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ABSTRACT

Universities are the highest level of the Czech school education system, as well as important scientific institutions that are granted full autonomy under the law. There are five technical universities and one military school with technical courses in the Czech Republic. Until the 1990s, the universities had provided only the five years magister study programs (engineering study), but the first University Law issued after the Velvet Revolution introduced the bachelor's degree. According to the recommendation of OECD, nearly all Czech technical universities have introduced the three-year bachelor study programs. There are two interpretations of them: (1) serial--prerequisite undergraduate programs with the possibility of continuing in a magister degree program; and (2) parallel--completed programs with only basic knowledge acquisition from theoretical subjects but more practical experience acquisition in each course of study. This paper focuses on the latter type and describes the problems with development and implementation of new bachelor study programs and their coexistence with magister study programs at traditional Czech technical universities with the practical placement as a stage of study and with the assertion of non-traditional new graduates in an industry. (Author/SAH)

# Bachelor Studies in the Czech Technical Universities

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**ABSTRACT** - Universities are the highest level of the Czech school education system, as well as important scientific institutions that are granted a full autonomy by law. There are five technical universities and one military school with technical courses in the Czech republic.

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serial - prerequisite undergaraduate programmes with the possibility of continuing in a magister degree programme

parallel - completed programmes with only basic knowledge acquisition from theoretical subjects but more practival experience acquisition in each course of study.

The former, if finished, seems to be overfed with theories, while the latter is insufficiently equipped with theories on how to continue with the traditional magister curriculum. These questions, after being introduced for years, are now being dealt with.

The paper is focused on the latter type and describes problems with development and implementation of new bachelor study programmes and their co-existence with magister study programmes at traditional Czech technical universities, with the practical placement as a stage of study and with the assertion of non-traditional new graduates in an industry.

## INTRODUCTION

The Czech Republic entered the nineties with the system of higher education which provided only one level of pregraduate study - five year magister (or engineer at technical universities) level (see Fig.1). In spite of the fact, that the higher education institutions were specialised in various branches, their ways of teaching and learning was very similar. The new University Law, passed in 1990, even emphasized it. The Law granted full autonomy and academic freedom for higher education institutions, but did not give a space for the creation of a new non-university sector in the sphere. The only progress of higher education diversitification admitted by the Law was a very brief and common definition of the bachelor studies. They were defined as a self-contained part of higher-education studies at the completion of which higher education institutions present a certificate and, possibly, award the title bachelor abbreviated by Bc, but the title is not considered to be an academical one.

The Law did not say anything about the aims, content or duration of bachelor studies nor anything about the extent to which they were expected to represent the termination of studies

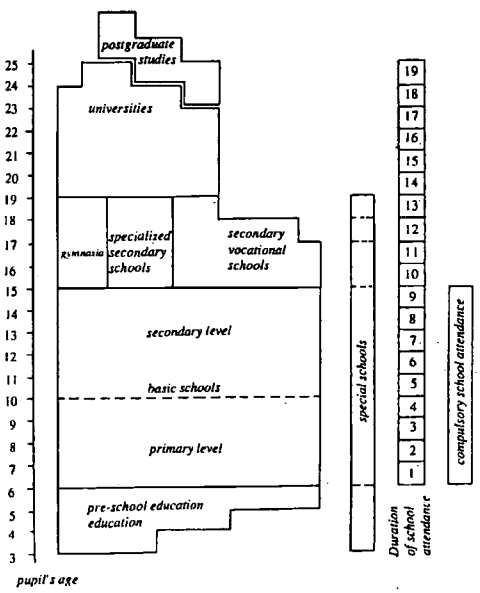


**Fig. 1** Scheme of the CSFR educational system in 1990

and degrees, the preparation for immediate entry into employment or simply the first phase of traditional magister studies. All this was left to the decision of the universities nad faculties introducing them.

## INTRODUCTION OF BACHELOR STUDIES IN THE CZECH REPUBLIC

In spite of the fact mentioned above, the new Law played a decisive role within universities by recognising bachelor studies as a component of the higher education system. The introduction of bachelor studies was the only real diversification within existing institutions of higher education after 1990. The other two were:

a) A considerable enlargement of the number of fields or programmes of study, disciplines etc., which corresponded not only with the scientific and technological progress, but above all, with the political transformation of the society. In many cases it led to the creation of new faculties or to the enlargement of existing ones. There were 72 faculties in 1990 and there are 111 by now.
b) An enlargement of existing specialised universities (e.g. technical ones) by faculties or departments in the fields of economics and management.

At the beginning universities were reluctant to introduce bachelor studies. They feared that the new degree might lead to a decline in the quality of education, and the placement of their graduates on the labour market might be difficult because the qualities and skills of graduates from such programmes were unknown. The newly created regional universities, which were encouraged by the accreditation commission to concentrate on these types of programmes, have introduced them, but only in the belief that it was a temporary step, only while awaiting accredidation of full magister studies.

The academic year 1992/93 may be considered as the beginning of bachelor studies at Czech universities (see Table 1). By 1996/97 over 36000 students were enrolled in bachelor studies which represented 24% of the total number of pregraduate students in recognized higher education. In the same year, over 28% of newly entering pregraduate students were enrolled in bachelor studies, which existed in 78 of 111 faculties. This corresponds fully to the recommendation of the OECD examiners who required that at least 20% of students in higher education schould be students of bachelor studies by the year 2000.

**Table 1: Bachelor studies students (full-time and part-time) at Czech universities**

| | Academic year | | |
|---|---|---|---|
| | **1992/93** | **1994/95** | **1996/97** |
| **Pregraduate students** | 111680 | 126582 | 152602 |
| **Bachelor studies students** | 12195 | 27805 | 36145 |
| **Percentage** | 10,9 | 22,0 | 23,7 |
| **First year pregraduate students** | 29795 | 37256 | 43508 |
| **First year bachelor studies students** | 5631 | 11829 | 12470 |
| **Percentage** | 18,9 | 31,7 | 28,7 |

Source: Institute of Information in Education

**The main arguments for an introduction of bachelor studies were:**

- mentioned above „starting" programmes of new universities
- the OECD recommendation
- changes in the secondery education level and thus espressive shift of many professional qualifications from the secondery to the post-secondery sphere
- governmental support of higher education institutions according to the number of students
- to economize higher education by the introduction of shorter study programmes
- to create a new level of resulting qualifications for those, who will not go through the whole five-years study programme.

## INTRODUCTION OF BACHELOR STUDIES AT TECHNICAL UNIVERSITIES

Technical universities were also very reluctant to introduce bachelor studies, but as Table 2 shows, they very soon changed their mind and promoted those study programmes. The arguments for it, except for those mentioned in the previous chapter, were:

- to keep unpopular courses of study for students because they are required by the labour market
- to raise the effectivity of higher education in engineering
- to compensate for confused diversification of secondary technical education
- to compete with newly created higher professional schools
- to meet special demands of industry.

Table 2 shows, that bachelor studies are the most popular in economic disciplines (including marketing, management, commerce, banking, etc.). This is largely due to the fact that The Economics University of Prague (the major higher education institution in the field of economics) considers bachelor studies as a compulsory first stage of traditional magister education. As to quantity, the technical sciences form the second largest group, with nearly 22% of the total number of bachelor students in the academic year 1996/97.

**There are two main models of relations between bachelor and magister studies:**

The serial or I model, which represents theoretical study programmes and where bachelor studies are the first stage of magister studies. Students who have completed bachelor studies can leave the institutions and search for a job, but nearly all of them continue in studies.
The parallel or V model, which represents practically oriented study programmes and where the graduates are supposed to leave university and start their practical lives. The specialised graduates are able to start in their jobs immediately, but in a case of a weakening of the studied branch they might be unemployed or have to be requalified. This model is much more extended at technical universities, but with the remark that the most graduates have been trying to find possibilities how to continue in the magister studies.

Fig. 2 shows a scheme of the present situation of diversifield higher education system at Czech technical universities. Both models of bachelor studies are seen from the figure and the parallel one is closed without any possibility to continue. In fact, as mentioned, faculties were forced to enable parallel bachelors to continue their study.

As Fig. 3 shows, it has been done by introducing a compensatory year with very strict final exam between bachelor and magister studies. The year compensate a difference between both streams in theoretical subjects and is very difficult. Less than 50% of bachelors are able to finish it but as Table 5 shows, the most of them try it.

**THERE ARE FIVE TECHNICAL UNIVERSITIES IN THE CZECH REPUBLIC:**

Czech Technical University in Prague (CVUT)
Technical University of Brno (VUT)
Technical University of Ostrava (TUO)
Technical University in Liberec (TUL)
University of West Bohemia (ZCU)

**Table 2: Numbers of bachelor students (full-time and part-time) by chosen fields of study and their percentage in the total number of the respective fields**

| Academic year | 1992/93 | | 1994/95 | | 1996/97 | |
|---|---|---|---|---|---|---|
| | | [%] | | [%] | | [%] |
| **Technical sciences** | 575 | 1,6 | 5792 | 15,4 | 7753 | 18,5 |
| **Economics and related disciplines** | 8747 | 66,7 | 13211 | 68,1 | 14555 | 55,8 |
| **TOTAL** | 12195 | 11,0 | 27805 | 22,0 | 36145 | 23,7 |

