

Federal higher educational standard for Business Informatics in Russia

Prof. Victor Nikitin, Prof. Svetlana Maltseva, Prof. Oleg Kozyrev

(State University – Higher School of Economics, Moscow)

Computer systems have become an integral part of the modern business environment, ensuring a dominant role for Information Communication technologies (ICT) in enterprise activities. The way the global information infrastructure facilitates competition in business has created a new corporate culture for which information systems have become vital managerial components.

Business Informatics is an interdisciplinary area, integrating computer science technology and business administration [1].

For Russia Business Informatics is a new, but already well-known education area. For the first time such educational program has been launched in the University Higher School of Economics. The Faculty of Business Informatics (FBI) of the HSE was founded in 2002 as a part of e-Russia program to meet a great demand in the market for ICT-managers.

The first Russian federal bachelors' and masters' standard programs for Business – Informatics were designed in 2004. The second federal standard for Business –Informatics was designed in 2008 by State University – Higher School of Economics (SU-HSE) and based on the following prerequisites:

1. We participated in the design of professional standards in the ICT field together with the professional association in ICT industry, educational experts' and employers' communities. As a result of such collaboration, qualifying requirements for major specialties in the ICT field have been formulated.
2. Integration into European educational programs – SU-HSE is the only Russian participant in European Research Center for Information Systems (ERCIS), being a coordinator of a number of projects in the ICT sphere conducted by the European Commission.
3. The activity undertaken both to establish experts' community and to define competences in Business-Informatics qualification:
 - Scientific journal “Business-Informatics” has been created;
 - The 1st International Conference on Business-Informatics has been held.

The methodology design has enabled SU-HSE to elaborate innovative Federal standard based on scientifically-grounded approaches and techniques, to ensure high quality methodology design, to make the procedure of standards creation transparent for both educators' and professionals' communities.

In addition, there has been determined the list of skills and competences demanded on the ICT labour-market, namely Business-Informatics qualification. The above mentioned specification has generated the competence model. The significant factor is the positive experience of bachelors' and masters' programs in the Business-Informatics sphere obtained by SU-HSE and the other Russian universities engaged in teaching students for Business-Informatics qualification.

The competence approach to the teaching requires close interaction between universities and businesses. SU HSE has been cooperating with leading in the ICT field firms.

The Business-Informatics department of SU-HSE has established so called "company chairs" of Microsoft, SAP, IDS Scheer and key local ICT companies such as IBS, 1C, Lanit. Moreover, there has been initiated the "E-business" program for masters' qualification, supported by the Russian "Internet and Business" Association.

The specific features of the federal standard for Business –Informatics qualification project are as follows;

- Insistent focus on the two-level program system taking into consideration content and education peculiarities of bachelors' and masters' programs;
- Competence approach to the educational process, the essence of which is the requirements of the labour-market towards graduates;
- Intention to enhance students' independence and activity in choosing their learning main paths;
- More freedom granted to universities wishing to adapt their educational processes for the labour-market demands;
- Businesses participation in defining major bachelors' and masters' competences for Business-Informatics qualification.

The federal standard for Business –Informatics will allow:

- To train broad-minded graduates ready to work in demanding environment, able to avoid stereotypes, competent to propose novel ideas and solutions;
- To provide strict criteria for knowledge, competences and skills obtained at different stages of educational process;
- To extend educational methodology and techniques in the field of Business-Informatics teaching while preparing bachelors and masters;
- To provide the opportunity for students to choose a flexible educational main path to combine bachelors' and masters' programs in various directions;
- To provide students interested in applying their knowledge into practice with qualitative vocational training;

- To provide individualized approach to the educational process;
- To motivate students, to develop their skills and capabilities to acquire knowledge over their working life;
- To develop incentives for professors and tutors to advance their professional competence;
- To integrate Russian universities into international educational environment, to provide the recognition of Russian diplomas and scientific degrees against international criteria.
- To differentiate educational establishments in accordance with their capacity to offer curricula of different levels.

Competence Model of Bachelors' and Masters' Degrees.

The innovative National Educational Standard of Higher Education is based on the competence approach [2], adopted by all educational systems in the developed countries of the world. According to this approach, professional competences and skills only account for a part of human and intellectual potential shaped by higher education institutions, whereas a number of other social, personality and cross-cultural competences are also supposed to develop.

Bachelors' and masters' competence suggests combination of fundamental knowledge, necessary to develop personality, readiness to continuous self-development and mobility on the labour-market [3,4].

The work on the development of professional standards in the ICT sphere has resulted in the creation of bachelors' and masters' competence model for Business-Informatics qualification.

The results of the above mentioned work helped us define qualifying criteria for professions for which Business-Informatics qualification was designed. These professions include a system architect, information systems specialist, system analyst, ICT manager, manager on solutions and complicated systems promotion, information resources specialist. There are five qualifying levels within professional standards for each specialization; different business positions and competences along with skills requirements comply with these professional standards.

In concordance with the conducted analysis of the recommendations presented by professionals' and experts' communities, we have determined the professional framework for bachelors and masters of business-informatics. It should be highlighted that both bachelors and masters are engaged in the same professional sphere; however, the types of their business activities and the level of tasks to accomplish significantly differ. The bachelor should have a good command of standard techniques to fulfill the assigned task; whereas, the master in his professional activity is to make independent decisions under uncertainty. His decisions should

rely on a profound analysis of the master's activity issues. The distinctions in the nature of the bachelor's and master's activities are reflected in different competence models for these levels.

Types of bachelors' and masters' activities (analytical; managerial; projects designing; scientific; consulting; innovative-entrepreneurial) coincide in everything but teaching obligations which are merely masters' competence.

Differences in the scope of professional tasks executed by either bachelors or masters are determined by the level of their competences: masters, in contrast to bachelors, have to deal with more complicated and demanding problems concerning, prima facie, scientific, managerial and project designing tasks.

Competence models for bachelors and masters include two groups of competences: cultural and professional ones.

Cultural competences provide holistic and scientific understanding of processes and events happening in nature and in society. These competences allow graduates to flexibly pattern their behavior on the labour- market and to be ready to continue their education either to get a Master degree (for a bachelor) or to take a postgraduate course.

Professional competences include both natural-science competences which determine scientific, prima facie mathematical basis for all types of professional activity, and professional competences related to specified activities.

Each level of higher professional education has its own set of competences as the ones differ for each educational level.

How to put into effect two-level program.

Introduction of two-level program for Business-informatics qualification is based on the idea of applying the competence model as a source of information for designing a curriculum.

The types of activities presented in the designed standards are elucidated by a set of tasks for each type of professional activity. A set of competences is assigned to each professional task to fulfill it successfully. Each group: "a type of professional activity"- "professional activity task"- "competence" is related to a single or a few educational modules necessary to form and develop this. Thus, the generated number of educational modules allows designing curricula for bachelors and masters programs accordingly.

The proposed standard design distinguishes between bachelor and master programs for Business-Informatics qualification. Among the knowledge, skills and habits does the master obtain, the creative component stands out, which means the ability to analyze difficult situations, to set goals, to choose adequate means. Master program includes not only scientific and

educational preparation, but applied professional preparation as well, since practical activity may also be creative.

Difference in competence models for bachelors or masters presupposes different ways of two-level program realization. Masters' program not only presupposes but requires moving to active forms of education, when independent work becomes a priority. This means a higher performance factor and such interactive activities as discussions, role plays, economic situations modeling, brainstorm, project teams and so on. In our opinion, the masters' course syllabus should devote 50% of classes to these types of activities (while bachelors' - only 30%); whereas, lectures should take 30% of educational process (for bachelors this figure is 50%).

The essential distinguishing feature of masters' program is orientation to satisfying students' individual educational and scientific interests; that is why their attendance load is limited to 20 hours a week (for bachelors – 25 hours).

Such an approach allows us to design masters' curricula of different types. A master's curriculum may concentrate on a generalized complex sphere of scientific research, inside which particular specialties may stand out. At the same time, the basis of masters' applied programs may become the principle of conformity with certain specified professional activities.

Structure of basic educational program (BEP)

To realize the competence model for bachelors' program is necessary to mark out the following educational cycles within the BEP:

- Humanitarian, social and economic cycle;
- Mathematical and natural-science cycle;
- Professional cycle.

Each cycle should consist of a compulsory part and an elective one assigned by an educational establishment. In addition, there should be included subjects a student chooses himself.

An elective part of BEP enables to enhance knowledge, skills and competences determined by the content of basic subjects (modules); in addition, it allows students to get perfected knowledge and skills for further successful professional activity or for taking a Master course as the continuation of their education.

The curriculum also includes either educative or practical work or scientific research work, which allows students to apply their acquired working habits and skills.

The compulsory part of the humanitarian, social and economic cycle should include the following subjects: Philosophy, History of Russia, Microeconomics, Macroeconomics,

Management, Psychology, Sociology, Law, and Foreign Languages. They constitute the basis of cultural competences which are refined while professional disciplines and practices are studied.

Academic competences are formed due to disciplines of the humanitarian, social and economic cycle plus the disciplines of the Mathematical and natural-science cycle. They include Mathematical Analysis, Discrete Mathematics, Differential Equations, Linear Algebra, Probability Theory and Mathematical Statistics, General Theory of Systems, Operations Analysis, Data Analysis, and Basic Theory of Informatics. These disciplines set up the foundation for studying subjects of the professional cycle.

