

Integration and Differentiation as the Universal Scientific Categories and their Reflection in the Theory and Practice of Natural Science Education

Abstract. The post-industrial society gives way to the qualitatively new formation of education, integrated at its every level: integration with science and production; cooperation of different educational establishments; succession of educational levels; cross-disciplinary and inter-disciplinary expertise development; choice of methods, technologies and organizational forms of education and upbringing, etc. The integration and differentiation in their didactic unity reflect the complexity and contradiction of educational process, either of them dominating in certain socio-economic conditions of the given historic period.

The retrospective analysis of the above correlation regarding the natural science disciplines demonstrates the lack of theoretical and methodological bases for integration, and its accidental unsystematic character in educational processes. The main conclusion of the study is the need for the complex competence model to combine the ideas of integration and differentiation providing both the wide outlook and professional training. For overcoming the predominance of differentiated education, the author suggests adapting the concepts of post-non-classical science, and selection and structuring of educational information with the reference to the semantic universals of systematic synergetic approach.

The research findings can be used in pedagogic research methodology, educational process design and modeling, its content, technology and organization.

Keywords: differentiation, integration, competence, interdisciplinary education, systematic synergetic approach, educational content, universals.

References

1. Budanov V.G Transdisciplinary education, technology and the principles of synergy // