment criteria, pass rates and drop-out rate	There is a high number of students who drop out in their first year of study.	The idea of education based on learning outcomes should be incorporated into all aspects of the education process. Introducing modern teaching methods, such as a flipped classroom, problem-based learning, learning by example, and interprofessional team-learning. Higher education institutions should seek to apply practical learning methods as much as possible.	Higher education institution
	Revising study programmes	Specialization programmes are rather comprehensive in scope.		Higher education institution
	Supervision	Higher education institutions offer and provide counselling, supervision and resources for vocational guidance.	Higher education institutions should improve procedures for vocational training of students because students feel that the system of supervision is effective, but that the system of teacher supervision is not optimal because there are not enough good supervisors.	Higher education institution
	Additional training and extra-curricular activities	Students are allowed to choose from among a large number of extra-curricular activities supported by higher education institutions.	The expert panel believes that this is one of the strengths of higher education institutions and students are therefore very satisfied.	
	Student facilities			
	Student support			
Teaching			Higher education institutions should define the criteria for the	university, MSE

Staff			advancement of teachers, which would take into account various aspects of their work, including their pedagogical training, teaching and so on. Pedagogical training should also be a prerequisite for promotion.	
Scientific research	Results	The average number of scientific papers published in international peer-reviewed journals is relatively high in the area of Biomedicine, especially when we consider the low funding of research. The number of papers published in high-impact journals is relatively low.	Expert panel stressed that there are only several scientists and research groups at each institution who publish outstanding papers.	Higher education institution
	Encouraging the scientific research and monitoring	There are no systematic formal mechanisms to recognize, reward and encourage outstanding scientists in the field of Biomedicine; there are only some exceptions which are rather informal rewards.	Employment and career advancement policies are in line with the national system of minimum criteria, which is not a precondition for creating a climate of scientific excellence.	Higher education institution, university
	Technology transfer and cooperation with the industry	The cooperation with the institutions in the public and private sectors is good.	International cooperation should be strengthened. HEIs have put minimum efforts into technology transfer, while the commercialization of professional activities is carried out optimally.	Higher education institution, university
Mobility and international cooperation		Faculties provide support to their students to complete part of their programmes abroad. Most higher education institutions are active in international cooperation and exchange with other institutions.	Higher education institutions should put more effort into encouraging their students to use their knowledge of foreign languages and spend study periods abroad (e.g, clinical practice, summer schools etc.). Higher education institutions could attract foreign teachers by developing policies and establishing a permanent programme for short visits by foreign scientists and teachers, and for their participation in teaching and scientific research.	Higher education institution, university, MSE
Physical and administrative resources	Laboratory equipment	Laboratory equipment and protocols for its use meet the prescribed criteria, and some equipment is internationally accredited.	At some institutions, there is a need for modernization to achieve a higher degree of scientific research recognition.	Higher education institution
	Other equipment	Modern equipment, technology and technical support for teaching and research activities has been ensured.	Continuing the modernization of equipment.	Higher education institution, MSE
	Non-teaching	The teaching and non-teaching staff ratio is mostly adequate.	There are rules in place for additional training of non-teaching staff, but they are mostly not sufficiently implemented.	Higher education institution

	staff			
	Library	Libraries are too small and there is not enough studying space. Access to e-journals is limited.		MSE
	Finances	Lack of space and financial resources. This group of higher education institutions relies too heavily on the state budget.	Faculties need additional funds for increasing their facilities and buying additional equipment for clinics to further develop clinical teaching. Institutions should seek to diversify the sources of funding in order to increase their autonomy and ensure sustainability of income from other sources, such as EU funds, cooperation with other faculties and companies and services for the local community.	Higher education institution, university, MSE

Biotechnical Sciences

Categories	Activities	Findings	Recommendations	Relevant institution
Higher education institution management and quality assurance	Management	There are no clearly defined specific goals and mechanisms for performance measuring and monitoring. Strategic planning rarely includes all stakeholders, and there are not any underlying operational plans and mechanisms for checking the implementation of goals and activities.		university, higher education institution
	Quality assurance	Quality improvement activities are not carried out systematically and they are generally not sufficiently developed. There are no systematic activities and formal procedures for continuous monitoring of the quality of teaching and study programmes. The HEIs insufficiently gather the information to improve their activities. Mechanisms for scientific activity monitoring are not formally and clearly established, or are in their early stages.	Introducing other methods of monitoring the quality of teaching, such as peer review, and by improving the content of surveys on the quality of courses and study programmes and the methods of conducting student surveys. Improving the use of information collected from all stakeholders.	MSE, university
	Mobility	Knowledge of English is crucial.	Encouraging the use of English at all levels of teaching and research activities, as well as to improve the opportunities for learning English.	
	Strategic goals	Strategic goals have in general been established, and research priorities should be more clearly defined at the faculties which have clear views and goals for research quality. In the case of integrated universities, scientific research strategies have been defined at the university level, but not at the department level.	Establishing functional mechanisms for monitoring scientific activities of teachers and defining performance indicators and the freedom to reward outstanding scientists. Strengthening the policy for rewarding research quality and excellence and developing mechanisms for monitoring low scientific productivity.	University
	Ethics	There are ethics committees and codes of ethics, and in the case of university departments, codes and commissions exist at the university level. There are no clear formal procedures for	Establishing formal procedures to ensure the prevention of copying and plagiarism. Introducing a system which would ensure detection of	University, higher education institution

		systematic monitoring of ethical behaviour of students. There are no formal processes that deal with teacher behaviour. Students are generally not systematically informed about the ways of solving complaints or remarks about teachers.	plagiarism.	
Study programmes	Enrolment quotas	Enrolment quotas are too high; Low enrolment quotas that allow the admission of "formal" students who do not actually study, but who exercise student rights; Enrolment of students who drop out and lower pass rates and the need to justify the enrolment quotas with the institution's resources and the needs of society which are not always clearly stated.	Assess, revise and better define enrolment quotas.	Rectors' Conference
	Learning outcomes	Learning outcomes have only been partially defined (sometimes only at the level of a study programme or undergraduate study programmes). Learning outcomes at the undergraduate and graduate study programmes are too similar and too general in character, and applicable on almost all courses.		Higher education institution
	ECTS credits		Revising the allocation of ECTS credits when all courses carry the same number of credits, and when it is necessary to ensure uniformity and consistency. Identifying and analyzing irregularities in relation to the workload for some courses and match the ECTS credits.	Higher education institution
	Internship (practical work)	There is a lot of room for improvement. Students considered the practical work to be a mere formality and feel that the time allocated for practical work is too short.	None	Higher education institution
	Alumni		Strengthening alumni organizations and systematically gathering information on graduate employment. HEIs should revise their enrolment criteria and introduce stricter	Higher education institution

			criteria.	
	Revising study programmes		Including industry representatives and other stakeholders in the analysis of study programmes, introducing additional courses taught in English, revising study programmes and systematically and strategically monitoring existing study programmes.	Higher education institution
	Supervision		Establishing a better system of mentoring, counselling and vocational guidance because students do not have information about their obligations and employment opportunities.	Higher education institution
	Additional training and extra-curricular activities			
	Student facilities	Lack of accommodation facilities and student restaurants. Students are familiar with the improvements resulting from their activities and participation in the work of the management structures.		Higher education institution, university, MSE
	Student support		Monitoring results achieved at the state graduation exam (*State matura*) and attracting excellent, motivated students. Maintaining contacts and communication with graduates (alumni) and gathering employment information. Exploring the opportunities for minimizing workload resulting from the large number of students which do not actually attend classes and who drop out in their first year of study. Establishing a mentoring system and putting more efforts into the mentorship of students in the first year of study in order to increase the pass rates. Resolving the mismatch between the ECTS credits and student workload, providing more practical work, organizing meetings for providing students with the feedback on the results of surveys and improvements introduced on the basis of these surveys. Giving information on mobility, job opportunities and employability.	

			Defining disciplinary action for cheating on exams, anonymous exam results and establishing more effective mechanisms of the appeals procedure by ensuring an independent person i.e. a committee outside the higher education institution. Revising and improving study programmes and defining the learning outcomes more clearly and precisely. Launching a course (and a study programme) in English to attract foreign students and improve the quality of practical work.	
Teaching Staff		The problem of unbalanced distribution of teacher workload. Teachers publish insufficiently in high-impact international journals. Insufficient horizontal and international mobility.	Higher education institutions should develop proper methods of checking the qualifications and expertise of the teaching staff which will represent the upgrade to the national criteria. The application of the teacher peer review system to ensure the verification of qualifications of teaching staff and their impact. Rewarding teaching, scientific and professional excellence.	Higher education institution, university, MSE
Scientific research	Results	Teachers publish insufficiently in high-impact international journals.		
	Encouraging scientific research and monitoring	HEIs have in place the mechanisms for encouraging scientists to publish their papers. All institutions have at least one in-house journal which is not indexed in relevant international databases. There is no system of commending and rewarding scientists who have published a large number of notable papers in top journals.		
	Technology transfer and cooperation with the industry		Improving cooperation activities with other institutions in the country or abroad.	Higher education institution, university, MSE
Mobility and internation-al cooperation		Insufficient student mobility; low teacher mobility; low incoming teacher mobility.		Higher education institution, university, MSE

Physical and administra-tive resources	Laboratory equipment	Obsolete laboratory equipment.	Modernization of laboratory equipment, equipment accreditation and sharing.	Higher education institution, university, MSE
	Other equipment	IT equipment is adequate.		
	Non-teaching staff	Teaching-non-teaching staff ratio is satisfactory.		
	Library	Lack of library space. Office hours are not always convenient for students. Access to databases is limited.		Higher education institution, MSE
	Finances	External sources of funding of scientific activity are limited.	Encouraging higher education institutions to attract other sources of funding. Control of income and expenditure.	Higher education institution, university, MSE

Social sciences

Categories	Activities	Findings	Recommendations	Relevant institution
Higher education institution management and quality assurance	Management	The expert panel has identified the need to strengthen the potential of higher education institutions in the field of strategic management. Mission and other parts of the strategy in the existing documents are mostly generic, and insufficiently specifically defined.	Making regular periodic strategic plans of higher education institutions with accompanying action plans and goal achievement indicators.	Higher education institution
	Quality assurance	It is necessary to empower the committees for quality assurance which act at higher education institutions mainly as advisory bodies, without decision-making powers.	The implementation of the recommendations by committees for quality assurance, which is carried out by certain faculty departments, should be connected with granting of financial resources to those departments and academic advancement.	Higher education institution, university, MSE
	Strategic goals		The importance of cooperation with external stakeholders (future employers and institutions in the region) in quality assurance of higher education institutions.	Higher education institution
	Ethics		Employees and students should be introduced to the code of ethics and the possibilities of protection against possible internet or workplace abuse.	Higher education institution
Study programmes	Enrolment quotas		The need for cooperation with external stakeholders, especially employers, industry experts, alumni etc.	Higher education institution, university, MSE
	Learning outcomes		It is important to systematically monitor the alignment of learning outcomes with general educational goals set out in programme and course descriptions. Additional efforts should be put into the standardization of approach to learning outcomes.	Higher education institution
	ECTS credits			
	Internship (practical work)	Excellent examples have been identified in relation to student practice/internships and other forms of gaining work experience during the study (the study of languages, psychology, sociology, archaeology).	Higher education institutions should include practical teaching elements in the study programmes, because they can contribute to employability. It is important to allow students to do internships at business partners' firms and to enable them to do volunteer work in the community. Such practices should also be introduced to other departments and data should be systematically gathered on the effectiveness of such activities.	Higher education institution

	Alumni			
	Enrolment criteria, pass rates and drop-out rates	ISVU system provides insufficient quality of the data on pass rates.	It is important for higher education institutions to independently collect information about graduate employment, which would represent the basis for analyzing society needs for the study programmes offered by higher education institutions, which would serve as the basis for making informed decisions on enrolment quotas for each study programme.	Higher education institution, university, MSE
	Revising study programmes		The main criterion for enrolment should be excellence which is why some departments have introduced the undergraduate grade point average as the main criterion. Faculties need to conduct a more detailed analysis of enrolment criteria in all departments and all graduate programmes should introduce criteria for enrolment.	Higher education institution, university, MSE
	Supervision		All students should be given supervisors.	Higher education institution
	Additional training and extra-curricular activities		To strengthen the institutionalization and support for extracurricular activities of students, especially in their first year of study.	Higher education institution
	Student facilities			
	Student support		A good relationship between students and teachers should be maintained by introducing better teacher evaluation mechanisms and by creating a system which would permanently provide relevant information. Faculties should adopt strategies to further encourage students to make a contribution to, and participate in the democratic processes at higher education institutions.	Higher education institution, university, MSE
Teaching Staff		Teachers consider the workload to be fairly distributed, while there are no formal mechanisms for workload distribution.	In some areas, the teacher/student ratio is inadequate, which certainly has a negative impact on the experience of studying. It is necessary to develop a formal policy of professional development of teachers. To launch teacher training centres which provide training in higher education pedagogy. Participation in professional development programmes will help the scientific and teaching staff in applying for	Higher education institution, university, MSE

			international competitions, writing and publishing in English and it will generally enable them to increase their international visibility.	
Scientific research	Results		Increasing the number and quality of papers and their visibility.	Higher education institution
	Encouraging scientific research and monitoring		It is necessary to establish an improved, standardized, regular monitoring and evaluation of scientific activity and its outcome (e.g. the number of scientific papers submitted to international journals by departments and by individual scientists and the number of papers published in these journals). The system for monitoring scientific excellence should be connected with effective procedures for rewarding scientific excellence (e.g. public commendation, taking a sabbatical year, reducing the teaching load, financial bonus, promotions, etc.).	Higher education institution
	Technology transfer and cooperation with industry		To lay down clear rules on supporting commercial activities of employees so they would benefit institutions and employees alike.	Higher education institution
Mobility and internation-al cooperation		International cooperation has not been recognized as one of the priorities of higher education institutions.	It is necessary to develop an institutional policy on the issue of membership and activities in international associations, and strategically plan various forms of international cooperation. To encourage Croatian students and doctoral candidates to participate in mobility programmes, and facilitate the recognition of ECTS credits earned at foreign higher education institutions. To offer a greater number of courses or even study programmes taught in English, covering topics which would benefit a broader international audience. It is necessary to ensure accommodation etc. for incoming student mobility.	Higher education institution, university, MSE
Physical and administra-tive resources	Laboratory equipment Other equipment Non-teaching staff Library Finances		It is necessary to develop a competitive science infrastructure, including laboratories, computers, software etc. for all disciplines. Ensure that the libraries are adequately adapted to learning and that they have a sufficient number of copies available for students and teachers i.e. scientists.	Higher education institution, university, MSE

			Acquisition of modern scientific resources – access to databases, secure data storage, statistical packages and other relevant software.	

