

INTERDISCIPLINARY APPROACHES IN THE FORMATION OF STUDENT'S HUMAN CAPITAL WITH HIGHER EDUCATION

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Abstract. The research subject in the article is the student's human capital, formed by the subject synthesis in the field of higher education. The purpose of the article is show the importance of using interdisciplinary approaches in the study of individual professional disciplines. The scientific novelty is the study of the educational essence, the formation and improvement of human capital theory in higher professional education by interdisciplinary approaches in student training. The theory of human capital concept is an integrated approach to analyzing human activities range in the light of a certain worldview. In this approach higher education is the center and the source of economic development in the regional and national economy. The relevance of the article is to consider the role of human capital both in the economy and in the pedagogical context.

In this regard, the university mission is to train students to perform their professional competencies at a high level as well as to take on additional responsibilities in human capital formation. This process includes professional development and professional retraining. Therefore, the modern educational system requires constantly new approaches in teaching, optimization of its didactic models, we have focused on interdisciplinary connection in training in the formation of students' human capital. We have developed and introduced into the university educational process the curriculum for students' human capital development, based on interdisciplinary connections. The relations indicated in the article play a significant role in enhancing the practical and scientific-theoretical student training, an essential feature of which is the mastery of students by the generalized nature of cognitive activity. Generalization allows one to apply the knowledge and skills in further specific situations, when considering private issues, both in academic and practical activities, in the future

production, scientific and social life of various specialties graduates. Using multilateral interdisciplinary connections provides a qualitatively new level of forming human capital, as well as creates the foundation for an integrated vision, approach and solution of ambiguous problems of reality. In this connection, the optimization of interdisciplinary connections and the didactic modules formation on their basis is the most important factor in ensuring the systematic students training, which we conduct at the Academy of Psychology and Pedagogy of the Southern Federal University in various pedagogical areas of training.

Interdisciplinary connections are an important aspect in the formation of human capital, and the result of a comprehensive approach to technical and technological student training. The implementation of interdisciplinary connections in the process of disclosing the educational topic provisions is most effective, when the necessary and essential connection interdisciplinary topics are used to overcome contradictions in the educational process. When students are convinced these contradictions can be resolved by using knowledge from other subjects.

The result of the interdisciplinary synthesis of knowledge will be the classification of reserves increase in labor productivity according to such features as:

- technical re-equipment (improvement of the motor car park structure, improvement of the car structural qualities, improvement of the maintenance materials quality, etc.);
- transport process and efficiency of goods and passengers' transportation (improvement of transportation technology, rationalization of transportation organization methods, implementation of dispatching management, etc.);
- organization of labor and traffic safety (organization of technical regulation, increase of labor discipline, use of moral and material incentives, increase in traffic volume, organization of traffic safety and safety techniques).

The theoretical foundations development of interdisciplinary connections in an educational subject makes it possible to use a mechanism for identifying and planning interdisciplinary connections to specific topics of the academic subject being studied and revealed its leading positions. For an experimental research work and as an example, let us consider the integrative discipline "Production Logistics" delivered to students in the Field of Science 44.03.04 - Vocational training (by industry), major: logistic and technical services for road transport.

Keywords: human capital, higher education, investments, interdisciplinary approaches

Introduction

Education is the most effective way to increase labour quality and productivity. This idea was massively supported by the theorists of human capital around the world, and for a long time was considered to be a consumer prosperity possessing benefits (Emrulla, T., 2014). Some changes in attitudes towards education occurred in the late fifties of the last century, after the American economist, Lau at the Nobel Prize, T. Schultz defined the concept of human capital. He substantiated the thesis that if education affects production and matters to the economy, then it is a form of capital. In addition, education can be considered as capital because it allows you to receive in the future satisfaction, or earn money (Schulz, T., 1960).

J. Walsh developed the definition of "human capital" in the context of higher education and economic importance, as one of the main factors for improving the quality of human capital. Considering investments in education as an investment for profit, he studied higher and postgraduate education as the basis for the long-term successful economic realization of the individual within the economic space of modern society.

