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The Intellectual Work Management as an Essential Condition For Creativity Development of Higher Education Institution

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ABSTRACT

The article discusses the methodological basis of creating effective system for intellectual work management at the higher education institution. The study of the intellectual work management is caused by the need of today's complicated socio-economic, organizational and educational systems to obtain reliably reproducible repercussions from future professionals based on scientific approach to management. We propose a methodology for intellectual work management, based on the interaction of complex concepts such as intellectual resource, intellectual process, intellectual potential, and intellectual capital. The intellectual resource can be considered as a combination of knowledge, technologies and scientific discoveries in the course of research and development (R&D) activities. The iintellectual potential ensures a high rate of acquiring new knowledge. Intelligence, as a mentality quality, promotes adaptation to changes in learning based on the experience, comprehension, and application of knowledge. Intellectual capital of the education institution consists of knowledge, accumulated while implementing educational programs and providing educational services, as well as knowledge structures and intellectual value. We believe that their interpenetration and mutual reinforcement allows solving many fundamental, specific and applied problems of intellectual work management. The study of the students' intellectual work within the described methodological framework of management science, in our opinion, forms a coherent system of representations about the attitude of employers to the intellectual work of future professionals that increases their manageability.

KEYWORDS
Intellectual work management, intellectual resource, intellectual process, intellectual potential, intellectual capital

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Introduction

Students of educational institutions including institutions of higher vocational education, as future professionals, are the main drivers and power source of quality education management system.

Intellectual work management helps to support future professionals to acquire knowledge in the course of education, that is

- to plan and design a learning curve;

- to evaluate and select content of education;

- to monitor and guarantee compliance between internal regulations of the educational work and the creative and analytical job, as well as research and project activities;

- to use new approaches in teaching and learning, assist in the knowledge formation and reconstruction.

A scientific approach to the intellectual work management allows aligning the interests of professionals with the management system. The simulation technique is the most productive method to provide congruence of interests of future professionals. Based on the "necessary" and "sufficient" principles, simulation technique allows focusing on the most critical management areas and neglecting the unimportant processes.

The intellectual work management, as an independent subject area within the framework of psycho-pedagogical science is not sufficiently developed. Thus, its study in the frameworks of the methodological basis of management science requires forming a coherent system of ideas concerning the relations between work subjects and objects, thereby increasing work manageability (Ilyenkova 2007).

Both domestic and foreign researchers note the lack of a common attitude towards the nature of intellectual work, intellectual work management in the system of higher vocational education, and criteria to assess its effectiveness. Therefore, it is necessary to study more in detail the issues related to the formation of the theoretical-methodological and methodical bases for systemic approach to the intellectual work management in the framework of higher vocational education. This should be based on the synthesis of psycho-pedagogical and managerial science methods with subsequent determination of further development lines of such a system.

Methodology

Integrating Conception of work as a complex phenomenon of Kazakh society, places demands on the intellectual work of the future professional, his research and project activities. This covers the learning process, intellectual potential, as well as functioning and development of the education system.

Modernization of intellectual work in the current context is determined by:
- accelerated development of scientific and technical progress, allowing involvement of machines;

- increased interdependence, accessibility and integration of knowledge that leads to deepening of intellectual work differentiation;

- establishing new mechanisms of interaction with market area, leading to changes in the training program of future professionals;

- changes in the intellectual work culture components that activate the needs for self-development and self-actualization as well as needs in creativity and information;

- changes in kinds of activity in the new environment.

Change affects all kinds of activities, though content of intellectual work culture changes to a greater extend. This is associated with the preparation of the content of education aimed at creating new approaches and optimizes combination of different types of resources in the course of knowledge production and educational services. Intellectualization of work assumes its revitalization against the strengthening of stochastic systems and their external environment that leads to understanding the need for purposeful managerial influence on intellectual work (Stewart 2007).