Economics

Categories	Activities	Findings	Recommendations	Relevant institution
Higher education institution management and quality assurance	Management	Organizational structure was unclear and insufficiently transparent at many higher education institutions.	The expert panel has noticed the autonomy of some higher education institutions, first of all departments, but also of certain faculties.	Higher education institution
	Quality assurance	Higher education institutions have quality assurance systems in place, with an emphasis on student surveys.	The possibility for making anonymous complaints and giving suggestions for improvement was commended.	Higher education institution
	Strategic goals	All included higher education institutions have defined their missions and visions, but they are too general. Most HEIs have institutional strategies, but again, they are too general, without clearly defined priorities and specific characteristics.	To have key external stakeholders (representatives of regional public administration bodies and industry) involved in the strategy development.	Higher education institution
	Ethics	All included higher education institutions have formal documents that guarantee work ethics.	Committees were mostly not able to assess whether they are implemented, because there were no examples of their implementation in practice.	Higher education institution
Study programmes	Enrolment quotas		All higher education institutions were working to reduce the enrolment quotas, particularly for dislocated and part-time studies.	Higher education institution, university, MSE
	Learning outcomes	A small number of higher education institutions have developed learning outcomes.		Higher education institution
	ECTS credits	Higher education institutions did not succeed in aligning the learning outcomes with student evaluation and grading methods, nor did they carry out an evaluation of actual workload in collaboration with students and teachers, which would		Higher education institution

		be evident in the ECTS credits allocated to each course.		
	Internship/practical work	There is not enough practical work.		Higher education institution
	Alumni	Only one higher education institution had an alumni club.		Higher education institution
	Enrolment criteria, pass rates and drop-out rates		Students singled out the problem of a lack of information on evaluation criteria, expected competencies and a lack of information on employment opportunities.	Higher education institution
	Revising study programmes	Some courses are too similar with contents that are not sufficiently relevant.	All higher education institutions have developed the procedures for the development of new programmes, but none of them have involved external stakeholders and students in the development of the existing ones in a sufficiently transparent manner.	Higher education institution
	Supervision	Most of the universities have developed student supervision.		
	Additional training and extra-curricular activities	Higher education institutions did not sufficiently analyse the market and monitor alumni employment.		Higher education institution
	Student facilities			
	Student support		Students regularly commended the quality of communication with the teaching staff. HEIs allow grade appeals.	Higher education institution
Teaching Staff		The number of teachers is too low and teaching workload is excessive. Junior teachers, although often commended as agents of change in their own higher education institutions, often encountered difficulties in their advancement. HEIs often employ their own alumni who then enter doctoral study programmes at those institutions.	Abolition of dislocated study programmes, banning employment at other higher education institutions and work on commercial projects, reducing the number of elective courses and specializations, better monitoring and fairer workload distribution (which, in addition to teaching, should take into consideration scientific work, work on international projects and the like) and the development of a comprehensive human resources management policy. Expert panels have recommended that the human resources management policy should be aligned with the plans of professional development and strategic priorities. One higher education institution has succeeded in employing mostly individuals who had finished their studies at other higher education institutions or abroad.	Higher education institution, university, MSE
Scientific	Results	Published in the local or regional	Excessive workload is the main obstacle to improving the quality of	Higher education institution,

research		journals which do not have an international reputation.	scientific activity. Scientific activity is evaluated solely against national criteria, which stress the quantity of scientific production, instead of quality.	university, MSE
	Encouraging scientific research and monitoring	Some higher education institutions additionally rewarded scientists who had their work published by prestigious journals.	An expert panel proposed to a HEI that, in addition to the publications, they also reward the scientists for the papers submitted but rejected for publication by prestigious journals.	Higher education institution, university
	Technology transfer and cooperation with industry		Only one higher education institution implemented a large number of projects, and in this case the expert panel criticized a lack of their strategic justification.	Higher education institution
Mobility and internation-al cooperation		Insufficient teacher mobility and international involvement Student mobility in Croatia is low. Insufficient internationalization of scientific work	Expert panels commended a higher education institution which encouraged teachers to bring visiting lecturers from abroad and a higher education institution which privileged individuals having international experience in employment, as examples of good practice. The main obstacles to attracting more foreign students are a lack of courses taught in English, even at the higher education institutions in which even local students would like to attend such courses. Lack of student accommodation was perceived as an additional obstacle.	Higher education institution, university
Physical and administra-tive resources	Laboratory equipment	Expert panels commend HEIs for having good equipment and computer resources.		
	Other equipment	Lack of course-books		Higher education institution, MSE
	Non-teaching staff	Almost all HEIs lack non-teaching staff, especially the professional staff which would work on supporting international projects, counselling and vocational guidance of students and similar activities.		Higher education institution, university, MSE
	Library	Most libraries did not have enough space for independent work of students.		Higher education institution, university, MSE
	Finances	Inadequate structure of the revenue, as HEIs were mostly funded from the state budget and,	Only a few higher education institutions managed to achieve significant revenue from various lifelong learning programmes, research projects and consulting services.	Higher education institution, university, MSE

		to a lesser extent, tuition fees, and the expenditures that mainly refer to employee salaries.	The expert panels proposed better co-operation with the industry and the local community through projects and lifelong learning programmes.	

Humanities

Evaluation	Activities	Findings	Recommendations	Relevant institution
Higher education institution management and quality assurance	Management	Developed organizational structure	Employees and students at some higher education institutions believe that the organization is ineffective, especially in cases of problem solving and implementation of quality assurance procedures.	Higher education institution
	Quality assurance	QA has been established at all higher education institutions, but only a small number of HEIs included external stakeholders in the system.	The information collected through the quality assurance systems is not sufficiently provided to stakeholders (teaching staff, students, administrative staff) as feedback important for further development.	Higher education institution
	Strategic goals	Strategic plans for the coming period have been developed, but most plans are not sufficiently detailed, while the strategic goals are too general and there are no clearly defined operational plans with mechanisms for monitoring.	The panels stressed the need to improve and develop strategic objectives and the need for making strategic documents available to the public.	Higher education institution
	Ethics	HEIs have codes of ethics, but it is not sure whether they are implemented by some higher education institutions.		
Study programmes	Enrolment quotas	Enrolment quotas are regularly monitored and aligned with the resources of higher education institutions and the needs of society.	The panels stressed the need for improving the collection and analysis of data on labour market needs and graduate employment, as well as for a detailed analysis and the adjustment of quotas.	Higher education institution
	Learning outcomes		Learning outcomes are generally clearly defined in accordance with Bloom's taxonomy, and in the last few years the methodology for determining learning outcomes was defined more clearly, and the outcomes were better defined.	Higher education institution
	ECTS credits	The criteria for awarding ECTS credits are determined at university level.	The panels has expressed the need for revising ECTS credits and their systematic monitoring, and added that the number of credits for identical courses is not aligned, and that it does not reflect a realistic assessment of student workload.	Higher education institution
	Internship (practical work)	Students have the opportunity to apply the acquired knowledge and	Integrated universities differ with respect to this area, and while certain departments are mentioned as examples of good practice, in some other	Higher education institution

		skills in practical and field work.	universities a better organization of practical work is recommended.	
	Alumni	Associations of former students (alumni) at several evaluated higher education institutions have recently been established and the collection of the data on their employment and the creation of a database are in the initial phase.	HEIs maintain more or less informal contacts with alumni, and the establishment of an official register of alumni and a more systematic collection of data is recommended.	Higher education institution
	Enrolment criteria, pass rates and drop-out rates	Enrolment procedures have been clearly defined.		Higher education institution
	Revising study programmes	The quality of study programmes is monitored by only two higher education institutions.	Monitoring and improving study programmes is not developed, and it is in the initial phase, while it often does not involve students and external stakeholders.	Higher education institution
	Supervision	Higher education institutions have a defined system of student supervision and counselling.	Recommendations for their improvement were made, namely the introduction of additional counselling, supervision and professional development programmes.	Higher education institution
	Additional training and extra-curricular activities	HEIs support their students in extracurricular activities and this criterion is generally believed to be satisfactory.		
	Student facilities			
	Student support			
Teaching staff		At some departments and chairs excessive teacher workload has been identified. Due to recent financial cuts, administrative tasks are performed by teachers, which probably creates the most difficulty for them.	Improving the effectiveness of teaching, for example, by merging some courses, developing e-learning etc. It is necessary to regulate and monitor the administrative workload of scientific and teaching staff. The rules related to teacher workload should provide clear and equal distribution of obligations, including teaching, research, supervision, consultations, administrative tasks and participation in the work of various bodies and committees at the level of divisions, departments, faculties and universities, which is essential for the proper functioning of institutions. Increased effort is needed to ensure time and facilities for the staff to conduct scientific research and the development of research skills and	Higher education institution, university, MSE

			interests. Considering a separate human resources development strategy and the strategy for the development of scientific and teaching staff and defining these strategies at the University level. The application of an effective growth policy based on transparency and clear communication, by involving all institutional bodies. The strategic goals of higher education institutions should include hiring more diverse teaching staff with the skills that meet the needs of public faculties/universities dedicated to internationally recognized scientific level of teaching and research. This should encourage employees to become more involved in the international scientific cooperation. The need for peer review, i.e. monitoring and evaluation of two examiners in teaching and knowledge assessment, because there are no procedures to ensure a uniform standard of assessment of students for the entire institution. The need for adequate professional training for junior staff by introducing institutional peer-review system, with older colleagues systematically supervising younger (and vice versa), i.e. by giving the younger staff the opportunity to regularly discuss their work with their supervisors.	
Scientific research	Results	There is a very low number of papers published in renowned international publications.	The vast majority of these papers are those published in Croatian journals in Croatian (often in in-house journals), although some exceptions in their quality were identified in several departments of the universities in Pula and Zadar.	Higher education institution
	Encouraging scientific research and monitoring	HEIs practically do not have programmes for encouraging the publishing of scientific papers in high-quality international publications or the rewards systems.	Developing clear research goals and articulating them in comprehensive strategic plans, which should include monitoring mechanisms. Teaching loads should be reduced in favour of the research workload. Employees would need to rely less on publication in in-house journals in order to avoid the impression that in-house magazines are a more available and easy outlet for publishing research results.	Higher education institution, university, MSE
	Technology transfer and cooperation with industry	In the field of humanities, technology transfer is not so relevant, however, the community work of the evaluated institutions is commendable,		

		particularly the programmes and projects run by theological faculties, often in collaboration with the Church.		
Mobility and internation-al cooperation		National student mobility is enabled at all higher education institutions in accordance with clearly defined rules. Mobility of scientific and teaching staff is low.	Individual teacher mobility should be raised to the level of permanent and regular practice and HEIs should work on attracting international projects. Intensified cooperation through international projects and contracts, application to European Union funded projects, a large number of courses taught in foreign languages, joint programmes etc.	Higher education institution
Physical and administra-tive resources	Laboratory equipment	In most case, the equipment is outdated.	The equipment at the studies of Psychology and Philological Studies should be modernized and brought into line with international standards. The need for technical support in the maintenance and upgrading of professional equipment and the development of software for student experiments. It is necessary to procure new eqipment, modernize the existing equipment in line with international standards.	Higher education institution, university, MSE
	Other equipment	The IT equipment in classrooms is mostly satisfactory.	Procurement of new IT equipment, modernization and upgrading of computer systems.	Higher education institution, university, MSE
	Non-teaching staff	Teaching - non-teaching staff ratio is much better at the faculties of theology than at the university humanities departments.		
	Library	Libraries are very well networked and students are able to obtain the required reading materials. The access to the databases is satisfactory.		
	Finances	Funding for higher education institutions is sufficient for further achievement of their missions. The sources of funding are transparent and sufficient to ensure the quality of teaching and research.	Consider the possibilities of cooperation between universities and government bodies in providing administrative support and providing financial advice regarding operational costs and salaries in order to facilitate the preparation of the teaching staff for applying for major international projects (projects of the European Research Council or other sources of funding within the Horizon 2020 programme).	Higher education institution, university, MSE

Natural Sciences

Categories	Activities	Findings	Recommendations	Relevant institution
Higher education institution management and quality assurance	Management	All higher education institutions in the area of natural sciences have drafted their strategic plans, but their quality varies considerably.	A low number of higher education institutions have included external stakeholders in the development of the plan. Monitoring of scientific work through appropriate actions (number of papers, journals in which they were published, participation in international conferences, etc.). Similar departments should share administrative resources.	Higher education institution
	Quality assurance	Higher education institutions have prescribed procedures for quality assurance.	Students and other stakeholders are insufficiently involved in quality assurance system. Cooperation with external stakeholders and further development of mechanisms is necessary.	Higher education institution
	Strategic goals		The strategic plans are not sufficiently aligned with the missions of higher education institutions, as they are too general and not adapted to departments and divisions. The strategic plan of scientific research is too general, and it lacks long-term strategic objectives and key areas – focus.	Higher education institution
	Ethics	All evaluated higher education institutions have codes of ethics.		
Study programmes	Enrolment quotas	Enrolment quotas at higher education institutions in the area of natural sciences in half of the cases are justified and appropriate for meeting the need for well-educated students.	Continuous analysis of labour market needs and the assessment of the need for revising enrolment quotas once in five years. Enrolment quotas are adjusted to institutional resources and demands for teaching quality and pass rates.	Higher education institution
	Learning outcomes	Defined learning outcomes do not clearly describe the knowledge and skills that students obtain upon the completion of study programme.	They should be defined more clearly. Defining the most important competencies obtained at certain courses and at the level of a study programme. To define more clearly and explain to the public the competencies obtained by students, as well as the information about the specific characteristics of these competencies and employment opportunities for graduates.	Higher education institution
	ECTS credits	There is a certain discrepancy between the actual student	It is necessary to regularly revise ECTS credits, by taking into account student feedback and the impact of e-learning tools on the workload.	Higher education institution, university

		workload and allocated ECTS credits.	The initiatives to assess the workload at two higher education institutions used in the calculation of ECTS credits are commended and they have taken into account the feedback from students which was used to change the assigned ECTS credits, and the standards related to the ECTS system are carefully implemented and revised.	
	Internship (practical work)	Opportunities for practical implementation of the knowledge gained.	Ensure more opportunities for practical work (internship) and increase and formalize cooperation with industry, as well as state clearly defined learning outcomes and the methods of achieving and evaluating the learning outcomes of internship, placement or practical work.	Higher education institution
	Alumni	There are informal personal contacts, and alumni associations have only been recently established.	Formalize contacts with alumni, regularly update the contact information, use other methods for tracking alumni and systematically collect and analyse the employment of alumni so these data can be used to improve study programmes and connecting students with alumni.	Higher education institution
	Enrolment criteria, pass rates and drop-out rates		In some cases, enrolment threshold has been raised, resulting in a better quality of graduates and the enrolment of high-quality candidates who are able to complete a study programme. HEIs should intensify their efforts to increase course hours to minimize drop-out rates.	Higher education institution
	Revising study programmes		To improve the mechanisms for monitoring and improving the quality of study programmes by more frequent testing of the labour market and introducing additional methods for checking student achievements, by introducing a formal system of teaching commissions and more direct and greater participation of students in the evaluation process, by paying equal attention to all programmes, the establishment of working groups for monitor the quality of study programmes, and including feedback from external stakeholders in the procedures.	Higher education institution
	Supervision	Half of the higher education institutions offer formal supervision opportunities and professional development of students, while the other half employs an informal approach.	It is necessary to strengthen the formally established and clear system of supervision and counselling.	Higher education institution
	Additional training and extra-curricular activities	Adequate support to student extra-curricular activities.	Ensuring additional premises for student associations and their activities, establishing student organizations and ensuring common premises.	Higher education institution, university, MSE

	Student facilities			
	Student support			
Teaching Staff		Teachers' workload and its even distribution.	Teaching staff workload is high but employees believe that it is fairly distributed. Inequality hinders HEIs to realize their the full potential in research and development activities. Additional efforts taken by more involved staff members should be taken into consideration. The calculation of workload should include administrative tasks, new projects and activities, and student and project supervision.	Higher education institution, university, MSE
Scientific research	Results	The number of papers published in international scientific journals is sufficient on average, but they realized that this is a result of high productivity of a small number of employees.	HEIs should intensify their efforts to balance the number of scientific papers published among all employees.	Higher education institution
	Encouraging scientific research and monitoring	One higher education institution has a system for monitoring and recognizing scientific work of employees, as well as reward system to stimulate their excellence.	Some institutions have the monitoring system in place, but they do not have the reward mechanism. At other institutions, expert panel members did not identify the existence of mechanisms for the recognition and encouraging excellence, or the reward system related to scientific productivity.	Higher education institution, university, MSE
	Technology transfer and cooperation with industry	Technology transfer is either not in place or it is rudimentary.		
Mobility and international cooperation		Insufficient mobility. Networking with international institutions as regards the exchange of scientific research results, but mostly on individual basis. Participation in various international programmes, projects, exchange.	Expert panels recommended HEIs to encourage students to complete part of their studies abroad. To adopt a more formal and systematic approach to international cooperation. To develop participation in various international programmes, projects, exchange.	Higher education institution, university, MSE
Physical and	Laboratory	Mostly sufficient level of laboratory	Enhancing laboratory equipment and alignment with international	Higher education institution,

administra-tive resources	equipment	equipment.	standards.	university, MSE
	Other equipment	Some departments have better equipment in the IT rooms.	There is a need for the procurement of new equipment because the existing equipment at some institutions is obsolete and does not meet the international standards.	Higher education institution, university, MSE
	Non-teaching staff	Teacher-staff ratio is mostly adequate.	The number of teachers at university departments should be increased.	
	Library	Problems concerning the size of the premises and professional literature holdings, especially in the libraries at the university departments that for the most part rely on their university libraries. Low availability of e-journals in most of the libraries.		
	Finances	Funds of higher education institutions enable all students to complete their studies.	Certain improvements in the allocation of funds are needed. Higher education institutions should ensure sufficient reserve funds for the maintenance of scientific equipment.	Higher education institution, university, MSE

