The Bologna Process and New Solutions in the Curriculum Business Information Systems Major

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The work considers the fundamentals of curriculum, Business Information Systems Major, at the Faculty of Economics. Having been taught for two years, our experience, i.e. comparing accomplishments relating to the curricula in the environment are analyzed. Special attention is paid to the role, importance and the need of informatics education at the study of Economics, Business Economics and Management, as well as the degree of satisfying the set goals and competences in Business Information Systems Major. In this work, we also present standards developed and implemented by the Faculty as new solutions in Bologna Process. These are Standards for Calculating the Engagement of Students and Standards for Assessment of Preliminary Exam Activities. By the help of the first defined standard, all the obligations of students were precisely determined, and in accordance with the number of ECTS. In this way, a supposition of efficient study at the Faculty is created, i.e. a supposition that students fulfill their obligations in the anticipated period. By the help of the second defined standard, some rules and minimal conditions enable students the possibility to take exams, as well as the rules for receiving the positive grade. This standard provides a continual work of students during the whole semester. A continual level increase of this standard will increase the study level.

Keywords

adaptation, Bologna process, business informatics, curriculum

1. Introduction

The education of students at the Faculty of Economics Subotica in the field of Business Informatics has long tradition. Since 1970, the majors have had different titles through different curricula; the last verified version is called “Business Information systems”. Up to now, the Major has noted the rise and constant positive moves and changes, in accordance with the dynamic changes and information technology development. The last curriculum (2005) was based on three important postulates: (1) Education concepts of the Bologna Declaration, (b) Efforts of the Faculty to transform itself into a modern European university institution, and (3) Changes in the field of information technologies and its implications on contemporary business (New Economy, e-Business, Network Economy, and so on).

2. The Model of the Curriculum

Following trends and international standards in the field of education, the Faculty brought the cited new curriculum making an important move to the academic education of students in a complete new study system. Except the Bachelor studies lasting three years, the Faculty

organizes, by the new curricula, Master studies lasting two years and the Doctoral studies taking three years to complete. This model is the most often used in modeling education processes in the European countries. It is illustrated in Figure 1.

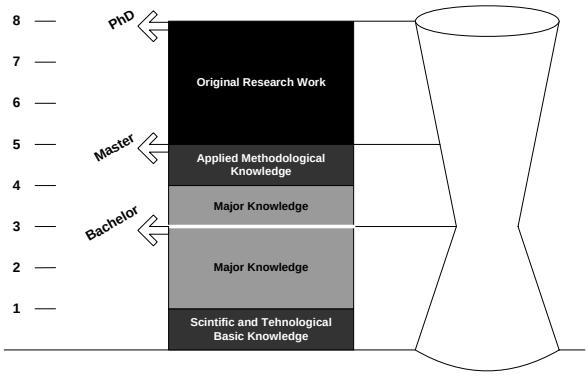

Figure 1 The Model of Curriculum

The presentation of the model in the form of a sandglass points to the inverted logic of learning, and gaining knowledge and skills: scientific and technological basic knowledge – theoretical methodological knowledge – major knowledge – applied methodological knowledge. In the first two years, students gain mostly basic theoretical and methodological knowledge. The third year emphasizes major knowledge. The fourth year emphasizes them even more, while the fifth year turns the process to the applied methodological knowledge. The next three years understand the advancement of knowledge by the original research work.

The concept of the Curriculum is integral one, starting from the premise of what the distal purpose of the education process it is. Taking the accepted formula "3+2+3" into consideration (bachelors, master and doctoral degrees), the distal aim of the Curriculum Business Information Systems Major can be expressed in the following way:

- During the first three years of the undergraduate study, we educate experts in the field of Information Technology for efficient application of information technologies and contemporary software products in business in order to attain an increasing business effectiveness and efficiency,
- During the next two years of the Master study, students of the above average performance are enabled to choose narrow specialist fields and acquire new specialist knowledge, broaden theoretical and methodological knowledge in their narrow educational fields, and train for development and research projects,
- Further develop, in the course of the last three years of the doctoral study, research capabilities and the capabilities of the best students for educational work, providing gradually in this way the teaching base of the Faculty, scientific institutes and universities.