F. Neumann, in his works, already considered education as an independent element of human capital and as the combination of such components as: cultural and ethnic features; general education; professional education; key qualifications (Neumann, F., 2002).

R. Steiner, in his turn, stated, that all the forces (student's soul, thoughts, feelings, and will) constitute a single whole. Intellect was supposed to be the one of the spiritual components of an integral personality, and any imbalance could lead to the one-sided development of a student, without forming the necessary professional skills and value orientations.

The teacher should not strive to pass a certain amount of knowledge, but affect the student's feelings, awaken his/her interest, make student love the subject (Shmidt, V.A., 2019)

In recent years, the role of higher education is changing, it is becoming more popular for a wide range of people, and the number of diploma holders is constantly growing. Higher education is an important part in the reproduction of human capital.

The role of higher education is increasing because we have an increased demand for the educated persons. Higher education is designed to transfer knowledge, skills and form the quality that will allow graduates to explore various professional situations and adapt to unexpected turns in the course of technological processes changes, in the work organization and professional structure. Higher education plays a large role in any area of training, since it performs an important social task: it is one of the means of implementing social justice in the society.

The formation and effective functioning of higher education plays an important role, since it fulfills the most important condition for the socio-economic development of the country, the comprehensive development of the individual, which are considered the main trends of higher education. Higher education acts simultaneously as an innovator, contributing to the process of knowledge enrichment as a result of ongoing research activities, and as a conservative in terms of educational activities.

Modern educational system is essential for improving the efficiency of the learning process. One of the most important means increasing the learning process effectiveness at a higher education institution is the of the interdisciplinary principle implementation. Interdisciplinary connection in higher education is known as a specific expression of the integration processes occurring in science and society.

M. Kovalchuk, the director of the Institute National Research Center named after Kurchatov, made it especially clear about the need for interdisciplinary relations.

“The world system is against interdisciplinary research. The country that is the first to understand and restructure its system in the field of interdisciplinary research will benefit the 21st century” (Gazeta.ru, 2019).

Methodology

This study is based on the literature analysis of human capital theory and the practical application of learning interdisciplinary. The most important function of a higher educational institution (HEI) is the development of common cultural capital, which provides the universal foundation for further professional activity and further development. At the macro level, a highly educated workforce represents the country's human potential (Karmazina, Ju. A., 2014).

Higher education is crucial for maintaining a healthy and growing economy, while at the same time applicants are trying to choose those higher education institutions that hold high positions in the ranking of graduate employment.

Considering the higher education prospects in human capital formation, one can identify the main priorities - the vocational education quality in its practical orientation. These priorities will create conditions so that the future specialist can easily and quickly adapt to the labor market and, if necessary, reorient his career within one specialization.

“New professional standards are being developed, WorldSkills standards are being introduced into the educational process, these and other measures are designed to meet the needs of the economy for qualified personnel” (Klimov, A., 2016).

It results that the system of higher education is one of the main components in the human capital formation, and periodically requires upgrades and reforms.

Interdisciplinary connection in higher education is considered a specific realization of the integration processes occurring in science and society. Modern scientific and pedagogical literature considers several definitions of "interdisciplinary connection". In our opinion, the most complete within the synthesis of philosophy and pedagogy point of view is the following: interdisciplinary connection is a pedagogical category, meaning integrative relations between objects, phenomena and processes of reality, reflected in various didactic models and performing an educational and developing function (Fedorec, R.F. 1983). Given the close relationship of pedagogy with other related sciences, one can use a variety of approaches, both to the pedagogical assessment of interdisciplinary connections, and their classification. Since the purpose of this article is not to provide a comprehensive criterion-based typology of interdisciplinary connections as a pedagogical category, we concentrate on one of the most common signs. Thus, the composition of interdisciplinary connection is traditionally subdivided into substantive, operational and methodical, which generally show what is used, or transformed from other academic disciplines when studying a particular topic.