Technical Sciences

Categories	Activities	Findings	Recommendations	Relevant institution
Higher education institution management and quality assurance	Management	A few higher education institutions in the area of technical sciences do not have a strategy.	There are no formal mechanisms for monitoring effectiveness, i.e. the implementation of goals and for the implemented improvements. It is necessary to more involve all stakeholders in strategic planning. Some higher education institutions should assess/modify/amend their organizational structure.	Higher education institution
	Quality assurance	Quality assurance systems are in place. The institutions partially implement formal mechanisms for monitoring and improvement of the teaching quality.	Formalize participation of all stakeholders in the system and improvement of the effectiveness of communication.	Higher education institution
	Strategic goals	Certain rules are in place, but there is no clear strategic programme or strategy, but in the early phase of implementation performance indicators are only generally defined or are not defined at all.		
	Ethics	Employees and students are only superficially familiar with these rules.	Students and teachers should be better acquainted with the rules of ethical conduct. It is necessary to develop internal surveys on ethical behaviour and solve the problem of cheating in exams.	Higher education institution
Study programmes	Enrolment quotas	Enrolment quotas are mostly justified in accordance with the industry needs.	Expert panels recommend revising enrolment quotas, taking into account the availability of staff, premises and equipment, i.e. higher education institution's resources and the needs of the labour market and employment conditions.	Higher education institution
	Learning outcomes	At slightly less than half of the evaluated higher education institutions, the methods and procedures for knowledge assessment are in line with the defined learning outcomes and various methods of student supervisions and knowledge	Further development of learning outcomes, teacher training and the involvement of external stakeholders in defining learning outcomes is necessary. It is recommended to establish better and more appropriate mechanisms for ensuring the assessment of defined learning outcomes.	Higher education institution

		assessment are used.		
	ECTS credits	The number of ECTS credits and credit allocation methods do not correspond with the actual student workload.	Carry out regular assessments of the relative credit weighting factors. Expert panels recommend a regular assessment of the appropriateness of allocated ECTS credits.	Higher education institution
	Internship (practical work)	The opportunities for carrying out practical work and doing internships in the area of technical sciences are relatively limited.	Higher education institutions are recommended to establish and maintain contacts with the industry in Croatia and abroad. The need for more opportunity for practical and field work at the undergraduate level, and HEIs are generally recommended to ensure longer practical work periods.	Higher education institution
	Alumni	To some extent, HEIs collect and use data on graduate employability, mainly using their connections with professional associations, or they use the data of the Croatian Employment Service.	The procedures should be strengthened, formalized and systematically implemented. Additional monitoring and processing of information about employability of alumni having graduated from a HEI. Connections with the alumni should be used for the development of study programmes and as an opportunity for various types of cooperation.	Higher education institution
	Enrolment criteria, pass rates and drop-out rates	Pass rates are very low.	Expert panels recommended HEIs to carry out analyses of pass rates, and establish the connection between the structure of enrolled students and their academic performance, as well as to investigate a lack of students' interest to continue their studies.	Higher education institution
	Revising study programmes	Certain formal procedures in accordance with which new study programmes are proposed, approved and implemented and the existing ones are revised.	It is recommended to include other stakeholders in introducing innovation to, and improvement of study programmes, whose purpose would be advising on the curriculum and study programmes.	Higher education institution
	Supervision	Higher education institutions offer counselling and supervision to their students. Students are provided with an opportunity to influence the process of decision making and problem solving.	Expert panels recommend paying more attention to introducing students to the types of support in place. The work of student councils should be promoted and students should be more actively involved in HEIs' activities.	Higher education institution, university
	Additional contents and extra-curricular	Higher education institutions mostly support students in their extracurricular activities.	Expert panels recommended some faculties to investigate the types and scope of extra-curricular activities offered by other higher education institutions in Croatia, and to provide similar facilities for sports, cultural and other extra-curricular activities to their students.	Higher education institution, university

	activities			
	Student facilities			
	Student support	Students are able to express their opinions and give suggestions for improvements, they are informed about the measures carried out based on their suggestions and opinions.		
Teaching Staff		Teacher/student ratio is mostly satisfactory and meets the formal criteria. The issue of the teaching workload primarily refers to an insufficient number of assistants and junior researchers. HEIs have a human resources development policy. The procedures for professional development of teachers and other similar activities carried out by higher education institutions are in line with the national rules. The faculties of maritime studies are faced with the problem concerning an insufficient number of teachers having qualifications in accordance with the International Convention on STCW (Standards of Training, Certification and Watchkeeping). Lack of communication has been noticed at several faculties.	The balance between teaching and scientific workloads should be carefully monitored, particularly in the case of junior researchers. In order to reduce the workload of assistants, in one case the expert panel suggested hiring external associates from the industry to carry out practical teaching activities. This is also proposed because the Ministry of Science and Education reduced funding for new positions. Higher education institutions are aware of this problem, and expert panels suggest to the Ministry to approve hiring more assistants and junior researchers. They proposed developing formal rules for determining teaching workload. This is connected to the issue concerning the balance between the teaching and scientific work. The proportion of time spent on teaching activities and scientific activities should be balanced and more time should be allocated for performing high-quality scientific work. Expert panels have proposed to the faculties to develop their own criteria for advancement which would suit the faculties' needs, which would improve quality assurance. They suggest adopting criteria for the appointment to scientific and teaching grades stricter than those defined by the regulations in force. University departments of integrated universities are suggested to take more account of the growth and development of human resources and to raise awareness of the importance of scientific research in teachers. The faculties have systematically organized teacher training (teaching methodology, psychology, pedagogy etc.). Teachers are encouraged to pay more attention to teacher training, scientific research and international mobility. Expert panels have also identified the need for the improvement of communication among the teaching staff.	Higher education institution, university, MSE

Scientific research	Results	Panels have assessed the scientific productivity, i.e. the publication of scientific papers, as adequate. Scientists predominantly tend to publish in low impact journals.	Panels have recommended encouraging teachers to publish in high-quality journals. More attention should be paid to research productivity, which has to exceed the minimum national level required under Croatian regulations for the appointment into teaching grades and advancements.	Higher education institution, university, MSE
	Encouraging scientific research and monitoring	Faculties of electrical engineering are the most successful in this aspect. A very low number of institutions use the information about the quality of work for stimulations.	All re-accredited institutions claim that they foster excellence, but they do not actually systematically monitor the quality of work, and they do not systematically use these data to encourage excellence.	Higher education institution
	Technology transfer and cooperation with industry	Several institutions are successful in this aspect as they have established excellent cooperation with the stakeholders from the industry and the public sector.	Reducing the teaching workload so teachers could focus on innovations and technology transfer. Extra efforts should be put into publishing papers in high-quality international scientific journals. Evaluators believe that this would be much easier if cooperation with foreign institutions improved. Such cooperation would facilitate access to EU funds, research and communication and contribute to better overall productivity.	Higher education institution
Mobility and internation-al cooperation		International incoming student mobility is very limited because only a small number of courses (generally elective) are taught in English. At most higher education institutions, outgoing mobility of teachers is in an initial phase and there is no systematic support. There is almost no incoming mobility of teachers.	Expert panels suggest HEIs to attract students from abroad by improving the resources for foreign students (primarily student accommodation and facilities), by translating HEI websites into English and attracting foreign guest lecturers. HEIs are recommended to plan cooperation to enable their teachers and doctoral candidates to gain experience in working at foreign universities, with high quality equipment in specialized laboratories. Expert panels also recommend HEIs to encourage their teachers and doctoral candidates for longer stays abroad (more than six months). Strengthening international relations and cooperation.	Higher education institution, university, MSE
Physical and administra-tive resources	Laboratory equipment	Laboratory equipment is mostly adequate. University departments often use equipment of other institutions.	The equipment is obsolete at a small number of institutions, and it should be nationally and internationally accredited. A need for procuring additional equipment was also identified to improve the scientific activity. Panels have recommended HEIs to modernize their laboratory equipment, and perform national and international accreditation of equipment. Panels also suggest HEIs to make plans for a systematic acquisition of sophisticated laboratory equipment for conducting scientific research activity.	Higher education institution, university, MSE
	Other	Sufficient number of computer	Modernizing IT equipment and regularly upgrading information systems.	Higher education

	equipment	equipment for students. Technical support to students is satisfactory.		institution, university, MSE
	Non-teaching staff	There are rules for professional development of non-teaching staff, but unfortunately a small number of the staff members actually attend seminars etc.	Panels propose improving computer skills and knowledge of foreign languages of the non-teaching staff so they could assist the teaching staff more, especially with regard to international activities. Stimulating professional development of non-teaching staff in a more systematic way.	Higher education institution, university, MSE
	Library	Most libraries are not adequately sized, the access to electronic resources is limited, and sometimes libraries do not have all volumes of certain journals.	Expert panels suggested HEIs to increase the size of the premises or HEIs are waiting for the relocation to new premises. HEIs should allocate more funds to increase their library holdings, including books, journals and access to electronic databases, often and they are recommended to increase the size of their libraries.	Higher education institution, university, MSE
	Finances	Higher education institutions ensure financial sustainability. The sources of funding and all financing terms are transparent at most faculties and they do not limit their autonomy.	Other sources of funding should be sought in the future, given the fact that the Ministry of Science and Education will no longer finance scientific projects, which could bring into question the overall financing of research. Faculties are recommended to continue investing their funds in increasing the quality of scientific and research activities, in line with their missions. Gathering, analyzing and using information relevant for the improvement of HEIs' activities. Expert panels recommend formalizing and systematizing the information collection and analysis in order to improve the HEIs' activities.	Higher education institution, university, MSE

Arts

Categories	Activities	Findings	Recommendations	Relevant institution
Higher education institution management and quality assurance	Management	Lack of strategic planning	Only one institution in this area has a strategic research plan (in the first stage of implementation), while all other institutions rely on the research strategies of their universities.	Higher education institution
	Quality assurance	The improvement of the teaching and research quality is not carried out systematically. HEIs do not employ a systematic approach to the monitoring, evaluation and planning of the activities related to quality assurance.	HEIs should improve the mechanisms for monitoring the quality of artistic and research activities and bring them in line with their development visions.	Higher education institution
	Strategic goals			Higher education institution
	Ethics	Ethical standards are defined at all institutions.	HEIs should introduce and develop more effective mechanisms for monitoring unethical behaviour.	Higher education institution
Study programmes	Enrolment quotas	Enrolment quotas are mostly defined in accordance with the size of an institution, the available teaching and research resources, the number of students enrolled and student pass rates.	HEIs collect data on first employments of their alumni in an adequate and formal way.	Higher education institution
	Learning outcomes	Difficulties have been identified in the definition of learning outcomes. Lack of structure which would standardize the development of learning outcomes and the method of informing about them.	The learning outcomes defined at the course level should be better aligned with the learning outcomes defined at the study programme level. The differences between the learning outcomes at the undergraduate and graduate levels should be more marked, and more precise methodologies for the development of learning outcomes for all study programmes should be defined.	Higher education institution
	ECTS credits			
	Internship (practical work)	Students have opportunities for practical work at local professional institutions and due to the personal efforts made by many professional artists teaching at an institution.	Cooperation should be incorporated in the teaching process and its effectiveness should be properly assessed. The development of a formal group of external stakeholders which would participate and give advice on adapting the study programmes and which HEIs could consult regarding student internship and finding employment.	Higher education institution
	Alumni	HEIs do not formally gather and process the information and statistics on their alumni.		

	Enrolment criteria, pass rates and drop-out rates	Enrolment criteria are strict in order to maintain a certain level of quality. A careful selection of enrolled students also resulted in high pass rates at the study programmes.	Introducing additional examinations to gain deeper insight into a candidate's abilities and introducing a holistic approach to student monitoring from registrations to employment.	
	Revising study programmes	Lack of a systematic approach to all study programmes	Aligning the content and quality of study programmes with the contents and quality of study programmes of foreign higher education institutions for various reasons ranging from a lack of current relevant literature, non-compliance with international recommendations by relevant professional networks, a lack of formal structure of the internationalization support, lack of office for international cooperation, the need to be actively involved in the work of relevant professional networks, increase of mobility, and minor flaws in the selection of courses which constitute the basis of the study programme.	Higher education institution
	Supervision	HEIs in the area of arts employ various approaches to counselling, supervising and vocational guidance	HEIs which have not established offices for psychological counselling and vocational guidance should do so.	Higher education institution, university
	Additional training and extra-curricular activities	Students are encouraged to pursue extra-curricular activities.	The problem concerning a lack of a structured and fixed schedule should be addressed, because it makes it difficult for students to balance their study obligations with extra-curricular activities.	Higher education institution
	Student facilities			
	Student support	Additional sources, such as electronic databases, scientific literature and other	A lot more additional contents should be ensured, while in some cases a virtual learning environment should be established so teachers could share studying copies and an appropriate library space and reading room should be ensured and the library holdings should be increased.	Higher education institution, university, MSE
Teaching Staff		Highly motivated and dedicated teaching staff with a strong artistic sensibility and focused students.	A formal, transparent and fair support to permanent professional development of all employees should be created. Mechanisms for rewarding teachers for extra efforts and achievements should be introduced. Administrative duties of teachers should be clearly defined and fairly distributed in order to solve the problem of excessive teacher workload. These activities include sitting on various committees and councils, the development of documents etc. Support to assistants in their professional development and the work on	Higher education institution, university, MSE

			their own projects.	
Scientific research	Results			
	Encouraging scientific research and monitoring			
	Technology transfer and cooperation with industry			
Mobility and internation-al cooperation		Mobility is low.	To encourage international mobility of their teachers, particularly longer stays abroad. To encourage and reward employees' greatest achievements and support important national and international artistic and scientific projects. Extra effort should be put into ensuring adequate conditions for attracting foreign teachers.	Higher education institution, university, MSE
Physical and administra-tive resources	Laboratory equipment	The equipment is mostly obsolete and should be modernized.	HEIs should modernize their equipment and make security protocols for the use of equipment.	Higher education institution, university, MSE
	Other equipment	Computer rooms are mostly not well equipped.	Equipment should be modernized and additional computers should be procured. HEIs should buy more technical equipment, especially filming equipment. HEIs should encourage the purchase of new equipment and making upgrades to the existing equipment.	Higher education institution, university, MSE
	Non-teaching staff	The teaching-non-teaching staff ratio is mostly inadequate.	The teaching workload is high and the administrative staff does not have the time to undergo additional training and seminars.	Higher education institution, university, MSE
	Library	Most libraries are well equipped.	Lack of space is the biggest problem.	Higher education institution, university, MSE
	Finances	Financing and financing terms are transparent and do not restrict the HEIs' autonomy.	To develop a clearer and realistic financial strategy. In financing, HEIs should take into consideration the specific characteristics of artistic education, as it is done in other European countries.	Higher education institution, university, MSE

4.2. POLYTECHNICS

4.2.1. ANALYSIS OF DATA FROM SELF-EVALUATION REPORTS

For the purposes of a comparative overview of polytechnics, we have distributed them by scientific area into technical sciences, biomedicine and health, biotechnical sciences and social sciences, and, on the other hand, by type of ownership, into public and private polyechnics. In the area of technical sciences, the information for the following polytechnics was provided: Polytechnic of Međimurje in Čakovec, Polytechnic of Zagreb, Nikola Tesla Polytechnic in Gospić, Polytechnic of Karlovac, Polytechnic of Rijeka, Polytechnic of Slavonski Brod, Polytechnic of Šibenik, Polytechnic of Varaždin, Velika Gorica Polytechnic and Hrvatsko Zagorje Polytechnic in Krapina. In the area of biomedicine and health the information on two polytechnics was provided, namely the University of Applied Health Studies in Zagreb and Lavoslav Ružička Polytechnic in Vukovar. In the area of biotechnical sciences, there are Marko Marulić Polytechnic in Knin, Polytechnic of Karlovac, Polytechnic of Požega, Polytechnic of Rijeka and Polytechnic of Slavonski Brod. In the area of social sciences there are Polytechnic of Međimurje in Čakovec, Polytechnic of Zagreb, Lavoslav Ružička Polytechnic in Vukovar, Marko Marulić Polytechnic in Knin, Nikola Tesla Polytechnic in Gospić, Polytechnic of Karlovac, Polytechnic of Požega, Polytechnic of Rijeka, Polytechnic of Slavonski Brod, Polytechnic of Šibenik, Polytechnic of Varaždin, VERN Polytechnic, Velika Gorica Polytechnic and Hrvatsko Zagorje Polytechnic in Krapina.

Public polytechnics include the Polytechnic of Međimurje in Čakovec, Polytechnic of Zagreb, Lavoslav Ružička Polytechnic in Vukovar, Marko Marulić Polytechnic in Knin, Nikola Tesla Polytechnic in Gospić, Polytechnic of Karlovac, Polytechnic of Požega, Polytechnic of Rijeka, Polytechnic of Slavonski Brod, Polytechnic of Šibenik and Polytechnic of Varaždin. Private polytechnics are Velika Gorica Polytechnic and Hrvatsko Zagorje Polytechnic in Krapina.

4.2.1.1. STUDENTS

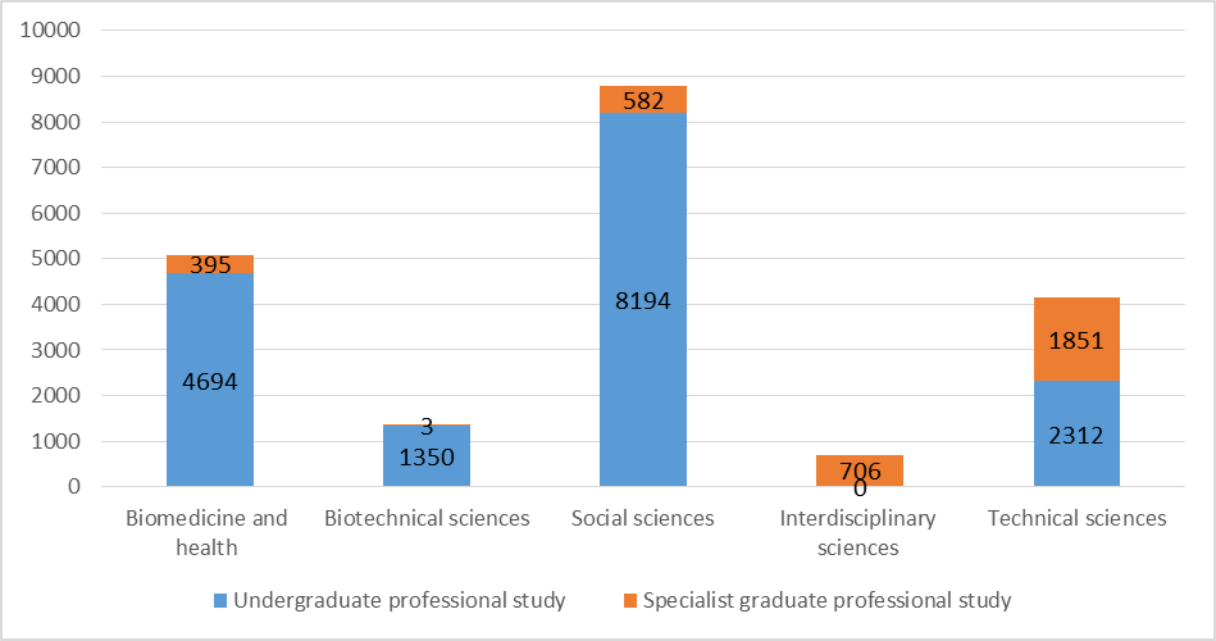


Chart 10 The number of students at polytechnics, by scientific area and level of study

According to the number of students at polytechnics distributed by scientific area and level of the study programme, the polytechnics having the highest number of students were those that deliver study programmes in the area of social sciences at the undergraduate level. Although only two polytechnics deliver study programmes in the area of biomedicine and health, they have the second biggest number of students at the undergraduate level (4694). The number of students at polytechnics delivering studies in the areas of social sciences and biomedicine and health at the second level (specialist graduate professional study programmes) is 12–14 times lower (395 students in biomedicine and health, 582 in social sciences) than at the first level (undergraduate professional study). Biotechnical and interdisciplinary sciences are specific for their unique student distributions – in the biotechnical sciences, almost all students study at the undergraduate level (1350), while almost all students of interdisciplinary sciences study at the specialist graduate professional level (706). The number of students at both levels is almost equally distributed at polytechnics delivering study programmes in the area of technical sciences (2312 students at the undergraduate level and 1851 students at the graduate level).

