# QUO VADIS FOI?

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**Abstract:** *The Faculty of Organization and Informatics (FOI), Varaždin, Croatia, was founded on 18 December 1974, and this paper is devoted to its 30th anniversary. The goal of the paper is to get responses on two questions: 'Are the conditions which Croatian faculties work in the same as the conditions in other countries?' and 'While working in the same conditions as the other faculties does FOI achieve the same results?' The used method was a method of the comparison of statistical data. For the purposes of the said research the following two research tasks have been established: (1) to find if there are any differences of work in conditions between the Croatian faculties and the faculties in other countries, and (2) to compare the results achieved by FOI and those achieved by other faculties in Croatia, and find if they are similar. To get response on the posed question, a selection has been made of certain entities and statistical indicators for the academic year 2001 – 2002. Besides Croatian entities (University of Zagreb, Faculty of Economics, Faculty of Electrical Engineering and Computing, and FOI), seven countries were chose to be compared to Croatia: Austria, Germany, Hungary, Ireland, Slovenia, United Kingdom and USA. Both – the first and the second research answer were negative: (1) the conditions, which Croatian faculties work in, are not the same as the conditions in other countries (in ratios to population, in Croatia there are on average less students, teachers and graduates than in the studied countries; although allocations for the GDP are not considerably lower than in other countries, Croatia holds the last position on the scale of allocations for Tertiary Education; in relation to other countries, except for Slovenia and Hungary, Croatian teachers are least paid), and (2) while working in the same conditions as the other faculties - the FOI results are better than expected (generally, considering the achieved results and the resulting quality, the FOI holds the second position, just behind the FER; the FOI is proportional, i.e. there is a balance between the enrolled students and the graduates on one hand, and the Masters and the Doctors on the other). The analysis presented somewhat poorer results in the 'Teaching Staff' section: on FOI, there is a shortage of Associated Professors, Assistants and Scientific Novices, and a surplus of Assistant Professors and Lecturers, which may point to problems that could reflect on scientific production. It could generally be said that FOI developed quite well during the 30 years of its existence, and has become a Faculty which, despite the ever-present problems such as low wages and blockage of employing the necessary number of experts, can stand side by side with many others within Croatia and abroad.*

**Keywords**: *tertiary education, conditions, comparisons, quality, Croatia, FOI.*

# 1. INTRODUCTION

*I study every day to be able to teach tomorrow.*
*(Emile Faguet)*

As an institution of higher education affiliated with the University of Zagreb, the Faculty of Organization and Informatics (FOI), Varaždin, was established on 18 December 1974. This paper is devoted to its 30th anniversary.

FOI is a unique academic institution in Croatia, which educates students in Information Systems. Its origins go back to 1962, when the College of Economics was founded in Varazdin as a result of, at that time, growing need for highly educated economists in this region. In 1968 the College introduced a two-year course of study in Industrial Informatics for part-time students. Only a year after, the course was offered to full-time students and in 1974 the FOI was established. The study was initially conceived to offer a two-year and a four-year undergraduate study programs. A two-year study program provided major courses in iformatics, finances or marketing, and a four-year study program offered major courses in informatics, finances and banking or business organization. Today, the aim of the study of Information Systems is to educate graduate professionals for the design and building of information systems by means of modern information technologies, aiming at right and timely business decision making. Creating the basis for further professional and scientific development in information sciences is yet another goal of this study. [6]

Today computers are omnipresent in all aspects of human lives. As far as education is concerned computers' application has also become wide spread. They are used everywhere, in all schools and at all levels. The profession of Computer Science graduate is one of the most required professions in the world and there has been a huge interest in this type of training. Therefore high responsibility lies on institutions, particularly those providing tertiary education. FOI is one of them.

# 2. RESEARCH TASKS

We often ask ourselves whether the conditions we live and work in are optimal or at least similar to those other people live and work in. To get the answer, we should compare us with the others. There are indicators and references to help us since they enable standardization, the use and comparison of data from all around the world. The most common indicators are the United Nations and UNESCO indicators, UNESCO being the top word educational institution.

Some of the mentioned indicators have been used in this research conducted with the goal to get responses on two questions: (1) *'Are the conditions which Croatian faculties work in the same as the conditions in other countries?'* and (2) *'While working in the same conditions as the other faculties does FOI achieve the same results?'*

The used method was a method of the comparison of statistical data. For the purposes of the said research the following two research tasks have been established: (1) *'To find if there are any differences of work in conditions between the Croatian faculties and the faculties in other countries.'* and (2) *'To (a) compare the results achieved by FOI and those achieved by other faculties in Croatia, and (b) find if they are similar.'*

## 1. COLLECTING AND PROCESSING DATA

To get response on the posed question, a selection has been made of observed entities and statistical indicators for the academic year 2001 - 2002[1]. These were then collected and processed. Table 1 gives the review of the observed entities and categories:

**Table 1**: Observed Entities and Categories

| Observed entities | Observed Categories |
|---|---|
| Countries | |
| Austria (AT)<br>Croatia (HR)<br>Germany (DE)<br>Hungary (HU)<br>Ireland (IR)<br>Slovenia (SL)<br>United Kingdom (GB)<br>United States of America (USA) | Central government budget<br>Gross domestic product (GDP)<br>in 000 USA $<br>Annual teachers salary<br>(average, 000 USA $)<br>Teaching staff<br>Student/Teacher ratio<br>Number of graduates (total)<br>Public expenditure on education<br>Enrolment |
| Croatia | |
| University of Zagreb, Croatia<br>Faculty of Economics - EF,<br>Zagreb, Croatia<br>Faculty of Electrical<br>Engineering and Computing<br>- FER, Zagreb, Croatia<br>Faculty of Organization<br>and Informatics – FOI,<br>Varaždin, Croatia | Number of Institution (total)<br>Number of Faculties<br>Enrolment (faculties)<br>Number of graduates (faculties)<br>Masters of science<br>Doctors of science |

Seven countries were chosen to be compared to Croatia, each with a defined goal: Austria, Germany, United Kingdom and the USA as the highly developed countries, Ireland being the most successful country in recent times, and Slovenia and Hungary as our neighbouring countries that started their democratic development at the same time as Croatia[2]. Among the universities, the research included the University of Zagreb (UNIZG) and three of it's faculties: FOI, the Faculty of Electrical Engineering and Computing (FER) and Faculty of Economics (EF). FER and EF were chosen for their curricula being similar to the FOI curricula.

Following their collection the data were grouped and shown as tables according the following attributes:

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[1] This particular academic year was chosen because there was not newer UNESCO official report

[2] Other countries resulting from the breakup of Yugoslavia should also have been included, but the available data are incomplete and would not serve the purpose

1. Observed Countries
   a. Tertiary (Higher) Education[3]
   b. Tertiary Education – basic ratios
   c. Percentage distribution of public expenditure on education
   d. Gross Domestic Product v. Teachers Salaries
2. Comparisons
   e. University of Zagreb, Croatia
   f. Faculty of Economics, Zagreb, Croatia
   g. Faculty of Electrical Engineering and Computing, Zagreb, Croatia
   h. Faculty of Organization and Informatics, Varaždin, Croatia

## Observed Countries

Data on the state level tertiary education (Table 2) comprise population, total number of enrolled students, number of teachers and number of graduated students and their mutual relationships.

**Table 2.** Tertiary Education – basic data

| Country | Total population | Total Enrolment | Teaching staff | Graduates |
|---------|------------------|-----------------|----------------|-----------|
|         | 1                | 2               | 3              | 4         |
| AT      | 8 058 200        | 264 669         | 26 500         | 27 100    |
| DE      | 82 500 000       | 1 868 666       | 494 065        | 550 000   |
| HR      | 4 446 000        | 104 168         | 7 700          | 14 300    |
| HU      | 10 198 000       | 330 549         | 23 611         | 296 600   |
| IR      | 3 838 900        | 166 600         | 11 107         | 57 900    |
| SL      | 1 994 026        | 91 494          | 2 859          | 19 300    |
| UK      | 59 050 800       | 2 067 349       | 98 445         | 370 000   |
| USA     | 277 803 000      | 13 595 580      | 1 045 814      | 274 000   |
| AVERAGE | 55 986 116       | 2 311 135       | 213 763        | 201 151   |

*Source: UNESCO [14]; Central bureau of Statistic, Croatia [12]*

Since the studied countries are different in size, all data referring to absolute amounts can be visually compared only with great difficulties. Therefore, data from Table 2 were used to produce an additional table of mutual relations (Table 3):

**Table 3:** Tertiary Education – basic ratios

| Country | Inhabitants per Student | Inhabitants per Teacher | Inhabitants per Graduate | Students per Teacher | Students per Graduate | Graduates per Teacher |
|---------|------------------------|-------------------------|--------------------------|----------------------|-----------------------|-----------------------|
|         | 1                      | 2                       | 3                        | 4                    | 5                     | 6                     |
| AT      | 30                     | 304                     | 297                      | 10                   | 10                    | 1                     |
| DE      | 44                     | 167                     | 150                      | 4                    | 3                     | 1                     |
| GB      | 28                     | 600                     | 160                      | 21                   | 6                     | 4                     |
| HR      | 43                     | 577                     | 311                      | 14                   | 7                     | 2                     |
| HU      | 31                     | 432                     | 34                       | 14                   | 1                     | 13                    |

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[3] The UNESCO term - Tertiary Education – fully complies with the term Higher Education

| IR | 23 | 346 | 66 | 15 | 3 | 5 |
| SL | 22 | 697 | 103 | 32 | 4 | 7 |
| USA | 36 | 266 | 1014 | 13 | 50 | 0,3 |
| AVERAGE | 32 | 424 | 267 | 15 | 10 | 4 |

*Source: Table 1, page 93*

Figure 1 through Figure 6 show relationships among educational indicators at the level of the studied countries:
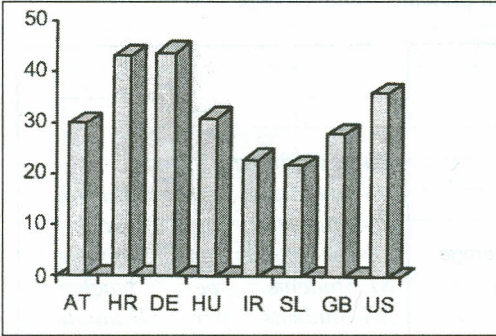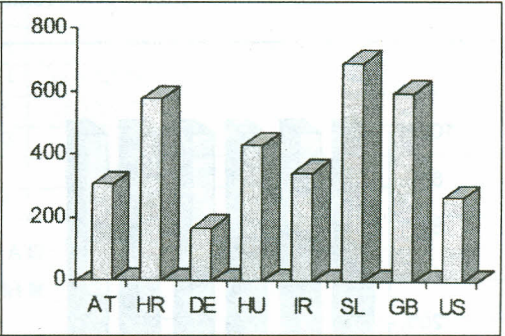


