

DIDACTIC INNOVATIVE LEARNING TECHNOLOGY BY THE „KNOWLEDGE→CAPITAL” METHOD

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Abstract: *The modern world is rapidly developing in the context of a market society-a new social formation. The regularities of this new economic formation led to the privatization of all industries of the national economy of Kazakhstan, including the education system. A consequence of this was the market-based learning process in schools and universities. This article considers the market-oriented learning process as a new pedagogical phenomenon that requires the creation of an appropriate special learning form (system). The article reveals the technology of transforming knowledge into capital in school practice as well as gives real examples of disclosing market values of educational subjects. The authors proposed a socio-pedagogical step-by-step system for the market-oriented learning process, a structural diagram of „knowledge → capital” with the corresponding groups of components, a methodology for identifying market values of school knowledge and a methodology for conducting new market lessons.*

Keywords: knowledge economy, knowledge-resource, knowledge→capital, man-market, market values of educational subjects, market-oriented learning process, market society.

In connection with the innovative development of the market economy of Kazakhstan, the concept of knowledge has greatly expanded. In the *Strategy of Kazakhstan-2030*, President N. Nazarbayev estimated knowledge as the key to the country’s strategic development. The State Program of Education Development in the Republic of Kazakhstan for 2005-2010 indicated the need to increase the market knowledge of the population. N. Nazarbayev in his Address to the People of Kazakhstan stressed that knowledge is a means of forming the nation’s competitiveness. As a result of such broad interpretations of the concept of knowledge, its unknown value as a market resource has been revealed so far.

After the crisis, the role of innovative knowledge was revealed (2009) for accomplishing an intellectual revolution in the country. In this sense, knowledge was regarded as a strategic resource of the country, contributing to the concept of the nation's intellectual level (2010). Based on this conceptual approach, an absolutely original project „Intellectual Nation-2020” was created in the Republic of Kazakhstan. It revived the exclusively new meaning of knowledge, which is an important and basic indicator of the nation's intellectual ability. This factor revealed the social and pedagogical potential of the usual notion of knowledge in a completely new philosophical cognitive position (interpretation).

Over the past 50 years, the ordinary direct meaning of knowledge has changed and expanded broadly as a new concept of the knowledge economy. The new term „*knowledge economy*” was first proposed by F. Machlup in his book *The Production and Distribution of Knowledge in the United States*.¹ The expansion of the knowledge sector and an increase in the educational level of the population resulted in many other meanings in the „*knowledge economy*” category such as „*knowledge-based economy*”, „*knowledge for economic goods*”, on a social scale for „*society of the future (civilization of developed countries)*”, an initiative for the use of the nation's intellectual capital, „*know-how*”, „*a knowledge management method*”, a tool for a new „*knowledge economy*”, „*creative economy*”, „*knowledge management technology*” etc.

In the mass media and scientific-methodological literature of Kazakhstan, the new concept of the knowledge economy was first mentioned in the lecture of President N. Nazarbayev, delivered at the L. N. Gumilyov Eurasian National University on the topic „*Towards a Knowledge Economy through Innovation and Education*”.² In this lecture, N. Nazarbayev revealed the new economic significance of knowledge-its transforming into the main source of value and profit. This newly revealed feature of knowledge allows the modern information society to conduct the learning process on the principle of the knowledge economy, which meets the requirements of a competitive global economy. The teaching principle based on the knowledge economy has long been successfully implemented in the educational institutions of South Korea. In this country even the Ministry of Education was renamed into the Ministry of Knowledge Economy. Accordingly, the

¹ F. Machlup, *The production and distribution of knowledge in the United States (New York, 1962)*, Trans. from English, Moscow, 1966.

² N. Nazarbayev, *Towards a knowledge economy through innovation and education (lecture at the L.N. Gumilyov Eurasian National University)*, Kazakhstanskaya Pravda, May 26, 2006.

names of local education authorities have also been changed. This means that the main innovation focus in the educational policy of South Korea is on the knowledge economy.

The idea of N. Nazarbayev to transfer education to the knowledge economy through innovation pointed to the need to organize the learning process on the principle of the knowledge economy. After a long study of the pedagogical meaning of the category concept of „*knowledge economy*”, we came to the conclusion that this term should be understood as the disclosure of the economic significance of educational materials studied in school disciplines. Guided by this position, we developed the didactic prerequisites of the knowledge economy as an innovative teaching method. As a didactic technology for introducing the knowledge economy into school practice, we created a new system of „*market learning*”, a methodology for identifying „*market values*” of school knowledge and a methodology for conducting new „*market lessons*”, as well as developed a technology for transforming knowledge into capital. These teaching guides are tested in schools and universities of Kazakhstan.