The compulsory part of the professional cycle should consist of the following disciplines: Enterprise Architecture, Business-Processes Modeling, Information System Life-Cycle Management, Programming, Databases, Computer Systems, Networks, Telecommunications, ICT Markets and Sales Management, ICT-service and Content Management, E-Business, Business Communications.

Analytical and research competences are formed due to disciplines of both the humanitarian, social and economic cycle and natural-science and professional cycle which include such subjects as Philosophy, Mathematical Analysis, General Theory of Systems, Operations Analysis, Data Analysis, Basic Theory of Informatics, Enterprise Architecture, Business-Processes Modeling.

Managerial competences are formed due to such disciplines as Microeconomics, Macroeconomics, Management, Psychology, Sociology, Law, ICT Markets and Sales Management, ICT-service and Content Management, E-Business, Business Communications.

Designing competences are developed while studying the following disciplines: Enterprise Architecture, Business-Processes Modeling, Information System Life-Cycle Management, Programming, Databases, Computer Systems, Networks, and Telecommunications.

Innovative-entrepreneurial competences are developed while studying Microeconomics, Macroeconomics, Management, ICT Markets and Sales Management, E-Business.

Perfection and development of the acquired competences occur within the elective part of BEP.

Masters' competence-based educational program includes scientific and professional cycles along with practical work and research activity. The program also embraces teaching practice which should result in pedagogical competences development.

To realize the competence model for masters' program is necessary to mark out the following educational cycles within the BEP: scientific and professional cycles. It should also include the "Practice and research" section.

Each educational cycle consists of a basic part and an elective one assigned by an educational establishment. In addition, there should be included subjects a student chooses himself. The basic part of the scientific cycle should include the following compulsory disciplines: General Theory of Systems and System Analysis, Decision- Making Theory. They constitute the basis of cultural and professional competences which are refined and enhanced within the elective part along with research work.

The basic part of the professional cycle should include the following disciplines: Enterprise Architecture (advanced level), Information System Life-Cycle Management (advanced level). The significant role in developing professional competences belongs to a research seminar, which is a constituent of the basic part.

Substantiation of prerequisites for realizing BEP

Prerequisites for realizing the proposed BEP are determined by material and technical facilities of an educational establishment, readiness of professors and tutors to work individually with students, the scope of students' independent work, along with students' access to a wide range of educational resources.

To make individual work with students efficient, to provide students with easy access to educational resources, educational institutions should have the sufficient number of computerized classes, enough library stock, access to professional e-libraries and databases both on the local nets and on the Internet. Professors and tutors should constantly renew their courses, design new ones; which requires a thoroughly considered professional development system. This should enable the teaching staff to do research in the scientific fields of their interest: economics, management, ICT.

Substantiation and recommendations for suggested curricula

The graduate honored with Bachelor's degree should possess interdisciplinary competences based on the awareness of general laws in compliance with which markets and economic organizations are functioning; he/she should have a good command of mathematical techniques, tools and information technologies to model and improve organization architecture; he/she should have adequate expertise and skills to apply managerial tools and methods. This set of competences provides for a wide scope of activity, gives an opportunity to change a job at minimal costs when this becomes inevitable because of technological and structural changes in the economy. Such competences shaping is ensured by the basic part of federal standard for bachelors which complies with international criteria in the field of Business Informatics.

The elective part taking the 50% load of the professional cycle is compiled by an educational institution independently. Meanwhile, the educational institution may either focus on a particular qualification program (20% of the professional cycle) or without choosing particular qualification program, may design its own curriculum within this 50% load of the professional cycle to provide Business-Informatics qualification program. The other cycles are designed in the same way.

Unlike bachelors', masters' Business-Informatics qualification program is always specialized enough and is problematic to get standardized. The set of masters' programs and their filling with special subjects are determined by the educational institution that takes into account the labour-market demand and its own resources and capability.

It should be emphasized that disciplines of masters' curricula which provide interdisciplinary professional competences (Enterprise Architecture, Information System Life-Cycle Management) suggest the advanced studying level. This should be ensured by adequate syllabuses and appropriate set of textbooks. To achieve the necessary quality of mastering the disciplines included into the professional cycle of Business-Informatics qualification, it is necessary to provide intensified mathematical studies within the structure of the science cycle. Since master's competences presuppose an ability in independent research, the master's curriculum includes scientific seminar on the chosen master's program.

Considering global character of ICT, Business Informatics are represented good areas for practically realization of Bologna Process principles, which purpose is creating the more comparable, compatible and coherent systems of higher education in Europe. The competence level of Russian graduates in the field of computer science is high and corresponds to the world standards. It is important to form compatible competence in the field of economy, management and ICT.

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