All of them have introduced bachelor and magister studies) and Ostrava's Faculty of Mechanical Engineering, with both models of bachelor studies, the other

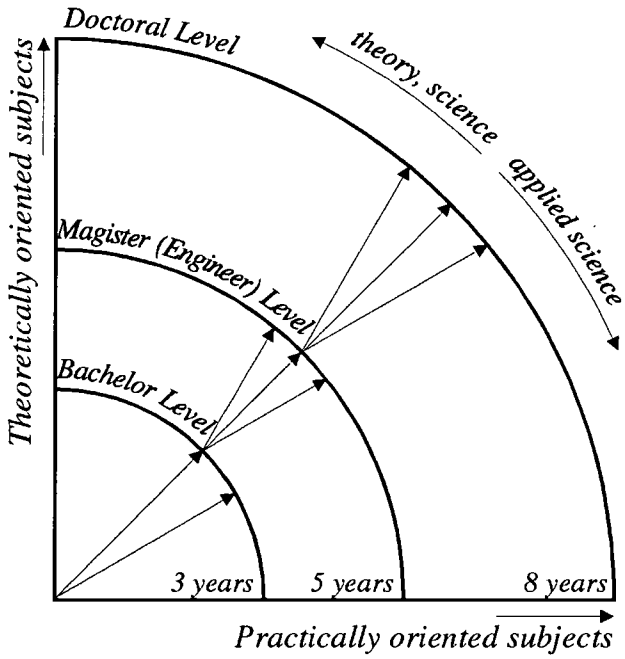


**Fig. 2** Scheme of the diversified higher education system at Czech technical universities after 1990

studies. Except of two faculties of architecture, with only the serial model of study, (interrupted with a at minimum one year practical placement between bachelor faculties practise the parallel model. The only faculties accredited at all technical

universities and at the same time very active as to bachelor studies are faculties of mechanical engineering. The next chapter will discuss them.

## BACHELOR STUDIES AT FACULTIES OF MECHANICAL ENGINEERING

The head personnel of Czech and Slovak faculties of mechanical engineering have regular meetings and that's why the principles of bachelor studies are very similar at all faculties. All faculties introduced three year professionaly oriented full-time study programmes and two of them (TUO and ZCU) also have four year part-time study programmes. The first year is general for all courses and provides students with a basic knowledge of theoretical subjects. The other two years are studied according to the individual programmes worked out often in close cooperation with industry and reflecting the needs of local regions. The study is finished by the final state exam and by the defence of the bachelor diploma work.
Table 3 shows that when the system of bachelor studies was coordinated among faculties, the creation of bachelor courses were very uncontrolled. Nearly twenty various study programmes have been introduced, some of them without any students as yet. I suppose that future evolution will be focused on the reduction of bachelor study programmes, closer cooperation with industry, and an extension of part-time study programmes.

**Table 3: Bachelor study programmes at faculties of mechanical engineering**

| Course | Continuity in engineer programmes | Number of faculties |
|---|---|---|
| Mechanical engineering | Yes | 4 |
| Construction of machines and equipment | Yes | 1 |
| Mechanical technology | Yes | 2 |
| Materials science | Yes | 1 |
| Power and process equipment | No | 2 |
| Operation, economics and management in power engineering | No | 1 |
| Operation, economics and management in mining industry | No | 1 |
| Preparation and control of production | No | 1 |
| Operation and maintenance of hydr.equipment | No | 1 |
| Applied informatics and control | No | 2 |
| Informatic and automatic technique | No | 1 |
| Ecological equipment | No | 2 |
| Technical diagnostics and maintenance | No | 1 |
| Robotics | No | 1 |
| Operation and economics of transport | No | 1 |
| Transport and handling equipment | Yes | 1 |
| Teacher training in mechanical engineering | Yes | 1 |

