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The Implementation of Trans-disciplinary Principle in the Content of Higher School Students Humanitarian Training

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ABSTRACT

This article is focuses on the scientifically-methodical substantiation of conditions of trans-disciplinary principle realization in the higher school students' humanitarian training. The article presents the theoretical ideas of trans-disciplinary as a methodology of general cultural norms, values, universals, invariants of the scientific picture of the world, organized form of communication in many disciplines; discloses the potentialities of the implementation of trans-disciplinary principle in the content of higher school students' humanitarian training; proposes the technology of trans-disciplinary principle implementation; defines the educational software of this process. Materials of the article are intended for the teachers of social-humanitarian disciplines and disciplines of professional cycles, the universities' methodists, the organizers of the educational process, attendants of qualification improvement system and teachers' retraining courses.

Keywords: Principle of Trans-disciplinary, Management of Education, Technology, Students
JEL Classifications: A23, I23, I26

1. INTRODUCTION

The possibilities of modern transformations in the educational process of high school have a qualitatively new potential, the study of which becomes especially important. Despite the fact that the humanitarian training as an educational phenomenon is studied in various aspects and directions that certainly contributes to a better understanding of the processes of students' personality development - the future experts in mobile modifies of the labor market, to talk about the origin of a holistic understanding of this phenomenon is premature. Under these conditions, the study of design features in humanitarian preparation's content, characterized by the expansion of the academic subjects' boundaries, reveals the hidden mechanisms underlying them, and improves the quality of students' training (Yusupova et al., 2015; Komelina et al., 2016; Zakirova et al., 2016; Alekseeva et al., 2015). This trend can also be seen in the requirements of the High Professional Education Federal State Educational Standards (HPE FSES) which state that "the long-term objective of the educational process in higher education becomes a transformation of subject knowledge from the main goals of the educational process into a means of meta-subject competencies through the integration of objectives, structure, content of social and humanitarian, natural - scientific and professional cycles' disciplines" (HPE FSES, 2009). Appeal to the idea about meta-subject competencies is reasoned by the urgent need for conversion not only of the structure of academic disciplines but also of the informational content provided in Humanities. Changing of the social paradigm from the post-industrial into informational one, the information "explosion" caused by the use of communications technology, have led to

an increase in the tens of times as in the consumed information volume so to its constant renewal. Constant changes become the norm for everyone today. In these circumstances, the productivity of students' humanitarian preparation depend not so much on the subject information knowledge, but on the ability to navigate the communication and information flows, and on this basis to develop the skills of a competent and proactive problem solving, to improve the level of knowledge or other resources to achieve goals. As it is evidenced by the study results, modern communication information flows of social sciences and humanities, as well as of natural - scientific and professional cycles are governed by the principle of trans-disciplinary (Ribakova et al., 2015; Priymak et al., 2014, 2015; Lipaev et al., 2010). Practical refraction of this principle occurs in the interpenetration and expanding the subjects' boundaries in the process of harmonization of related and not very closely related disciplines' concepts that enrich them by norms, values, invariants, universals of scientific world.

2. LITERATURE REVIEW

2.1. The Essence of The Concept of Trans-disciplinary

The term "trans-disciplinary" first was introduced into scientific circulation in 1970 by Piaget who invited to work in the founded International Center for Genetic Epistemology specialists of different scientific disciplines. Under trans-disciplinary he understood the principle of scientific research, which describes the application of a scientific approach to the problems which appear (transcending) beyond the conventionally established academic disciplines (Tararina et al., 2015; Kiyashchenko and Moiseev, 2009; Barabanova and Ivanov, 2012; Ibragimov et al., 2015).