The basic characteristics of the Curriculum are:

- European Credit Transfer System – ECTS. It provided suppositions for including the Faculty into the unified university system of Europe. By the compatibility of the Curricula, the complete mobility of the teaching staff and associates in the country and abroad is enabled, as well as the complete student mobility when receiving any of offered diplomas, as well as undergraduate students.

- Specially created diploma supplement following all the study degrees, giving possibilities to emphasize characteristics of the student, his basic and specialist knowledge and skillfulness, successes and rewards awarded during his study at the Faculty.
- One-semester courses, classified into four categories are obligatory core courses, elective core courses, obligatory major courses and elective major courses. In the Curricula, the Faculty has nine majors of bachelor studies, thirteen majors of master studies and four majors of doctoral studies. Depending on the level of studies, elective courses make 15% at the bachelor studies, 20% at the master studies and 50% at the doctoral studies. This broad choice of majors and elective courses enable students a very narrow specialization and complete orientation from the beginning of the study with the advantage of free choice of courses from the offered categories of courses.
- Changed number of lectures and exercises and their relationship in favor of practical and laboratory exercises.
- A number of small groups of students in both classes and exercises, especially in the classes where practical knowledge and skills are gained.
- Programs of courses are simply and transparently formulated without redundant program contents, according to the basic requirements of the Bologna standards. They are the aim of the course, competences, short contents of the course, year and semester of the course, number of classes and exercises, way and form of knowledge test, literature, teaching language, week schedules of classes with the date of tests and midterms (examinations taken halfway through an academic term), date of accepting the program, as well as the date of its last change.
- Indicative reading is rationalized and coordinated to the number of effective classes and exercises. It is done by the defined and described standards for calculating the volume of student engagement.
- Defined standards for evaluating preliminary exam activities of students.
- Defined rules of assessment methods and minimal conditions for positive grades based on preliminary obligations.
- The assessment methods proposed by ECTS should provide the distribution of grades 10%-25%-30%-25%-10percentage, respectively for the grades 6-7-8-9-10 and meet the Gauss schedule. Therefore, 10% of students should pass the exam obtaining the grade six and ten, 25% of students should pass the exam obtaining the grade seven and nine, and 30% of students should pass obtaining the grade eight. From the total number of students, 90% should pass the exam obtaining one of passing grades.

The structure of knowledge, in accordance with the above-described model of curriculum, is illustrated in Figure 2. It is easy to see that points to the following knowledge: basic knowledge (theoretical-economic knowledge, knowledge of business economics, knowledge of quantitative methods and techniques, knowledge of management and social science) and major knowledge. Major knowledge is in accordance with different majors in the curriculum model:

- Agricultural Economics and Agribusiness
- European Economics and Business
- Finance, Banking and Insurance
- Quantitative Economics
- Marketing
- Management
- Business Information Systems
- Accounting and Auditing
- Trade

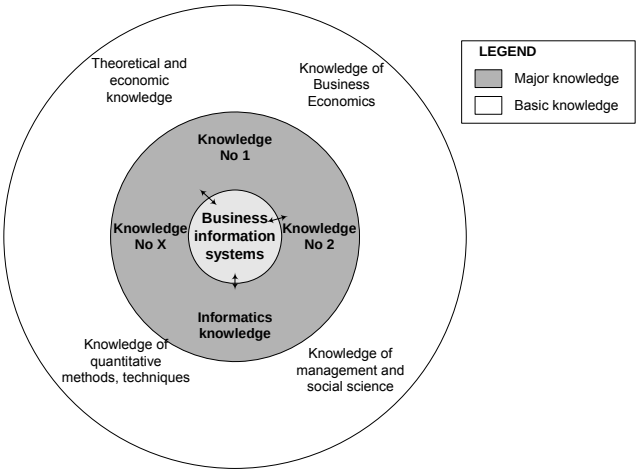

Figure 2 Structure of Knowledge in represented Model of the Curriculum

3. ECTS System and Standards at the Faculty

ECTS points are allocated to each category of courses, starting from two standards: one academic year is worth 60 points. A student in the course of the study works 8 hours a day, 5 days a week, i.e. 40 hours a week. The fact is that the academic year at the European universities has 45 weeks, and then the total number of students' working hours amounts to 1800 hours. The number of points (x) belonging to one course during one semester is proportionate to the number of hours (y) the student spends at classes and exercises of the course, preparing seminar works, projects and essays, preparing tests, midterms and so on. The proportion for defining ECTS points to the category of courses is:

X: 60 points = Y: 1800 hours

The Faculty decided to the even number of ECTS allocation, as two, four, six, eight. Therefore, courses with 240 hours per semester are worth eight ECTS points and they are in the categories of obligatory core courses and obligatory major courses, with the number of lessons and exercises of 3+3, 2+3 or 3+2. The courses with 180 hours of activities per semester are worth six ECTS points and they are in the categories of elective core courses and elective major courses, with the number of lessons and exercises of 2+3 or 2+2. The courses with 120 hours of activities per semester are worth four ECTS points. These are foreign languages, and sport and physical education, with the number of lessons and exercise of 0+3 or 0+2.

3.1 Standards for Calculating the Engagement of Students

Besides the previously cited basic suppositions defining the contents weight of courses, some other standards are determined for calculating the engagement of students per course. The following standards are defined:

- Completed year gives the student 60 ECTS, according to the Law on Higher Education.
- Engagement of the student per year amounts 1800 hours.
- 30 hours is needed to acquire 1 ECTS.
- Page volume of literature per hour of classes and exercises is 6 pages B5 maximally. .
- Student can learn 6 pages of curriculum per hour, i.e. an hour per a school class.

- There is exact number of anticipated hours for preparation for every student's obligation.
  a. 5 hours to prepare 50 pages for test.
  b. 10 hours to prepare a 100 pages for test.
  c. 15 hour to prepare a 150 pages for test.
  d. 20 hours to prepare a 200 pages for test.
  e. 10 hour to prepare the seminar work.
  f. 15 hours to prepare the case study.
  g. 1 hour to prepare the homework.
  h. 10 to prepare the final oral examination.
  i. 10 hours to prepare the final written examination.

Based on the defined plan of lectures, exercises, tests and literature, a calculation is done to determine the number of ECTS for every course. The example of determining ECTS for the course Information Systems Development is illustrated in Table 1.

Table 1 Generating the number of ECTS for the course Information Systems Development

Course:	**Information Systems Development**
Lectures:	2 lessons per week
Exercises:	3 lessons per week
Number of working weeks:	15

Student's obligations	**Number of working hours per semester**
Lectures:	30
Exercises:	45
Preparation for classes:	50
Final exam - oral:	10
Final exam - written:	10
Mid-term 1.	10
Mid-term 2.	5
Mid-term 3.	5
Mid-term 4.	10
Total number of classes:	180
Number of ECTS (Classes/30)	**6**

The anticipated volume of literature for this course is 299 pages so 50 hours is anticipated to prepare this part of the Curriculum. To study successfully this course, based on the obligations illustrated in the following Table, the student needs 180 hours. It means that the student gets six ECTS if he/she finishes the course.

This very controlled approach provides the rational volume of effective classes and exercises that is 20 classes per week at the most. It enables students to complete and meet course requirements until the examination period if he/she works hard by numerous forms of knowledge testing: midterms, tests, home works, projects, study cases, essays, presentations, and so on. For less active students, there is the possibility of traditional taking oral and written exams, if the student realizes the minimum proving his/her engagement in the class creating the elementary supposition for taking the exam.

3.2 Standards for Assessment of Preliminary Exam Activities

Special problems in defining some courses of the Curriculum according to the new rules are created by the need to assess all the activities of students to their complete engagement. Mid-terms, tests and other forms of engagement are not arbitrary any more and alternative ones but obligatory activities in some level. If there are some forms of knowledge testing, then they are alternative relating to the traditional examination at the end of the semester.

Regarding to the diversity of some course categories and the courses themselves, it was very difficult, almost impossible, to define the unified rules for determining the way for assessment of preliminary exam activities, the way of assessment and determining the rules for realizing right to get the signature certifying the student's right to take examinations. To assess easier, preliminary exam activities worth 100 points are distributed to three different modalities depending on the type and character of the course.