These guides and didactic technologies were used in schools and universities of the Republic of Kazakhstan by new teaching methods: „*knowledge economy*”, „*knowledge→capital*”.

The use of the knowledge economy teaching method in the teaching of school disciplines can be carried out by identifying market values of educational materials and a specially developed methodology for carrying out new forms of market lessons that help to shape the business qualities of an entrepreneurial personality.

„Knowledge→capital” as a new teaching method

The knowledge economy as a new teaching method is designed to implement the newly emerged market training system in the learning process by revealing market values of educational materials and the technology of market lessons. Forming an entrepreneurial personality is the ultimate goal of the newly introduced market training system, which is absent in the current form of the learning process, being its serious drawback. As known, each socio-economic formation prepared relevant personalities for its functioning. For example, feudalism educated the feudal lord, capitalism-the capitalist, socialism-the builder of communism. What personality is prepared by the current market society is still unclear.

The findings of our continuing studies show that an entrepreneurial personality fits the market society. This circumstance can be explained by its particular development features. Private property is the basis of the modern market formation. Consequently, modern society can be called an entrepreneurial society, and entrepreneurs are considered the driving force of the economy. The country that has many wealthy entrepreneurs-businessmen retains the leading position. Creativity, self-confidence and competitiveness are in their nature. Entrepreneurs can be called the most advanced and conscious segment of the population. They are not divided by nationality and equally related to religious beliefs, geographic locations, party positions, economic and technological spheres etc. Entrepreneurs are called upon to engage in the favorite kind of entrepreneurship, helping to increase state and family budgets through their knowledge and skills.

Therefore, there is a need to form entrepreneurial qualities in students, so that they could become well-known businessmen. This in turn will promote the renewal of education and solve the most intricate problems encountered in the learning process in schools and universities.

The market-based learning process

From a general scientific position, according to the transition to a new market society formation, it would be necessary to develop a philosophy for the special development of pedagogy. Such a general scientific philosophy of pedagogy should be based on the market teaching principle. The insufficient study of this problem has aggravated the contradictions between the renewal of the learning process and the accelerated development of the innovative market economy, which led to a regular crisis in education. Despite the fact that the social and economic formation of society has changed and Kazakhstan has switched to a market economy, the country's pedagogy has remained unchanged at the old conservative level. This discrepancy between the development of society and pedagogy exacerbates contradictions, which does not allow the renewal of the learning process. The solution of these accumulated contradictions requires a special organization of scientific and practical discussion among a wide range of specialists, scientists and educators.

On this basis, the proposed socio-pedagogical step-by-step system for the market-based learning process is schematically shown in Figure 1. This system, to a certain extent, makes it possible to correct the above-

mentioned factors of the crisis in education. This was facilitated by educational and methodological manuals published in 1994-2011, which have no analogs, and the experience accumulated during this period in organizing the market-based learning process.

For the in-depth study of theoretical pedagogical and methodological aspects of the problem in question, to help teachers and researchers, we created new manuals entitled *Basics of Market Pedagogy*,³ *Knowledge Economy Didactics*,⁴ as well as developed a new non-traditional teaching form—a market training system and an innovative knowledge economy teaching method (2010). They contributed to the renewal of the learning process.

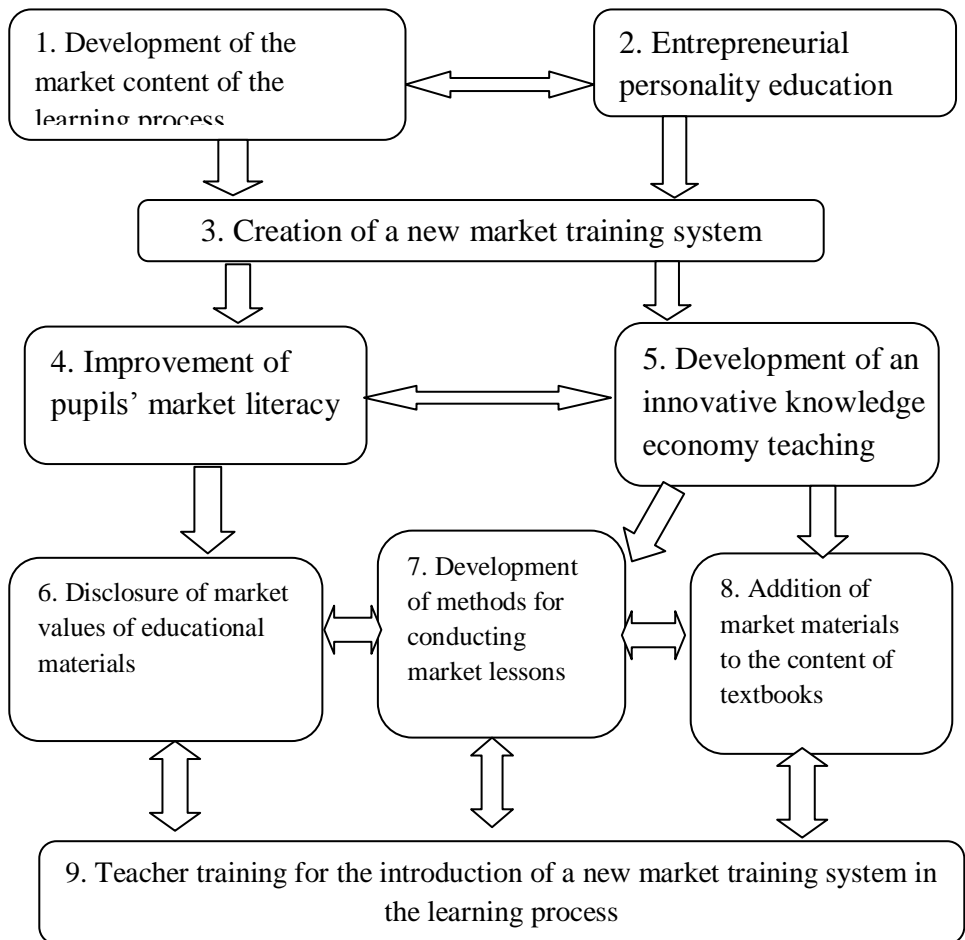
The literature review shows that at first general pedagogical questions of economic education were raised, then methodical aspects of teaching economy at school were considered. Over the past 30 years, some teachers have tried to give students economic knowledge and skills in mathematics, physics, chemistry, biology, computer science and technology. However, their work has not considered the market values of lessons. These tasks were addressed by us when creating new types of lessons—market lessons.

As a result of this lesson content, pupils were acquainted with such concepts as „market” and „market—the fourth dimension”, „meeting people’s needs”, „market value”, „money as a means of exchanging goods and social labor”, „market—an indicator of the person’s creative ability”, which contributed to an increase in students’ economic literacy, corresponding to the order of the Minister of Education and Science of the Republic of Kazakhstan No. 353 of July 22, 2009 „Increase of Students’ Economic and Financial Literacy” (grades 4-11).

Figure 1: General pedagogical system of the market-based learning process

³ M. A. Kudaykulov et al., *Basics of market pedagogy*, Almaty, Shkola 21 veka, 2007, 276 p.

⁴ M. A. Kudaykulov, S. A. Nurpeissova, *Knowledge economy didactics*, Almaty, KazNPU, 2010, 184 p.



Of course, it is not easy to find educational materials of a market nature. We collect them from various sources, additional literature, newspapers, magazines, radio- and TV-shows, the Internet, commercial advertising, business advertising, excursions to industrial enterprises, the history of invention, etc. We hope that this will serve as a methodological prerequisite for developing the technology of market lessons.

We have developed about 70 market lessons in various school subjects, which contribute to the expansion of the market entrepreneurial worldview of students.

Our books *Basics of Market Pedagogy*, *System and Technology of Market Education*,⁵ *Didactic innovative learning technology*,⁶ *Knowledge Economy Didactics* and others make it possible to introduce market education in schools, use the innovative method of teaching the knowledge economy and market lessons on educational subjects, teach the basics of entrepreneurial activity as well as shape students' entrepreneurial personality.

Modern market society in its essence is called entrepreneurial. Business life is now habitual for people, since entrepreneurship has become the source of daily work, and on a national scale-a „generator” for the development of market relations. It has become the unshakable law of human life. Everyone is now mastering an entrepreneurial profession, trying to succeed.

The ability to work was the subject of sociology and philosophy. The peculiarities of labor activity and skill of people were studied by such psychologists as A. N. Leontiev, N. V. Kuzmika, V. D. Shadrikov etc. On the basis of such studies, the essence and types of specialists' abilities, enthusiasm and skills were defined. These and other studies contributed to a new hybrid branch of science-acmeology.

