Specificities for the development of digital practice-oriented cross-professional competencies of students in economic fields using SAP standards and technologies

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Abstract. By incorporating a competency-based approach and improving the practical orientation of learning, new educational standards are being developed of bachelor and master degree programs based on professional standards.
One aspect of any educational standard in economics is the inclusion of cross-professional skills (in corporate information systems). A feature of these skills is their presence in all blocs: general cultural, general professional and professional. The article discusses the implementation of SAP standards and technologies in calculating and economic, organizational and managerial, analytical, accounting, and financial activities in accordance with the higher education standards in the area of bachelor and master degree programs in "economics".
The purpose of this article is to explain the relevance of using SAP ERP in the educational process when training students in solving practical issues with mastering cross-professional skills, as well as solving the disciplinary problems faced by specialists in everyday activities. The authors are comparing and evaluating the skills provided in educational standards with the features of SAP ERP; defining the specifics of using SAP ERP in the educational process and assessing the advantages compared with other software products. The findings provide recommendations on the use of SAP standards and technologies in the educational process for developing cross-professional skills.

Keywords: cross-professional skills, economic information system, SAP ERP.

1 Analysis of information competences of students of economic directions

In the context of the introduction of a competent approach and the strengthening of the practice of education, new educational standards are being created in the areas of bachelor 's and master 's degrees on the basis of professional standards.
One of the components of any educational standard of economic orientation was the existence of cross-professional competences that provided knowledge, skills and skills in corporate information systems. A feature of these competences is that they are present in all blocks: general cultural, general professional, pro-professional.
At the beginning of December 2019, the register of professional standards was studied on the website of the Ministry of Labour and Social Development of the Russian Fed-

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eration. The analysis revealed a lack of professional standards in selected economic areas, which should form the basis of State educational standards (economists, managers, etc.). Taking into account the technical direction of our educational institution, the authors consider the supply of specialists of economic profile for work, first of all, in the scientific sphere of production. Taking into account the availability of professional standards and existing economic directions of training in higher education institutions, as well as the requirements of the regional labour market, we study the professional standards of business analyst, personnel management specialist, marketer.
All the standards considered for labour functions provided for the use of information systems as a tool for labour action.
The labour actions described are, most often, skills developed during the training process. In the previous learning paradigm (fig. 1), skills are developed through narrow-directed knowledge in separate professional areas. The formation of information competences has evolved along the same lines of a highly specialized approach.

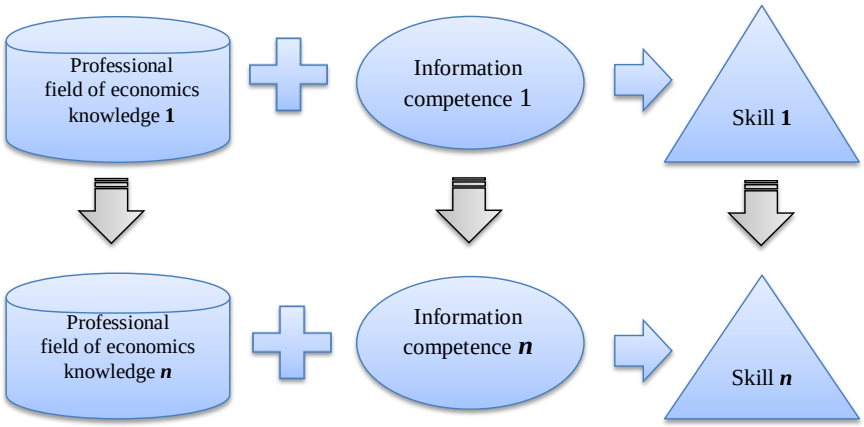

Fig.1. Past skills-building paradigm

At present, the role of information competences is increasing. The specification should not only be able to work with information, but also have the skills to perform operations in corporate information systems (digital competences).
The analysis of professional standards in the above-mentioned areas of training made it possible to highlight the following information companies.
For a human resources specialist, it is "the ability to analyze documents and transfer information to information systems and databases," the ability to "work with information systems and databases" in the following main areas:
1) on record keeping, personnel movement;
2) on maintenance of statistical and reporting information on personnel;
3) provision of personnel, search and registration of candidates for vacant positions;
4) on evaluation and certification of personnel;
5) on staff standardization and remuneration;
6) on social policies for personnel;