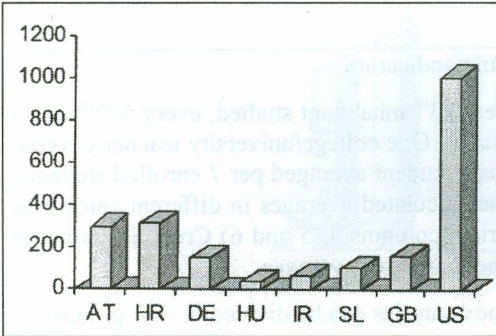**Figure 1:** Inhabitants per Students



**Figure 2:** Inhabitants per Teacher



**Figure 3:** Inhabitants per Graduate
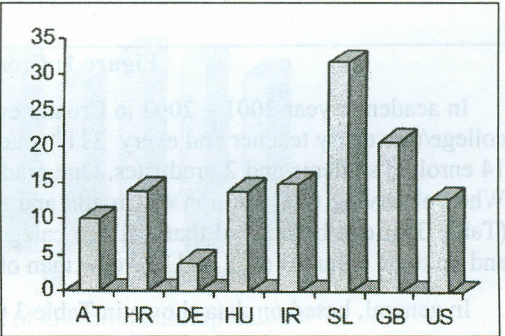


**Figure 4:** Students per Teacher
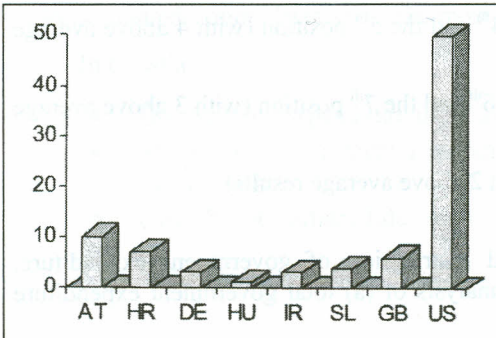


**Figure 5:** Students per Graduate
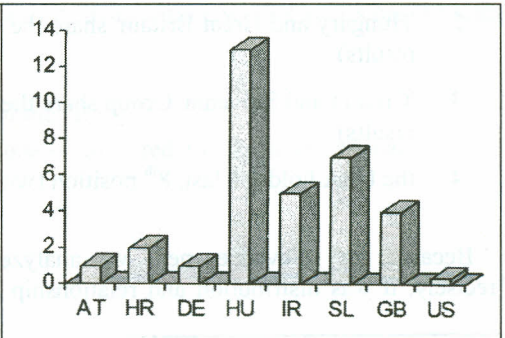


**Figure 4:** Graduates per Teacher

In academic year 2001 – 2002, every $32^{nd}$ inhabitant of the studied countries, on average, was a student, (in Slovenia: every $22^{nd}$; in Germany: every $44^{th}$), every $424^{th}$ inhabitant was a college/university teacher (Germany: 1 teacher per every 167 inhabitants; Slovenia: 1 teacher per every 697 inhabitants), and every $267^{th}$ inhabitant graduated (in Hungary every $34^{th}$, in the USA every $1014^{th}$). On average, there was 15 enrolled students (Germany 4, Slovenia 32) and 4 graduates (Hungary 1, USA 50) per one college/university teacher. In the above mentioned academic year there was 10 enrolled students per one graduated (USA at about 3, Hungary 13).

Figure 1 shows relationship between Croatian indicators and average:



Abbreviations:
IP-Inhabitants per Student
IT-Inhabitants per Teacher;
IG-Inhabitants per Graduate
ST-Students per teacher
SG-Students per Graduate
GT-Graduates per teacher
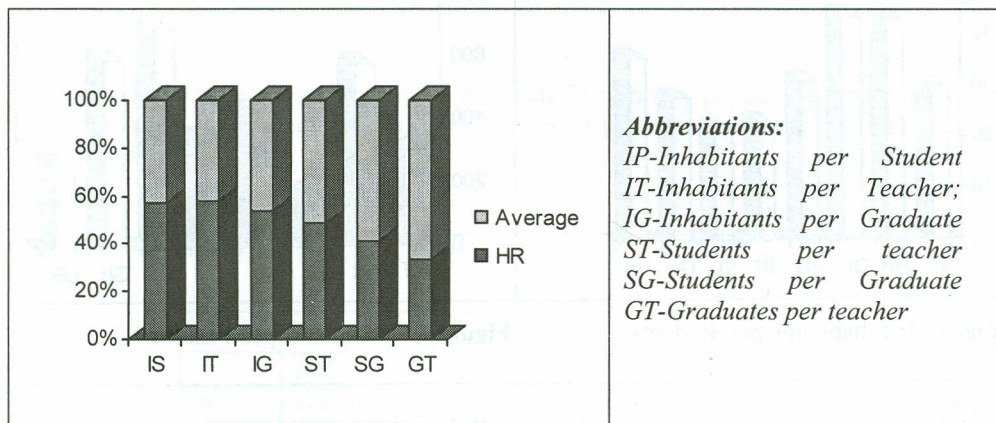
**Figure 1:** Croatian indicators