The term „acmeology” comes from the Greek word acme, logos (doctrine), which means the science of reaching the acme of skill. Acmeology explores the patterns of improving professional competence in the process of performing professional activities. B. G. Ananiev⁷ (1977) defined the place of acmeology in human sciences. The first special department of acmeology and psychology of the professional service of the Academy of Public Administration in St. Petersburg (1990) was established under the President of the Russian Federation. Doctors of Pedagogical Sciences, Professors N. V. Kuznik, A. A. Derkach and A. A. Zimichev organized the first international academy of acmeological sciences in St. Petersburg (1992). Then, in 1995, the first higher educational institution Acmeological Academy was organized. It is now called the St. Petersburg Institute of Psychology and Acmeology.

In the Russian Federation, there are a special journal and a bulletin on acmeology; specialists in acmeology are trained, as well as doctoral dissertations on acmeology issues are defended. A special course on

⁵ M. A. Kudaykulov et al., *System and technology of market education*, Almaty, KazNPU, 2010, 152 p.

⁶ M. A. Kudaykulov, S. A. Nurpeissova, *Didactic innovative learning technology*, Almaty, KazNPU, 2011, 168 p.

⁷ B. G. Ananiev, *About the problems of modern humanism*, Moscow, 1977.

acmeology is read at the East Kazakhstan State University, and an international scientific and theoretical conference on the problems of increasing the productivity of professional and pedagogical activities was held more than once (1994). Currently, acmeology develops in the context of interrelation with other sciences: philosophy, psychology, sociology, energy, conflictology, logic, physiology, technology etc.

From the position of acmeology, in any profession, achieving the acme of skill depends, first of all, on the right choice of professions corresponding to their abilities. So far, people have chosen a profession according to the system of „*man-nature*”, „*man-technology*”, „*man-man*”, „*man-signal*”, „*man-information*”, but this system has been supplemented with the sixth component „*man-market*”. Market professions are also gradually expanding with new specialties. Everyone should take this system into account in order to choose the right profession.

The goal of each person in the pursuit of achieving the acme of skill is to obtain high profits. In the context of market relations, the successful choice of modern market professions depends on the skillful use of the „*cash flow quadrant*” (Figure 2), proposed by the American businessman R. T. Kiyosaki. According to this system, money is in the flow in four quadrants of a circle. In accordance with their ability, people in a market society should correctly choose their free entrepreneurial activity.

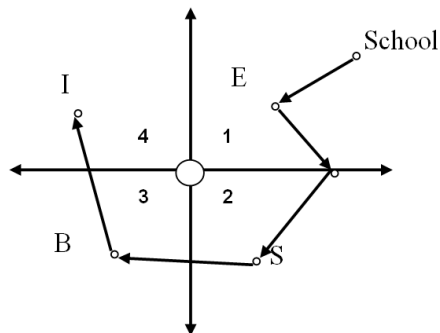


Figure 2: Cash flow quadrant

Note: 1, 2, 3, 4-each quadrant of the cash flow quadrant; 1) E-employee; 2) S-self-employed; 3) B-business owner; 4) I-investor.

30% of the profits from entrepreneurship are obtained in the 1st and 2nd quadrants of a circle, and the biggest profit can be obtained in the 3rd-4th quadrants of the cash flow. This system should be presented in schools, since it is considered one of the ways to speed up the process of reaching the acme of skill. R.T. Kiyosaki's experience shows that the greatest profit is obtained in the fourth quadrant, i. e. when an entrepreneur works as an investor.

The acmeological principles of increasing the acme of professional activity can be characterized by the following categorical concepts: constant self-knowledge, self-education, self-development, mastery of „*new knowledge*”, creative thinking and self-education; continuous education, innovative inventiveness, development of entrepreneurial business qualities, acquisition of new specialties, studying the best practices of others, seeking new entrepreneurial opportunities, increasing abilities, awareness raising, etc. All this increases the intelligence of a person, nation and country.⁸

The further expansion of market-based education requires the disclosure of market values of educational subjects, the improvement of the technology of market lessons, the economic literacy of teachers and the market content of school textbooks, as well as the development of the concept of educating an entrepreneurial personality.

Technology of disclosing market values of educational subjects

Teaching pupils the methods of „*knowledge*→*capital*” provides for the preliminary introduction of the process of transforming educational knowledge into capital, which often has a complex, peculiar structural character, to teachers. Didactics of this teaching technology involves the division of components of the process of transforming knowledge into capital into separate groups in which a set of components, a scheme of their location and a structural relationship reflect the very principle of transforming knowledge into capital.

To disclose market values of educational knowledge, we considered three groups of the „*knowledge*→*capital*” structure.

