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IDENTIFYING COMPETENCIES IN DESIGNING THE EDUCATIONAL PROGRAM «SMART CITY»

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Abstract

Educational program (EP) is a document where the application of an individual approach to students is ensured, so do the transformation of professional competencies from professional standards and qualification standards into learning outcomes. Innovative educational program «7MO1511(2) – Technologies – Smart City» has been developed in order to prepare masters of IT education on the basis of a multidisciplinary approach to allow the students to possess fundamental knowledge and practical skills in the fields of analysis of the development, management and services of the Internet and the use of SMART technology. However, the EP can be successful if the competencies of students are determined. In this article, the main component of educational program is discussed. The competencies were indentified under the professional standards developed by «Atameken». The concepts of competency, professional standard and educational programs are given.

Keywords: Educational program, key competencies, professional competencies, professional standard.

Аннотация

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ОПРЕДЕЛЕНИЕ КОМПЕТЕНЦИЙ ПРИ ПРОЕКТИРОВАНИИ ОБРАЗОВАТЕЛЬНОЙ ПРОГРАММЫ «SMART CITY»

Образовательная программа (ОП) – это документ, в котором обеспечивается применение индивидуального подхода к обучающимся, а также трансформация профессиональных компетенций из профессиональных и квалификационных стандартов в результаты обучения. Инновационная образовательная программа «7MO1511(2) – технологии – Smart City» разработана с целью подготовки магистров ИТ-образования на основе междисциплинарного подхода, позволяющего студентам овладеть фундаментальными знаниями и практическими навыками в области анализа развития, управления и обслуживания интернета и использования интеллектуальных технологий. Однако ОП может быть успешной, если будут определены компетенции студентов. В данной статье рассматривается основной компонент образовательной программы. Компетенции были определены в соответствии с профессиональными стандартами, разработанными национальной палатой предпринимателей «Атамекен». Даны понятия компетентности, профессиональных стандартов и образовательных программ.

Ключевые слова: образовательная программа, ключевые компетенции, профессиональные компетенции, профессиональный стандарт.

Андатпа

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«SMART CITY» БІЛІМ БЕРУ БАҒДАРЛАМАСЫН ЖОБАЛАУ КЕЗІНДЕ ҚҰЗЫРЕТТЕРДІ АНЫҚТАУ

Білім беру бағдарламасы-бұл білім алушыларға жеке көзқарасты қолдану, сондай-ақ кәсіби құзыреттерді кәсіби стандарттар мен біліктілік стандарттарынан оқыту нәтижелеріне айналдыру қамтамасыз етілетін құжат. «7MO1511(2) – технологиялар - Smart City» инновациялық білім беру бағдарламасы студенттерге Интернетті дамыту, басқару және оған қызмет көрсету және соңғы технологияларды пайдалану саласындағы іргелі білім мен практикалық дағдыларды игеруге мүмкіндік беретін пәнаралық тәсіл негізінде АТ-білім беру магистрлерін даярлау мақсатында әзірленді. Алайда, егер студенттердің құзыреттілігі анықтау және дұрыс қоя білу бұл білім беру бағдарламасының негізгі функцияларының бірі. Бұл мақалада білім беру бағдарламасының негізгі компоненті қарастырылады. Құзыреттіліктер «Атамекен» әзірлеген кәсіби стандарттарға сәйкес анықталды. Құзыреттілік, кәсіби стандарттар және білім беру бағдарламалары туралы ұғымдар осы мақалада қарастырылған.

Түйін сөздер: білім беру бағдарламасы, негізгі құзыреттіліктер, кәсіби құзыреттіліктер, кәсіби стандарт.

Introduction

Currently, professional education is increasingly focused on specialized training of personnel with a high level of competence. In connection with the changes that have taken place in the life of our society, professional education workers have faced new challenges – training and education of a competent specialist who is able to adapt in this difficult world and withstand competition in the modern labor market. An indicator of the quality of professional education in the context of its modernization is considered the competence of a specialist, which is determined not through a certain amount of knowledge and skills, but characterizes the ability of a person to mobilize the acquired knowledge and experience in a specific situation. Educational program (EP) can be only successful when competence is prioritized. However, to build the general and professional competencies, EP developers must follow the professional standards. There are some of the definitions for the terms which are discussed in this article.