This raises the problems in the management of intellectual potential development, which are associated with the parameters of the effective knowledge work management at the level of higher education institution departments, namely:

- the extent, to which the intellectual work can be encouraged;

- the extent, to which the intellectual processes must be controlled.

Up-to-date requirements for intellectual processes and their organization are defined by the broad variety of operations and techniques that are required to the future professional for self-development. They suggest criteria and parameters of process quality that range from the complication of interrelations between functions to high moral and ethical responsibility both for the process and the result.

The intellectual work combines all features of mental, informational and creative work:

- mental nature;

- informational focus;

- transformative principle;

- availability of special intelligence;

- availability of emotional and social intelligence, etc.

Intellectual work possesses a goal-setting, i.e. creating a culture of the individual, while interaction of the concepts of "intellectual potential" – "intellectual capital" and "intellectual recourse" – "intellectual process" forms a model that allows describing their interaction through intellectual work, labor, and activity (Lukicheva 2007).

The intellectual work ccomponents are interlinked with the majority of the intellectual potential components, and the common part of these potentials is realized in the course of intellectual work, conceptually and terminologically becoming the intellectual capital. This common part comprises the competences as a key intense factor in the formation of the intellectual work culture of the future professionals. The special feature of this model is that intellectual work is considered not only as a condition for the realization of intellectual potential, but also as a basis for formation of the intellectual work culture.

Dynamics of the time spent on the formation of intellectual work culture confirms the assertion of high proportion of analytical and creative work in

professional's work hours as well as the work associated with the information creation and transformation.

Analytical work consistently requires more than half of the professional's regulated time. It grows due to the increased time spent on the content, actions and operations related to the expenditure of mental energy. The time needed to work with the labor content reduces due to the implementation of informational and communicative technology (ICT) (Figure 1).

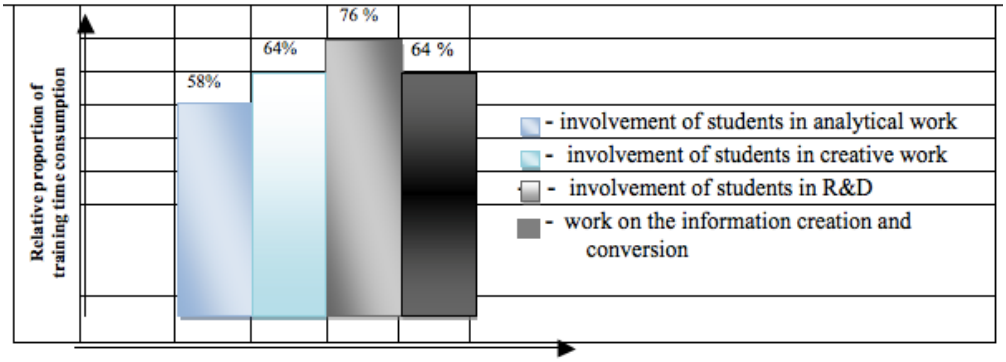

Figure 1. Dynamics of intellectual work as part of students' training time consumption

The intellectual work includes information and processing, analytical and creative actions and operations. The proportion of R&D work in the total training time of students as well as the time spent by future professionals for creative work is significantly reduced due to the transition to the new intellectual work management system.

The implementation of the ICT significantly increases the time consumed by the future professionals while performing creative work. There has been a significant growth in the development of actions and operations associated with analysis and development of plans, consultations, discussions, and project implementations in the course of creative activities.

Formation of a scientific methodology of intellectual work management of future professionals enhances the practical relevance of the managerial-based approaches to intellectual work. The rationalistic approach, limited to the management of the intellectually-advanced students, is focused on their development and self-actualization. The dialectical approach is typical for managing the development of the intellectual potential. The system approach, taken from the methodology of general systems theory, allows studying the subsystem of intellectual resources management from the perspective of "black box", involving direct relationship and feedback as well as the impact of the external environment (Beckman 1997).