In academic year 2001 – 2002 in Croatia every $43^{rd}$ inhabitant studied, every $577^{th}$ was a college/university teacher and every $311^{th}$ graduates. One college/university teacher covered 14 enrolled students and 2 graduates. One graduate student averaged per 7 enrolled students. When observing total relation of Croatia and the calculated averages in different categories (Table 3) it can be noticed that in three categories (columns 4, 5 and 6) Croatia was better and in three columns (1, 2 and 3) worse than other countries averages.

In general, based on data shown in Table 3 the countries can be divided in four groups:

1. 'Austria, Germany & Ireland' Group has 5 above average results and share the $1^{st}$, the $2^{nd}$ and the $3^{rd}$ position[4] respectively.

2. 'Hungary and Great Britain' share the $4^{th}$ and the $5^{th}$ position (with 4 above average results)

3. 'Croatia and Slovenia' Group share the $6^{th}$ and the $7^{th}$ position (with 3 above average results)

4. the USA hold the last, $8^{th}$ position (with 2 above average results)

Because it's relevance, next we analyzed distribution of government expenditure. Precisely, it was distribution and relationship analysis of (a) total government expenditure

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[4] Above average results: Austria (columns 1, 2, 4, 5, 6), Germany (columns 2, 3, 4, 5, 6), Ireland (columns 1, 2, 3, 4, 5), Hungary (columns 1, 3, 4, 5), UK (columns 1, 3, 5, 6), Croatia (columns 4, 5, 6), Slovenia (columns 1, 3, 5), USA (columns 2, 4)

against government education expenditure, and (b) total education expenditure against tertiary education expenditure.

Table 4 give the review of the observed categories:

**Table 4:** Distribution of government expenditure

| Country | Total Government Expenditure (TGE) | | Education Expenditure | | | | Other Government Expenditure (%) |
|---|---|---|---|---|---|---|---|
| | | | Total (as % of TGE) | Tertiary | | Other (as % of TGE) | |
| | USA $ | as % of GDP | | USA $ | as % of TGE | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| AT | 3 031 373 970 | 15 | 25 | 121 254 959 | 4 | 21 | 75 |
| DE | 195 871 500 000 | 10 | 24 | 58 76 145 000 | 3 | 21 | 76 |
| GB | 18 264 530 5416 | 14 | 20 | 9 132 265 271 | 5 | 15 | 80 |
| HR | 4 645 625 400 | 10 | 8 | 92 912 508 | 2 | 6 | 92 |
| HU | 16 318 839 600 | 14 | 21 | 652 753 584 | 4 | 17 | 79 |
| IR | 7 208 403 990 | 11 | 30 | 72 084 040 | 1 | 29 | 70 |
| SL | 10 944 627 122 | 12 | 15 | 218 892 542 | 2 | 13 | 85 |
| USA | 1 416 661 954 560 | 16 | 26 | 56 666 478 182 | 4 | 22 | 74 |
| AVERAGE | 229 665 953 757 | 13 | 21 | 9 104 098 261 | 3 | 19 | 80 |

*GDP = Gross Domestic Product, Source: UNESCO [14]*

Following figures are the illustrations of Table 4:
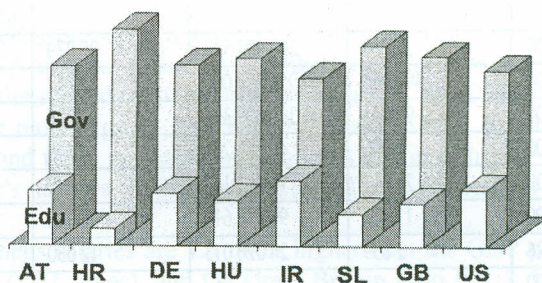


**Figure 8:** Distribution of Government Expenditure

Figure 8 shows distribution of Government Expenditure by countries, i.e. the relationship of the share allocated for education (Series name: Edu) and the rest (Series name: Gov). Related to education, Ireland has the most favorite distribution, while Croatia has the least.

In Croatia

- Government Expenditure is 10% of the GDP
- 8% of the Government Expenditure is allocated to the entire education (30% in Ireland) and
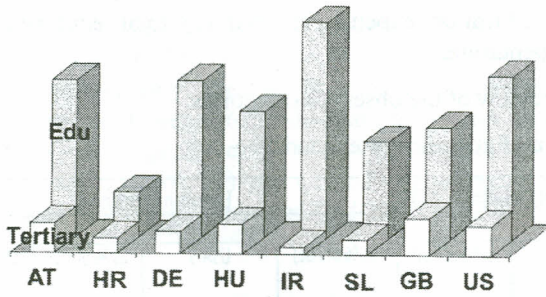- only 2% for Tertiary Education

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**Figure 9:** Distribution of Education Expenditure

Figure 9 shows distribution of costs in education, particularly the average ratio of tertiary education (Series name: Tertiary) and other categories of costs in education (Series name: Edu). The top place of investment into education is held by the United Kingdom (5% of total investment into education), and the bottom by Ireland (1%). The second last is Croatia sharing the level with Slovenia (about 2%).

