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Implementation of Models for Assessing Professional Competencies Using ICT Tools

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Abstract

In the article author examines the methodology for assessing professional competencies in the training of bachelors. The author identifies the role of ICT tools, conducts information modeling and offers software tools for implementing the methodology. In addition, the author gives an example of an expert map for external evaluation of competencies.

Keywords: professional competence, ICT, evaluation methodology, software tools

Introduction

Today's society is completely dependent on Information and Communication Technology (ICT), which is also currently the fastest growing industrial sector. The aim of education is to meet society's enormous demands for ICT solutions and prepare a new generation of highly skilled specialists in the field. The rapid developments in this area, combined with an ever-increasing range of applications, creates many exciting opportunities for students to utilize the knowledge foreither an international career, or further higher education.

Main part

Professional competencies are basic abilities to conduct professional activities in a chosen subject area.

When preparing bachelors in universities, the main attention should be paid to the formation of professional competencies. Quality standards for such competencies are formed in educational programs based on:

- European Qualifications Framework (EQF)
- The European e-Competence Framework (e-CF)

In Table 1 for an example, an overview of the profession “Information Systems Specialist” is presented in terms of functional duties (activities of employees) and job titles for each qualification level.

Table 1. Overview of the profession “Information Systems Specialist” in the context of functional duties and names of posts

<i>Qualification levels</i>	<i>Activities of employees (functional responsibilities)</i>	<i>Name of posts</i>
1	Installation of the information system; technical support and adjustment of the information system parameters, programming within the framework of the assigned task, the formation of technical documentation	Programmer Trainee
2	Customization (adaptation, customization) and maintenance of the information system; advising users of the information system; training users to work with the information system	Programmer Consultant Serviceengineer
3	Implementation and coordination of works on adjustment (adaptation, customization) and maintenance of the information system; advising users of the information system; training users to work with the information system and participate in the development of teaching methods; coordination of works on the hardware-software complex support, carries out work in the group, is responsible for the decisions made within the framework of fulfilling their official duties	Implementation Specialist Senior consultant Senior programmer SeniorService- Engineer
4	Interaction with the customer for clarification of initial needs, decision-making on the choice of the information system and work on its customization, project management in terms of content, human resources, timetable, quality, integration, contracts, risks, budget, communications; the development of methodologies for project management and management; integration of the information system with the hardware and software systems of the customer, is responsible for justifying the decisions made and implemented	Systems Analyst Lead Consultant Business analyst ProjectManager
5	Development and improvement of the methodology of work, monitoring of activities, analysis and decision making within the project or the work of the unit, management of projects and project portfolios, personnel management, makes decisions and is responsible for the allocation of resources and for the work of the unit's staff, is responsible for the result, strategic direction management	BusinessArchitect Projectmanager

Each qualification level of the profession contains a list of job descriptions with a detailed description of the knowledge, skills and skills necessary for the effective performance of each job function. Meeting the same job duties at different qualification levels is characterized by sets of knowledge, skills and skills, personality traits.

ICT tools are effective tools for creating a continuous educational space in the formation of professional competencies.

To effectively form professional competencies using ICT tools, the author suggests an integrative model (fig.1). Examples of ICT tools for the implementation of the model:

- LMS and knowledge management systems
- Private educational cloud
- Corporate portals and social networks of campuses
- Corporate Content Management Systems
- Project Repositories
- Mobile applications for monitoring activity

- Educational services of a professional orientation
- Project Management
- Modeling of processes and systems
- Software Development Environments
- Environment for the development of educational content, development of MOOC

