Уводна статия
Introductory article

COMPARATIVE ANALYSIS OF THE TEACHING SUBJECT MATTER FOR THE SUBJECT "DATA BASES" ON THE CASES OF THE FACULTIES OF THE UNIVERSITY OF ŽILINA AND THE RAILWAY COLLEGE BELGRADE

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***Key words**: Databases, comparative analyze*
***Summary**: This article describes experience and knowledge gained by solving TEMPUS project in Slovak Republic. The aim of project was to adjust content and methods of teaching of Informatics in Serbia and Montenegro according to model used in Slovak Republic.*

Introduction

During last year individual mobility grant IMG-SCG3018-2005 was conducted within the framework of the TEMPUS project. The action of the grant was: Updating the teaching programs for the subjects of 'Computers' and 'Algorithms and Programming' in accordance with the new High Education Act of the Republic of Serbia and the transition of the Railway College to the level of higher education according to the Bologna Declaration. The action was performed at the faculties of the University of Žilina and at the faculties of the Slovak Agricultural University in Nitra. One of the planed and realized activities was to make a comparative analysis of the teaching subject matter for the subject "Data Bases" which is taught at the Railway College with similar subjects which are taught at the Universities of Žilina, and drawing up a proposal for a new plan and program, as well as forming a proposal for the ECTS credits.

Comparative Analysis of the Teaching Subject Matter for the Subject: Data Bases

1. Railway College Belgrade (RCB)

The subject "Data Bases" is the third module of the subject "Computers". Its intension is to enable students to get basic theoretical knowledge, to understand methods and models of computer oriented data bases. Also the module aims to give students necessary skills for exploiting data bases using computers and to make them the following phases in their education easer.
The subject's matter covers:

- Data base concept; Entity, attribute, domain, file, data base and entity relationship, information systems;
- Data base types-architecture; different DB models, masters work with specific data base system, examples;

- Basics of Creating information systems; Real IS analyzing and modeling; Methodologies for real system modeling; data model: model Entity-Relation; Models of functions; Examples;
- Relational DBS; relational algebra, relational calculus, entity normalization, types of relations, relations restoration, E-R into relational model transforming;
- Modeling and creation DB tools; data modeling and function modeling; logical model making, logical model transforming into physical model, example ErWin and BpWin;
- Physical realization of DB; resources, software, entity physical organization; forms and queries creating; using of MS ACCESS;
- Application security;
- Multiuse of DB.

Railway College has its own textbooks for this module.
As the teaching method for lectures, frontal method is chosen because of the great number of students. Beside the 28 hours of lectures, students have also 14 hours exercises in classroom practicing on examples and 14 hours in computer classroom making exercises. Student also has to make a seminary work. These activities give student opportunity to earn up to 50 scores. Seminary work could bring up to 25 scores, and practical work could result with 25 scores too.
Examine is of written type, test, and student can score up to 50 scores.
Final grade is gained by adding of all scores and dividing the total score by 10 rounding to nearest whole number.
Student passes exam when the final grade is 6 or more, up to 10. If the final grade is 5 or less student did not pass exam. For this module student earns 6 ICTS credits.

2. University of Žilina

2.1. Faculty of Special Engineering (FSE)

At the Faculty of Special Engineering there is a subject "Informatics-Programming-Databases" but it is not included in the bachelor study. It is in the fourth year and it is a part of engineer study. Its curricula is likewise the curricula of the RCB subject Data Base, but given in shorter form.
Subject is realized through 24 hours exercises, seminary work and final examen. Passing the exam student earns 3 ECTS credits.
Because of different levels in education it is not to expect recognition of this subject in RCB, but FSE has a real base to recognize RCB subject Data Base which has more lesson hours and covers wider area of DB-s.

2.2. Faculty of Operation and Economics of Transport and Communications (FOETC)

At the Faculty of Operation and Economics of Transport and Communications (FOETC) there is subject "Informatics 1" that touches data bases. But this "touch" is very slight, only through a few hours of exercises. Through lab work there is planed work with data bases-tables, entities, forms, configurations, macros. Because of the planed number of hours it seems that student must learn alone this matter.
There is also a subject "Programming" that also touches data bases with 6 hours of lectures and 6 hours of exercises.

These subjects could not be comparable with RCB Data Base module alone and will not be further analyzed.