The scientific character of intellectual work management is stipulated by the scientific approach to the intellectual resources (IR) management, intellectual work (IW) and intellectual processes (IPr) as well as development of the intellectual potential (IP) and intellectual capital (IC) (Borisov and Bakhenskaya 2010).

We propose to evaluate the intellectual work effectiveness and conduct the integrated assessment of the intellectual work management effectiveness at the higher education institution through the creation and mathematical description of the optimization model developed based on current scientific methodology. We have formed a number of controlled variables of the intellectual work management system (Table 1).

Table 1. Controlled variables of the intellectual work management system at the higher education institution

SMIT subsystem (Strategic Management of Information Technology)	Controlled variables
Subsystem of the intellectual resources management	Supportability of the process by intellectual workers with certain qualifications Supportability of the process by training methodical complex (teaching materials), Supportability of the process by high technologies The cost-effectiveness of the knowledge workers' maintenance (including the use of external patents, information protection, and organization of jobs)
Subsystem of the intellectual and academic process management	Loss of time associated with information search Indicators of irrational use of intellectual work The level of interrelation between intellectual processes and valuation parameters The level of satisfaction with educational process
Subsystem of the intellectual potential development management	The proportion of knowledge workers involved in the students development system with regard to total number of workers The profitability of spending on the teaching staff (TS) development The number of conflicts in the social and work sphere with the involvement of knowledge workers The cost of education and advanced professional training of knowledge workers The cost of maintaining a system of intramural training per one knowledge worker

From the psycho-pedagogical perspective, the intellectual work management is seen as interrelated and mutually supportive concept of intellectual capacity, intellectual resource, intellectual process, and intellectual capital, where each subsequent concept is a part of the previous one (Abdikeev and Kiselev 2011).

Results

Teaching Conducted study has revealed that the intellectual potential of the higher education institution:

- is an integrative assessment of the development level of intellectual and creative abilities and resources of both the higher education institution and the individual;

- is determined by the development level of society and education system, science and culture, as well as the genetic fund of the society;

- reproduces the accumulated knowledge;

- uses accumulated knowledge to form new approaches for the assessment of the ongoing changes in order to develop innovations.

The intellectual potential of the creative higher education institution, as the totality of its intellectual capabilities, consists of the intellectual potentials of prospective students, teachers, organizations (schools, gymnasiums, lyceums), industries, regions and the country at large and is crucial for their effective innovative development. The interaction between these elements results in synergistic effect in the development of the higher education institution, country, and society.

The intellectual work management of contemporary society is formed and developed by the very system of education and training, upgrading qualifications and personnel development, self-education and science, research and development, as well as using the methods, means, tools and mechanisms that are applied when making and implementing decisions (Kryshtafovich 2003).

The intellectual work management at the higher education institution depends on the mission and strategy, set goals and objectives that affect creativity. Therefore, the intellectual work management should be considered not only in the short-term but in the medium-term and long-term period. The intellectual work management of the higher education institution is associated also with the level of intellectual work culture. A high level of culture promotes the growth of intellectual potential, intellectual resource, intellectual process and the intellectual capital, while low level leads consequently to its reduction.

The intellectual resource, as a set of accumulated knowledge, developed technologies and scientific discoveries is an outcomes of creative and analytical work as well as knowledge specific to the certain higher education institution. They are objectified in the forms such as intellectual capital, intellectual property, educational programs, knowledge, innovations, technologies, and organizational culture. They serve the basis for creating very important assets of the higher education institution. The assets of the education institution consist of identified objects (buildings, inventory, equipment, stocks) and intellectual property (inventions, designs, utility models, R&D activities as well as project outcomes protected by copyrights and trademarks).

The intellectual resource includes:

- ideas based on knowledge, accumulated experience, qualifications, and the advanced hypotheses;

- carrying out research, design studies and development activities;

- developing new methods of knowledge reproduction;

- the implementation of new technologies (Rumyantseva 2003).