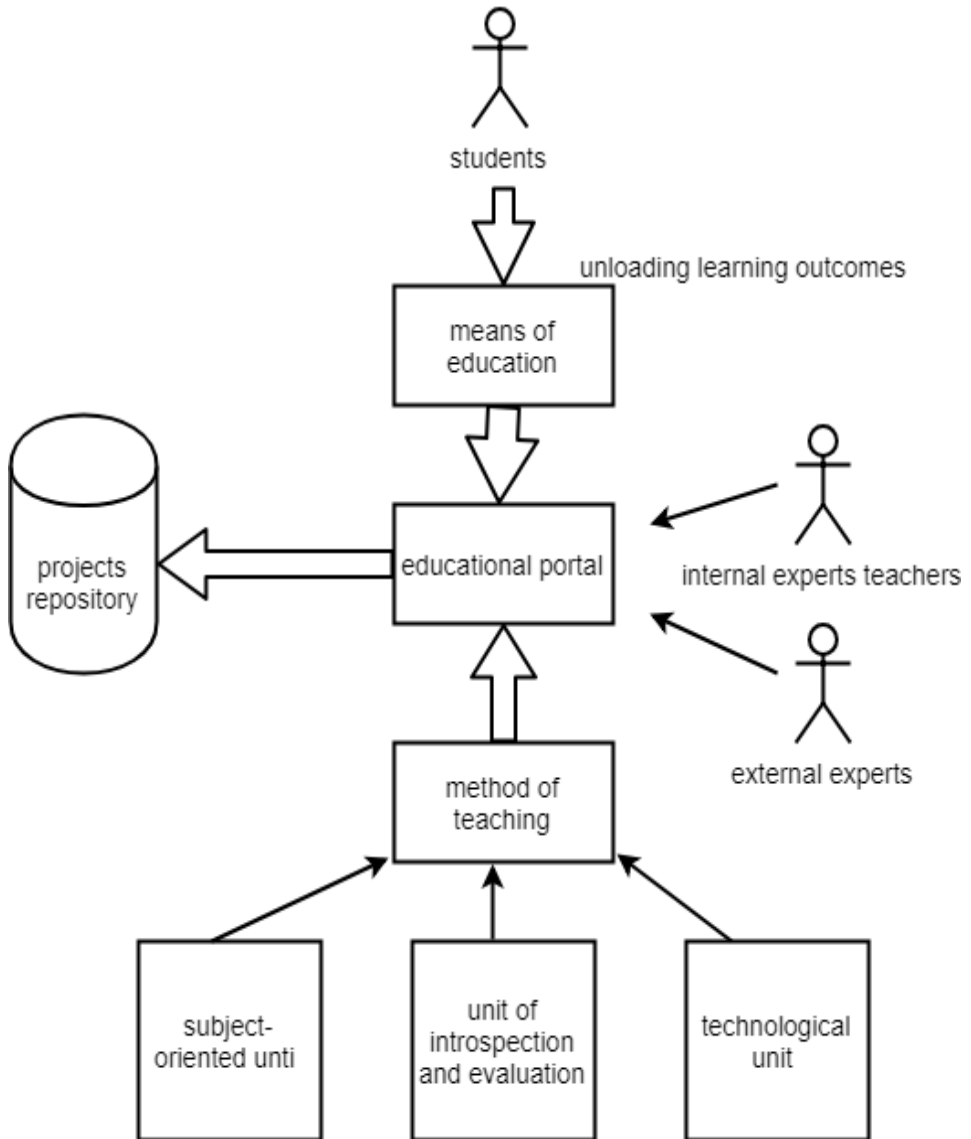


Fig. 1. Competency building model

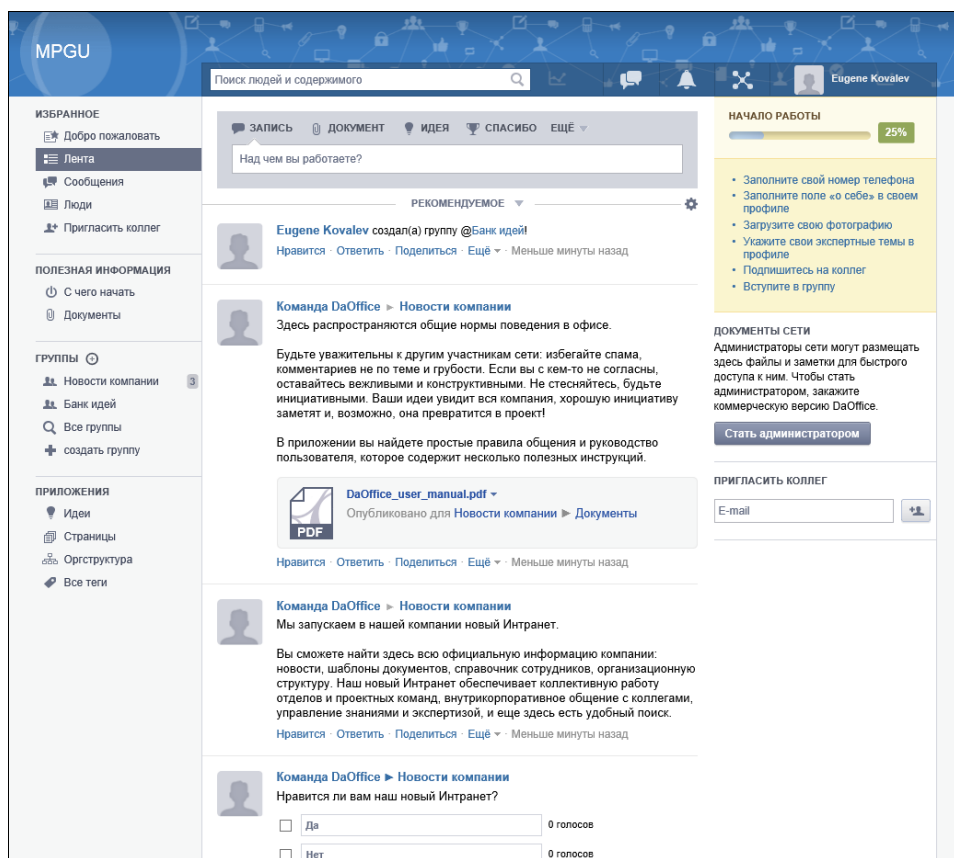


Fig. 2. An example of an educational social network of the faculty on a platform DaOffice

The methodology for forming and evaluating competences consists of 3 blocks.

The subject-oriented block of the course is an educational program whose content meets the current requirements for the competence of the head of a professional educational organization in the field of procurement activities and provides the opportunity for a differentiated approach depending on the level of training and individual educational needs of students.

The unit of introspection and evaluation covers the theoretical (at the knowledge level) and competence (at the level of skills, skills and practical experience) content of training, and carries a certain value-meaning load that meets the stated goal of the course and selected methodological approaches. The block is designed to assess the degree of achievement of the learning outcome.

Evaluation of the result of training performs two functions: ascertaining (ascertains the fact of mastering certain components and the formation of compe-

tence in general); as well as problem-diagnostic (identification of areas of insufficient achievement of the goal, on the basis of which individual tasks for self-education for the intercourse period are then formed).

As a technology of estimation, the model of “3D-evaluation” (three-dimensional estimation) was selected by the author, its individual dimensions being: self-esteem of the listener, external evaluation (teacher), evaluation of an independent expert (expert). Three dimensions of the assessment can significantly increase its objectivity, and also discuss the causes of collisions related to the discrepancy in the assessments, identify possible deviations in the self-assessment of the listener and, if necessary, adjust them.

The technological unit is a set of pedagogical technologies, forms and methods of teaching, through which the subject-oriented unit is integrated into the educational process, as well as the auxiliary procedures necessary for implementing a differentiated approach and the principle of individualization (input diagnostics, the formation of individual educational routes). This block manages the educational process, the activity of listeners in it, aimed at achieving the set educational goals and objectives.

The evaluation of professional competencies is based on an assessment of the student’s electronic portfolio, which includes certificates received during training, completed coursework, participation in projects, and scientific work. The evaluation is carried out by experts from professional communities, which fill out expert feedback and put an integrative assessment of the competencies created. Tables 1, 2 shows an example of an expert map.