Author's conceptual approaches to solving problems and providing the analysis. The theoretical foundations development of interdisciplinary connections in an educational subject makes it possible to use a mechanism for identifying and planning interdisciplinary connections to specific topics of the academic subject being studied and revealed its leading positions. For an experimental research work and as an example, let us consider the integrative discipline "Production Logistics" delivered to students in the Field of Science 44.03.04 - Vocational training (by industry), major: logistic and technical services for road transport.

The subject choice was due to the fact that this industry economy occupies one of the most important places in the system of knowledge on the economic system functioning in general and on the automotive industry in particular. This course is aimed at developing individual, scattered knowledge in company's economy into a unified system of theoretical, practical and ideological concepts about the activities of business entities in the particular industry.

Main types of interdisciplinary connections in the development of the course under study (Table 1).

Table 1 - Types of interdisciplinary connections of the course “Industrial Logistics”

Possible	Associated	Creation of integrated courses (economics + technical and technological disciplines)
Required	Previous interdisciplinary links "as a goal"	Require prior study in other items of the logistic Major of study
	Perspective interdisciplinary connection "as a result"	subjects that need basic knowledge of economics in logistics

Having the economic aspects of the functioning of enterprises as the main object of study, the course “Industrial Logistics” uses elements of knowledge from other subjects to understand and demonstrate its own principles, theories, etc. The content elements of other academic disciplines in terms of the logistic and technical services of road transport can be the basis for a parallel consideration of the motor transport sector to create integrated courses that form the modules of the university academic mobility curriculum for bachelors training. As an example, such courses as "IC: user courses", "Economics and Law."

Table 1 shows that the necessary interdisciplinary correlation is divided into interdisciplinary correlation "as a goal" (previous) and "as a result" (promising).

Let’s consider interdisciplinary correlation "as a goal" in the course "Economics of the company" presented in Figure 1.

When studying issues related to the economy in transport logistics, examples should be given from various subject areas indicated in Figure 1. Thus, when studying the depreciation of fixed production assets at a road transport company (ATP), it is necessary to classify rolling stock by various types (according to carrying capacity, number axes, class, displacement, etc.), which will allow to specify the methods of calculating the rates and depreciation amounts for transport. The classification and types of vehicles for a number of the above criteria are to be studied in the framework of the course “Transport Logistics and Organization of Transportation”.

Students' knowledge of the major of study under consideration in the area of operation, equipment, principles of operation and maintenance of repair and diagnostic equipment of motor transport enterprises will be useful and in demand for detailing the analysis of the effectiveness of using basic production assets: determining the share of advanced equipment in its total volume for individual types the age of groups of equipment used, the grouping of equipment by life, etc.

One of the objectives of studying the course “The Economics of the Firm” is to form the students' ability to determine the internal reserves for the growth of employee productivity.

The selection of educational material is not intuitive, but on the basis of specific principles.

The teacher should be guided by the following selection principles.

a) The principle of the selected material compliance with the requirements of the standard in bachelors training in the field 44.03.04 Vocational training (by industry).

b) The principle of selected material conformity to the structural elements of technical knowledge. In this case, educational material is based on the isolation of basic technical concepts with the phased introduction of new components, theories, laws, etc. Then auxiliary information is selected: for example, historical-scientific information, revealing the evolution of ideas, theories, technical concepts and specific scientific discoveries.

c) the principle of the logical structure of educational material conformity to the stages of knowledge formation. This principle focuses on the allocation of enlarged studied didactic units (the studied modules and their elements).

The implementation of interdisciplinary connections and correlations “as a result” is necessary to ensure a high level of teaching the another subject and the formation of a positive student’s human capital. The specified interdisciplinary connections should be initiated by subjects that need elements of economic education (Table 2).