The intellectual potential is a set of subsystems and elements, such as:

- intellectual potential: the intelligence, health, living standard, and employment;

- organizational potential: the infrastructure of the higher education institution, science, number and structure of master's students, postgraduates, candidates and doctors of sciences;

- information potential: the knowledge, information systems and technologies;

- international potential: the image of the higher education institution, educational, scientific, cultural and other relations with foreign higher institutions;

- process potential: up-to-date methods, forms, means and technologies in education, management, behavioral and emotional spheres;

- structural potential: the structure of the higher education institution;

- innovative potential: areas of fundamental and applied technological developments, their financing, innovation, inventive activity, intellectual property protection; development of high-tech research, the share of their implementation in other institutions;

- competitiveness potential: competitiveness structure, and relations with employers.

Each subsystem of intellectual work is characterized by its parameters and growth indices. For example, the intellectual potential of the educational institution is characterized by the number of bachelor's and master's students, postgraduates, doctoral students, as well as the quality and structure of their training.

The most important element in the intellectual work management in the creative higher education institution is the intelligence of future professionals, which is reflected not only in knowledge but in activities. Knowledge and activities are represented by different mechanisms. Knowledge is information, while activity is an implementation of knowledge in practice in accordance with the set goals and objectives. The mental power of future professionals, being the quality of the psyche, facilitates adaptation to changes in teaching based on the experience, understanding and application of knowledge. In the course of activity, the mental power of future professionals is formed based on:

- practical skills (work with objects);

- communication skills (communication and partnerships);

- leadership abilities;

- ability to oral and written presentation of ideas;

- ability to logical and mathematical thinking;

- capacity for short-term and long-term memory (Büchel and Raub 2002).

The intellectual process, as the basis for achieving a high level of special and professional intelligence, depends on the hereditary factors. Its elements are formed and developed by education and training systems through the evolution of logical and analytical (left brain hemisphere) as well as deductive and creative (right brain hemisphere) thinking. For example, left-sided thinking is related to individual's ability to express his ideas orally and in writing, as well as his logical and mathematical reasoning and short-term memory. Other abilities are associated with right-sided thinking. Special attention is paid to the development of communication skills associated with the right-sided thinking and creating culture.

Intellectual capital of the higher education institution includes qualifications, experience, motivation, knowledge, technology and communication

channels that can create added value and provide competitive advantages of the educational institution in the labor market.

Creative higher education institution, making efforts for the development of intellectual capital, invests many resources in research, training, and development. At that, the market capitalization of the higher education institution is higher than the physical value of its tangible assets and funds due to the developed intellectual capital (Bontis 2001). Intellectual capital, like a synergetic phenomenon, is formed not by simple addition of separate parts, but as a property of their mutual interaction. Employees, future professionals and sub-structures are carriers of the intellectual capital of the educational institution. The structure of intellectual capital consists of human, organizational and consumer capitals of the higher education institution (Table 2).

Table 2. Intellectual capital of the creative higher education institution

	Intellectual capital of the higher education institution		
Components	Human capital knowledge, creative and intellectual potential, personal qualities, moral values, leadership, work culture	Organizational capital technologies, procedures, management systems, culture, technical and software support, patents, organizational forms and structures	Consumer capital the system of sustainable contacts and relationships providing the possibility of productive communication and interaction
Management aspects	effective leadership, employee motivation, change management	research activity, values, mission, behavior and communication norms, ways of doing business	high quality knowledge, increase in scope of knowledge, high loyalty, employment with the best employers

It should be understood that such a division of intellectual capital on the types is quite conditional, because in reality they are not isolated, but exist together, creating a synergistic effect. In fact, the most creative individuals, high technologies, software developments, research and project activities, as well as research intensity are the driving forces of the creative educational institution, defining its structure.

Creativity, as the highest form of intelligence of a future professional defines his inventive ability and capacity for creation of advanced ideas in various fields. The main methods of creative thinking include analysis, combinations, synthesis, analogies, metaphors, associations, and imagination. At that, the main role in creative thinking and communication is played by the right hemisphere.