Competence is a way of using knowledge, skills, and education that contribute to personal self-realization, finding one's place in the world, as a result of which education appears highly motivated and in a true sense personally oriented, providing maximum demand for personal potential, recognition of the individual by others and awareness of its own importance [1].

Professional standard is defined as a standard that defines the requirements for the level of qualification, competencies, content, quality and working conditions in a specific field of professional activity [2]. In other words, the conceptuality of the idea of a professional standard is the ability and readiness of the student to solve professional problems on the basis of formed knowledge, mastered skills and practical experience, implemented through labor actions. Today, special attention is paid to the development of professional standards at a high level. The national chamber of entrepreneurs of Kazakhstan "Atameken", in accordance with the Labor code of RK, from 1 January 2016 has been approving the professional standards developed by industry associations of employers.

Educational programs are developed and implemented with the aim of guiding students in order to acquire the necessary knowledge, values and skills, and to develop their learning in a holistic way, with preliminary to the teaching process [3].

Innovative educational program «7MO1511(2) – Technologies – Smart City» has been developed in order to prepare masters of IT education on the basis of a multidisciplinary approach to allow the students to possess fundamental knowledge and practical skills in the fields of analysis of the development, management and services of the Internet and the use of SMART technology.

General professional competencies (GPC):

General professional competencies reflect a set of basic professional abilities, knowledge and skills of a professional, which are invariant for any professional activity [4].

Mastering General professional competencies determines the breadth of professional employment, therefore, in the professional training of a bachelor of pedagogical education, the formation of General cultural competencies should be paid close attention. In the educational program ‘Smart City’ in the direction of training of masters of pedagogical Sciences in computer science, the following General professional competencies are defined and shown in table 1.

Professional competencies (PC):

Based on the identified requirements of potential employers, the educational results that should be achieved as a result of training in this educational program were clarified. Table 1 presents a list of professional competencies that a graduate should have.

Developing the Knowledge, Skills and Attitudes (KSAs).

A professional is competent when behaving responsibly and efficiently in compliance with the performance criteria. It can also be assumed that this specialist has ample competence. Professional competence is seen as a genetic, integrated and internalized capacity to deliver sustainable (worthy) success (including problem-solving, creativity and transformation) in a specific professional area, position, organizational context and task solution.

Table 1. List of competencies listed in EP

General professional competences (GPC)	*GPC1*	*Ability to apply in practice the latest achievements in the field of pedagogical activity, to expand and develop competences in the field of scientific researches and outlook*
	GPC2	*Ability to working with modern technologies and possess communication skills*
Professional Competences (PC)	*PC1*	*The ability to develop Internet resources and mobile applications for carrying out professional activities in the field of business, education, ensuring information security of information systems with*
	PC2	*The ability to solve practical issues of planning, designing, developing, integrating and operating information systems of the IoT class. The ability to analyze the information received, be able to develop new algorithms, process large amounts of information based on data virtualization technology and the creation of cloud storages, build machine learning systems. The ability to use basic SQL tools for programming commercial platforms*
	PC3	*The ability to use methods, tools to analyze processes, projects, production planning, ICT systems and new business models, quality management, organization of scientific and practical activities in the form of projects. Ability to choose methods and develop algorithms for solving problems of control and design*

Competence consists of a number of competencies. Competence is part of genetic competence; it is a cohesive cluster of knowledge, skills and attitudes that can be used in the sense of actual performance.

There are following definitions of KSAs:

1. Knowledge. We are not talking about knowledge "in General", but those knowledge that directly relate to the subject of activity and make it possible to solve the tasks set.
2. Skills. At the same time, the competence includes both skills directly related to the object of action, and auxiliary skills necessary for the organization of activities in General: for example, goal-setting skills, self-assessment skills
3. Attitude - this refers to values and self-image. An example is self confidence, a person's belief that he or she can be successful in a given situation, such as a teacher's self confidence in conducting a lesson.

As it was developed on the basis of multidisciplinary approach, EP 'Smart City' aims to prepare graduates in following specialties; Business – analyst, Content Manager, IT-analyst, IT-Developer, IT-researcher and Education Managers. Supposedly students professional competencies were determined under the professional standard developed by 'Atameken' [2]. As an example, IT – Developer's professional competencies is illustrated in the table 2.