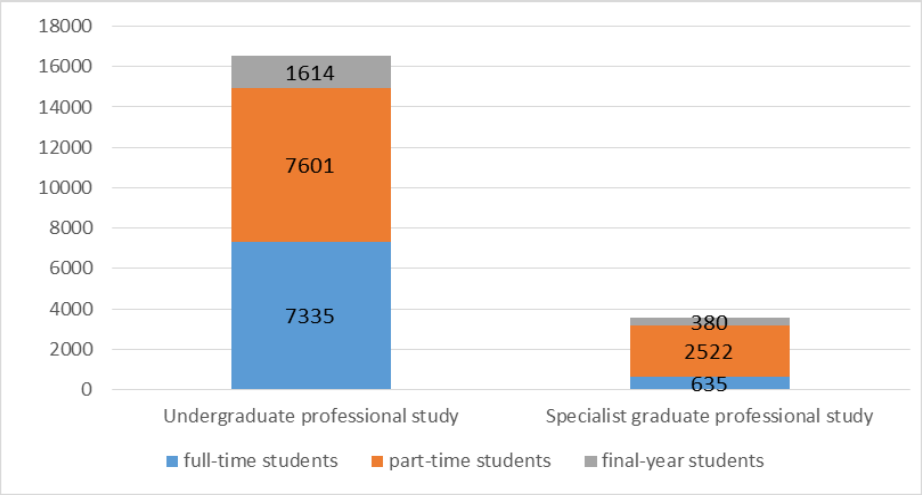


Chart 11. Number of students at polytechnics, by type of study and level of study

As regards the type of study, there are more part-time students at polytechnics (2312 at the undergraduate level and 1851 at the graduate level). There is almost an equal number of full-time and part-time students at the undergraduate level, while the number of part-time students at the graduate level is four times (2522) higher than the number of full-time students (635).

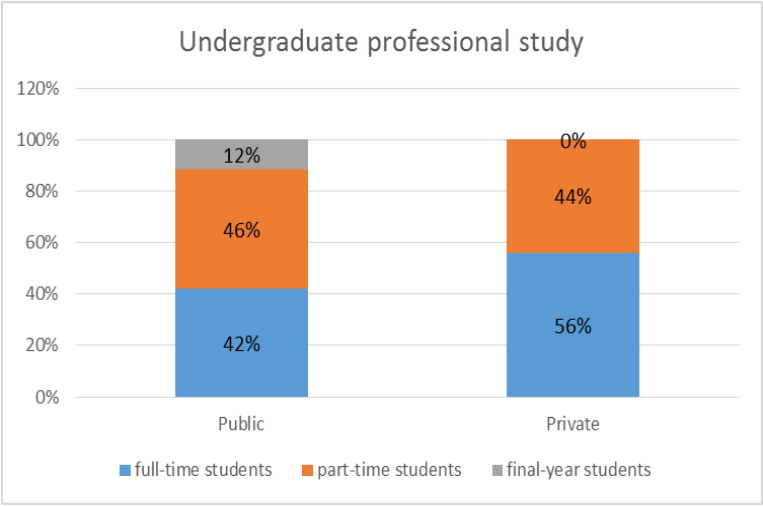


Chart 12. Average percentage of students at polytechnics, by level of study at polytechnics, by ownership type – undergraduate professional studies

More than 50% of the students at the undergraduate level studying at private polytechnics are full-time students, while the percentage of part-time students at public polytechnics is higher (46%). The percentage of final year students eligible for their degree finals at public polytechnics exceeds 10% (12%) at the undergraduate level.

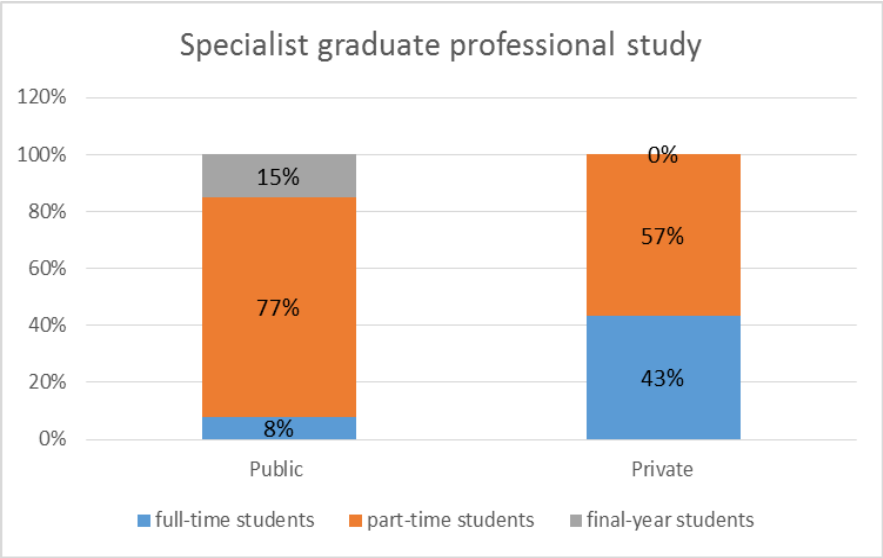


Chart 13. Average percentage of students at polytechnics, by level of study at private and public polytechnics – specialist graduate professional studies

The percentage of part-time students at the graduate level at both types of polytechnics exceeds half of the total number of students (57% at private polytechnics, 77% at public polytechnics). At private polytechnics, the participation of full-time students at the graduate level is relatively high (43%). At public polytechnics, that number is almost negligible (8%). The percentage of final-year students eligible for their degree finals at public universities is 15%.

4.2.1.2. TEACHING STAFF

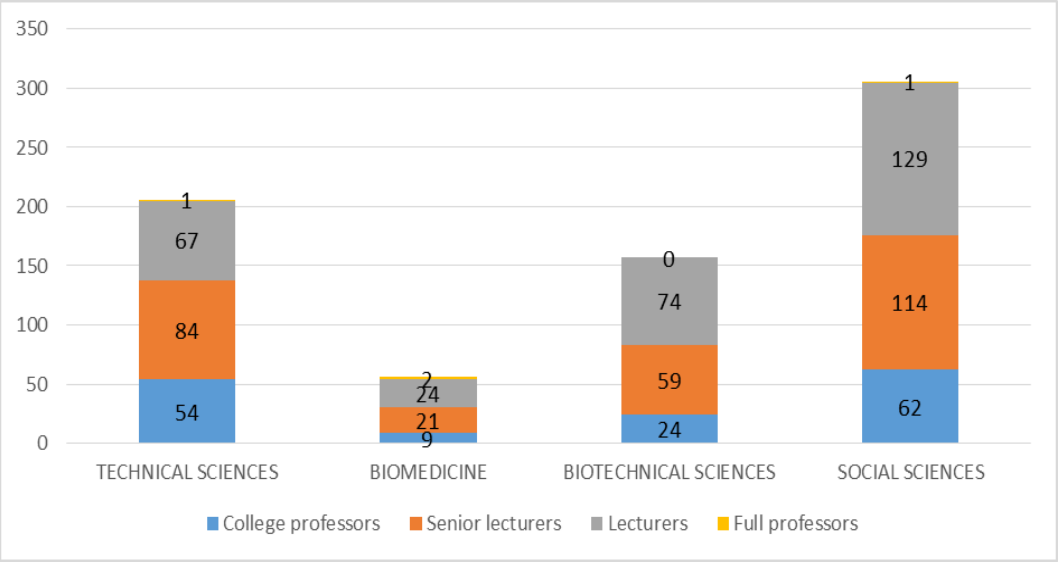


Chart 14. Number and structure of teachers at polytechnics, by scientific area

The highest number of teachers at polytechnics are employed in social sciences. This is understandable, given the fact that all polytechnics in the Republic of Croatia, apart from the University of Applied Health Studies, deliver study programmes in the area of social sciences. Likewise, the number of teachers in all areas is proportional to the number of students of these areas.

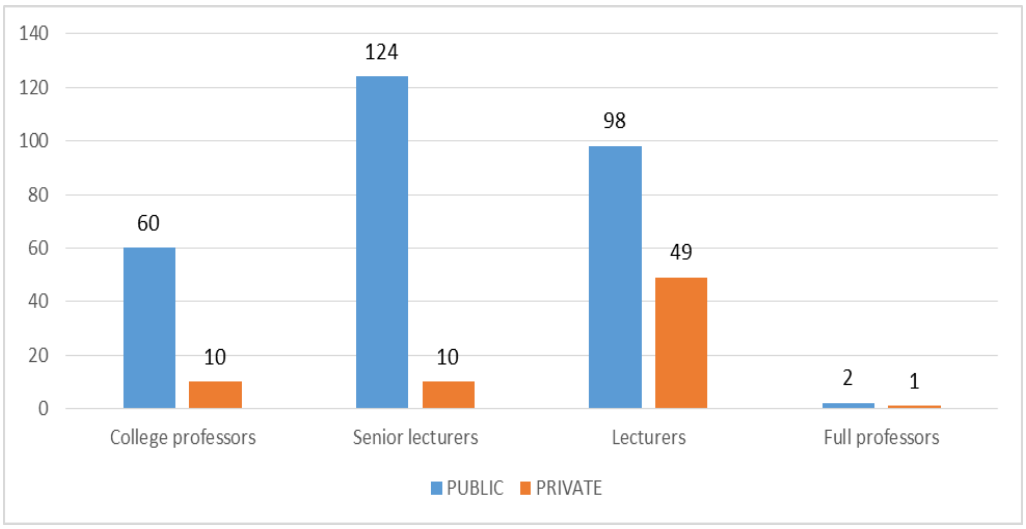


Chart 15. The number and structure of teachers at polytechnics, by ownership type

According to the type of ownership of polytechnics, public polytechnics have more teachers with the title of college professors (60), senior lecturers (124) and lecturers. In the category of full

professors, the number of full-time teachers is very low at both private and public polytechnics (two teachers at public polytechnics and one teacher at a private polytechnic).

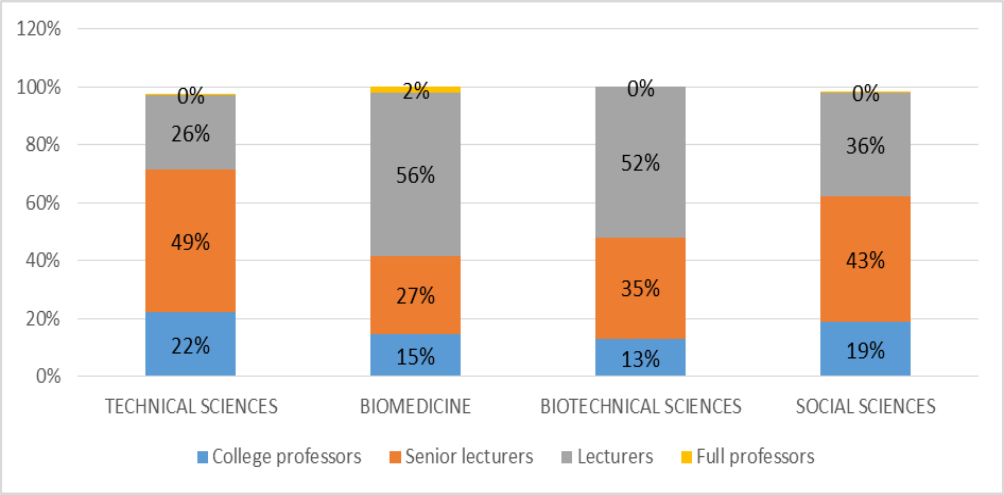


Chart 16. Average percentage of teacher categories at polytechnics, by scientific area

Average percentages for each teacher category vary among scientific areas. The area of technical sciences has the highest average share of college professors (22%) and senior lecturers (49%). Biotechnical sciences have the lowest percentage (13%), with more than half of teachers being lecturers (52%), while there are not any full professors. Polytechnics delivering study programmes in the area of biomedicine and health have the highest percentage of lecturers (56%), and they are the only areas employing full professors (2%).

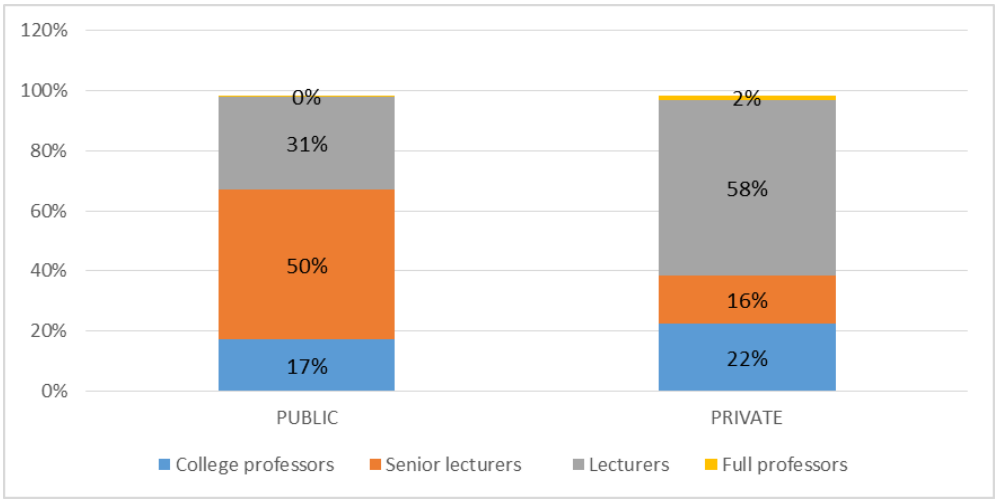


Chart 17. Average percentage of teacher categories at polytechnics, by ownership type

The average share of college professors in full time employees is similar among public and private polytechnics (17% at public polytechnics and 22% at private polytechnics). The biggest difference can be observed in the average percentage of senior lecturers (50% at public

polytechnics and 16% at private polytechnics) and lecturers (31% at public polytechnics and 58% at private polytechnics). This information has shown that senior lecturers account for 50% of full-time teachers at public polytechnics, while private polytechnics have the highest share of lecturers, which account for 58% of their full-time staff.

Table 6. Average age of teachers, by title and scientific area

	College professors	Senior lecturers	Lecturers	Full professors
TECHNICAL SCIENCES	55.98	51.05	39.46	68.00
BIOMEDICINE	49.30	47.00	44.10	-
BIOTECHNICAL SCIENCES	49.25	46.20	37.20	-
SOCIAL SCIENCES	53.40	49.64	40.70	68.00

The average age of teachers at higher education institutions by scientific areas in which they deliver study programmes is the highest in the area of technical sciences (56 years), while it is the lowest in the biotechnical sciences (49 years). The average age of senior lecturers ranges from 46 in the biotechnical sciences to 51 in technical sciences. The range of the average age of lecturers is slightly broader than that of senior lecturers – from 37 in the social sciences to 44 in biomedicine and health. The average age of full professors is relatively high (68 years).

Table 7. Average age of teachers, by title and type of ownership

	College professors	Senior lecturers	Lecturers	Full professors
PUBLIC	51.96	47.44	39.17	-
PRIVATE	59.93	56.87	43.77	68.00

By type of ownership, the average age of teachers in each category varies more among polytechnics. College professors and senior lecturers at private polytechnics are, on average, eight years older than those at public polytechnics. The difference between the average age of lecturers teaching at public polytechnics (39 years) and those teaching at private polytechnics (44 years) is somewhat smaller.

4.2.1.3. TEACHER/STUDENT RATIO

Table 8. Average teacher/student ratio at polytechnics, by scientific area

Technical sciences	1/28.22
Social sciences	1/27.23
Biotechnical sciences	1/26.43
Biomedicine and health	1/28.86

At polytechnics, the teacher/student ratios are relatively similar (from 1/26 to 1/29). The highest ratio is recorded in the area of Biomedicine and Health (1/29) in which there are no private polytechnics delivering those study programmes.

Table 9. Average teacher/student ratio at polytechnics, by type of ownership

PUBLIC	28.56
PRIVATE	23.55

The teacher/student ratio differs more by type of ownership. At public polytechnics, the ratio is slightly less favourable (1/29) than that at private polytechnics (1/24).

4.2.1.4. SCIENTIFIC AND PROFESSIONAL ACTIVITY

Table 10. Number and participation of papers published by teachers at polytechnics, by scientific area

Scientific area	Technical sciences		Social sciences		Biomedicine and health		Biotechnical sciences	
Type of publication	number	ratio*	number	ratio*	number	ratio*	number	ratio*
Scientific papers (CC, WoS, Scopus)	267	0.158	547	0.405	331	1.81	177	0.218
Other reviewed papers indexed in databases that are recognised for the purpose of election into scientific grades	717	0.423	868	0.449	257	0.85	300	0.338
Authorship of books published abroad	5	0.004	9	0.006	5	0.01	5	0.01
Authorship of books published in the	283	0.175	330	0.176	46	0.22	106	0.118

country								
Papers published in national journals with international peer review	333	0.23	367	0.2	11	0.07	242	0.352
Peer-reviewed papers published in the proceedings of foreign and international conferences	1299	1.258	1569	1.139	85	0.565	828	1.946
Papers published in national journals with national peer review	280	0.232	447	0.302	54	0.36	237	0.428
Professional publications	1000	0.73	1126	0.723	220	0.63	534	1.1
Chapters in reviewed books	165	0.066	193	0.078	132	0.385	62	0.058
Peer-reviewed publications in proceedings of national scientific conferences	550	0.527	746	0.564	118	0.785	268	0.496
Editing foreign books	6	0.006	6	0.005	0	0	5	0.01
Editing national books	91	0.087	124	0.101	34	0.21	25	0.06
Number of papers published in the journals of an evaluated institution	173	0.231	173	0.178	0	0	75	0.26

Peer-reviewed papers published in the proceedings of foreign and international conferences are the most common type of scientific publication at polytechnics in all scientific areas. They are followed by professional papers. There are similarities between technical and natural sciences regarding the number and type of publications. In many cases, those are the same polytechnics that deliver study programmes in social sciences and technical sciences. Since information on scientific and professional activities has not been submitted for some polytechnics, their overview by type of ownership has not been included in this analysis.

* per teacher

4.2.1.5. FINANCES

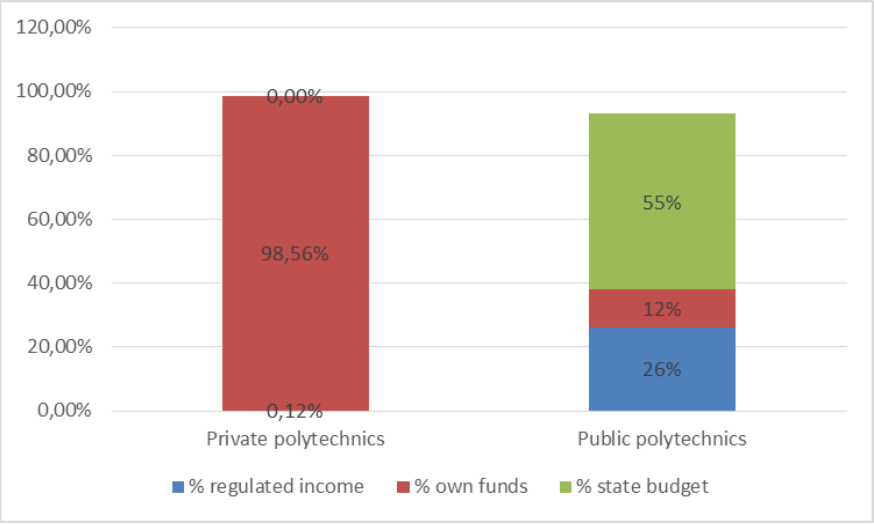


Chart 20. Average percentage of revenue categories in the total institution revenue, by type of ownership

Percentages of revenue categories vary among polytechnics with regard to type of ownership. Almost 100% of the revenue of private polytechnics is own source revenue (98.56%). However, the average participation of funds from the state budget at public polytechnics is only 55% of their total revenue. Regulated income accounts for 26% of funds, while own revenue sources account for 12%.

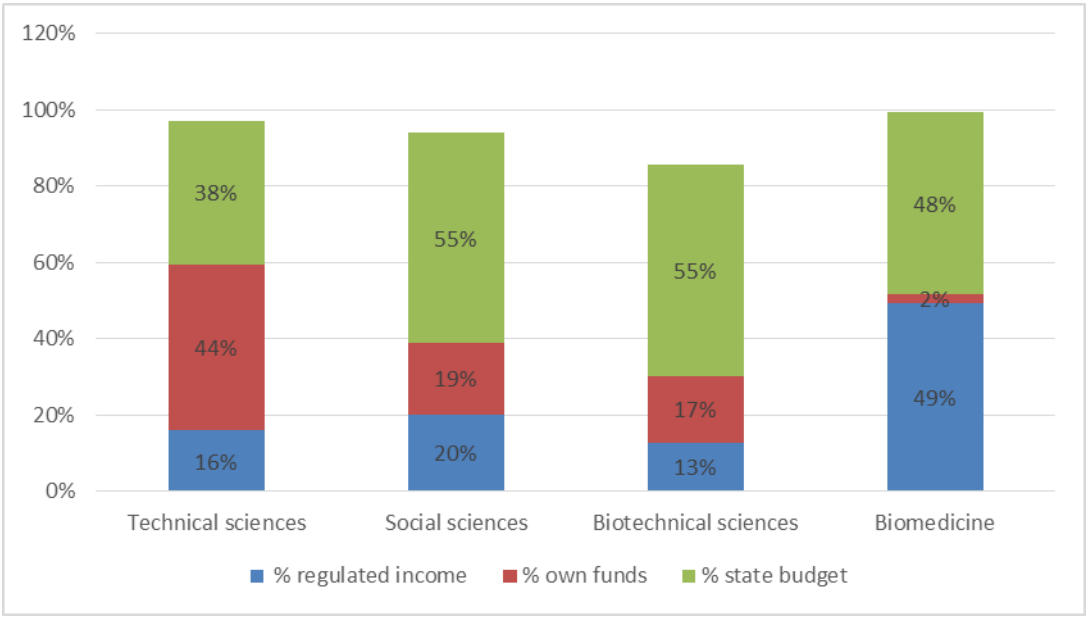


Chart 21. Percentage of revenue categories in the total institution revenues, by scientific area

On average, less than half of total revenue at the polytechnics delivering study programmes in the technical sciences (38%) and in the area of biomedicine and health, in which there are not any private polytechnics, is from the state budget (48%). Polytechnics delivering study programmes in the area of biomedicine and health (49%) have the highest average share of regulated income[23]. This income is at least twice higher than in other areas (20% in social sciences, 16% in technical sciences and 13% in biotechnical sciences). Polytechnics delivering study programmes in the technical sciences have the highest average share of own source revenues[24] (44%), while the polytechnics in the area of biomedicine and health have the lowest average share (2%).

4.2.1.6. MOBILITY

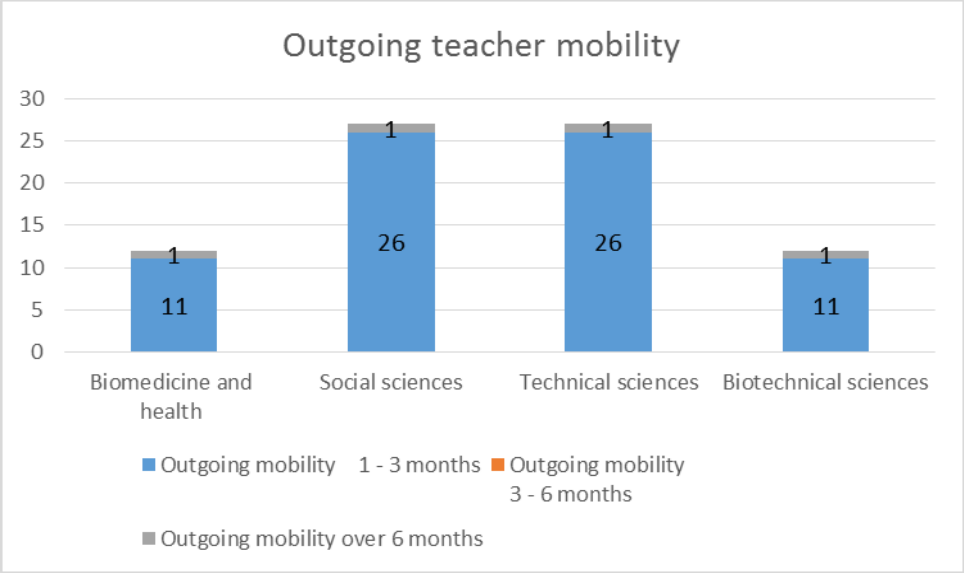


Chart 18. Average outgoing teacher mobility, by polytechnic, by scientific area

[23] Regulated income includes the following items: Tuition fees – professional, additional knowledge or skills testing (if implemented in addition to the matriculation exam), enrolment fees, publishing activity, administrative fees (charging for various forms, diplomas, certificates, etc.).

[24] Own source revenue includes the following items: Tuition fees – specialist graduate professional, research projects, professional projects, rent revenue

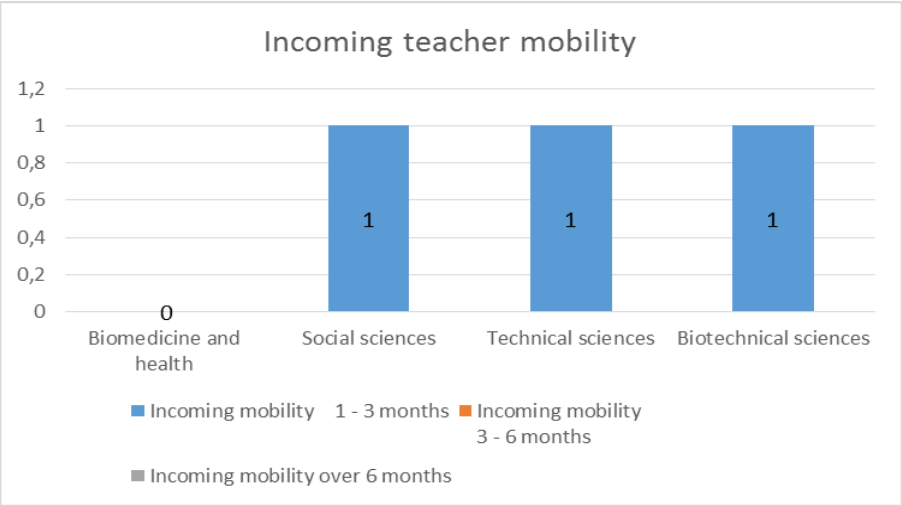


Chart 19. Average incoming teacher mobility, by polytechnic, by scientific area

Outgoing teacher mobility exceeds incoming mobility. Mobility rates by scientific areas are equal at HEIs delivering programmes in social and technical sciences. In the area of biomedicine and health and in biotechnical sciences, mobility rates are slightly lower (11). In each group of HEIs, at least one teacher spent more than six months at another institution.

Table 11. Average incoming and outgoing student mobility, by scientific area

	Mobility 1 - 3 months	Mobility 3 - 6 months	Mobility longer than 6 month
Biomedicine and health			
Total incoming mobility	4	0	0
Total outgoing mobility	5	0	0
Biotechnical sciences			
Total incoming mobility	0	0	0
Total outgoing mobility	18	13	4
Social sciences			
Total incoming mobility	0	0	0
Total outgoing mobility	27	33	4
Technical sciences			
Total incoming mobility	0	0	0
Total outgoing mobility	17	24	4

Only polytechnics in the area of biomedicine and health recorded incoming student mobility (4), only lasting 1–3 months. Polytechnics in the social sciences and technical sciences have the highest outgoing mobility in all three mobility categories.

4.2.2. ANALYSIS OF EXPERT PANELS' RECOMMENDATIONS

In most of the reports on the evaluation of polytechnics, expert panels have commended the good relationship between students and teachers. Students can express their opinions, proposals and complaints during consultation hours. They also have the opportunity to voice their concerns through student surveys, and they are provided with feedback, which is formalized, as student representatives participate in the bodies of polytechnics and the Student Council.

The allocation of ECTS credits reflects the actual student workload at most study programmes and a large number of polytechnics foster good cooperation with external stakeholders and alumni. There is an efficient system in place for gathering information from the mentioned groups on the appropriateness of the existing study programmes and for suggesting improvements. Further development of student practice and student entrepreneurial skills would also be useful. It is also important to define the learning outcomes of student practice.

Expert panels have also established that polytechnics have young and enthusiastic teaching staff that is highly motivated for scientific and professional development. Supporting services (student services, accounting office, library and the IT office) work well with students in performing their tasks (applying for exams, getting marks, administration of the information system for students, borrowing books and journals).

On the other hand, expert panels have noticed certain deficiencies at this type of HEIs; the responsibilities of part-time students are not adequately defined, the enrolment quotas are too high, especially for self-funded students. At certain polytechnics, it was noticed that the planned enrolment quotas are not in line with the institution’s resources. Their websites are only available in Croatian, which limits their international visibility and international cooperation. Lack of appropriate resources for international student and teacher mobility is an obstacle to achieving higher mobility rate. There are also limited opportunities to attract students because there are no student dormitories. At all the evaluated polytechnics, teachers and students have rather limited experience in international cooperation and a lack of formal procedures for the recognition of qualifications obtained from other higher education institutions was identified. Student facilities are not adequate enough due to a lack of accommodation facilities and student restaurants.

At most evaluated higher education institutions the management boards are highly motivated and the organizational structures effective and highly adaptable to change. Good management

contributes to an efficient organization of all services, a clear mission of future development of higher education institutions and the development of a quality culture in all aspects, especially in the quality management and assurance system.

In nearly half of reports, expert panels have stated that the study programmes delivered at the evaluated private higher education institutions are well defined and have specific market orientation, while sometimes they are even unique among Croatian HEIs.

Many evaluated HEIs enjoy the support from the local governments, and have established good connections with the industry in their regions, which contributes to a better organization and quality of student placement (internship), and a faster response to changes in market demands, including the development and revision of study programmes.

Expert panels particularly commended the pleasant work atmosphere and good relations among the management representatives, teachers and students. The communication between teachers and students, and the availability of teachers was often assessed to be exceptionally good. A good teacher/student ratio and working in small groups also increases student and teacher motivation (external associates were probably taken into consideration because the low number of full-time teachers was identified as one of the shortcomings). Teachers are involved, committed and highly motivated, and use a variety of teaching methods.

The management boards of higher education institutions support the development and improvement of the quality of the teaching staff in a variety of ways, i.e. by funding postgraduate studies, organizing various training events, funding participation in conferences, supporting publishing of scientific papers by full-time teachers and international teacher mobility.

The identified advantages of private higher education institutions also include good teaching and learning resources. HEIs have well-equipped buildings and classrooms, creating excellent teaching conditions and a good learning environment. The panels particularly commended the computer labs having modern, high-quality equipment, and a wide access to the information technology, as well as the use of platforms, which supports learning and facilitates communication between students and teachers.

Expert panels have noticed that polytechnics have limited library resources (poor library holdings, lack of access to and insufficient use of e-materials and various databases, lack of study rooms, etc.). Teacher and student mobility and international cooperation are low (low international cooperation, insufficient number of signed agreements and a poor level of incoming and outgoing student and teacher mobility, especially international mobility).

Expert panels have also commented on the small number of expert projects in collaboration with industry and a lack of research projects.

The ratio of full-time teachers to external associates at most higher education institutions is not adequate. Panels have stated in one third of the reports that the number of full-time teachers is low, while the number of external associates is high, which calls into question the stability of study programmes and the quality of teaching in the long run. In a number of reports, expert panels have identified the need for a better distribution of the teaching load.

Expert panels consider the learning outcomes at the level of study programmes to be insufficiently defined and developed. At some smaller private higher education institutions they noticed a lack of formal structures (some issues are addressed in an informal way), which hinders an institution's growth.

4.3. COLLEGES

4.3.1. ANALYSIS OF DATA FROM SELF-EVALUATION REPORTS

A comparative overview of colleges is divided into public and private colleges (by ownership type), and those delivering programmes in the area of social and technical sciences (by scientific area). Although colleges also deliver study programmes in the area of humanities (Evangelical Theological Seminary in Osijek), biotechnical sciences (College of Agriculture in Križevci) and the artistic area (TV Academy – College of Multimedia and Communication in Split), only one college in each area is involved so the data are not relevant for the whole area. For that reason, the comparison is based on the following divisions – public/private and social/technical sciences. In the first division into public and private colleges, there are 21 private colleges and three public colleges. In the area of social sciences, 16 colleges deliver study programmes, while seven colleges deliver study programmes in the area of technical sciences. Study programmes in the area of humanities, biotechnical sciences and arts are delivered by one college in each category.

The analysis of the number of students and their distribution by category is presented in the overview by college.

