

Novelties in “Business Informatics” Education: Towards Apprenticeship and Interdisciplinarity

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Abstract

This paper presents the development of a study program in “Business Informatics” at the Wrocław University of Economics, Poland and its educational evolution since the InSITE2011. Gathering experiences and having strong cooperation with software companies, we decided to redesign our program including two aspects of education: practice and compacting courses into more problem oriented topics. Additionally, education effects are discussed in the National Framework of Qualification context. The new structure of subjects taught and the organization of the curriculum for bachelor’s and master’s levels are detailed. The authors discuss also potential direction of professional education based on participation of partners interested in our graduates: IBM Poland, Oracle Poland, SAP Poland, and Volvo. Examples of common initiatives with our partners are presented.

Keywords: teaching model of business informatics, bachelor’s and master’s studies in business informatics, practice orientation, curriculum of business informatics

Introduction

The curriculum of "Business Informatics" (BI) at the Wrocław University of Economics, Poland, was presented during the conference InSITE in Novi Sad (Korczak et al., 2011). In 2011 we began to work on an English edition of the Bachelor diploma in Business Informatics. In designing the program of study, we have tried to implement the standards and best European practices, so that on the one hand we meet the needs of the enterprises and institutions, and on the other hand we stimulate the mobility of students and teaching staff. The curriculum of the currently running Polish version “Informatyka w Biznesie” was essentially modified. The modifications took into account current trends in overseas education and standards - primarily the ACM (Association for Computing Machinery) and IEEE (Institute of Electrical and Electronics Engineers), but also programs in universities such as the universities in Dublin, Hasselt, Leipzig, and Nancy (Gesellschaft für Informatik, 2003; Gorgone et al., 2003; Topi et.al., 2007; Helfert, 2011). Having been inspired by foreign university practice, we have put great attention on the customization of educa-

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tion, involving the introduction of a large offering of elective courses. In addition, students may pursue one of two tracks, namely: one professional – allowing the student to work immediately after graduation, and one academic – allowing him/her to follow the research-oriented program of the Master diploma.

To increase the attractiveness of the curriculum and pragmatic aspects of business informatics, a large number of out-

standing practitioners and foreign specialists will be involved in the training program. In particular, we invite experts from software leaders such as IBM, Oracle, SAP, and TETA to deliver lectures and participate in common projects.

The structure of this article is organized into four sections. After the initial presentation of the general ideas of the project, the next section will describe the improved curricula of Bachelor as well Master Studies in Business Informatics. The third section presents the interdisciplinary approach in BI education, along with descriptions of profession-oriented modules. The last section highlights the conditions and program implementation in the international context of this project.

Improved Model for Professional Education

The teaching of business informatics belongs to the rather complex and demanding challenges in the modern education system. First, it is a cross between several disciplines, including economy, modern computer technologies, man-machine communication, management, and many others. Second, it is a very unstable area of education; both “pillars”--business as well as computer science—are changing rapidly in terms of theory and practice applied. Third, there is still an increasing demand for graduates from this area, and on the other hand the expectations of business people are very high. Therefore, elaborated models of BI education should be monitored and improved as a result of changes in broadly viewed environment.

The main assumptions of the BI model of education development implemented in Wroclaw University of Economics include:

- maintenance of two levels of education (bachelor’s and master’s) – this way offers the possibility of starting professional activities after completion of the first level apart from continuing education ;
- reinforcement of practical forms of education as a result of active cooperation with software companies;
- a more interdisciplinary approach to teaching, which means designing courses that cover a broader scale of delivering knowledge, basically representing closer areas of interest;
- gradually introduced changes (also considering multilingual teaching) - actually forms are focused on the bachelor’s level of study, where the just mentioned aspects of our reshaped program are introduced, while for the master’s studies we plan to do this in the coming years.

As a result, the revised and accomplished program structure for both levels of BI was elaborated. Details about the transformation process are presented in the figures and tables.

The first assumption of the program modification was to reduce significantly the number of courses, taking into account intersections in the existing topic contents. Second, a certain autonomy of the delivered knowledge should be considered in the course analysis in order to assure that it is consistent and is problem-oriented education. For example, after analysis of the programs of the courses on quantitative methods such as “Statistics”, “Business econometrics”, and “Operational research”, a new course “Business statistics and econometrics” was proposed as compacting the topics in the considered courses. Similar methods and dependencies in terms of delivered content were integrated and allowed the development of new syllabuses with more consistent structure of the topics and ambitious educational projects. An idea of this transformation is presented in Figure 1.