2.3. Faculty of Management Science and Informatics (FMSI)

At the Faculty of Management Science and Informatics (FMSI) there exist two bachelors' degree programs treating data bases: "Basics of Database Systems" and "Database Systems – MS Access"

Basics of Database Systems

The subject "Basics of Database Systems" is planed for 6th semester of Bachelors Degree Studies, major Informatics with 24 hours of lectures and 24 hours lab works in semester.

Aims and objectives of the subject are:

- Database systems design and creation principles.
- Using of different data files.
- Manage work with particular database system.
- Data definition and data manipulation language.

The course consists of:

Lectures:	Laboratory work:
- Basic concepts. - Database systems architecture. - Entity-Relationship model. - Relational DBS. - Relational integrity. - Relational algebra. - Normal forms (1NF, 2NF, 3NF, BCNF). - Introduction to SQL. - Data manipulation in SQL.	- Creating of own DB system and information system on existing DBS. - Creating of database, tables, data types. - Creating of simple and multi-table forms. - SQL statements – INSERT, UPDATE, DELETE, SELECT. - Creating of reports and menus. - Masters work with specific database system.

The Faculty has own literature, but in the course description there are items of other publishers.

Assessment is through:

- Recognition of course work – 15%
- Written and oral examinations - 85%

After passing exams student earns 6 ECTS credits.

Database Systems

The subject "Database Systems – MS Access" is planed for 5th semester of Bachelors Degree Studies, majors Informatics, Computer Engineering and Management with 24 hours of lectures and 24 hours lab works in semester.

Aims and objectives of the subject are:

- Manage work in database management system ACCESS.
- Creation of database, tables, forms, queries, reports, macros and modules.
- Programming of procedures and functions by means of Visual Basic language.

The course consists of:

Lectures:	Lab work:
- Creating of database and tables. - Data types of table attributes. - Forms and queries creating. - Details of SQL SELECT statement. - Creating of reports, macros and applications. - Principles of modules and procedures creation. - Visual Basic for Applications – declaration of variables, user types, constants. - Using of objects and collections. - Work with OLE and DDE object and with extern data. - Creating and using of libraries. Application security.	- Database creating in MS ACCESS environment – creating of tables, forms, queries, reports and macros. - Applications creating by means of Visual Basic for Application – creation of modules, procedures. - Using of objects and collections, programming code tuning, treatment for errors. - Work with OLE and DDE objects. - Creating and using of libraries. - Application security. - Master work: - Information system in MS ACCESS environment.

In the course description there are items of foreign publishers.
Assessment is through:

- Recognition of course work – 15%
- Written and oral examinations - 85%

After passing exams student earns 4 ECTS credits.

Analyzing both subjects it could not be avoided the notice that recommended order of the subject is strange. Normally student would get the basic knowledge before and then special knowledge. Here, for major Informatics, students learn special software MS Access first, and after finishing of the course they started to learn common things. This is also a possible way of learning, but little unusual. The reason could sit in the fact that this subject belongs to other majors of the faculty: Computer Engineering and Management. They do not have the Basic of Database System, and subject Database Systems – MS Access is only DB subject for them, and such plan is surely a compromise connected with funds.
Both subjects are comparable with RCB subject Data Bases and could be a matter of recognition.

2.4. Faculty of Electrical Engineering (FEE)

At the Faculty of Electrical Engineering there exists a subject named “MS OFFICE in Technical Praxis” planed for the first semester in the first year of studies at the major “Telecommunications”.
In the plan there is a part of MS Access.
The aim of the subject is to give students practical skills in PCs, to show MS DOS, MS Windows, text processors, spreadsheets and databases. Student learns MS DOS, Norton Commander, basics of MS Windows, MS Word, Access and Excel. For the subject it is planed 13 hours of lectures and 26 hours of lab works. Listed literature is from the foreign publishers. After finishing the course and passing final exam student earns 4 ECTS credits.

Comparing the subjects from FEE and RCB it can be concluded that the differences are enormous and that there is no possibilities of recognition of ECTS credits. On the RCB side there is a greater number of teaching hours, and on the FEE side are only basics in MS Access.