One of the first who begin to use the term "trans-disciplinary" were experts of the Center of modern anthropology and epistemology, founded in 1999 by Morin in Paris. Differences between interdisciplinary and trans-disciplinary research by Morin is explained as follows: "Inter-disciplinary can only mean simply that different disciplines "sit down at one table", just as different nations come to the UN only to assert their own national rights and sovereignty in relation to the neighbors' assaults. But inter-disciplinary can also seek to exchange and cooperation, bringing inter-disciplinary to something organic. With regard to trans-disciplinary, it is often discussed about the cognitive circuits that can move from one discipline to another, sometimes so quickly that subjects are immersed in a state of trance. In fact, it is the very inter-, poly- and trans- systems knowledge work and play a productive role in the history of science; it is worth to remember those key concepts that are involved here, namely co-operation, to be more precise, the connection or relationship or, to express more precisely, a joint project" (Morin, 1999).

2.2. Opposing Views on the Inter-disciplinary and Trans-disciplinary Essence

In modern science, there are diametrically opposed views as for inter-disciplinary and trans-disciplinary essence, from their identification to their principal opposition. Moreover, a number of experts stress that interdisciplinary is inherent to science initially, and it should not be allocated as a special research principle. The well-known Russian specialist in the theory of knowledge Kasavin writes that "interdisciplinary interaction is the natural state of the science" (Kasavin, 2006). Professor Knigin (2008) notes interdisciplinary as a principle which does not have any advantages over the dialectical principle of full consideration. He criticizes the term itself, indicating that inter-disciplinary can be interpreted literally as "between disciplinary" that is, as an analysis of areas lying between the intellectual fields of individual disciplines. According to Knigin, it would be more correct to speak about the integration of separate disciplines, because really new knowledge appear "at the sciences' crossroads," and not "between" the sciences.

On the question of the relationship between the concepts of "inter-disciplinar" and "trans-disciplinary" there is no any unity. Thus, the German philosopher Mittelshtrass believes that the interdisciplinary and trans-disciplinary are identical, and interdisciplinary main value is that it allows overcome the disciplinary impasses (Mittelstrass, 1999). Supporters of trans-disciplinary, in contrast, strongly emphasize its fundamental differences from interdisciplinary.

Romanian physicist Nicolescu formulates three important methodological postulates. According the first one, the reality is multi-leveled and each discipline studies only one of its levels. Trans-disciplinary aims at understanding the dynamics of the process at several levels at the same time, connects the fragments of reality, examined by the specific disciplines in a single picture. The second postulate of trans-disciplinary is in the logic of the third one. Trans-disciplinary combines according the subsidiary principle those things which from the standpoint of particular disciplines was seen as the opposite one. And finally, the third postulate - the complexity. Trans-disciplinary is trying to understand the reality in its complexity (Aleksandrov et al., 2015).

Russian scientists (Arshinov and Svirsky, 2005) consider the trans-disciplinary at the level of a constructive project and organized form for many disciplines' cooperation to understand, study, create, and perhaps, super complex systems' phenomena management. Today it is environmental problems, global studies, anti-crisis management, social engineering, artificial intelligence, integrated psychology and medicine, space exploration, and others. In physics, for example, it is a simulation of the universe evolution within the cosmological anthropic principle. The investigation of any serious accident is a trans-disciplinary project heuristic hypothesis' confirming - its cause analogy. "The project is built as a bridge between the islands of disciplines as a route in the complex landscape of disciplinary discourses, and if its purpose is to test hypotheses or its analogy making and if its purpose is search - research or design activities. On the basis of the project there is the implementation of trans-disciplinary methodology of norms, values, invariants and universals of the scientific picture of the world (Budanov, 2013). In this project five levels of trans-disciplinary are observed: The coordination of related disciplines' languages; trans-coordination of disciplines' languages which are not very close; a heuristic hypothesis - analogy; constructive interdisciplinary project; network communication or self-organizing communication).