The general condition for having the positive grade based on assessing preliminary exam activities during the semester is the lecturer's signature. To get the signature is limited by a partial fulfillment (to 30%) of preliminary obligations, as well as the presence in the classroom. The basic rule of the Law on Higher Education that preliminary exam obligations do not exceed 70% of the total obligations, i.e. 30% of obligations is the examination itself, is authentically kept. These obligations differ depending on the course character, as the forms of knowledge testing: homeworks, study cases, projects, tests, midterms, and so on. The oral examination certifies the offered passing grade and the higher grade can be realized for two grades more at the most, then it is offered on the basis of the preliminary results.

Table 2 Assessment rules of preliminary exam obligations and condition for getting the signature

1. Forms of knowledge testing	Number	Minimal number of points per unit	Maximal number of points per unit	Total points maximum	Minimal condition for geting the signature - points
Information system development					
1.a. Midterms	2	8	20	40	1 x 8 = 8
1.b. Laboratory tests	3	4	10	30	2 x 4 = 8
TOTAL				**70**	**16**
2. Presence	Number of weeks	Number of points per unit		Total points	Minimal condition for getting the signature - points
2.a. Class attendance	15	1		15	12
2.b. Exercises	15	1		15	12
TOTAL				**30**	**24**
TOTAL				**100**	**40**

If the student realizes the right to get the signature, but minimal conditions for getting the passing grade is not fulfilled based on the previous results, or if the student wishes the higher grade, he/she shall take oral and written examination.

Notes:

- Students are allowed to take oral examination for a grade one bigger at the most than the offered one (realized in the previous cycle).
- To realize the grade bigger for two than the offered one, students may take an oral examination completely or those parts where he/she had less number of points.
- Students who do not realize the needed number of points for a passing grade, when taking midterms, should take an oral examination.

- Students who do not realize the minimal number of 5, 5 points in laboratory tests may not take the final examination at the end of semester.

Table 3 Assessment rules and minimal conditions for positive grades based on preliminary exam obligations

	Minimal number of passed points	Minimal number of points for positive grade	Offered grade				
Information system development			**6**	**7**	**8**	**9**	**10**
1.a. Midterms	2	11	38,5−48	49−55	56−62	63−66	66,5−70
1.b. Laboratory tests	3	5,5					

4. Place and Importance of Informatics Courses in the Curriculum Model

Regarding to the wish to analyze the place of Informatics and the courses in the Curriculum, we shall analyze separately the Curriculum and the Major of Business Information Systems, on one side and separately other majors on the other side. Namely, the educational model of the Curriculum is built so that Informatics courses in other majors are identical.

When the Curriculum is considered from the standpoint of Informatics and especially the Major of Business Information Systems (BIS), it is important to emphasize its mission and aims: forming experts with knowledge in the field of analysis; designing; developing and implementing integral information systems and operative system management and its further development; then software product development; developing and implementing business intelligence systems, and e-business development systems.

Speaking in general, the curriculum courses in the field of Informatics are studied as obligatory core courses, major obligatory courses and major optional courses. Obligatory core courses in the curriculum (information technologies and management information systems with special characteristics in some majors) enable students of all the majors to gain necessary theoretical and practical knowledge on contemporary information technologies and their implications on business. In addition, they give the possibility to master basic skills in working on the computer with a view of creating the basis for achieving specific competences needed for data and information management, and business knowledge. In this way, students, besides the capability for information management, develop the capability to collect and select relevant data and information from various sources, as well as the capabilities for their qualitative analyses.

Studying the obligatory core courses in the field of Informatics, students will gain knowledge of Informatics terms, realize all the suppositions for better cooperation with experts in the field of information technologies, and understand the significance of cooperation between the users and experts. Students will be able to study independently, to choose and apply specific information technologies in some functional fields of Economics, as Marketing, Finance, Accounting, or in some branches of Economics, as Agriculture, Trade, Banking, Insurance, and so on.

Studying the major obligatory and major optional courses, students of the Major of Business Information Systems will gain fundamental knowledge of the narrow specialized area. They will be trained to differentiate the kinds and resources of information systems, as well as ethical and social aspects of information technologies and their impact on modern organizing and functioning business systems. The major obligatory courses enable the development of capabilities, self-confidence and knowledge of an independent learning and work. Students gain methodological and practical knowledge on the application of different software development tools. They become skilled in the principles of development, methods, techniques and methodologies of developing software and business information systems.