An example for the *first group of the „knowledge*→*capital*” structure can be the invention of an electric generator and the use of a transformer in the transmission of electricity over a distance that are studied in physics,

⁸ S. Marginson, *The Knowledge Economy and Higher Education: A System for Regulating the Value of Knowledge*.-OECD, 2009, retrieved from: www.oecd.org.

electrical engineering and technology. In this case, knowledge of the induction current (based on Faraday's experiment) was first needed. After these discoveries, the electrotechnical industry was not organized for many years until the fundamental theory of electromagnetic waves was developed by Maxwell. On the basis of this theory, electrotechnical production was created, in particular, the production of power generators, transformers and other electrical products that served as a source of capital for large corporations and companies.

Chemistry, physics and biology teachers can witness the realization of the second group of the „*knowledge*→*capital*” structure during the educational industrial excursion with pupils to the sugar factory. There they were attracted by the chemical technology of making sugar white from the liquid red beet concentration. To understand this process, pupils studied with interest the chemical-biological basis (knowledge) of obtaining sugar and creating sugar production. Then they inquired about the volume of sugar produced per day as well as the monthly, annual income and profits from the resulting finished beetroot products. Thus, the excursion classes showed the primary importance of chemical technology in obtaining sugar in sugar factories.

The third group of the „*knowledge*→*capital*” teaching method, as demonstrated by our experimental testing at school, starts with the introduction of a new market product, such as a diaper and a medical system—a disposable drip. At first physics teachers found it difficult to give answers to the questions:

- 1) what is the physical principle of diapers for babies?
- 2) what physical phenomenon underlies the functioning principle of a drip?
- 3) how is the safety of air bubble penetration into the human blood automatically ensured through the drip system, if it is not removed from the vein in time?

These goods contributed to additional applied knowledge about capillary phenomena and atmospheric pressure, used in diapers and drips. Then physics teachers became interested in the peculiarities of manufacturing processes for the production of diapers and drops.

During the excursion to the beer factory „*DERBES*” pupils got acquainted with the manufacturing process for the production of new non-alcoholic beer „*DERBES*”, where an innovative nanotechnological method of dealcoholization was used. Pupils asked questions to the guide—the engineer-technologist of the beer factory:

1) What new instruments or materials are used for beer dealcoholization?

2) What are the physico-chemical principles of beer dealcoholization?

3) Why is it necessary to produce non-alcoholic beer like „*DERBES*”?

4) What is a nanotechnological membrane (sieve)?

The necessity of obtaining nanotechnological knowledge arose after pupils got acquainted with the manufacturing process of a brand beer „*DERBES*” release, which corresponded to the principle of the fourth group of the „*knowledge*→*capital*” structure.

Undoubtedly, other groups of the „*knowledge*→*capital*” structure can be identified that contribute to the renewal of the learning process in the future as the innovative development of the global economy accelerates and the use of teaching methods of the knowledge economy and „*knowledge*→*capital*” is increased in the practice of schools and universities.

As can be seen from the above interpretations of the grouping of components, the process of transforming knowledge into capital can occur in various combinations of components of this structure. For example, in some cases they can start from the 4th group-„*Technology*”, in others-from the 5th group-„*Production*” or even from the 7th-„*Goods*”, depending on the nature and content of the applied market significance of educational materials in disciplines that are the source of pupils’ acquired knowledge.

Conclusions

The technology of transforming knowledge into capital in school practice is better and easier implemented when the „*knowledge*→*capital*” structure is divided into the corresponding groups of components. Therefore, we call this approach a new innovative way of learning „*knowledge*→*capital*”. Teachers and methodologists of this principle have already started calling it „*M. Kudaykulov and S. Nurpeissova’s teaching method*”, as in the way of innovative methodological teaching methods with „*V. Shatalov’s basic notes*” (Donetsk, Ukraine), „*P. Erdniev’s enlarged didactic unit*” (Elista, Kalmykia), „*K. Bitibaeva’s lessons of wisdom*” (Ust-Kamenogorsk, Kazakhstan), „*A. Iskakov’s labor classes*” (Almaty, Kazakhstan), „*Sh. Amanashvili’s lessons without marks*” (Georgia) etc.

On the basis of these studies, we intend to create new teaching aids and electronic versions, necessary for subject teachers to carry out innovative market lessons and extracurricular activities, which are useful tools for developing pupils' interest in learning and business.

The findings of this study contributed to the creation of a system of new didactic concepts and categories, such as „*market-based learning*”, „*market learning*”, „*market value of educational knowledge*”, „*market lessons*”, „*teaching method*”, „*knowledge economy*”, „*knowledge→capital*” structure, „*M. Kudaykulov and S. Nurpeissova's innovative teaching method*” etc.

All these innovative methodological initiatives to renew the learning process can serve as a basis for the development of a new didactic technology of learning „*knowledge→capital*”.