Creativity requires the availability of the following capabilities:

1) competencies (knowledge, skills, experience);
2) creative thinking (flexibility, ingenuity, perseverance in solving problems, using creative thinking and management techniques);
3) motivation:

a) internal motivation is personal concernment in solving problems, desire for self-fulfillment and application of acquired knowledge;

б) external motivation is material incentives and professional advancement;

4) work, activity, and job.

Discussion

The creativity of the higher education institution is the highest form of the manifestation of the intellectual potential, the intellectual resource formation, the intellectual process organization, the intellectual capital accumulation while creating, transferring and using innovations. It is provided by the methods and means of intellectual work management at all stages of the innovation cycle - from development to implementation of solutions in various fields of activity. Creativity initiates the innovation cycle, while innovation completes it.

When managing intellectual resources of the higher education institution the following must be taken into account:

- special knowledge of future professionals that are accumulated upon receiving special education;

- professional experience, knowledge and skills obtained in the course of practical activity (practice);

- intellectual and creative abilities;

- responsibility for the fulfillment of an assignment and the quality of the results (Bukovich and Williams 2002).

While managing the intellectual potential, the divisional managers should base their activities on the following competences:

- strategic competence;

- functional competence;

- social competence;

- managerial competence;

- environmental expertise;

- emotional strengths;

- leadership competence;

- responsibility for the safety of people.

This system of the intellectual potential management is formed as a result of the synthesis of leadership, intelligence, knowledge, entrepreneurship and expertise of the manager, i.e. the rector while making non-standard managerial decisions together with teaching staff.

Team management function in the creative higher education institution plays significant role. This involves individual and group development, including ongoing training, professional development and self-training of employees. The increase of the employees' intellectual potential contributes to advancement of intellectual potential of future professionals, their capabilities and efficiency.

The reflex-creative paradigm in the intellectual work management involves:

- learning critical thinking skills, moving from the problem towards efficient solution;

- integrated use of intellectual and creative resources in the creation of knowledge value. To this end it is necessary to develop courses such as "Culture of intellectual work", "Creative pedagogy", "Critical thinking", and "Compensation

management". The development of reflex-creative learning leads to conceptual change in the structures' activities, forms scientific bases of innovative management, and improves the intellectual work effectiveness.

The intellectual work in the creative higher education institution becomes the major component of human activity. Overall universal work can be manifested in the intellectual work of large teams with diverse specialties and experiences, working together, as well as in the activities of individuals, who are using in their research and project activities integrated scientific, technical and cultural achievements of the human intellect.

Conclusion

Thus, the capital that uses living labor makes no sense. This circumstance gives rise to a theory, which states that the technological innovation results in saving the increased amount of unpaid work, rather than its appropriation. It is impossible to manage intellectual labor using traditional methods, thus it is necessary to form a system of innovation management of intellectual work, the most relevant to the current stage of development of the creative higher education institution.

A synergistic approach seeks to:

- perform communicative role between different knowledge areas as transdisciplinary science;

- give general guidelines for scientific inquiry, forecasting, planning and process modeling, as well as designing and implementing new approaches in teaching and learning.

The reflex-creative paradigm as a synthesis of scientific knowledge on the creation and use of ideas, elements, models, new applications of existing technologies, generation of knowledge, critical thinking, development of key competences and their implementation, must show that achieving sustainable growth of the intellectual potential, intellectual resource, intellectual process, and intellectual capital is impossible without the recognition of the priority of individual's intellectual work culture. The compensation management methods will allow effectively solving these problems.

The following has been carried out to implement this approach:

- the trends in the change of content and nature of activity have been identified in accordance with the proposed model;

- general and specific requirements for intellectual work have been defined;

- conceptual and categorical framework for intellectual work management has been formed;

- intellectual work management methodology has been grounded;

- productive modeling tools have been defined.

Disclosure statement

No potential conflict of interest was reported by the authors.

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