Table 2. Expert map for assessing the competencies of students in the system of continuous practices

Indicators Points	The content and completeness of the assigned task	The validity of the automation solution	Originality, innovative solutions	Execution and presentation of the report
<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
3	The task is fully implemented, presented a complete solution to this situation, demonstrated the possession of the necessary knowledge, skills, ways of working in this situation	The decision is completely justified, all the necessary processes have been solved	The solution contains signs of novelty, relies on modern approaches to solving the problems of enterprise automation	The report is presented correctly, designed in accordance with the requirements
2	The task is executed, although there are some minor inaccuracies and logical gaps in the solution, demonstrated the mastery of basic knowledge, skills, ways of working in this situation	The decision not to partially justified, missing some necessary processes	The solution contains elements of creativity, relies on modern scientific approaches to solving the problems of enterprise automation	The report is presented competently, there are minor defects in the design

1	2	3	4	5
1	The task is not completed completely, there are significant logical gaps in the solution; demonstrated a fragmented knowledge, skills, ways of working in this situation	The decision is practically not justified, many necessary processes are missing	The solution is standard, the creativity and originality of ideas is almost non-existent, there is a reliance on modern approaches to solving the problems of enterprise automation	The report has significant shortcomings in the design, literacy, possession of professional vocabulary
0	The task was not carried out, the decision was not submitted, the knowledge, skills, ways of working in the context of this situation	The decision is not justified, there is no argument	The solution does not contain original ideas, does not rely on modern approaches to solving the problems of enterprise automation	The report issued in accordance with the requirements, there are serious mistakes in speech
Expert evaluation				
in total				
evaluation				

Table 3. Scale of conformity of final points to traditional evaluation

in total	0–4	5-7 (in the absence of a zero indicator)	8–10	11–12
Evaluation (five-point scale)	2	3	4	5
Level of competence formation	No	Sufficient	Increased	High

Conclusion

The evaluation system built in this way allows us to evaluate the professional competencies of students, focusing on dexryptors built based on professional standards, professional software and external (expert) evaluation.

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