Table 2 - Recommended model of promising interdisciplinary connections within the framework of the “Logistics and technical service of road transport” major

Course name	Selected topics of the course	Basic concepts and methods of the course "Company economy"
Transport logistics and transportation organization	Types of vehicle insurance	The economic nature, principles, objects and features of OSAGO and Kasko insurance
Information technology in road transport systems	Electronic vehicle identification	Features of the automatic identification of ATP in market conditions and the planning of their activities
Labor protection and Safety Techniques at motor transport enterprises	Workers labor protection requirements in the organization and work	Methods for determining the intensity of use of equipment in the transport company

Basics of logistics and technical services	Warehouse in the logistics chain	Principles for determining economic efficiency, methods and indicators of warehouse profitability
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Results

Study results. As students move from one course to another, the teacher can actually increase the student's human capital ratio, and also help them focus on the idea that they can specifically invest in their own human capital efforts, they put into acquiring different skills and knowledge. For this purpose, we developed modules, special programs and individual student's routes. Along a modular program a student can choose additional disciplines in economics, business, etc. and also increase his/her human capital self-training.

The effective use of such technologies allows us to organize the educational work of students systematically during the entire period of study.

For example, the content of the discipline is divided into modules. Tests of several levels have been developed for each module:

Level 1 - introductory;

Level 2 - theoretical;

Level 3 - practical.

To determine the quality of knowledge acquired by a student in the process of discipline studying, a test task covering the content of the entire course is carried out. The learning process is structured in the way that if a student fails one of the level tests, he is given recommendations with an indication of the topic that he needs to study.

The analysis of the presented results. To improve the proposed approach efficiency, we have revised the entire learning process. In order to find out which disciplines, and accordingly modules, cause the greatest difficulties for students, we conducted a survey and testing. Such an approach allowed not only to establish which disciplines cause the greatest difficulties, but also to find out in what form it is better to use interdisciplinary connections. In recent years, we carried out the study on the development of electronic manuals, which allows teachers organize the independent work of students in more effective way, which, ultimately, contributes to improving the education quality. In developing such electronic materials, great attention is paid to professional orientation, which allows to take into account the specifics of each training area. Thus, the approach based on interdisciplinary connections, we used, allows to adapt the educational system to new tasks and provide the most complete use of modern technologies.

Conclusion

The implementation of interdisciplinary connections in the university space is closely connected with teachers' views on the problems of scientific knowledge synthesis and analysis as a concrete expression of the sciences differentiation. The theoretical and practical solution to this problem was changed in accordance with the development of society, its social and economic orders of pedagogical and methodological science. The establishment and strengthening of the subject system of teaching in modern higher education is inextricably linked with the further development of the idea of interdisciplinary approaches in shaping students' human capital.

References

- Emrulla T. 2014. The Theory of Human Capital: Holistic Criticism. *Review of pedagogical research* 3(84): 411-445.
- Fedorec R.F. 1983. Fedorets RF Interdisciplinary communication in the learning process. Leningrad: LGPI, 88 pp.
- Gazeta.ru 2019. URL: www.gazeta.ru/tags/person/mihail_kovalchuk.shtml [Accessed April 06 2019].
- Karmazina Ju. A. 2014. Education as an investment in human capital. *Young scientist*. 7: 349-351.
- Neumann, F. 2002. Methodology for the Economic Evaluation of Human Capital, Public Administration: Transformational Processes in the Modern World: Proc. report international scientific-practical. conf. Minsk. Academy of Management under the President of the Republic of Belarus. Part. 2. 128 pp.
- Schmidt V.A. Some aspects of human capital formation and the process of globalization. URL: www.konspekt.biz/index.php?text=1033 [Accessed April 9 2019]
- Schulz T. 1960. Formation of capital education. *Journal of Political Economy*. 6 (68): 571-583.
- Klimov A. 2016. The Gaidar Forum. "The role of education in the strategic development of Russia". URL: www.unkniga.ru/news/5473-rol-obrazovaniya-v-strategicheskoy-razviti-rossii.html [Accessed April 24 2019].