7) on issues of efficiency of personnel management and organization of activities of structural subdivisions.
The following knowledge and skills are needed for the marketer:
1) systematize and summarize large volumes of primary and secondary marketing information;
2) work with specialized programs to collect information and manage marketing and forecasting tools;
3) use office applications to collect and process information;
4) work with information and databases.
For business analytics, you have the knowledge and skills to:
1) use information technologies to the extent necessary for business analysis;
2) define links and dependencies between elements of business analysis;
3) collection, analysis, systematization, storage and maintenance of business analysis information;
4) submit business analysis information in various ways and in personal formats for discussion with interested parties;
5) identify, record, analyze and classify risks and develop a set of measures to minimize them;
6) simulate the scope and boundaries of the work.
Thus, the cross-professional digital competences of students of economic directions, in accordance with the available professional standards, can include:
- ability to work with databases and information systems in the applied area;
- skills of collecting, analysis, systematization and synthesis of information;
- ability to work in the electronic document management system;
- ability to reveal, analyze and minimize the risks arising at the solution of business challenges;
- ability to work with digital models of business processes.

Ownership of the set of listed knowledge and skills is at the heart of the formalization of competences presented in the state educational standards in the economic directions of bachelor's degree and master's degree. These competencies allow to carry out the following types of activities: settlement-economic, organizational-management, analytical, accounting and settlement-financial.

2 Role of SAP in the formation of digital cross-professional competences of specialists in demand in the labor market

It is necessary to note the relevance of cross-functional skills in the process of integration in the labour market. There was no consensus in the modern system of higher education as to whether higher education institutions should form schools of that level at their students, or whether they would gradually be stored in the course of their professional activities. On the one hand, the conditions for carrying out specific labour actions may differ significantly in practice from the environment in which the skills of

the staff members were developed. On the other hand, the value of cross-professional digital compacts was that they were universal and could be adopted outside the context of individual disciplines and even activities.

In the educational process, the formation of competences that meet the requirements of professional standards is currently carried out in the study of 3–5 separate disciplines. Disciplines that form one competence are often not related to common cross-cutting tasks and do not give students an idea of how these tasks should be solved in practice in the context of a dynamically changing internal and external environment of the enterprise.

Professional standards for selected economic occupations involve a narrow range of labour activities, including those related to information resources. Consequently, in his workplace, the specialist is engaged in solving narrow tasks, often not seeing the connection of the result of his work with processes taking place outside his division. Information security requirements are one of the reasons for restricting access to information flows originating elsewhere in the enterprise.

Even when solving narrow tasks of the specialist, their competent, professional performance is important. The ability to track the impact of a work action (decision) made increases awareness of the performance of work functions, which affects the efficiency of the work (for example, due to fewer errors made).

Current educational technologies did not provide a link between the labour actions of the economic worker and the result of the enterprise's activity as a whole. For example, by solving the problem of selecting a supplier of raw materials, a student may have the task of minimizing material costs by obtaining a reduction in the cost of the product, but does not see a relationship with the quality of the obtained product, pricing issues, and the problem of selling these products and so on.

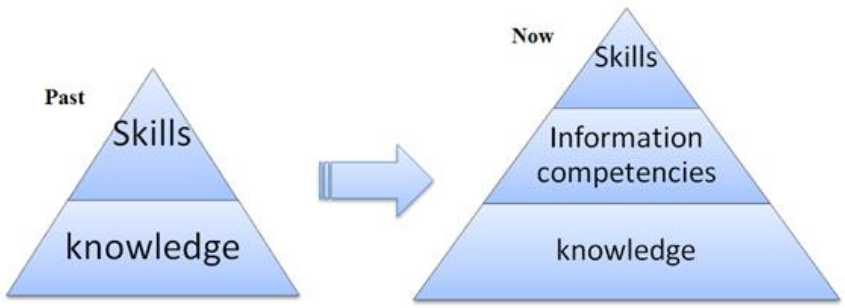

Fig.2. The role of information competencies
in the development of professional skills

Cross-professional information competencies in the digital economy underpin labour self-realization and, at a minimum, professional fitness (fig. 2). "More than 70% of respondents who are in search of a job consider that, in the processes of recruitment and selection cross-functional skills are valued in particular…with specialized vocational skills occupying a second position" [10, p. 353]. For a student of economic

direction to be in demand and competitive, he/she must have the ability to work not just in narrow-sand software products, but also in corporate information systems. Studying the capabilities of such systems allows the employee to learn new functions faster, it is easier to move from working in one subsystem to working in another if necessary. To the employer, this increases the efficiency of the use of the labour force by reducing the time and cost of closing the vacancy, reducing the costs directly for training and for monitoring by the mentor (imputed costs).

SAP standards and technologies, when used in the training process, enable individual training disciplines to be combined into a single digital industry that best reflects the enterprise 's real production environment. This approach allows to form a modern paradigm of cross-professional digital skills. In this case, the addition of basic economic knowledge with the capabilities of SAP standards and technologies allows to form several professional skills at the same time (fig. 3), which makes this system promising for use in the educational process of universities and practical activities of enterprises.

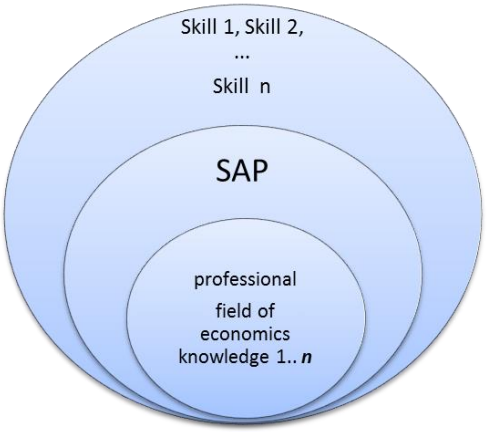

Fig.3. Modern skills-building paradigm using corporate information systems

The advantages of this corporate system allow to support the development of business processes and structural changes of the enterprise, to carry out business modeling in a single information environment, to carry out operational analysis on non-standard requests, to reduce the level of operational load on personnel, to maintain productivity of work while increasing the volume of processed information.

Comprehensive SAP solutions enable you to perform business analysis, enterprise performance management, risk analysis, and analytical forecasts.

Let 's take a look at some of the opportunities that SAP technologies offer when studying economic disciplines.

When you create digital business process models, SAP creates 5 main functional blocks: Finance, Planning, Purchasing, Storage Locations, Manufacturing, Sales and Distribution. The presence of these blocks and their interconnection allow the student

to study in real time the implementation of all functions of process control in the enterprise. At the same time, students are able to study the specifics of each block and gain skills in collecting, systematizing and summarizing information relating directly to that block. They have the opportunity, using existing demonstration databases, to supplement them with information on current business processes. By providing basic data for all types of resources (for example, materials and their suppliers, workplaces (including equipment and workers), the student has the opportunity to study all types of resources and their properties, and to highlight the properties that are required for the business processes being designed.

At the same time, the system forms all necessary forms of documents, co-leading and fixing business actions. This allows to form cross-professional competence of work with electronic document circulation.

The functional blocks mentioned above affected the principles of organization structure and allowed the creation of organizational levels necessary for the execution of business processes in accordance with the business logic existing in the organization. (Business process flow)

It should be noted that working with databases is one of the cross-professional competences for a student of any economic direction.

One of the main skills of students-economists formed in the process of learning cross-professional competences is the work with digital models of business processes. Modeling at different organizational levels is widely represented in SAP standards and technologies. For example, material requirements planning is based on scenario modeling, which significantly improves the performance of the business processes being designed. In the system, the student can see planning processes at all levels of resource management, ranging from operational material requirements planning for the production plan and the creation of safety stock to advanced production and sales planning.

In today 's environment, many enterprises use project management. The implementation of various projects is always associated with risks. The ability to identify, analyze and minimize risks was also a cross-professional competence that, when applying SAP standards and technologies, could be mastered in a separate Project Management function block.

The authors carried out studies, which allowed to identify peculiarities of formation of cross-professional skills (competences) in students of technical direction "Fundamental informatics and information technologies." The research was carried out as part of a focus group that in the past academic year optionally studied SAP as an enterprise information system. It was noted that the development of skills in resource management took place about 2 times faster than on the basis of only the ability to perform certain labour actions, which emerged as a result of practical exercises and laboratory works, which you pass to learn theoretical knowledge in educational disciplines.

At the same time, there was a decrease in the duration of the preliminary stage of skill generation, involving numerous repeats of trial actions. They are usually carried out intuitively, at random, but SAP technologies have a user-friendly interface, from the first time allowing you to understand the necessary sequence of actions and the connection between individual blocks.

The analytical step of comparing lessons learned and actions could be eliminated, since SAP standards provided a clear procedure for obtaining results from existing databases and the relevance of actions that could not be compromised. In class 2–3, many students already have a clear idea of the skill and are free to use it.

The speed of skill formation may have been higher, but this was hampered by the lack of technical focus of special economic knowledge in students. Thus, it is possible to predict for students-economists to accelerate the formation of professional competences in all practical-oriented disciplines when using SAP standards and technologies in the course of their training by 3–5 times, because they have basic knowledge in the field of economics.

Thus, using SAP standards and technologies, economic students can link separate economic concepts, knowledge of business processes, analysis and calculation skills, the ability to present the results in different formats in a single, holistic system, and the business community will have workers who are effective in cross-functional tasks and capable of responding to the change in the external and internal environment of companies.

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