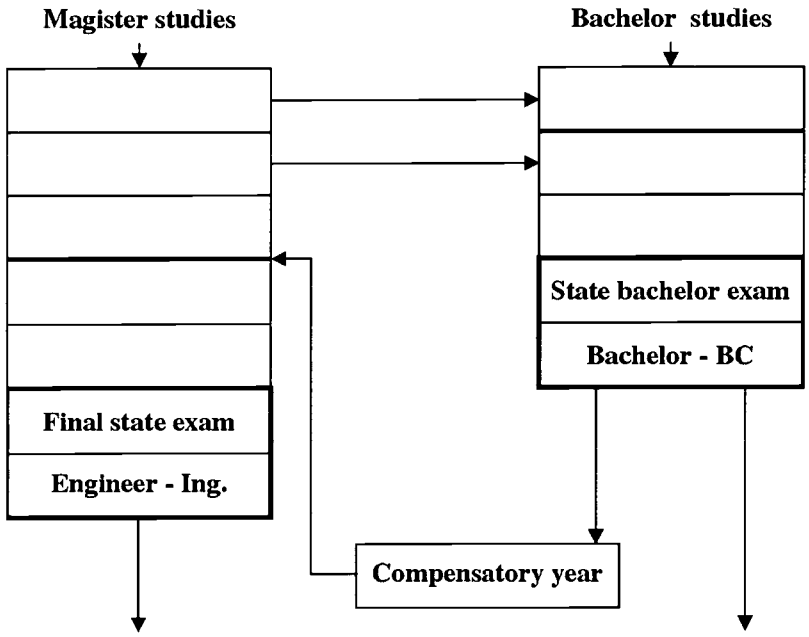


**Fig. 3** Typical scheme of parallel model of magister and bachelor studies

Experience not only from the Ostrava´s Faculty of Mechanical Engineering indicates that bachelor studies might be an attractive opportunity for people interested in combining employment and practical experience with further studies.

There were 7,3% part-time students in the total number of bachelor students in the academic year 1992/93, with an increase to 21% in the academic year 1996/97.

Table 4 shows the numbers of first year students at faculties of mechanical engineering in the academic year 1996/97 in distribution of full-time engineering and bachelor studies and part-time bachelor studies. The conservatism of the applicants still prefering engineering studies can be seen from the Table. As it is possible to transfer from the engineer to the bachelor stream at any time, unsuccessful engineering students then increase the number of bachelor students.

It is very dificult to evaluate the insertion of the graduates of bachelor technical studies on the labour market so far.

**Table 4: Number of first year students at faculties of mechanical engineering in the academic year 1996/97**

| University | full-time eng. studies | | full-time bach. studies | | part-time bach. studies | |
|---|---|---|---|---|---|---|
| | applicants | enrolled | applicants | enrolled | applicants | enrolled |
| CVUT | 2435 | 1304 | 130 | 60 | -- | -- |
| VUT | 1966 | 786 | 400 | 166 | -- | -- |
| TUO | 1056 | 574 | 215 | 110 | 117 | 87 |
| TUL | 1203 | 435 | 188 | 99 | -- | -- |
| ZCU | 833 | 320 | 69 | 26 | 9 | 9 |

There are maximaly three waves of graduates and as it can be seen from Tables 5 and 6, nearly 80% of them have continued their education in a compensatory year. In spite of the fact it seems that the graduates, especially with computer skills, are mostly accepted by small factories or by private firms rather than by established big factories with traditional professional structures.

**Table 5: Total number of full-time bachelor students at faculties of mechanical engineering in the academic year 1996/97 and graduates in the year 1996**

| University | Students in 1996/97 | Gratuates in 1996 | Continuing in compensatory year |
|---|---|---|---|
| CVUT | 355 | -- | -- |
| VUT | 425 | 101 | 86 |
| TUO | 331 | 38 | 23 |
| TUL | 147 | 18 | 14 |
| ZCU | 82 | -- | -- |

**Table 6: Full-time bachelor students at the Faculty of mechanical engineering TUO**

| Starting academic year | First year students | Graduates of them | Continuing in compesatory year | Succesfull in compensatory year |
|---|---|---|---|---|
| 1992/93 | 79 | 15 | 12 | 9 |
| 1993/94 | 79 | 36 | 23 | 11 |
| 1994/95 | 123 | 37 | 30 | -- |
| 1995/96 | 143 | -- | -- | -- |
| 1996/97 | 110 | -- | -- | -- |
| 1997/98 | 99 | -- | -- | -- |

## CONCLUSIONS

Bachelor studies, introduced at Czech universities in the early ninties, were certainly the most important diversification of the traditional higher educational system. All technical universities accepted new conditions very soon and created practically oriented three-year bachelor study programmes. Certain problems with the study and with its graduates were caused by two main reasons:

- very general and thus ambiguous definition of bachelor studies in the valid University Law
- the lack of information avaible to the world of industry about what bachelor studies really are and about the type of qualifications which they provide

The Czech Ministry of Education, Youth and Sports assumes that there will be about 50% of students in bachelor study programmes organised and oriented towards the immediate insertion of graduates on the labour market in the year

2005. Universities are supposed to maintain and even to extend professional bachelor studies. It can be stated that technical universities are able to satisfy all applicants for bachelor studies even today.
To achieve these aims it will be necessary to redefine bachelor studies as a self contained form of higher education with an emphasis on the practical utilisation of its graduates and to make employers aware of the existence and purpose of bachelor studies.

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