The ratio of teacher's salaries (income) and GDP per capita is shown in Table 5:

**Table 5:** Gross Domestic Product & Teachers Salaries (UN estimation, 2002)

| | Total population | Tertiary Education Teaching Staff | GDP Total (000 USA $) | GDP per capita (USA $) | Annual salary (gross) Teaching Staff average (USA $) | National average (USA $) |
|---|---|---|---|---|---|---|
| AT | 8 058 200 | 26 500 | 202 091 598 | 25 079 | 30 376 | 29 147 |
| DE | 82 500 000 | 494 065 | 1 958 715 000 | 23 742 | 35 546 | 52 782 |
| GB | 59 050 800 | 98 445 | 1 304 609 324 | 22 093 | 22 839 | 35 572 |
| HR | 4 446 000 | 7 700 | 46 456 254 | 10 449 | 7 500 | 12 037 |
| HU | 10 198 000 | 23 611 | 116 563 140 | 11 430 | 6 908 | 7 119 |
| IR | 3 838 900 | 11 107 | 99 496 610 | 25 918 | 23 033 | 29 175 |
| SL | 1 994 026 | 2 859 | 24 028 013 | 12 050 | 7 204 | 15 804 |
| USA | 277 803 000 | 1 045 814 | 8 854 137 216 | 31 872 | 25 405 | 27 259 |
| AVERAGE | 55 986 116 | 213 763 | 1 575 762 144 | 20 329 | 19 851 | 26 112 |

*Sources: UN [13],Chronicle FOI [2] [3], UNESCO [14]; Croatia – Central Bureau of Statistics [11]*

Figure 10 and Figure 11 graphs illustrate data from Table 3 and show the ratio of teachers' salaries and GDP per capita (Figure 10), and average salary rates at the state level[5] (Figure 11):

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[5] For the purposes of comparison the gross annual averages of university teachers were considered
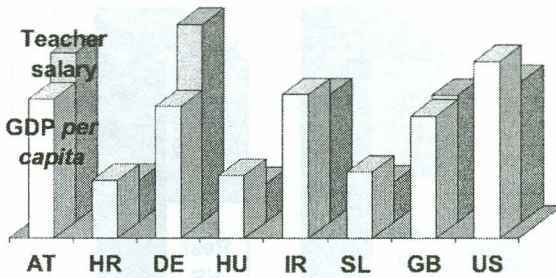
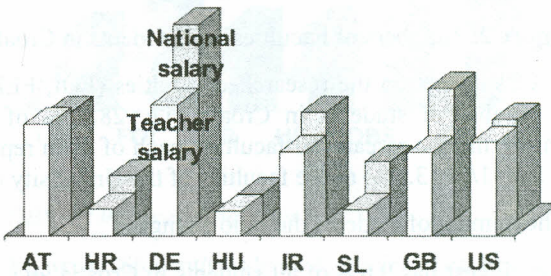**Figure 10:** GDP v. Teacher Salaries



**Figure 11:** National v. Teacher Salaries

Among the studied groups, the highest salaries of university teachers were recorded in Germany (3 627 USA dollars, gross per months), and the lowest in Hungary (576 USA dollars). Slovenia is the second last with 600 USA dollars, and Croatia holds the 6th position with 625 dollars per month, gross. Teacher's salaries in Great Britain are three times the incomes in Croatia, and those in Germany are almost six times higher than those in Croatia. Additionally, teacher's salaries in Croatia are just 62% of national average (Austria 104%, Hungary 46%).

In Germany teacher's salaries are 1.5 times higher than the GDP per capita. Germany is followed by Austria (1.21 times), and the Great Britain ratio is 1:1. In other countries the GDP is higher[6], culminating in Slovenia, were GDP per capita is 1.7 times higher than teacher's salary (Croatia, 1.4 times).

### COMPARISONS

### Dispersions and ratios

Data comprising the statistical indicators of the University of Zagreb and the three faculties (FOI, FER and EF) providing similar studies are shown in Table 6, page 101. All analyses and illustrations of the part named 'Comparisons' result from the data taken from this table.

Croatia has 72 faculties and a total of 107 911 students, and the University of Zagreb comprises 29 faculties (40.3% of the total number) and 52 519 students (48.7%). Illustration - Figure 2:
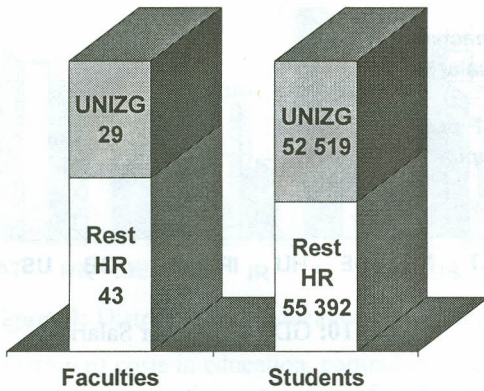
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[6] Ireland: 1.12 times; the USA: 1.25 times

**Figure 2:** Numbers of Faculties and Students in Croatia

The total number of students on the researched faculties (FOI, FER and EF) is 14 901 (13.8% of the total number of students in Croatia, i.e. 28.4 % of the students of the University) [12]. Considering the researched faculties, each of them represents 1/72 (1.39%) of Croatian faculties, and 1/29 (3.4%) of the faculties of the University of Zagreb.