The choice of majors and gaining theoretical, domain and practical knowledge are special distal aims in the Major of Business Information Systems, and, of course, every student. In this way, concrete aims of the educational system are attained: “know-what”, “know-how” and “know-who”. Students are directed to some narrow specialist fields, in the fourth and fifth year of the study to meet their preferences, democratic education and satisfy a need for their interest and learning.

The Major of Business Information Systems, Master degree is structured into four modules:

- Module Information Engineering
- Module Software Development
- Module Business Intelligence
- Module Electronic Business

5. Conclusions

The basis for the analysis of presenting the courses in the field of informatics in the Curricula of the Faculty of Economics in Subotica, is the Table 3, besides Tables 1 and 2, where the correlation of the total number of courses and the courses in Informatics in the Major of Business Information Systems and all the other majors is illustrated.

We can draw the following inferences by a detailed analysis. First, at the undergraduate academic studies, Major of Business Information Systems, from the total 27 courses, students have eight courses in the field of informatics or 29.62%. Considered proportionately, it may be too much. However, regarding to the need for creating the basis for four modules at the Master studies, to kinds and contents of the courses, it may be insufficient. Students gain fragmentary knowledge in some fields that cannot be connected into the harmonious entirety to be applied in practice. Therefore, at this level of the study, the Curriculum should be segmented from the beginning to some modules, or rebuilt with the supplementary courses in the field of informatics. A possible solution of the noticed problem is to introduce a number of major optional courses that should be chosen by the help of the major mentor.

As for the other majors at the undergraduate three-year studies, from the 27 courses, students have only 2 courses in the field of informatics, or 7.40%. It means an insufficient representation of courses in the field of informatics. This fact makes worse the contents of the other courses where the representation of informatics in insignificant. We cannot assert that our students are illiterate in Informatics after three years of the study, but they are not quite ready to the challenges in practice. Their future employers do not expect traditional accountants with their sleeves rolled up any more, but the economists who use the world network and the newest program solutions in order to do qualitative analyses.

The analysis of the two-year Master study, the Major of Business Information Systems, shows that there are even seven courses, from 14 in total, in the field of Informatics, or

58.33%. This percent completely satisfies every module. The weak choice of the courses at this level of the study is compensated by the possibility of choosing the modules. The number of major optional courses is satisfactory and it gives students the possibility to specialize narrowly.

If we analyze the two-year Master curriculum of the other majors, the situation is also very bad, the same as at the undergraduate study. Only one from 12 courses is in the field of Informatics. It is 8.33%, so it is necessary to emphasize the impossibility of choosing optional courses in the field of informatics.

At last, summarizing the above cited, the Curriculum, the Major of Business Information Systems, points to the unique problem that must be primarily solved. Disregarding the accepted educational module of the Curriculum, the Major of Business Information Systems is built in the way that can be illustrated as a pyramid. In other words, instead of three years of the undergraduate study with the possibility of employment and the applying knowledge in practice, the only high-grade result in this Curriculum is after five years of the study. The students' knowledge is appropriate to the aims and possibilities of employment and their profession.

In applying the new Curriculum, numerous problems have appeared although new solutions have been included into it. First, it is necessary to emphasize the following:

- Numerous core and obligatory major courses in some majors that, especially with the core courses, makes the problem to attend the course. It causes, in the same way, a great number of groups for attending classes and exercises.
- Small, almost neglecting, number of core elective courses. It significantly narrows the possibility for self-financing.
- Small number of major (obligatory, elective?) courses at the undergraduate level. It is a modest possibility for developing skillfulness.
- Big problems in realizing the students' right to elect courses. First, the absence of appropriate software for generating the schedules for every student according to the needs and the absence of high-grade criteria for assigning students under conditions of quotas in elective courses of some groups.
- Choice of the way enabling students to be informed adequately about different courses.
- Problems of staying in touch with and evaluating students and their specific possibilities, as well as giving advices regarding to their further education and development.
- Difficulties in providing current literature because of constant changes of major program contents, as well as high-qualified staff.
- Insufficient time for selection of the best students and for their additional education.

  Shortage of students' free time unable them any possibility to choose free elective courses at the University.

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