4.3.1.1. TEACHING STAFF

Table 12. The average age of teachers at colleges, by type of ownership

	College professors	Senior lecturers	Lecturers	Full professors	Associate professors	Assistant professors
Public colleges	48.62	51.04	41.4	-	0	45.64
Private colleges	55.33	48.28	39.8	64	50.7	45.14

The average age of teachers at colleges is fairly homogenous and ranges from 39 to 55. On average, teachers at public colleges are somewhat older (55) than those at private colleges (49). Senior lecturers and lecturers at public colleges are, on average, only two years older than at private colleges, while the average age of assistant professors is equal at public and private colleges (46).

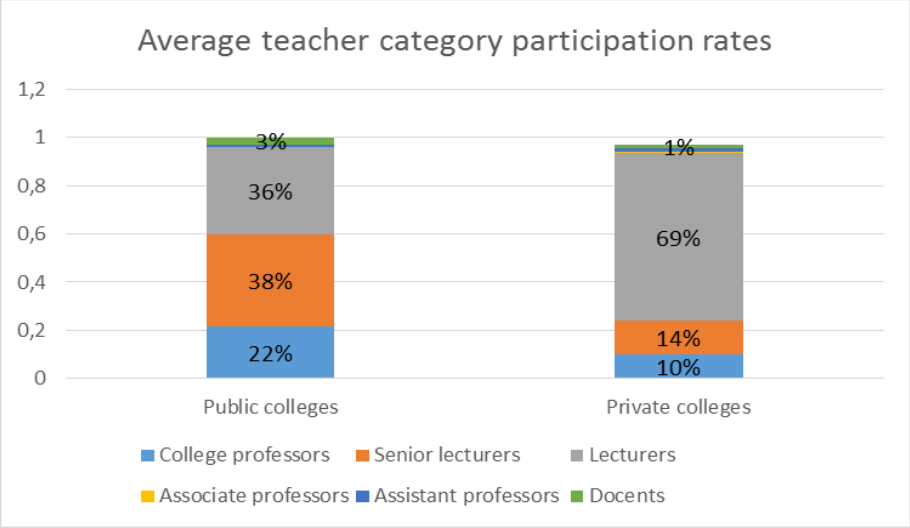


Chart 22. Average participation of teacher categories in teaching and scientific-teaching grades in colleges, by ownership type

The structures of the teaching staff are different at public and private colleges. There are twice as many college professors and senior lecturers at public than the private colleges. Lecturers account for the largest share of the teaching staff at private colleges (69%). Senior lecturers account for the largest share of teachers at public colleges (38%). On average, teachers appointed to scientific-teaching grades account for the lowest average shares at both types of colleges.

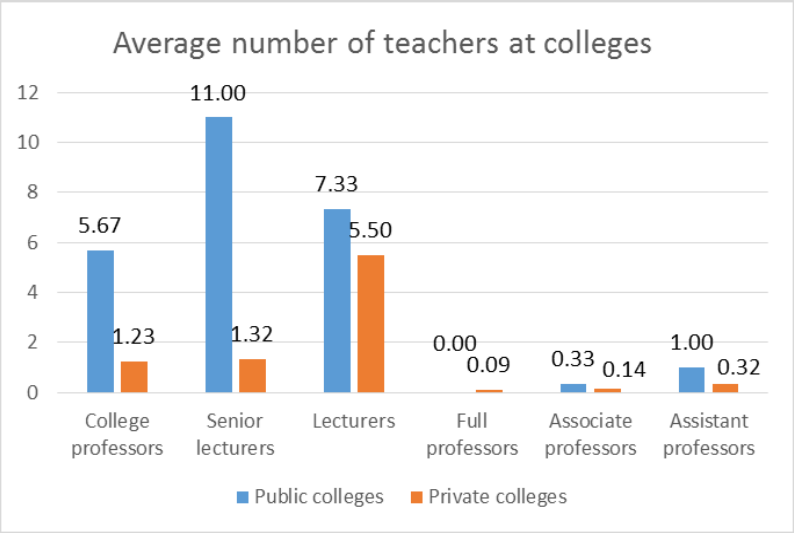


Chart 23. Average number of teachers in teaching and scientific-teaching grades at colleges, by ownership type

The average number of teachers at public colleges is higher in all teacher categories. There is a relatively small number of teachers working at private colleges (on average, one teacher with the title of college professor and senior lecturer per college). On average, there are seven lecturers at public colleges, and six at private colleges.

Average teacher/student ratios are almost equal for public and private colleges.

Table 13. Average teacher/student ratios, by ownership type

PUBLIC COLLEGES	1 / 19.69
PRIVATE COLLEGES	1 / 17.85

4.3.1.2. MOBILITY

Teaching staff

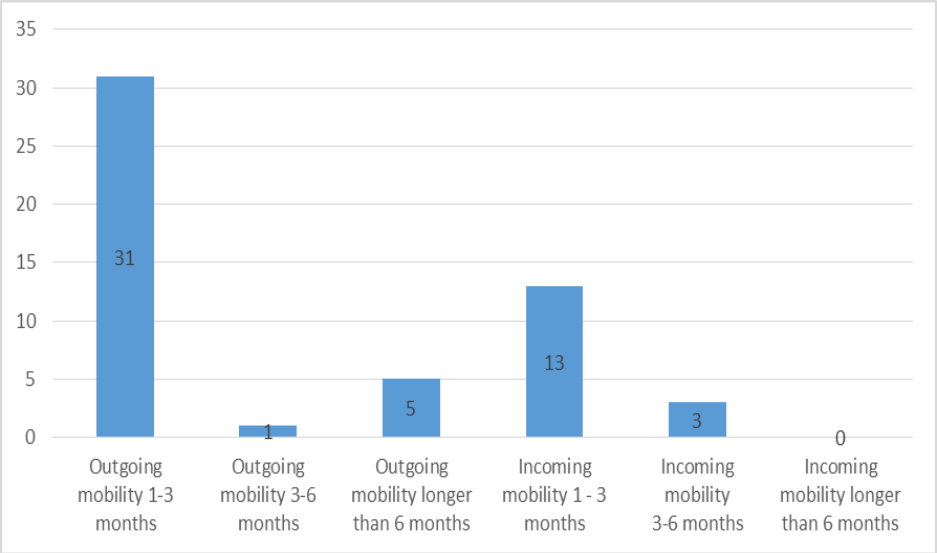


Chart 24. Outgoing mobility by duration category

Teacher mobility at colleges is relatively low. There was no teacher mobility at public colleges. At private colleges, teachers mostly went to foreign institutions for 1 to 3 months (31 times), which is followed by the number of incoming visits lasting from 1 to 3 months (13).

STUDENTS

Table 14. Incoming and outgoing student mobility

	Private colleges			Public colleges		
	1-3 months	3-6 months	over 6 months	1-3 months	3-6 months	over 6 months
Total incoming mobility	148	0	0	7	0	0
Total outgoing mobility	128	3	0	25	0	0

Mobility is higher at private colleges than at public colleges, especially stays lasting from 1 to 3 months. Stays longer than that are also identified at private colleges (three stays lasting for 3-6 months).

4.3.2. ANALYSIS OF RECOMMENDATIONS BY EXPERT PANELS

Most colleges have strategic plans, but they are not sufficiently developed, and higher education institutions' visions are limited to the production of experts benefiting only Croatian economy. The procedures for quality assurance have been implemented, but their effectiveness is insufficiently assessed.

Expert panels have commended the competent and highly motivated employees in almost all included colleges. These higher education institutions often employ young employees who are enthusiastic and willing to study and work. However, colleges have a high participation of external associates which makes the teacher/student ratio at some institutions less adequate.

The expert panels have also commended high student satisfaction at all public colleges. They have also emphasized the good support to students by their supervisors, student placement and extra-curricular activities. Students participate in the main bodies of higher education institutions, where they are entitled to express their opinions, suggestions and complaints about inappropriate management or teacher actions. Students have commended the teaching quality and treatment of students in student surveys and interviews with students during site visits. Laboratories, facilities and cooperation with alumni were positively assessed at all higher education institutions, as well as the good cooperation with the labour market and the public administration.

Colleges have not made any formal analyses of competencies of students they want to attract, with respect to the market labour demands, industry and education opportunities. Colleges have some information about the industry parts in which students have found employment, but they have not conducted any analyses of such information with regard to the student competencies upon enrolment.

The external stakeholders are typically not involved in the procedures related to enrolment quotas and study programmes, and a lack of a systematic approach to the calculation of ECTS credits was identified, which is related to the calculation of student workload. Expert panels have identified that learning outcomes are insufficiently developed, and identified a lack of learning inputs, teaching methods, types of exams and literature.

Scientific productivity at colleges is limited and encouraged only by some institutions. The scientific productivity at colleges is low, as colleges do not engage in scientific research and publishing papers in renowned scientific journals. Likewise, expert panels have identified a small number of expert projects and projects in cooperation with the industry.

Colleges are not sufficiently involved in the international associations of similar institutions. Most colleges neither foster a stimulating atmosphere, nor provide conditions and support to their staff to become involved in such activities. These higher education institutions should assign a high priority to participating in international projects, and they should reward their staff for their efforts in this field.

These higher education institutions currently do not offer courses in English or courses that would be of interest for international students, which could attract teachers and students from abroad. Apart from short study visits, students do not have the opportunity to spend part of their study abroad. Colleges should also strive to launch courses which would be interesting and relevant in global terms, and to enable their students to spend part of their studies abroad.

Also, as observed by expert panels, student pass rates are relatively low at most colleges.

4.4. PRIVATE UNIVERSITIES

4.4.1. ANALYSIS OF DATA FROM SELF-EVALUATION REPORTS

4.4.1.1. TEACHING STAFF

Table 15. Number and average age of full-time employees in the scientific-teaching grades

Institution	Full professors			Associate professors			Assistant professors			Total	
	Number	Aver. age	Participation	Number	Aver. age	Participation	Number	Aver. age	Participation	Number	Aver. age
DIU Libertas International University	0	-	0%	2	51,5	17%	10	41	83%	12	46,25
Croatian Catholic University	1	64	5%	4	45	21%	14	39	74%	19	49,33
University North	3	54,6	9%	5	53	16%	23	47	72%	32	55,65
Total	4	59,3	6%	11	50	17%	47	42,33	75%	63	50,41

As shown in the table, University North has the highest number of full-time employees in the scientific-teaching grades (32). The percentage of full professors is very low and ranges from 0 to 9%, while their average age is 59. The percentage of associate professors at these higher education institutions is 16-21%, while their average age is 50. The percentage of assistant professors at all three analysed higher education institutions is relatively high, ranging from 72 to 83%. The lowest average age of assistant professors (39) and associate professors (45) is recorded at Croatian Catholic University.

4.4.1.2. TEACHER/STUDENT RATIO

HKS – Croatian Catholic University	**University North**	**DIU Libertas International University**
1/16.28	1/20.08	1/8.04

These higher education institutions have teacher/student ratios lower than the legally defined ones, and they range from 1/8.04 at DIU Libertas to 1/20.08 at University North.

4.4.1.3. SCIENTIFIC ACTIVITY

The information about the number and shares of publications presented in table (3.1.) are hardly comparable, because the data for Croatian Catholic University have included the publications by the scientific-teaching staff working part time (cumulative employment). Most teaching staff members come from other institutions, so their publications are included in the publications of several HEIs.

Table 16. Number and percentage of publications at universities per teacher

Type of publication	**DIU Libertas**		**Croatian Catholic University**		**University North**	
	Number of papers	**ratio**	**Number of papers**	**ratio**	**Number of papers**	**ratio**
Scientific papers (CC, WoS, Scopus)	10	0.16	183	1.14	199	0.55
Other reviewed papers indexed in databases that are recognised for election into scientific grades	57	0.95	36	0.22	629	0.05
Authorship of books published abroad	1	0.01	2	0.01	8	0.51
Authorship of books published in the country	8	0.13	9	0.06	88	2.37
Publications in national journals with international peer review	22	0.36	16	0.11	149	0.23
Peer-reviewed publications in proceedings of foreign and international scientific conferences	34	0.56	67	0.41	477	0.80
Publications in national journals with national peer- review	15	0.25	22	0.15	202	0.93
Professional publications	14	0.23	136	0.85	204	1.80
Chapters in reviewed books	7	0.11	83	0.51	59	0.46
Peer-reviewed papers in the proceedings of national scientific conferences	5	0.08	68	0.42	75	0.81
Books edited abroad	0	0	3	0.06	5	0.23
Books edited in the country	0	0	16	0.10	37	0.03
Number of papers published in the	0	0	0	0	137	0.75

journals of an evaluated institution						

Projects

Table 17. Number of projects

Institution	Funding sources		
	MSE and Croatian Employment Service	Other (in Croatia)	International
Croatian Catholic University	0	8	2
University North	10	0	4
Total	10	8	6

The information for the said period is not available for DIU Libertas as they have not submitted it yet, while for University North, the information on the project of Polytechnic of Varaždin has been included for the evaluated period.

4.4.1.4. MOBILITY

Staff

Table 18 Teacher mobility

	Outgoing mobility 1 - 3 months	Outgoing mobility 3 - 6 months	Outgoing mobility longer than 6 months	Incoming mobility 1 - 3 months	Incoming mobility 3 - 6 months	Incoming mobility longer than 6 months
DIU Libertas International University	**0**	**0**	**0**	**49**	**0**	**0**
Research	0	0	0	49	0	0
University North	**15**	**0**	**3**	**0**	**0**	**0**
Research	6	0	1	0	0	0

Professional	5	0	1	0	0	0
Teaching	4	0	1	0	0	0
Croatian Catholic University	**0**	**2**	**0**	**0**	**0**	**0**
Research	0	2	0	0	0	0
Total	**15**	**2**	**3**	**49**	**0**	**0**

The highest outgoing teacher mobility lasting 1-3 months was recorded at University North (15). The highest incoming teacher mobility was recorded at DIU Libertas International University (49).

Students

Table 19. Student mobility

Institution	Mobility 1 - 3 months	Mobility 3 - 6 months	Mobility longer than 6 months
DIU Libertas International University	**43**	**0**	**1**
Foreign students	37	0	1
Students of this HEI	6	0	0
Croatian Catholic University	**0**	**4**	**0**
Foreign students	0	2	0
Students of this HEI	0	2	0
University North	**9**	**0**	**0**
Foreign students	4	0	0
Students of this HEI	5	0	0
Total	**52**	**4**	**1**
Total incoming mobility	41	2	1
Total outgoing mobility	11	2	0

The highest outgoing and incoming student mobility was recorded at DIU Libertas International University (45). Lower incoming and outgoing mobility was recorded at University North (9). Outgoing and incoming mobility of two students in each category lasting 3-6 months was recorded at the Croatian Catholic University.

4.4.1.5. FINANCES

Unfortunately, the information about finances for this group of higher education institutions is incomplete or has not been submitted.

4.4.2. ANALYSIS OF EXPERT PANELS' RECOMMENDATIONS

Higher education institution management and quality assurance

Three private universities in the Republic of Croatia have been established relatively recently, and that fact was acknowledged by expert panels in the evaluation. Private universities are recommended to define and implement the strategy to include stakeholders (such as companies and other entities, professional organisations etc.) in the procedure of defining and implementing mid-term and long-term goals. Existing management practices are sufficiently developed, but it seems they are process-oriented, whereas expert panels recommend shifting the focus to goal-oriented management. In addition to making information available, it would also be useful to set up committees which would report on goals achieved in all areas, including quality assurance.

Panels also recommend private universities to define an overarching and integrated plan for the quality of scientific work, which would define effective and optimum mechanisms for encouraging, monitoring and improving scientific quality. Expert panels have taken into consideration the fact that these institutions have been established relatively recently, while some of them have just recently obtained licences.

Universities have adopted regulations for ethical behaviour of students and employees (disciplinary rules for professional conduct, codes of ethics etc.) but the impression is that the implementation has not been thoroughly defined and documented. It is necessary to establish an appropriate body, define the procedures and inform employees and students about the regulations and procedures.

Study programmes and students

The three private universities differ considerably, and they deliver study programmes in different scientific fields and areas. Expert panels believe that formal procedures for ensuring comparability of grades among these universities and other higher education institutions in Croatia should be introduced for all study programmes. Joint recommendations have also been made for drafting annual reports on the quality of study programmes with the proposed changes. For part of the study programmes the link between study programmes and the labour market should be the central point of cooperation. Expert panels propose introducing student practice as an integral part of study programmes.

Expert panels believe that the defined learning outcomes mostly clearly describe the knowledge and skills students will obtain upon graduation. Learning outcomes include general skills, as well as occupation-specific skills. Study programmes mostly ensure that student assessment is aligned with the defined learning outcomes, that the knowledge assessment includes the whole spectrum of the learning outcomes and that the knowledge assessment is in line with the qualification levels. Course descriptions are clear and detailed. Allocation of ECTS credits reflects the realistic estimate of student workload. Course descriptions clearly define the distribution of classes into lectures, seminars, homework, studying independently, etc.

In order to increase the number of international students, curricula and course descriptions should be available in English or another European language. On the other hand, students should be encouraged to participate in international student exchange programmes, while HEIs should also establish and maintain connections with their alumni, and include them in the activities performed by the universities.

