

Intellect as the basis of future scientist's intellectual work culture
El intelecto como base de la cultura del trabajo intelectual del futuro científico

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Abstract

The relevance of the problem is due to the need for monitoring diagnostics of future scientist's intellectual work culture and insufficient study of various aspects of the multidimensional intelligence model as its basis. The purpose of the article is to consider the functional-structural model of multidimensional intellect as the basis of future scientists' intellectual work in the line of the human-anthropological approach and its approbation. The leading method of studying this problem is modeling, which allows us to study this problem as a process of mastering by future scientists the fundamental system qualities of intellectual work culture. The article presents a functional-structural model of multidimensional intelligence, consisting of interrelated subspecies of intelligence and components of the culture of intellectual work; their features are defined; an algorithm for implementing this model in practice is developed. The multi-dimensional intellectual model is aimed at transforming the research activities of future scientist based on determining the fundamental system qualities of future scientist's intellectual work culture of the by means of monitoring diagnostics.



Keywords: structural and functional model, monitoring diagnostics, intellect, types of intellect, intelligence.

Resumen

La relevancia del problema se debe a la necesidad de monitorear los diagnósticos de la cultura del trabajo intelectual del futuro científico y al estudio insuficiente de varios aspectos del modelo de inteligencia multidimensional como base. El propósito del artículo es considerar el modelo funcional-estructural del intelecto multidimensional como la base del trabajo intelectual de los futuros científicos en la línea del enfoque antropológico-humano y su aprobación. El método principal para estudiar este problema es el modelado, que nos permite estudiar este problema como un proceso de dominio por parte de los futuros científicos de las cualidades fundamentales del sistema de la cultura del trabajo intelectual. El artículo presenta un modelo funcional-estructural de inteligencia multidimensional, formado por subespecies de inteligencia interrelacionadas y componentes de la cultura del trabajo intelectual; sus características están definidas; Se desarrolla un algoritmo para implementar este modelo en la práctica. El modelo intelectual multidimensional tiene como objetivo transformar las actividades de investigación del futuro científico basándose en la determinación de las cualidades fundamentales del sistema de la cultura del trabajo intelectual del futuro científico mediante el diagnóstico de seguimiento.

Palabras clave: modelo estructural y funcional, diagnóstico de seguimiento, intelecto, tipos de intelecto, inteligencia.

Introduction

The intellectual potential of the nation, as a sustainable human capital, ensures the prosperity of society through the intellectual work culture of professionally trained scientists. The main strategic objective of higher professional education is the need to extract, creatively implement and create new knowledge-an intellectual product. This implies the formation of readiness and habits for intellectual work. In this regard, it is of great importance to study the aspects of a multidimensional model of an intellectual and creative self-developing personality as a system-forming goal of forming a culture of intellectual work (Shaimardanov & Khuziakmetov, 2008; Amhag et al., 2019). The basis of intellectual work is mental activity that requires the manifestation of the intellectual abilities of the individual. Therefore, the modern cultural man of the twenty-first century must be distinguished by a quality closely related to intelligence. The derived quality of intelligence is intelligence, which develops through the technologies of the human-anthropological paradigm (Yarullin et al., 2018; Hur et al., 2019). If these qualities are not taken into account, then the competence components of the technology of forming a culture of intellectual work as the results of training will be incomplete, with a pronounced defragmented personal segment in fundamental system qualities of the future scientist's personality (Hivner et al., 2019; Razumova, 2018). Intellect as the ability of the brain at the level of heuristics allows you to improve the activity, work of a

person, while it is necessary to maximize and effectively apply your own body of knowledge, passing them through psychological processes-analysis and synthesis. In the process of such work, a special personal quality of the structural component of intellectual work culture as a component of human - anthropological paradigm of education – intelligence must be manifested. Intelligence as a multi-level personal structural component is inherent in any person who has mastered the culture of intellectual work. These are cognitive and personal properties and qualities of an individual associated with emotional, social, verbal, and logical intelligence. Intelligence is expressed in a person's attitude to a rational understanding and acceptance of values. The basis of cognition and understanding is intellect, which combines the cognitive abilities of the individual and is the main component of intellectual work culture (Fig.1):

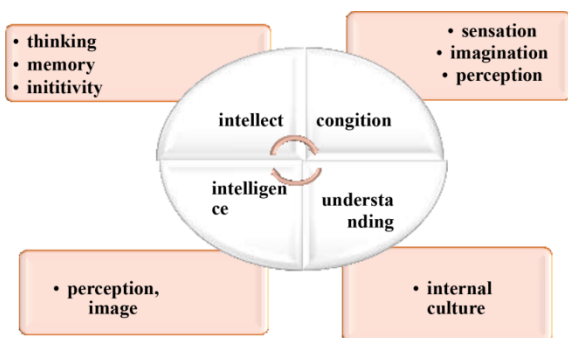


Figure 1. Intellect and intelligence as the basis of cognition and understanding



Intellect and intelligence as the key links of positive and effective interaction of the individual with society are the basis of ways, approaches and conditions for the formation of the culture of intellectual work in the human-anthropological paradigm.

Research Methods

The following methods were used in the research process: theoretical (analysis; synthesis; classification; comparison; method of induction and deduction; modeling); diagnostic (questionnaires; testing; method of tasks and tasks); empirical (study of the experience of educational organizations, legal and educational documentation; pedagogical observation); experimental (ascertaining, forming, control experiments); methods of mathematical statistics and graphical representation of results.

Experimental base of the study

The experimental base of the research were S. Toraighyrov Pavlodar State University (Pavlodar) and Kazan Federal University (Kazan).

Investigation stages

The study of the problem was carried out in three stages:

- the first stage - existing conceptual ideas and theories in philosophical, psychological and pedagogical scientific sources, dissertations were analyzed, the theory and methodology of pedagogical research were studied, their components were identified, the stages of the experiment were developed;

- the second stage - the experience of implementing the diagnostic monitoring system of the fundamental qualities of future scientist intellectual work was examined; a multidimensional model of intellect as a basis for future scientist' intellectual work culture was described, programmes of compulsory subjects and optional courses were developed and amended, the experiment was conducted.

- at the third stage the analysis of psychological and pedagogical experiment, which allowed to determine the effectiveness of modulated intellect as the basis of creating a culture of intellectual work; the mathematical processing, systematization and interpretation of the results, conclusions, the study was completed.

Results

Structure and content of the method

Practice proves that the majority of students can show moral and intellectual qualities, but they do not have developed intellect, and, on the contrary,

intellectually developed individuals cannot be intelligent. To overcome this dissonance, technologies are used to form the culture of intellectual labor. An intelligent person is prone to mental work, is able to consciously understand and analyze social processes objectively, abstracting from their needs and needs. An intelligent person is distinguished by intellectual decency, freedom of belief, and does not depend on economic compulsions and social biases.

The basic principle of intelligence is intellectual freedom, and as a moral category, freedom is manifested in the fact that an intelligent person is not only free from his conscience and his own thoughts, but he has the right to change his own beliefs, if there are reasons for moral orders.

The result and indicator of cognitive progress also depends on intellectual operations. The functional mechanism of operations depends on specific physiological systems-perception, memory, thinking, and the system of acquired operations. Certain types of intellectual operations are based on cognitive, convergent, divergent, and evaluative judgments, and intelligence is based on concrete-figurative, abstract levels, verbal intellect, and social intellect.

Intellect is manifested in the cognitive ability of a person, in the ability to think through intellectual operations and is aimed at processing and distinguishing information, and intelligence is manifested in the process of performing intellectual functions (Fig.2).

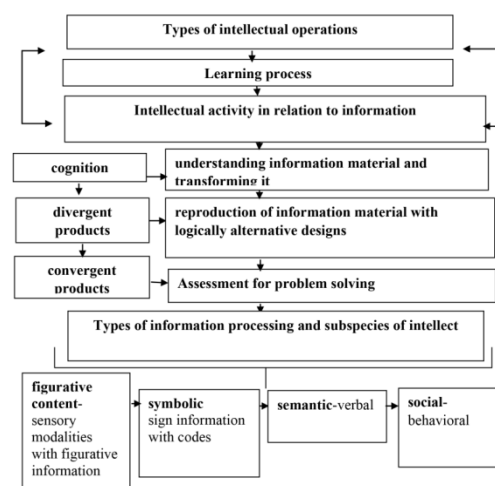


Figure 2. Functional mechanism of intelligent operations

Intellect as a component of intelligence determines the theoretical and cognitive, ethical and aesthetic relationship to the content of life and activity.



Intelligence is a quality of personality, according to the technology of forming the culture of intellectual work consists of intellectual and ethical qualities: - intellectual culture and responsibility for activities and work; the need for knowledge; - in recognizing the absolute priority of truth; - perseverance.

The criterion for the quality of intelligence is determined by the multidimensionality of intellect, its integration with the components of the intellectual work culture and the moral qualities of the social subject (Fig. 3).

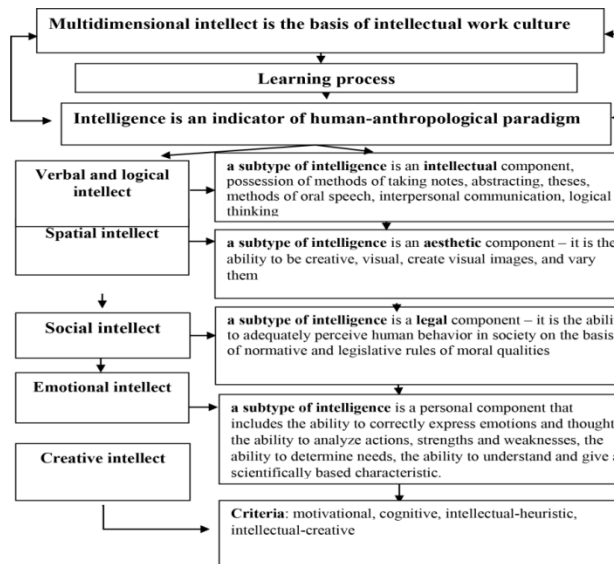


Figure 3. Multidimensional model of intellect as the basis of intellectual work culture

The internal imperative for achieving and explaining the true rules and norms acts as the basis for cognition, evaluation, and a mental plan for transforming one's own activity, in justifying the possibilities of such a transformation based on principles and laws.

Stages of model implementation

Implementation of the model involves the following stages of experimental work:

- determination of the initial level of formation of fundamental system qualities in future scientists using methods of testing, questioning, pedagogical observation and self-observation, statistical processing of research results. And also by using the technique of progressive matrices designed to differentiate subjects by their level of intellectual development.

Ascertaining stage

In total, the study covered 146 doctoral and master's students, and 83 students were directly involved in the experiment. Analysis of the results of the diagnostic examination allowed us to conclude that the majority of students have an initial (67.8%) and an average (24.5%) level of formation of the considered system qualities and a high – 8.5 (Fig.4).