When analysing the number of students the ratio changes:

- EF, being the biggest has 9.0% of all students in Croatia and 18.5% of students of the University of Zagreb
- FER is the second large and has 3.7% of all students in Croatia and 7.6% of students of the University of Zagreb
- FOI, the smallest, has 1.1% of all students in Croatia and 2.2% of students of the University of Zagreb

The ratio of the enrolled students, the graduated ones, students with master's and those with doctor's degree is of great importance in measuring the quality of a tertiary education institution. See illustration in Figure 3:
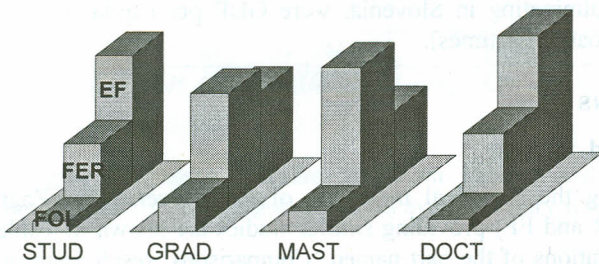


**Figure 3**: Dispersion of Students, Graduates and Academic Degrees

The analysis shows that at FOI there was one graduate student per 11 enrolled, one Master of Science per 84, and one Doctor per 392 enrolled students. At FER it is one graduated per one enrolled student, one Master per 82, and one Doctor per 135 enrolled students. The ratio at the EF is 1: 27 (graduates), 1 : 94 (Masters) and 1 : 1389 (Doctors). At the same time the University of Zagreb had an average of 1 graduate per 7, one Master per 78, and 1 Doctor per 625 enrolled students. The comparison shows that FOI and FER are proportional and above average, while the EF shows negative trends in the analyzed ratios.

We can conclude that among the analyzed faculties – considering the observed ratios and the University average – the FER is of highest quality, the FOI is slightly lower but still pretty well rated and the EF is far behind them.[7].

Figure 4 shows the ratios in Croatia compared to the results received previously[8] at the level of the analyzed countries:
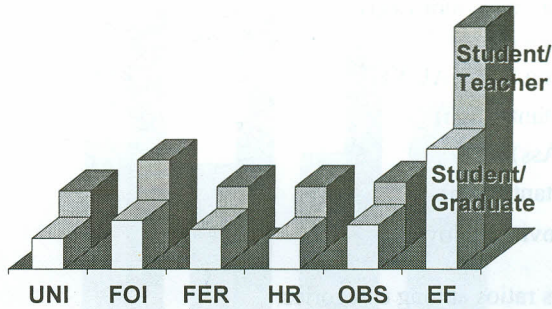


*OBS = Observed Countries*

**Figure 4:** Student/Graduate & Student/Teacher ratios

The averages per the country levels are as follows: 1 graduate per 10 enrolled and 15 students per one teacher. The Croatia average is better: 1 graduate per 7 enrolled i.e. 1 teacher for every 13 enrolled students. The ratios at UNIZG and those at FER are almost the same as the Croatian averages (1 graduate : 7 enrolled and 13 enrolled : 1 teacher). Based per the analyzed ratios Croatia, the UNIZG and the FER show above average results.

The results at the EF are not encouraging. There is a lack of teachers present at this faculty (1 per 50 enrolled students) and a low number of graduates (one graduate per 27 enrolled students).

The results at the FOI are quite the opposite. The number of graduate students is almost the same as the average in the analyzed countries (1 graduate per 11 enrolled). At the same time though, there are indices per the lack of teachers (1 teacher per 20 enrolled students). These indicators show that despite the lack of teachers, the FOI still provides high quality, i.e. the small number of teachers compared to the success indicates their high quality.

Of the analyzed faculties, the FOI and the FER are proportional, i.e. there is a balance between the enrolled and the graduate students on one hand and the Masters and the Doctors on the other. The EF shows exceptional non-proportion.

### Scientific and Teaching Staff

When determining conditions under which a faculty operates, the analysis of the Teaching Staff is of utmost importance. Like in other countries, in Croatia there are 10 university titles distributed in three categories:

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[7] This raises the issue of a criterion, i.e. a dilemma: Is there a possibility that the large number of graduates (the FOI, the FER) reflect low level of criteria? The answer is 'no' because if the case were the opposite there would not be so few of them at the EF.

[8] Table 2 page 93 and Table 3 page 94

I.   Scientific/Teaching Staff: (SCI)[9]
  1. Full Professors (Full. Prof.)
  2. Associated Professors (Assoc. Prof.)
  3. Assistant Professors (Assist. Prof.)
II.  Teaching Staff  (TEACH)
  4. Post-secondary Professors
  5. Senior Lecturers (Senior Lect)
  6. Lecturers (Lect)
III. Auxiliary Teaching Staff (AUX)
  7. Senior Assistants (Sen)
  8. Assistants (Ass)
  9. Junior Assistants (Jun)
  10. Scientific Novices (Nov)
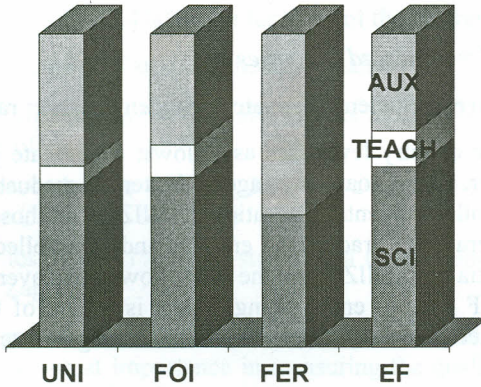
Figure 5 illustrates ratios among categories:



**Figure 5:** Scientific and Teaching Staff

Considering categories, especially in the case of the Scientific Teaching Staff category (Series name: SCI), what is noticed is a relative harmony. The exception is the FER, where there are no teachers belonging to the Teaching Staff group. Such analysis, however, is not enough because it does not show the relationships inside the groups.

Therefore three more illustrations of the relationships distributed by categories were produced: Scientific Teaching Staff (Figure 6, page 103), Teaching Staff (Figure 7, page 104) and Auxiliary Teaching Staff (Figure 8, page 104). Those Figures provide more information:

Some features seen at first sight are:

- apart from the fact that there are no teachers in the Teaching Staff category, the FER provides the best structure, even better than the University in general
- considering proportions, the FOI is the closest to the University
- the EF proportionally has too many Professors, and too few Novices

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[9] Markings in the brackets appear in graphs as descriptions of a particular category

Since ratios at the UNIZG reflect the average of the entire university (29 faculties), in further analysis all other entities shall be compared to this.

### Scientific/Teaching Staff

Figure 6 shows that the ratios at the FOI and the FER in the Scientific Teaching Staff category are rather proportional, with Full Professors[10] in the lead.
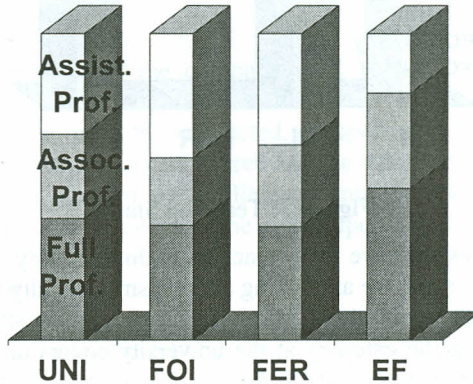


**Figure 6:** Scientific/Teaching Staff

With other titles of this group, at the FOI there is a certain lack of Associated Professors (UNI 14.3%, FOI 20.3%) and a surplus of Assistant Professors (UNI 17.1%, FOI 22.0%). At the FER the situation is better but still closer to the FOI: Associated Professors (UNI 14.3%, FER 11.2%), Assistant Professors (UNI 17.1%, FER 15.4%).

In relation to the UNIZG the data at the EF are less proportional: Full Professors (UNI 20.7%, EF 28.6%), Associated Professors (UNI 14.3%, EF 17.9%), Assistant Professors (UNI 17.1%, EF 11.2%). Notice the considerable surplus of Full Professors and, also considerable, lack of Assistant Professors.

### Teaching Staff

In considering titles of the Teaching Staff category (Figure 7), no such appearance was noted at the FER[11]. The highest degree – Post Secondary Professor, present at the UNIZG with only 3% – has not been found anywhere. Teachers with other two titles appear both at the FOI and the EF.

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[10] UNI 20.7%, FOI 20.3%, FER 15.7%

[11] Titles of the category Teaching Staff are usually awarded to college teachers and those faculty teachers who do not teach majors, e.g. foreign languages at the non-philological institutions
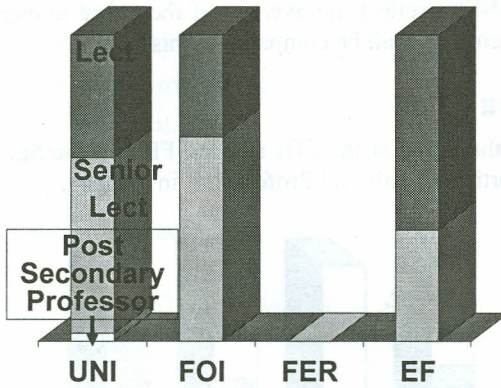
**Figure 7:** Teaching Staff

The FOI generally does not have many teachers in this category – 4 Senior Lecturers and 2 Lecturers. Nevertheless, since we are talking about a small faculty with the total staff of 59 the mentioned group represents about 10%. This information should not be neglected, especially if we know that the category at the university covers only about 5%. At the EF there are 22, i.e. 11% of the teachers who belong to the Teaching Staff[12] category.

## Auxiliary Teaching Staff

In the Auxiliary Teaching Staff category (Figure 8) special attention should be directed to the auxiliary titles. These are the titles that indicate the future of this institution.
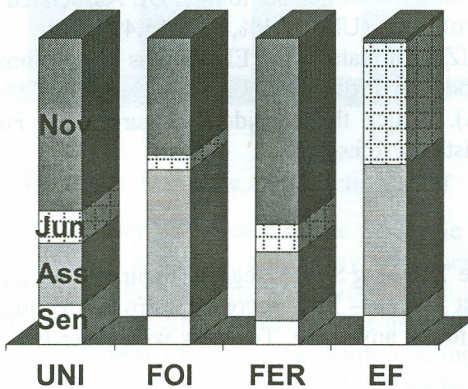


**Figure 8:** Auxiliary Teaching Staff

Many researches show that the optimal ratio that would guarantee scientific reproduction is 1.4 auxiliary teacher per one teacher of the Scientific Teaching Staff [13]. At the UNIZG the ratio is 0.8 auxiliary teacher per one professor, at the FOI 0.7; at the FER 1.4, and at the EF 0.5. Only the FER has reached international levels.

The reason probably lies in decreased employment at the cost of the state budget inside the social sector in Croatia. The situation is better at the FER because there is a considerable influx of extra-budget funds. The FER structure includes various institutes/departments and considerable revenue element, which provided conditions for possibilities of recruiting a

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[12] 8 Senior Lecturers or 4% and 14 Lecturers or 7% of the total number of teachers)

range of young experts at their own expense. In the last two years both, the FOI and the EF, employ a fair number of auxiliary teaching. Since this paper is based on the results of the academic year 2001 – 2002, these were not taken into consideration.

The students/auxiliaries ratios are also important. The international recommendations are 1 auxiliary per at about 15 to 20 students [13]. At the UNIZG, there is one auxiliary per 31 students, and among the faculties the best position holds the FER (24 to 1), followed by the FOI (56 to 1) The EF hold the last position with the total of 159 students per one auxiliary.

## Analysis

For the purposes of method of the comparison of statistical data, observed entities (countries, university, faculties) as well as – for the studied event – the relevant data have been selected in this paper and were then collected, grouped and presented. Data on tertiary education at the country, the University of Zagreb and the three faculties (FOI, FER and EF) levels comprised population, number of enrolled students, number of teacher, number of graduates, their mutual ratios and a review of the most important expenses.

## Results at the country level

1) By data known as *basic ratios* the countries have been divided into four groups:
   a) the highest quality is 'Austria, Germany and Ireland' group, equally sharing the first, second and third position
   b) the following is the 'Hungary and Great Britain' group (4th and 5th position)
   c) the 'Croatia and Slovenia' group shares the 6th and 7th position and
   d) the USA holds the last, 8th position.

2) Considering distribution of the Government Expenditure Croatia has the least favourable distribution: the Government Expenditure is 10% of GDP, and only 8% of the Government Expenditure is allocated to entire education (Ireland 30%) and only 2% for Tertiary Education.

3) Considering the results of allocations for Tertiary education, the Great Britain allocates the most and Ireland the least, while Croatia and Slovenia hold the second last position.

4) Among the studied points, the highest incomes are recorded in Germany, and the lowest in Hungary. Croatia holds the 6th position (625 dollars gross, per month). Teacher's salaries in Great Britain are three times the incomes in Croatia. Teachers' salaries in Germany are almost six time those in Croatia.

## Results at the university and faculty level

1) Analysis in UNIZG section 'Dispersion of Students, Graduates & Academic Degrees' has shown that the FOI and the FER are proportional and above average, while the EF shows negative trends of the studied ratios.

2) Comparison with results in the studied countries has shown that the Croatia, the UNIZG, and the FER are above the average. Among the analyzed faculties and considering the studied average values, the average values of the studied countries and the UNIZG, the FER is of the highest quality, the FOI little less and the EF falls far behind.

Section 'Teaching Staff Analysis' has shown that, among the analyzed faculties, the FER is of the highest quality, the only one among those meeting the international criteria. It is followed by the FOI, and the EF is the last.

## CONCLUSION

For the purposes of analysing conditions of work of faculties in Croatia and the level of achieved results at the FOI, this paper set two questions: (1) *'Are the conditions, which Croatian faculties work in, the same as the conditions in other countries?'* and (2) *'While working in the same conditions as the other faculties, does FOI achieve the same results?'*.

A) According to the achieved research results, the first answer was: *'No, the conditions, which Croatian faculties work in, are not the same as the conditions in other countries.'*:

   1) in ratios to population, in Croatia there are on average less students, teachers and graduates than in the studied countries
   2) although allocations for the GDP are not considerably lower than in other countries, Croatia holds the last position on the scale of allocations for Tertiary Education, and
   3) in relation to other countries, except for Slovenia and Hungary, Croatian teachers are least paid

B) The second answer is also negative, because - *while working in the same conditions as the other faculties - the FOI results are better than expected*:

   1) generally, considering the achieved results and the resulting quality, the FOI holds the second position, just behind the FER
   2) the FOI is proportional, i.e. there is a balance between the enrolled students and the graduates on one hand, and the Masters and the Doctors on the other
   3) The analysis presented somewhat poorer results in the 'Teaching Staff' section:

      i) although FOI is, by proportion, very much like the UNIZG, we register a shortage of Associated Professors, Assistants and Scientific Novices, and a surplus of Assistant Professors and Lecturers, which may point to problems that could reflect on scientific production
      ii) regardless the fact, that the reason for the said imbalance is the policy of decreased employment on the public sector in Croatia, the problem should be solved as soon as possible

It could generally be said that FOI developed quite well during the 30 years of its existence, and has become a Faculty which, despite the ever-present problems such as low incoms and blockage of employing the necessary number of experts, can stand side by side with many others within Croatia and abroad. It seems a fine future awaits it, one which should be approached with optimism.

## ACKNOWLEDGMENTS

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