Table 2. IT developer's professional competency

	K	*S*	*A*
1. Determination of the characteristics for each component of the software		+	
2. Software development lifecycle	+		
3. Software design standards, principles, and patterns	+		
4. Development of automated tests to check the performance of system components.		+	
5. The principles of construction and application of unit testing.	+		
6. Programming languages and standard sets of programming language libraries	+		
7. SQL, an API for working with a DBMS for a given programming language.	+		
8. Orderliness			+
9. Flexibility of thinking			+
10. Effectively networking ability			+
11. Assertiveness			+
12. Ability to select and apply basic software design principles		+	

Discipline

The educational program contains a standard curriculum based on the state educational standard, with the distribution of components of professional competence of a specialist. At the same time, the standard

curriculum is supplemented with appropriate competencies that take into account the specifics of the direction. This is done by including in the curriculum a list of recommended discipline that should be included in the course of choice.

The choice of elective disciplines is based on the principle of complementing competencies, the acquisition of which is not fully provided by the disciplines of the mandatory component. Key competencies of students are specified by level of study and by each discipline, which implies their improvement and development from course to course. There are the list of disciplines, including elective courses, such as Machine learning, Data Mining, IT project management and so on. All of them are allocated in accordance with their professional competencies. For example, Professional Competency 1 (PC1) can be applied to related courses as ICT Management, Innovation Ecosystems, eCommerce and eGovernment and IT project Management.

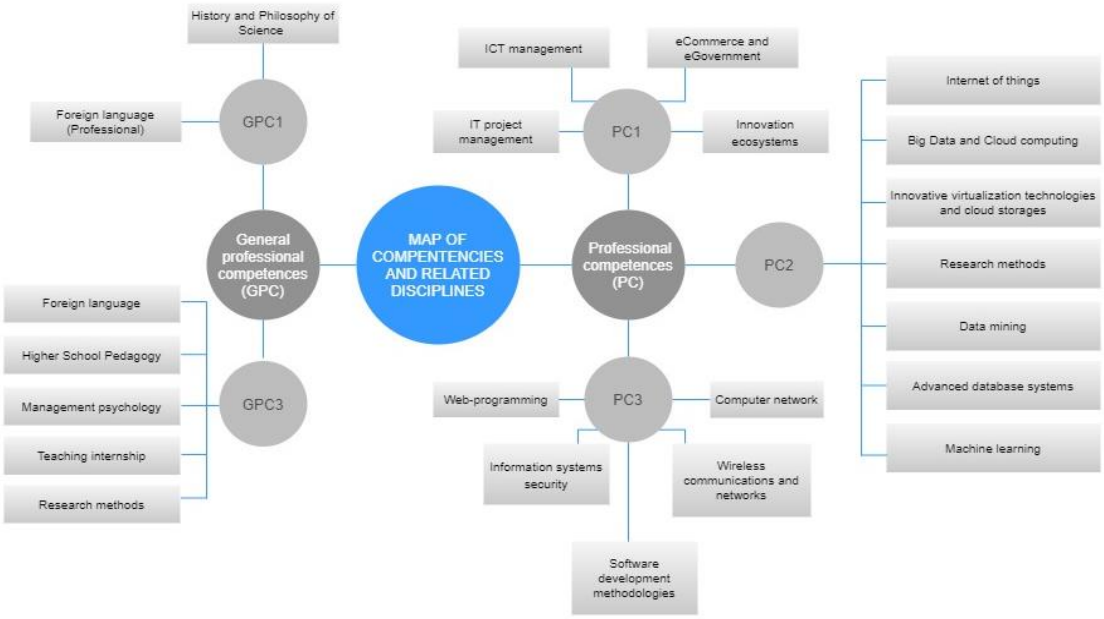

Figure 1. A map of competencies and related disciplines

Thus, the presented educational program allows implementing a competency-based approach to learning by creating the necessary conditions for this, aimed at the formation, development and professional development of the individual on the basis of national and universal values, achievements of science and practice. Their implementation will optimize the educational process, target teachers and students to the final result, improve educational work, psychological and pedagogical support, increase the level of professional competence of students, and generally improve the quality of University education. In addition, the developed program will allow future specialists from the initial stage of training to determine the individual trajectory of their education and thereby gain deeper knowledge of the core disciplines.

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