3. Slovak Agricultural University in Nitra

3.1. Faculty of European Studies and Regional Development (FESRD) – Nitra

At the Faculty of European Studies and Regional Development (FESRD) in Nitra there exists a subject named "Database Systems" in the sixth semester, and it could be comparable with the third module of RCB subject "Computers": Data Bases.
For the subject matter it is reserved 14 hours for lectures and 42 hours for lab work.
The course consists of:

Lectures, that covers:

- The basic mélange from DB systems: entity, database, system, managing databases, structure...
- Creating of database and tables.
- Methods of programming databases – structural and object. Basic mélanges in programming, program, subroutine, cycles, editors...
- Data types of table attributes.
- Forms and queries creating.
- Creating of reports, macros and applications.
- Principles of modules and procedures creation.
- Using of objects and collections.
- Main program creating, compilation and using of libraries in chosen database system. Application security.
- Database systems in MS Windows environment. Projects, tables, forms, SQL.

Lab work, which fully covers lectures:

- Database creating in dBase III Plus environment in the first 33 hours of lab works.
- Database creating in Visual dBase 7 in the following 6 hours of lab works.
- The last 3 hours are planed for the final test.

Examen is of oral type, and after passing of exam student earns 6 ECTS credits.
This subject is very professional planed, but it is mostly incomparable with RCB subject Data Bases so it could not be a matter of recognition on both sides RCB and FESRD.

3.2. Faculty of Economics and Management (FEM) - Nitra

At the Faculty of Economics and Management (FEM) in Nitra there exists no subject concerning data bases. There are fragments in the subject Statistics, but it is incomparable with RCM Data Bases.

Conclusions for the RC Module: Data Bases

Analyzing all available programs concerning Operation Systems and Business Software courses of seven higher education institutions from three universities it is possible to conclude that a variety of approaches is in practice. Practically there are faculties that practically have no subject concerning data bases as FOETC, FEE and FEM. It is little strange, because DB systems are everywhere even in the small stores. The reasons could be numerous as mentioned before but, again, the main reason could

be that 3 years study for bachelor degree is too short to give students special knowledge from majors they chosen and that the faculties must reduce other contents.
Some of the faculties, like FMSI, have very ambitions programs in data bases, even two subjects. All named faculties as well as RCB are using predominantly MS Access, while FESRD has ambitious program, but based on dBase III. The other faculties who are not specialized in computer technics expect students of different profiles, and their programs include business software and basics of operation systems, mostly MS Windows. Verily they also have a bit of data bases in the Windows environment.
As mentioned, it is also interesting that some of the faculties start with MS Access, and then in the next semester have MS Excel.
All institutions put in their programs lot of titles covering wide area of data bases and data bases tools. It is questionable if they can cover all items with very different number of hours. In the following table short revue of school hours concerning data bases is given.

Table 2 Revue of schools hours used for data bases

No.	Higher Institution	Lectures [h/semester]	Exercises [h/semester]
1	RCB	28	28
2	FSE	0	24
3	FOETC	0	~4
4	FMSI	48	48
5	FEE	~2	~4
6	FESRD	14	42
7	FEM	~0	~0

In the table it could be seen that RCB and FMSI have approach that lectures are the means to give student a common knowledge and to prepare them for practical work. It is also a possibility to save resources in lecturers in the case of greater number of students. But giving a lot of time for lectures could also lead to deep theory. Maybe better combination is as in FESRD: less number of lectures, and more of lab works, but it rise costs. Working in small groups gives a possibility to avoid classic lectures and to work in labs, as in FSE, but it is applicable only for a small number of students.

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СРАВНИТЕЛЕН АНАЛИЗ НА УЧЕБНОТО СЪДЪРЖАНИЕ НА ДИСЦИПЛИНАТА "БАЗА ДАННИ" В ПРАКТИКАТА НА ФАКУЛТЕТИТЕ НА УНИВЕРСИТЕТА В ЖИЛИНА И ВИСШЕТО ЖЕЛЕЗОПЪТНО УЧИЛИЩЕ В БЕЛГРАД

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Ключови думи*: База данни, сравнителен анализ.*

Резюме*: Тази статия описва опита и натрупаните знания в проекта по програма TEMPUS в Словакия. Целта на проекта беше да се пригодят съдържанието и методите на преподаване на Информатика в Сърбия и Черна гора към модела, използван в Република Словакия.*