3. RESULTS

3.1. Implementation Technology of Trans-disciplinary Principle

In the course of the study there was an attempt to justify and to implement the pedagogical possibilities of trans-disciplinary principle in updating the content of students' humanitarian training on the basis of approaches suggested by Arshinov and Svirsky (2005), Budanov (2013). Taking into account the proposed trans-disciplinary levels by these scientists an experimental technology how to realize the trans-disciplinary principle in the content of Humanities' education was developed and adapted to the educational process of the University. The technology involves a combination of the following stages:

1. A pairwise interaction. At this stage a related disciplines' curricula harmonization, the conceptual language's updating, the development of multi-disciplinary Glossary, joint courses' creating, the monitoring of the social order for educational services, a unified online center forming, teachers' and students' joint methodological and research work on rethinking of the conceptual content of Humanities' training and scientific and methodological justification of learning technologies' choice occur. As a result of this interaction joint courses are created, the structure and content of training curricula and work plans of social - humanitarian cycle's disciplines are changed.
2. The alignment of goals, objectives and content of the disciplines of social - humanitarian, natural - scientific and professional cycles. At this stage there is the creation of subjects' unified educational space "teacher - environment-student" as conditions for the development of student's personality: The structural - semantic harmonization of norms, values, invariants, universals of scientific picture of the world and not very closely related disciplines is carried out; a system of theoretical knowledge, providing profoundness of training, knowledge and practical skills' is defined, making a basis of professional training; interdisciplinary relations in linked fields of professional activity are established; in the content of humanitarian training the core components, meeting the requirements of HPE FSES are defined: An invariant part, representing a new perspective for modern production technologies', technical facilities, machinery's description etc.; professional part that combines professionally oriented knowledge, selected in accordance with the groups of occupations; a specialized parts, including concepts and theory, selected in accordance with the specialization of students; an ideological part, combining socio – humanitarian knowledge, providing ideological and socio-cultural orientation of the academic knowledge. The result of this harmonization is trans-disciplinary projects of communication scenarios of interaction between educational environment of the University with space of major scientific and industrial complexes, research centers, laboratories, international student scientific associations, technology parks.
3. The creation of a heuristic hypothesis - analogies of some disciplines designs' transfer into other disciplines. The justification of some disciplines designs' transfer into each other, within a particular discipline or review of the latter one on the basis of communication is fulfilled: A departure from the encapsulation of language and the epistemological spaces of disciplines, increase of their interaction, neutralization of disciplinary snobbery. An example confirming the relevance of the heuristic hypothesis - analogies, is the crash of the space Shuttle "Discovery" occurred due to communication gaps in coordination of numerous technical services' languages. The result of the heuristic hypothesis - analogies' using are projects of students' search and research activity based on the self-organization of cognitive, intellectual activity, on the redistribution of knowledge and ignorance, communication and self-organization of communication, competencies' forming to project new designs of educational knowledge: Self-design of the problem, goals, hypotheses, objectives, preparation of future work-plans, their implementation, evaluation, quality control of the final product.
4. Criteria-based support includes the generic productivity indicators: The students' willingness to transfer structures of one discipline into others based on specific ideas about the subject of activities; the involvement in the activities on the concepts' harmonization of closely and not very closely related disciplines and the results' self-evaluation of this creative activity.

The dominant criteria of trans-disciplinary principle's productivity in the Humanities training's content is motivation on knowledge learning which belong to closely related or not very closely related disciplines; readiness to apply the norms, values, ideals, invariants, universals of scientific map of the world, to transfer of some disciplines' structures into others, to create a heuristic hypothesis - analogies of content's designing of trans-disciplinary academic knowledge; the possession of necessary knowledge for communication; experience of communications' using in standard and non-standard situations as activity aspect; axiological attitude to the principle of trans-disciplinary as an object of use; the emotional response to the activities' process (Table 1).

Table 1: Productivity indicators of trans-disciplinary principle in the content of humanitarian training (data in %)

Indicators	Before experiment	After experiment
Motivation to learn knowledge of closely related and not very closely related disciplines	33	65
The readiness to apply the norms, values, ideals, invariants, universals of scientific picture of the world in the process of one discipline's design transfer into another one	15	51
The willingness to create a heuristic hypothesis - analogies of content's design of trans-disciplinary academic knowledge	5	35
Possession of necessary communication knowledge	25	53
Experience of communications' application in standard and non-standard situations, as the activity aspect	25	44
Emotional value perception of trans-disciplinary principle as an object of activity	15	64,3