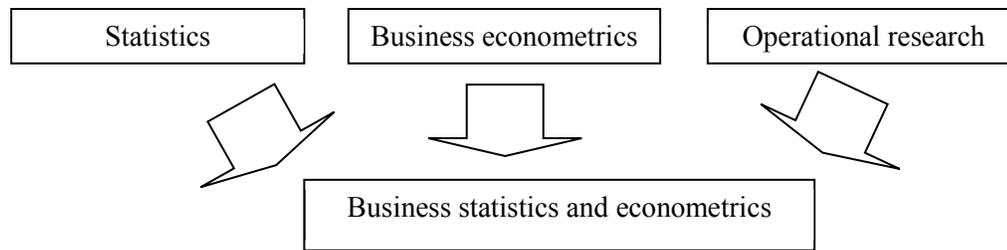


Figure 1: An example of course elaboration at the bachelor's level

Apart of from the afore-mentioned contents of the topics, some additional attributes of the new concepts should be taken into account: the hours of teaching and student labor (as a basis for ECTS points), and applied software tools in teaching topics.

The general program structure of bachelor's studies is presented in Table 1. In the left-hand column the new version of course list is displayed. Courses placed in no. 1-6 refer to management, economy, accounting and finance necessary in studying business. Below (positions: 7-13), courses strictly tied to informatics are presented. The rest of the table contains subjects and activities which include specialized courses, more general courses, and projects directly involved with co-operation and an internship in software companies.

Table 1: Program of bachelor's studies in Business Informatics

No.	Compacted courses (improved version)	Hours	Course Components (initial version)
1	Economics	75	Macroeconomics + Microeconomics
2	Mathematics	90	Mathematics I+ Mathematics II
3	Management	75	Theory of Management + Management in SMEs
4	Business Statistics & Econometrics	90	Business Statistics + Business Econometrics + Operational Research
5	Business Finance & Accounting	75	Finance in Business + Basics of Accounting
6	Business Principles & Organisation	90	Business Models + Operational Management + Logistics
7	Fundamentals of Information Systems	90	Basics of Information Systems + Basics of E-business
8	Information & Communication Technologies	60	Information Technology + Business Communication + Legal Aspects of IT
9	Business Programming	60	Algorithms & Data Structures + Programming Languages
10	IT Project Management	90	Project Management + Economics of Informatics + Risk Management
11	Business Systems Analysis & Design	90	System Analysis + System Development + Information System Development
14	Computer Networks & Security	60	Computer Networks + Information & System Security
12	Databases & DataWarehouses	60	Database + Data Warehouses in Business
13	Knowledge Structures in Business	60	Knowledge Management + Artificial Intelligence
14	Industrial Project	60	Module courses
15	IT for Business courses	60	Module courses
16	Corporate MIS courses	60	Module courses
17	Languages	180	
18	Elective courses	60	
19	Other courses	60	
20	Diploma Seminar	90	

It is worth stressing the different forms of practice assumed in our education. These forms are elaborated with companies: IBM, Volvo, Oracle, TETA, and SAP also are discussed with our university partners: Leipzig University (Germany) and Shippensburg University (USA) and embrace:

- industrial projects - where problems are discussed in common and students are obliged to present solutions after investigation. We assume teamwork here, and the results achieved will be published as thematic reports;
- internships – for students with defined topics for their diploma thesis. Student practice in software companies permits them to become familiar with current company problems and activities;
- lectures – delivered for students by company leaders and practitioners. They can be delivered as elements of particular courses or be presented as a thematic set of educational forms (lectures, workshops);
- certificates – offered for ambitious students interested in some computer science competences. Some companies offer exams free of charge, some courses can be paid for from grants gained from the National Science Centre and the National Centre for Research and Development.

Cooperation with IBM: workshops for students ”Multipurpose Cloud Center” and studies on „Cyber Security” is a very promising project with real activities for our students. Cooperation within the IS:link Project - the international academic network of renowned Information Systems schools, which is dedicated to promoting worldwide student exchange and academic collaboration. The Summer School on Service Science and Enterprise Modelling (SSEM) 2012: in cooperation with IS:link; 36 students from numerous countries (e.g. Germany, Mexico, Peru, Portugal, Pakistan, Israel, Poland); the lecturers were drawn from Germany, Australia, Poland.

All the mentioned forms of collaboration are highly evaluated in the context of the National Requirements of Qualification (NRQ). This initiative allows us to check the defined goals and contents of the particular courses and to confront them with the more global aims of BI education. In the case of practice, the trained proficiency of students performing assigned tasks in companies is expressed as their professional skills and list of competences in NRQ. The program of the master’s studies is presented in Table 2.