At all three private universities, students have said that the methods and procedures of knowledge assessment cover all areas and are clearly defined, and that they are familiar with the assessment criteria. They have stated that they are familiar with the level of knowledge required for a certain grade. Assessment is carried out by written, oral and practical exams requiring the application of practical knowledge. However, expert panels believe there is room for improvement of the evaluation practices, so they would be comparable with the best European practices. If students believe that they deserve a higher grade than the one they received, they are allowed to make a complaint about their grade.

Teachers

Expert panels have established that private universities have many enthusiastic and motivated teachers who enjoy HEIs' support in their efforts. In order to achieve their goals, i.e. to become renowned and recognized universities, they will have to pay more attention to employment and continuing professional development of employees, and establish a clear programme of future development of employees reconciled with the strategic goals of the university.

Expert panels have recommended to all three universities to employ more full-time teachers, especially in certain key disciplines, in order to fully meet this criterion.

Teacher workload is similar to the workload at other private and public institutions in the European Higher Education Area (EHEA). Universities should clearly differentiate between

teaching, research and administrative duties in their human resources policy. Professional development should be additionally encouraged, which includes taking a sabbatical year or spending research periods abroad, bringing international experts to the universities etc.

Expert panels recommend defining rules for professional development and the improvement of teaching skills of the scientific and teaching staff.

Scientific and professional activity

Scientific work is among the least developed areas of private universities' activities, which does not surprise, given the relatively short period of work of these universities. For now, they cover the cost of doctoral studies for a small number of employees, which is commendable, but this should become more frequent. Expert panels have recommended HEIs to either establish their priorities, or focus on the development of a specific research field by financing a sufficient number of doctoral candidates, or to gradually increase the number of doctoral candidates in a broad range of disciplines.

Private universities have generally started to develop their scientific research activities, but there is a need for more investments to encourage them, particularly in some disciplines.

Private universities should be additionally encouraged to include science and practice in teaching, i.e. to apply the results of scientific research in teaching. They should also try to attract experts from the industry to become involved in research projects, which can become a model that could be followed by other Croatian higher education institutions. It would definitely be useful to examine the possibilities of organizing annual or semestral events on the integration of scientific and professional activities.

Private universities are recommended to set clear goals and expected results of scientific projects, which will enable their monitoring and performance assessment, as well as gaining knowledge about best practices, which would benefit future projects.

The number of published papers should be increased, especially the number of papers published in the internationally renowned scientific journals included in Science Citation Index, by ensuring additional public and private fund sources.

Research component is very important for further development of universities and programmes. Universities should continue to pursue research in the areas in which they already conduct

research, and to encourage and support more employees to attend and present their work at prestigious international conferences and other events.

The funds from Croatian and international funds, including those of the European Union, should be used in order to close the gap between the scope of implemented research activities and university goals, so the research activities could, among other things, increase student employment opportunities.

International cooperation and mobility

In the area of mobility, the fact that these institutions have been recently established was taken into consideration. There are differences among them, but they share some of the expert panels' recommendations. Expert panels believe that international cooperation and mobility should be further encouraged. Universities are involved in Erasmus Plus programme activities, which is a promising fact, and a good sign for the future positioning of the universities.

The establishment of international offices would surely contribute to the strengthening of cooperation and universities could secure facilities and support for student and teacher incoming and outgoing mobility. It is also necessary to improve the networking of private universities with similar institutions abroad.

Private universities encourage teachers and scientists to spend shorter periods abroad, while covering their travel expenses. They should increase the number of stays abroad, extend their duration, and cooperate more actively in international networks and organizations in their scientific areas.

Students should be encouraged to spend a semester abroad and more foreign students should be attracted. Institutions should encourage the use of foreign languages as the courses taught in English and other foreign languages would increase the number of foreign students enrolling private universities. By developing English websites, HEIs would contribute to better presentation of the universities abroad and offer new opportunities for international cooperation.

Administration, space, equipment and finances

Expert panels have concluded that resources at private universities are relatively adequately allocated. Professional services, facilities, equipment and finances are aligned with the models of similar European universities.

Expert panels have also stressed the need for timely provision of resources in case the universities engage in new areas and disciplines.

The number of qualified administrative staff members should be increased to provide better administrative support to the teaching staff, especially with regard to the application to, and participation in the international scientific projects.

Professional training of non-teaching staff should be planned annually, while policies and procedures for the control of quality and effectiveness of non-teaching staff (such as annual assessment) should be developed.

Universities should ensure the provision of laboratory and other equipment in accordance with the enrolment quotas by specialisations, the establishment of the protocols and procedures for the use and maintenance of laboratory equipment and the accreditation of laboratories. They should also modernise their computer and laboratory equipment.

Universities should increase their library holdings, especially the number of international journals, and to expand access to electronic databases and other electronic copies in the libraries.

The management boards of private universities should ensure public and other sources of funding, while maintaining their university's autonomy.

5. CONCLUSIONS

5.1. PUBLIC UNIVERSITIES

- Nearly half of students in Croatia study in the area of social sciences (47%). This is twice the number of students studying in the area of technical sciences (20%) and six times the number of students studying in the area of biomedicine and health (8%).
- The percentage of students that study in the area of natural and biotechnical sciences range from 4% to 5%. They account for less than 10% of students studying at Croatian public universities.
- Undergraduate professional study programmes delivered in the area of biomedical science (70% – the study programme in Nursing) and the postgraduate university study programmes (77% – specialization in Medicine) have the highest number of part-time students.
- The percentages of full-time students are higher than those of part-time students in social sciences at the integrated studies (65%) (law), graduate university study (76%) and undergraduate university study (83%). More than half of the part-time students at the undergraduate professional study programmes at public universities study in the area of biomedicine and health (nursing) and in the area of social sciences.
- The majority of students in all areas at specialist graduate studies are part-time students.
- Part-time students at undergraduate university studies (Economics and biomedicine and health – nursing and physiotherapy) account for 25% of students, and 5% in biotechnical sciences, while there are no part-time students in the area of natural sciences. At university graduate studies, all students in the area of natural sciences are full-time students. There are only 30% full-time students in the area of biomedicine and health (nursing and physiotherapy), while there are 92% full-time students at biotechnical sciences.
- The percentage of part-time students at the integrated studies in the field of Economics and the area of social sciences (law) is 30%.
- At the doctoral studies in the area of social sciences, the percentage of full-time students is 30%, while all students at postgraduate specialist and doctoral studies in the field of Economics are part-time students.
- In the field of Economics, the percentage of part-time students is somewhat higher (52% on average) than of full-time students (on average 48%).
- In the area of technical sciences, the percentages of part-time students studying at the specialist graduate professional studies is 100%, while it is 68% at the postgraduate

specialist studies. At the doctoral level, the percentage of full-time students is almost as equal as that of part-time students (48% full-time and 52% part-time students).

- At the doctoral level, in most scientific areas except the social sciences and Economics, more than 50% of the students are full-time students.
- From the distribution of teachers in scientific-teaching grades it is evident that, if we look cumulatively at the number of teachers by areas, the pyramidal structure (the smallest percentage of teachers in highest grades, and the biggest percentage of teachers in the lowest grades) has only been achieved in the artistic field. The largest deviation, i.e. the inverted pyramid structure, is identified in the field of Economics, in which more than half of teachers (51%) have the scientific and teaching title of a full professor. The field of biomedicine and health has a similar structure, but with similar, almost identical percentages (35%, 33%, 32%, respectively) of teachers in scientific and teaching grades.
- Finally, the average percentages of the three categories of teachers in scientific and teaching grades for all areas in Croatia have indicated that a desirable pyramidal structure[25] has not been achieved. There is a high percentage of full professors (35%) among the total scientific and teaching staff, and a relatively low participation rate of associate professors (28%), which can be explained by the criteria for election into a higher grade that were met by more than one-third of teachers in the system (on average 35%)[26]. Possible reasons of the low percentage of associate professors should be additionally explored. The percentage rate of assistant professors is 38%, which makes assistant professors the group of teachers with scientific and teaching grades with the highest percentage. Their percentage is the lowest in the field of Economics (28%).
- The average age of university teachers with scientific and teaching grades in Croatia is relatively homogenous across areas, and, on average, it ranges from 47 to 53. The highest average age is in the area of natural sciences (53), while it is the lowest in the biotechnical sciences (47). Average age of full professors in Croatia is 58.
- Although the areas of social sciences and Economics have the highest number of programmes and students, the area of biomedicine and health (1052) and the technical sciences (1090) have the highest number of teachers with scientific and teaching grades. However, when we look at their structure, more than half of the teaching staff in the area of Economics are full professors (51%).

[25] Direct measure which was the intended result of the proposed acts on higher education, science and the university; from the public discussion on proposed acts from the area of science and higher education (2011) http://public.mzos.hr/Default.aspx?art=11079&sec=3349 (accessed on 10 December 2016).

[26] Ordinance on the Conditions of Appointment to Scientific Grades (Official Gazette 84/05, 138/06, 42/07 – Decision of the Constitutional Court 120/07, 71/10, 116/10 and 38/1) – unofficial revised text https://www.azvo.hr/hr/o-nama/propisi, accessed on 12 December 2016.

- The average age of teachers with scientific/teaching grades in Croatia is 50. On average, the oldest teachers work in the area of humanities (59), while their lowest average age is 54.
- In all scientific areas, the average teacher/student ratio is below 1/20, except in social sciences (1/20) and Economics (1/50), while the lowest average ratio is in natural sciences (1 / 12.5).
- The average number of publications published annually in various scientific areas, by all publication categories, indicates that the biggest scientific production per scientist was recorded in the area of biomedicine and health (0.39 publications by scientist annually).
- On average, the lowest number of publications in journals indexed in CC, WoS and Scopus databases is published by scientists in the field of Economics (on average, one publication per scientist in three years). On average, it is even lower than in the area of humanities (an average of 0.44 publications per scientist a year), in which such a category of publication is not the primary form of scientific communication.
- Papers in Croatian peer-reviewed journals are most frequently published in the area of biomedicine and health (on average, 0.64 publications per scientist a year), and Economics (on average, 0.54 publications per scientist a year). Almost two reviewed papers in the proceedings of the foreign and international conferences are, on average, published by scientists in the field of Economics (on average, 1.7 publications per scientist a year).
- The highest average number of papers published in Croatian peer-reviewed journals is published by scientists in the area of biomedicine (an average of 0.39 publications per scientist a year) and humanities (an average of 0.30 publications per year). This category of publication is not common in the areas of biotechnology, natural sciences and technical sciences (below 0.1 publications per scientist per year).
- Professional papers are mostly published in the area of humanities (on average, 0.76 publications per year) and in the field of Economics (on average, 0.52 publications per scientist per year), and the lowest number of papers is published in biotechnology (on average, 0.20 publications per scientist per year).
- Biotechnical sciences have a similar number of publications categorized as scientific papers (indexed in CC, WoS and Scopus databases) – on average, 0.83 papers per scientist a year, and other reviewed papers in the databases recognized for the appointment into scientific grades, on average, 0.49 papers per scientist a year. The percentage of reviewed papers in the proceedings of foreign and international scientific conferences is the same.

- In the area of natural sciences, the category with the highest number of publications is scientific papers (CC, WoS, Scopus) – on average, 1.25 papers per scientist a year. The lowest number of papers was published in Croatian peer-reviewed journals (on average, 0.07 papers per scientist a year), professional papers (on average, 0.17 papers per scientist a year) and papers published in in-house journals (on average, 0.41 papers per scientist a year).
- The highest number of longer stays abroad of teachers (more than six months) among the total number of stays abroad, is recorded in the area of biomedicine and health (38), natural sciences (37) and in biotechnology (22). There is no outgoing teacher mobility longer than three months in the field of Economics.
- The highest number of longer stays of students abroad (longer than six months) is found in the social sciences and humanities. A very small number of stays abroad, especially those longer than three months, has been recorded in the field of Economics in higher education institutions within public universities.
- Funding of public higher education institutions within public universities in each scientific area is mainly from the state budget (more than 75%). The exceptions are higher education institutions in the field of Economics, where the share of funding from the state budget amounts to 55%. The largest share of funding from the state budget (88%) is found in higher education institutions within public universities which deliver study programmes in the scientific area of natural sciences.
- Average percentage rates of regulated funds[27] are the highest at higher education institutions within public universities which deliver study programmes in the field of Economics (27%). Those percentages are even higher in HEIs delivering programmes in social sciences (17%), humanities (12%), and in biomedicine and health (10%).

5.2. POLYTECHNICS

- Number of full-time students at the undergraduate professional level (359) is almost double that of part-time students at the same level (175). Number of full- and part-time students at the specialist graduate professional level is fairly balanced.
- The biggest share of college professors is employed by the Polytechnic of Zagreb (42%), and their average age is also the highest (65 years). On the other hand, the Polytechnic of

[27] Regulated financing includes the following items: Tuition fees – undergraduate, graduate, professional, additional knowledge or skills testing (if implemented in addition to the matriculation exam), enrolment fees, publishing activity, administrative fees (charging for various forms, diplomas, certificates, etc.).

Požega has the lowest share of college professors (11%), but they have the lowest average age in this group of institutions (40 years).

- The difference between private and public polytechnics can be seen in the structure of human resources – while private HEIs have more than 50% of teachers in the teaching grade of lecturers, public HEIs have more than 50% of senior lecturers.
- The average age of teachers at public polytechnics is 48, and at private ones 56 years.
- Public polytechnics have more part-time students (46% and 42%), and more than 10% of final-year students (tuition fees for part-time students), especially at the specialist graduate level.
- Private polytechnics have a somewhat lower teacher/student ratio than public ones; the only polytechnic that did not meet this requirement at the time of the evaluation was Velika Gorica Polytechnic.
- Polytechnics and colleges that are not entered into the Register of Scientific Organisations do not have the obligation to deliver the scientific component.
- Polytechnic of Karlovac had the most projects funded by MSE and CSF (3). The biggest number of projects funded from other sources in Croatia were carried out by the Polytechnic of Rijeka (10), while the Polytechnic of Slavonski Brod had the biggest number of international projects in the evaluated period (4).
- The table shows data for private polytechnics that had projects in the evaluated period. VERN Polytechnic had an extremely large number of projects funded from other sources in Croatia (128). Both VERN and Zagreb School of Economics and Management had a significant number of international projects in the evaluated period (21 in total).
- The first place by the percentage of own funds is held by the Polytechnic of Rijeka (41.98%), followed by the Polytechnic of Zagreb (23.38%); these are funds that came from projects with the real sector.
- Polytechnic of Applied Health Studies in Zagreb (55.96%) and the Polytechnic of Varaždin (54.96%) are in leading positions according to regulated income (tuition fees).
- The percentages of incoming and outgoing teacher and student mobility are very low.

5.3. COLLEGES

- The average age of teachers at colleges is quite homogeneous, and ranges between 39 and 55 years. Teachers at public colleges are on average a little older (55 years) than at their private counterparts (49 years).
- On average, the largest group of teaching staff at private colleges are lecturers (69%), while public colleges have the biggest average share of senior lecturers (38%). The

lowest average share of teaching staff at both types of colleges are teachers in scientific-teaching grades.

- The average number of teachers at public colleges is higher for all groups of teachers. What is noticeable is the relatively small number of teachers at private colleges (average is one teacher elected in the grade of college professor and one senior lecturer). The average number of lecturers at public colleges is 7, and at private 6.
- The average teacher/student ratio is almost the same at both public and private colleges (1/20 and 1/18).
- Teacher mobility at colleges is relatively low.
- Private colleges have higher mobility than the public ones.

5.4. PRIVATE UNIVERSITIES

- The number of full professors is extremely low and ranges between 0% and 9%, while their average age is 59.
- The percentage of associate professors at these HEIs is between 16% and 21%, and their average age is 50 years.
- The percentage of assistant professors at all three private universities is rather high and ranges between 72% and 83%.
- These HEIs have a teacher/student ratio that is below the legal limit, and ranges from 1/8.04 at Libertas International University, to 1/20.08 at University North.
- The highest outgoing teacher mobility that lasts from 1-3 months was recorded at the University North (15), while Libertas International University had the highest incoming teacher mobility (49).
- The comparison of data on scientific productivity is not possible since most of the teaching staff comes from other institutions, which means that their publications were attributed to multiple institutions.

6. RECOMMENDATIONS

6.1. RECOMMENDATIONS TO HIGHER EDUCATION INSTITUTIONS

HIGHER EDUCATION INSTITUTION MANAGEMENT AND QUALITY ASSURANCE

- Strategic mission should be aligned with the strategic plan.
- Teaching quality monitoring should involve feedback from students and a formal evaluation of the teaching staff.
- Implementation of the strategic plan should be appropriately monitored through performance indicators and collecting quantitative data that can be used to monitor progress.
- Faculties should expand their codes of ethics or to raise awareness with the concept of unethical behaviour in their staff and students.
- Improve the use of information collected from all stakeholders.