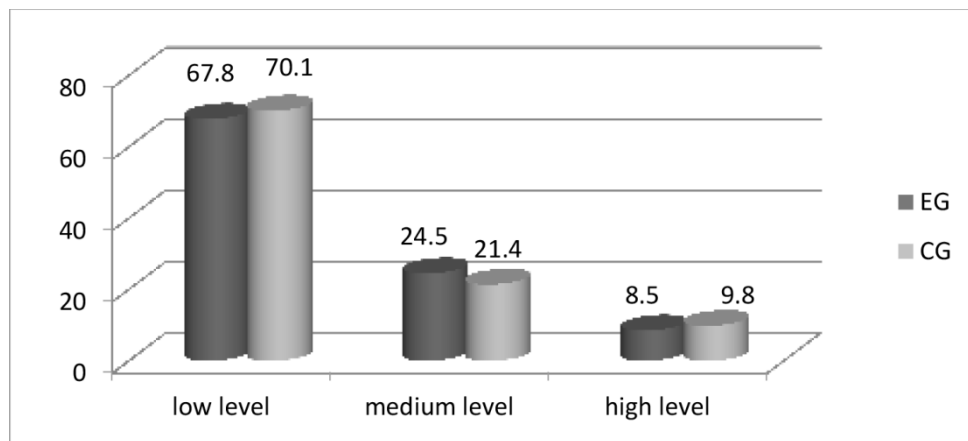


Figure 4. Results of fundamental system qualities of students at the ascertaining stage

The correctness of problem solving depends on the ability to logically determine the principle that is associated with the level of cognitive activity at the moment of solving the problem. Each set of tasks is complicated in the form of progressive matrices, as a result of which the criteria are set for using relationships, analogies, progressive changes, rearrangements, and criteria for dividing the whole into parts that depend on the quantitative and qualitative development of kinetic, dynamic series, and the highest form of abstracting and dynamically synthesizing concepts. As practice shows, intelligence is due to genetics, and intelligence is due to the internal state of the individual. Intelligence as an adaptive ability manifests itself in an inadequate response to problems, and intelligence is an indicator of the quality of the individual and depends on the ability to perform analysis and synthesis. Intelligence and intelligence are associated with the process of logical thinking, as one of the important psychological process and indicator of the degree of intellectual development and the culture of intellectual work in general.



Formative stage

The expediency of the study is aimed at assisting students in building individual educational routes of subject content. It should be noted that at this stage, for psychological and pedagogical assistance and support, a program of development "Emotional intellect" has been developed, which is based on the formula of social intelligence. The key provisions of the program are theoretical, content-technological and scientific-methodological aspects of the model of multidimensional intelligence as the basis of future scientist intellectual work culture.

The "Emotional intellect" program is aimed at implementing a model of multidimensional intelligence, which is based on subspecies of intelligence and through which an important personal quality is formed – intelligence in the course of intellectual work culture based on the human-anthropological paradigm.

Control stage

At this stage of the experiment, the dynamics of the formation of evaluation components of intelligence and intelligence as fundamental system qualities in the course of forming the culture of intellectual work of students is determined. In the course of the work, monitoring diagnostics was carried out using the same method as at the ascertaining stage of the experiment. The indicators of the control diagnostics are higher compared to the measurements made at the previous stage. However, significant indicators were noted in the experimental group, since the number of students with medium (58.9%) and high (32.6%) levels of formation of fundamental system qualities is greater. In the control group, there were no significant changes in the level of formation of these skills (Fig. 5).

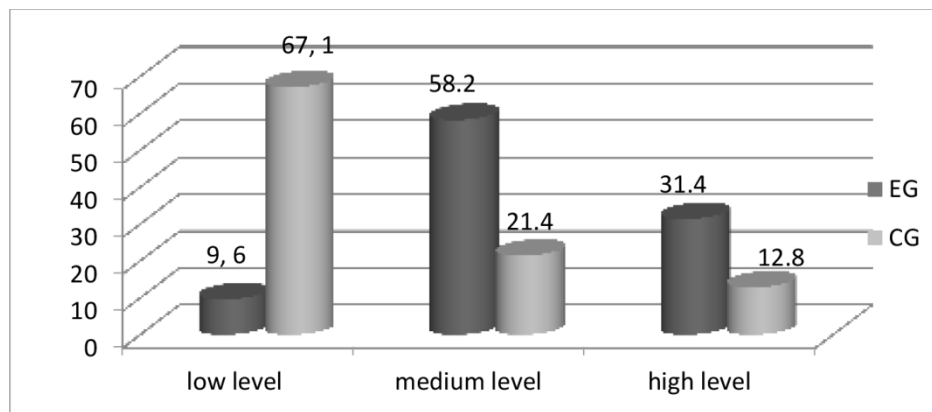


Figure 5. results of estimated components of intelligence for learners at the control stage

Also, in the process of observation, survey and analysis, the results were obtained: 52% of undergraduates and 36% of doctoral students show that they do not have sufficient skills for effective organization of independent work on a scientific basis, 15% did not think about the correct organization and distribution of their own time. Therefore, training programs for organizing independent work on a scientific basis have been developed. Some aspects of the program's priority areas are shown in the diagram (Fig. 6).