3.2. Educational - Software Providing in Trans-disciplinary Principle Implication in the Content of Students Humanitarian Training

1. The definition of a heuristic hypothesis - communication analogy of related and not closely-related disciplines' complex:
   - Actualization of the communication's problem. The problem is not available in finished form. Students with the help of special techniques are brought to an independent formulation of the problem, hypothesis definition to solve it;
   - Understanding of the problem (the use of knowledge and skills for concepts' communication of related and not closely related disciplines, the content of any other information presented as text, diagrams, file; integration of information; critical evaluation);
   - Characteristics of the communication problem (determination of the communication's level and content, coordination and trans-coordination of concepts, relationships between them, the hypothesis design);
   - Representation of the problem (hypothesis construction – communication analogy;
   - The problem solving (to make decision in accordance with the terms of the problem, analysis, solutions' panning to achieve the goal of communication);
   - The problem's solution rethinking (explore the solution and, if necessary, to attract additional information, to evaluate the decision);
   - Presentation of the problem (to choose the form of results' presenting and to present summary evidently).
2. Methodical support:
   - The preparation of the student's technological card (definition of objectives, design of tasks for independent work on construction of norms, values, invariants, universals of scientific picture of the world, forms and methods of training, methods of diagnosis and remedial work on designing of heuristic hypothesis – analogies to transfer structures of one discipline to another);
   - Features of co-creation of lecturers and students;
   - The interiorization of knowledge by students, preparation of more complex training projects on the basis of trans-disciplinary principle.
3. Final examination and evaluation of the productivity of trans-disciplinary principle. They allow to determine the compliance of the result obtained to the original plan. If necessary, one can make adjustments, to make decision on a local or broader use of the study materials in educational practice.

Methods of assessment:

1. Through the involvement of independent experts;
2. In the course self (evaluation) of results in accordance with the selected criteria;
3. In the course of reflections on the success and integrity of communication as joint activity, including its objectives, content, forms and methods of implementation;
4. In the course of analytical activity of trans-disciplinary principle's implementation.

4. DISCUSSION

The results of the study allow to specify clearly the problem of trans-disciplinary principle's implementation in Humanities' content as a priority educational strategy to date, allowing dramatically alter the content of the Humanities on the basis of communication and harmonization of related and not very closely related concepts, to rethink the norms, values, invariants and universal of scientific picture of the world which are necessary to learn for a student for his or her self-identification in the future social professional activity.

The implementation of this principle include: (1) At the content level - communication (organized form of interaction) of many disciplines (humanities, natural - scientific, professional), harmonization of concepts, self-organization, communication, heuristic hypothesis - an analogy, the constructs' transfer of one discipline into another one, based on the principle of trans-disciplinary; (2) at the process level - a modification of the relationship of the teacher and students, expanding of partnerships, cooperation and mutual assistance; (3) at the level of means - interactive and design technologies; 4) At the level of conditions - collective creative environment, generating and supporting creative behavior of personality, its self-organization and self-transformation; (5) at the level of criteria productivity of trans-disciplinary principle: Competences' development of trans-disciplinary knowledge operating; self-identity in the system of value orientations and social norms demanded in various activity fields; ideals; regulations; invariants; universal of scientific world; heuristic hypothesis - analogies of some disciplines structures' transfer in other disciplines; degree of involvement in modifying educational - cognitive and socio - professional activities.

5. CONCLUSION

This study confirms the importance of the theoretical and practical aspects of the research problem in the content of high school students' humanitarian training, as an innovative trend in educational knowledge rethinking on the level of communication's conceptual ideas of closely and not very closely related disciplines of social - humanitarian, natural - scientific and professional cycles; actualization of norms, values, invariants, universals of scientific world, heuristic hypotheses - analogies in the interpenetration of some disciplines' structures into others. This direction has extensive internal resources to enrich the methodology of the humanities in the development of conceptual language, communication and self-organization of communication in various branches of science - academic knowledge to rethink the students training theory, content and technologies of educational process and others.

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