STUDY PROGRAMMES

- The idea of education based on learning outcomes should be incorporated into all the aspects of the education process.
- Adoption of international frameworks for learning outcomes, which would encourage a more transparent, reliable and effective process of development and monitoring of syllabi.
- Define a set of skills that students must acquire after completing a study programme.
- Revise the allocation of ECTS credits, so it could appropriately reflect the student workload at all courses.
- Cooperation with the Croatian Employment Service for the purpose of making a systematic analysis of employment statistics and professional achievements of graduates from higher education institutions in Croatia and abroad.
- Introduce modern teaching methods.
- Higher education institutions should seek to apply practical learning methods as much as possible.
- Higher education institutions should improve procedures for vocational guidance of students by introducing other methods of monitoring the quality of teaching, such as peer review, as well as by improving the contents of surveys on the quality of courses and study programmes and methods of conducting student surveys.
- Improve the quality of student internship.
- Assess, revise and redefine enrolment quotas.
- Assess and revise enrolment criteria.
- Include representatives of the industry and other stakeholders in the analysis of study programmes, introduce additional courses in English, revise study programmes and systematically and strategically monitor existing study programmes.

STUDENT SUPPORT

- To provide many additional contents and facilities, and in some cases, establish a virtual learning environment for teachers to share teaching materials, and provide adequate library and reading room space for students, and to increase library holdings.
- To introduce a student supervision system.
- To include representatives of the industry and other stakeholders in the analysis of study programmes, to introduce additional courses in English, revise study programmes and systematically and strategically monitor the existing study programmes.
- To establish a better system of mentoring, counselling and vocational guidance, because students lack information about their obligations and employment opportunities.

TEACHERS

- The development of proper methods of checking the qualifications and expertise of the teaching staff, which will represent an upgrade to the national criteria.
- Explore the opportunities for minimizing workload resulting from the fact that some students do not actually attend classes and drop out in their first year of study.
- Introduce the peer review system among teachers, to ensure the assessment of qualifications of the teaching staff.
- Rewarding teaching, scientific and professional excellence.
- In some areas the teacher/student ratio is not adequate, which certainly has a negative impact on studying.
- It is necessary to develop a formal policy on professional training of teachers.
- To launch teacher training centres which provide training in higher education pedagogy.
- Participation in professional development programmes will also help the scientific and teaching staff in applying for international competitions, writing and publishing in English, and it will enable them to increase their international visibility.

SCIENTIFIC ACTIVITY

- Excessive teacher workload as the main obstacle to the quality of scientific work.
- Increase the number and quality of papers and their visibility.
- Employment and professional development policies are in line with the national system of minimum criteria, which is not a precondition for creating a climate of excellent science.
- Minimum efforts are invested in technology transfer by the evaluated institutions, while the commercialization of professional activities is carried out adequately.
- Establish functional mechanisms for monitoring the scientific activities of teachers and define performance indicators and rewarding successful scientists.
- Strengthen the policy on rewarding research quality and excellence and develop mechanisms for monitoring low scientific productivity.
- Introduce the system for rewarding teaching, scientific and professional excellence.
- Improve cooperation with other institutions in Croatia and abroad.

- It is necessary to establish an improved and standardized, regular monitoring and evaluation of scientific activity and its outcomes (e.g. the number of scientific papers submitted to international journals by departments and by individual scientists, and the number of papers published in these journals).
- The system for monitoring scientific excellence should be connected with effective procedures for rewarding scientific excellence (e.g. public recognition, taking a sabbatical year, reducing the teaching load, financial rewards, promotions, etc.).
- Lay down clear rules on supporting commercial activities of employees, so they would benefit institutions and their employees alike.
- Scientific activity is evaluated solely against national criteria, which stress the quantity of scientific production, instead of its quality.

MOBILITY AND INTERNATIONAL COOPERATION

- Improve cooperation with institutions in Croatia and abroad.
- International cooperation of all categories of higher education institutions should be strengthened.
- Higher education institutions could attract teachers from abroad by developing policies and establishing permanent programmes of short visits by foreign teachers and scientists, and their participation in teaching and scientific research.
- Encouraging the use of English in all teaching and research activities, and improving the opportunities for learning English.
- Launching courses (and study programmes) in English to attract foreign students and improve the quality of student practice.
- Higher education institutions should put more efforts into encouraging students to use the foreign languages they know, and to spend study periods abroad.

6.2. RECOMMENDATIONS TO THE RECTORS' CONFERENCE AND THE COUNCIL OF POLYTECHNICS AND COLLEGES

- The implementation of the recommendations made by the committees for quality assurance performed by certain faculty departments, should be linked to the granting of funds to those departments and to academic advancement.
- The importance of cooperation with external stakeholders (future employers and institutions in the region) in quality assurance at higher education institutions.
- Expert panels have noticed the autonomy of certain higher education institutions, first of all departments, but also of individual faculties.
- Excellence should be a key criterion for study enrolment, which is why some departments have introduced the undergraduate study grade point average as the main criterion.
- Faculties need to conduct a thorough analysis of enrolment criteria in all departments and all graduate programmes should introduce enrolment criteria.
- In some areas, student – teacher ratio is not adequate, which certainly has a negative impact on studying.
- Expert panels have concluded that several researchers stand out at each institution, while other meet the minimum formal requirements.
- HEIs should adopt international frameworks for learning outcomes, which would encourage a more transparent, reliable and effective process of development and monitoring of syllabi.
- Community service, partnerships with industry (pharmaceutical) or cooperation with other higher education institutions (in the field of Medicine and Nursing) could represent opportunities for students to reinforce their knowledge.
- Higher education institutions should define the criteria for the advancement of teachers, which would take into account various aspects of their work, including their pedagogical training, teaching, and so on.
- Pedagogical training should also be a prerequisite for promotion.
- Employment and career advancement policies are in line with the national system of minimum criteria, which is not a precondition for creating an atmosphere of scientific excellence.
- Some institutions have to modernize their equipment etc. in order to achieve a higher degree of scientific research recognizability.
- Expert panels recommended HEIs to continue modernizing their equipment.
- There are rules in place for additional training of non-teaching staff, but they are not sufficiently implemented.
- Faculties need additional funds for the expansion and furnishing of clinics to develop clinical teaching.
- Institutions should strive to find various sources of funding in order to increase their autonomy and ensure the sustainability of income from other sources, such as EU funds, cooperation with other faculties and companies, and services rendered to the local community.
- It is necessary to develop a formal policy on professional training of teachers.
- To launch teacher training centres which provide training in higher education pedagogy.
- Participation in professional development programmes will help the scientific and teaching staff in applying for international competitions, writing and publishing in English, and it will generally enable them to increase their international visibility; they

should develop institutional policies on membership in international associations and make strategic plans for various forms of international cooperation.

- Introduce mechanisms for rewarding teachers for extra efforts or achievements.
- Encourage teachers to spend longer periods abroad.
- Encourage and reward the employees for their greatest achievements and support important national and international artistic and scientific projects.
- To encourage Croatian students and doctoral candidates to participate in mobility programmes and facilitate the recognition of ECTS credits earned at foreign higher education institutions.
- Extra efforts should be put into ensuring adequate conditions for attracting teachers from abroad.
- Offer a higher number of courses in English, with topics that would be interesting to a broader international audience, or the study programmes in English.
- It is necessary to ensure accommodation and make other arrangements for incoming students.
- It is necessary to develop a competitive scientific infrastructure, including laboratories, computers, software etc., for all disciplines.
- Ensure that the libraries are adequately furnished for learning and that they have sufficient materials for students and teachers, i.e. scientists.
- Acquisition of modern scientific resources – access to databases, secure data storage, statistical packages and other relevant software.
- Creating a formal, transparent and equitable structure of support to continuing professional development of all employees.

6.3. RECOMMENDATIONS TO POLICY-MAKERS

- The implementation of the recommendations made by the committees for quality assurance performed by certain faculty departments should be linked to the granting of funds to those departments, and to academic advancement.
- The importance of cooperation with external stakeholders (future employers and institutions in the region) in the quality assurance at higher education institutions.
- Expert panels have noticed the autonomy of certain higher education institutions, first of all departments, but also of individual faculties.
- Excellence should be the main enrolment criterion, which is why some departments have introduced the undergraduate study grade point average as the main criterion.
- Faculties need to conduct a thorough analysis of enrolment criteria in all departments, and all graduate programmes should introduce enrolment criteria.
- In some areas (social sciences and the field of Economics), the teacher/student ratio is not adequate, which certainly has a negative impact on studying.
- It is necessary to revise enrolment quotas.
- Expert panels have concluded that several researchers stand out at each institution, while other meet the minimum formal requirements.
- Higher education institutions should define the criteria for the advancement of teachers, which would take into account various aspects of their work, including their pedagogical training, teaching and so on.
- Pedagogical training should also be a prerequisite for promotion.
- Employment and career advancement policies are in line with the national system of minimum criteria, which is not a precondition for creating an atmosphere of scientific excellence.
- A large number of institutions have to modernize their equipment etc. in order to achieve a higher degree of scientific research recognition.
- Faculties need additional funds for the expansion and furnishing of clinics to develop clinical teaching.
- Institutions should strive to attract various sources of funding in order to increase their autonomy and ensure the sustainability of income from other sources, such as EU funds, cooperation with other faculties and companies, and services rendered to the local community.
- It is necessary to ensure accommodation facilities etc. for incoming students.
- It is necessary to develop a competitive scientific infrastructure, including laboratories, computers, software etc., for all disciplines.
- Acquisition of modern scientific resources – access to databases, secure data storage, statistical packages and other relevant software.
- Creating a formal, transparent and equitable structure of support to continuing professional development of all employees.

7. References

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8. LIST OF EVALUATED INSTITUTIONS

Academic year 2010/2011

Faculty of Economics, J. J. Strossmayer University of Osijek,
Faculty of Economics, University of Rijeka,
Faculty of Economics, University of Split,
Faculty of Economics and Business, University of Zagreb,
Faculty of Organization and Informatics in Varaždin, University of Zagreb,
Faculty of Tourism and Hospitality Management Opatija, University of Rijeka,
Department of Economics and Business Economics, University of Dubrovnik,
Department of Economics and Tourism 'Dr. Mijo Mirković', Juraj Dobrila University of Pula,
Department of Economics, University of Zadar,
American College of Management and Technology in Dubrovnik,
University Centre for Professional Studies, University of Split,
Polytechnic of Knin,
Polytechnic of Vukovar,
College of Market Communications "Agora",
VERN Polytechnic,
Zagreb School of Management,
Zagreb School of Economics and Management.

Academic year 2011/2012

Faculty of Architecture, University of Zagreb,
Faculty of Electrical Engineering,
Josip Juraj Strossmayer University of Osijek,
Faculty of Electrical Engineering and Computing, University of Zagreb,
Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture, University of Split,
Faculty of Transport and Traffic Sciences, University of Zagreb,
Faculty of Mechanical Engineering and Naval Architecture, University of Zagreb,
Faculty of Geodesy, University of Zagreb,
Geotechnical Faculty, University of Zagreb,
Faculty of Civil Engineering, Josip Juraj Strossmayer University of Osijek,
Faculty of Civil Engineering, University of Rijeka,
Faculty of Civil Engineering, University of Zagreb,
Faculty of Civil Engineering, Architecture and Geodesy, University of Split,
Faculty of Graphic Arts, University of Zagreb,
Faculty of Metallurgy in Sisak, University of Zagreb,
Department of Electrical Engineering and Computing, University of Dubrovnik,
Department for Traffic and Maritime Studies, University of Zadar,
College for Technology and Business - Pula Polytechnic,
Faculty of Maritime Studies, University of Rijeka,
Faculty of Maritime Studies, University of Split,
Maritime Department, University of Dubrovnik,
Faculty of Mining, Geology and Petroleum Engineering, University of Zagreb,
Faculty of Mechanical Engineering in Slavonski Brod, Josip Juraj Strossmayer University of Osijek,
Faculty of Engineering, University of Rijeka,

Polytechnic of Zagreb,
Polytechnic of Slavonski Brod,
Polytechnic of Šibenik,
Polytechnic of Varaždin,
College of Occupational Safety and Health,
Hrvatsko Zagorje College in Krapina,
University College for Applied Computer Engineering,
College for Information Technologies, Zagreb,
Nikola Tesla Polytechnic in Gospić.

Academic year 2012/2012
Faculty of Agriculture, University of Zagreb,
Department of Aquaculture, University of Dubrovnik,
Department of Ecology, Agriculture and Aquaculture, University of Zadar,
Faculty of Agriculture, Josip Juraj Strossmayer University of Osijek,
Faculty of Food Technology, Josip Juraj Strossmayer University of Osijek,
Faculty of Food Technology and Biotechnology, University of Zagreb,
University Department of Marine Studies, University of Split,
Faculty of Forestry, University of Zagreb,
International Graduate Business School Zagreb,
College for Financial Management, RRiF, Zagreb,
TV Academy - College of Multimedia and Communication in Split,
Velika Gorica Polytechnic,
Zagreb Polytechnic College,
Minerva University College of Applied Sciences for Management & IT in Dugopolje,
Business College with Public Rights, Višnjan,
Business School for Tourism and Hotel Management "Utilus" in Zagreb,
Nikola Šubić Zrinski University College of Economics, Entrepreneurship and Management,
Aspira University College of Management and Design,
Kairos College for Public Relations and Media Studies,
Baltazar Adam Krčelić Accredited College of Business and Management Zaprešić,
Technical College in Bjelovar,
Evangelical Theological Seminary in Osijek,
College of Agriculture in Križevci
EFFECTUS University College for Law and Finance

Academic year 2013/2014

Faculty of Special Education and Rehabilitation, University of Zagreb,
Faculty of Political Sciences, University of Zagreb,
Faculty of Philosophy of the Society of Jesus, University of Zagreb,
Faculty of Humanities and Social sciences, University of J. J. Strossmayer in Osijek,
Faculty of Humanities and Social sciences, University of Rijeka,
Faculty of Humanities and Social sciences, University of Split,
Faculty of Humanities and Social sciences, University of Zagreb,
Croatian Studies, University in Zagreb,
Catholic Faculty of Theology, University of Zagreb,
Catholic Faculty of Theology, Josip Juraj Strossmayer University of Osijek,
Catholic Faculty of Theology, University of Split,
Faculty of Kinesiology, University of Zagreb,
Faculty of Kinesiology, University of Split,

Department of Mass Communication, Dubrovnik,
Department of Culturology, Josip Juraj Strossmayer University of Osijek,
Department of Humanities, Department of Studies in Italian Language, Department of Educational Sciences, Juraj Dobrila University of Pula,
Department of Pedagogy, Department of Psychology, Department of Sociology, Department of Teachers' and Preschool Teachers' Education, Department of Teachers' and Preschool Teachers' Education, University of Zadar,
Department of Archaeology, Department of Philosophy, Department of Ethnology and Anthropology, Department of History, Department of History of Art, University of Zadar,
English Department, Department of French and Ibero-Romance studies, Department of Classical Philology, Department of Croatian and Slavic Studies, Department of German Studies, Department of Italian Studies, Department of Linguistics, University of Zadar,
Faculty of Teacher Education, University of Zagreb,
Faculty of Teacher Education, Josip Juraj Strossmayer University of Osijek,
Faculty of Teacher Education, University of Rijeka,
Polytechnic of Karlovac,
Polytechnic of Požega,
Polytechnic of Međimurje in Čakovec,
Polytechnic of Rijeka,
Police College,
College for Management in Tourism and Informatics in Virovitica,

Academic year 2014/2015

Faculty of Science, University of Zagreb,
Faculty of Science, University of Split,
Department of Biology, Josip Juraj Strossmayer University of Osijek,
Department of Physics, Josip Juraj Strossmayer University of Osijek,
Department of Chemistry, Josip Juraj Strossmayer University of Osijek,
Department of Mathematics, Josip Juraj Strossmayer University of Osijek,
Department of Physics, University of Rijeka,
Department of Mathematics, University of Rijeka,
Department of Informatics, University of Rijeka,
Department of Geography, University of Zadar,
Faculty of Chemical Engineering and Technology, University of Zagreb,
Faculty of Chemical Engineering and Technology, University of Split,
Faculty of Medicine, University of Zagreb,
Faculty of Medicine, University of Split,
Faculty of Medicine, University of Rijeka,
Faculty of Medicine, Josip Juraj Strossmayer University of Osijek,
School of Dental Medicine, University of Zagreb,
Faculty of Pharmacy and Biochemistry, University of Zagreb,
Faculty of Veterinary Medicine, University of Zagreb,
University Department of Health Studies, University of Split,
University Department for Forensic Sciences, University of Split,
Department of Professional Studies, University of Dubrovnik,
Department of Health Studies, University of Zadar,
Department of Biotechnology, University of Rijeka,
University of Applied Health Studies in Zagreb
Academy of Dramatic Arts, University of Zagreb,
Academy of Fine Arts, University of Zagreb,

Academy of Applied Arts, University of Rijeka,
Academy of Music, University of Zagreb,
Arts Academy, Josip Juraj Strossmayer University of Osijek,
Arts Academy, University of Split,
Department of Music, University of Juraj Dobrila in Pula,
Department of Art and Restoration, University of Dubrovnik,
Faculty of Textile Technology, University of Zagreb,
Faculty of Law, University of Zagreb,
Faculty of Law, University of Split,
Faculty of Law, University of Rijeka,
Faculty of Law, Josip Juraj Strossmayer University of Osijek,
Croatian Catholic University in Zagreb,
DIU Libertas International University in Zagreb,
University North in Koprivnica.