Table 2: Program of Master’s Studies in Business Informatics

No.	Compacted Course (improved version)	Hours	Course components (initial version)
1	Managerial Accounting and Finance	75	Managerial Accounting + Managerial Finance
2	Business Planning	60	Prognosis and Simulation in Business + Business Plan
3	Advanced Management	90	Strategic Management + Information-Decision Systems in Business
4	Business Environment	60	Law, Ethics and Intellectual Property + IT Technology Environment + Information Society
5	Business Quantitative Methods	90	Statistical Data Analysis + Finance and Insurance Mathematics
6	Business Intelligence Implementation	90	Business Intelligence in an Enterprise + Data Mining + Data & Information Management in Organisations
7	Advances in Project Management	60	Methodology of Project Management + Effectiveness of Computer Projects
8	Business Processes Engineering	90	Business Process Modelling + Software Engineering + Information Systems Auditing

9	System Integration & Network Architectures	60	Computer Outsourcing and In sourcing + Network Services + Integration of Applications and Systems
10	Industrial Project	60	Module courses
11	Research in BI courses	60	Module courses
12	Expert IT courses	60	Module courses
13	IS and IT Manager courses	60	Module courses
14	Languages	120	
15	Elective courses	60	
16	Other courses	60	
17	Diploma Seminar	90	

Obviously, these four semester studies call for more advanced methods of education, and some disciplines are taught using a problem oriented approach. The knowledge and capabilities of course participants can be formally confirmed by official certificates acquired by students. This creates also the fundamentals for better education according to business expectations, where interdisciplinarity seems to be an essential feature of modern teaching.

Interdisciplinary Approach in BI Education

Interdisciplinarity in common understanding denotes the creation of “bridges” between disciplines separated by nature. It is a must in modern society, where problems can be solved assuming that many aspects - and the same - knowledge from many areas should be taken into account. There are at least two main reasons for applying interdisciplinarity in education. First, the implementation of interdisciplinarity means a more flexible way of teaching (methods from different disciplines can be applied). Second, students taught in such a way are able to solve non-typical problems more effectively. As a final result, graduates have a greater chance on the labor market.

In order to reach a higher level of interdisciplinarity in BI education, the following quests and steps are included (see: School of Interdisciplinary Studies at <http://www.utdallas.edu/is/faq> or De La Salle University at <http://ww.dls.edu.ph/academics/programs/undergraduate/con/ibs.asp>):

- a new curriculum of the BI major was prepared. The list of initial courses was essentially reduced (see Table 1 and Table 2). Basically new courses were created as a “compacted” version of the starting list of courses. “Modules” created in such a way represent knowledge and methods from close or complementary disciplines;
- practice with problem oriented projects requires knowledge from different disciplines. Such forms of education are discussed and implemented with the participation of our industry and academic partners. For instance, decision-taking problems can be solved with adequate support programming;
- interdisciplinarity is in some way represented and “mapped” in software solutions. For example, by preparing applications to support managers in finance sectors, we acquire knowledge about sources of financing, regulations in crediting etc. Especially intelligent technologies are provided with domain knowledge bases;
- when preparing formal documentation about BI education in the National Framework of Qualifications, we are obliged to check and point out educational effects coming from different subjects. Therefore, education areas are considered in the context of particular, sometimes loosely linked courses;

- new challenges appear in the context of internationalisation in education. The list of courses is discussed with our university partners, and very often an interdisciplinary approach seems to be the one real solution.

Summing up, this property of BI education has become more and more important. It is one of the significant determining factors which allow students with BI diplomas to be more flexible and better fitted for the labor market.

Conclusion

Business Informatics as a relatively new major in education has found a favourable climate both among university authorities, business partners, and academic staff. It seems that, against prevailing stereotypes concerning the ponderousness of changes in programs in higher education and certain forms of resistance in the university environment, here we have created conditions of project implementation that are a very useful perspective.

As far as an indispensable characteristic for the whole venture is concerned, one ought to underline the values of the diploma and the determination of the team realizing the project. Introduced earlier, the education model has been updated and will be carried out by a team which possesses a high level of competence and represents experienced and young staff of the Institute. The innovative character of the program demands also access to appropriate computer resources which are then successively modernized and enriched. One ought also to underline the qualitative aspect of the education in the "IT in business" field of study. Within the framework of one research project conducted in the Institute of Business Informatics, fundamental methodological principles were elaborated concerning evaluation and quality control in education [Nowicki 2010], the use of which (principles) warrants the high level of education projected and constitute its distinguished value in the educational market.

In conclusion, these considerations take into account also the market and international context of the venture. To judge from the research carried out thus far and ongoing, there exists a large and real demand for graduates in this field of study in every proposed degree program. The field of study concerns IT education for business limited to small and medium size companies. In the future, we foresee also developing specialization modules which refer to large companies and corporations. Participating in the preparation of international projects with close profile, we are also planning the enrichment of post graduate diplomas for „*the joint degree*” version, which would strengthen the position of this field of study in the educational market. Taking into account also the preliminary agreement with the University of Leipzig, we are planning to enhance education concerning this field through the organization of the doctoral programme.

Summing up, one ought to hope that the proposed plan of study in the requisite manner should contribute to improving IT education in higher education, preparing graduates who are needed in the market and gifted with appropriate skills and competences. Retaining the merits of the precursor of the disciplines here discussed (reliable preparation within the range of economics sciences) in the proposed educational model should produce well prepared professionals who are able to take a job in different sectors.

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Biographies



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