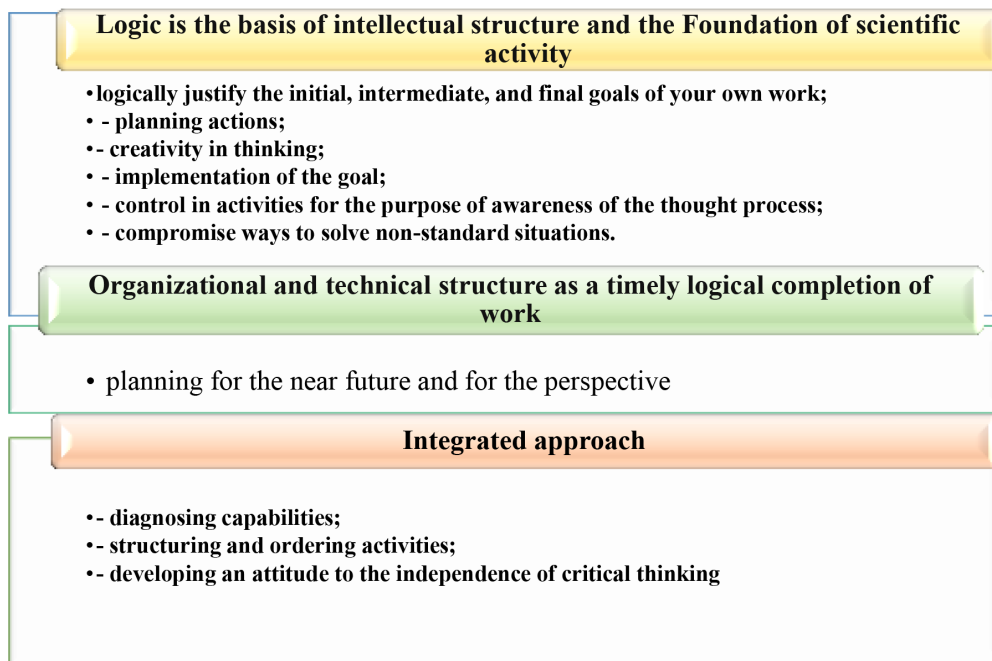


Figure 6. Some aspects of the program's priority areas

Practice proves that the success of the thought processes is influenced by the concentration of attention on the results of the productivity of one's own thinking.

Discussions

Study and analysis of existing conceptual ideas and theories in philosophy, psychology and pedagogy, the theses on this question allows us to conclude the absence of special studies devoted to studying aspects of the multidimensional model of intelligence as the Foundation of future scientist intellectual work culture the in a real practical teaching. The basis of the formation of intellectual work culture is activity, and its core is based on "multidimensional intellect", which affects the content components of intellectual work culture. However, in the works of scientists created a methodology that allows us to determine the multidimensional thinking of brilliant people (Suzan, 1983), we consider a set of human abilities based on a set of certain dimensions of intellect (Sternberg, 1985), identified certain abilities that are important components of intellectual work culture (Guilford, 1967; Guilford & Hoepfner, 1971).

Conclusion

It is established that multi-dimensional intellect from the point of view of intellectual work culture is a key position and includes various subtypes of intellect that interact on a complex basis, while forming the basis of content-structural components of the formation of intellectual work culture. Optimal ways and approaches for improving and

developing the fundamental system qualities are valuable for the organization of successful scientific activity, and the diverse aspects of the multidimensional model determine the dialectics, integrity and functionality of the professional and creative system.

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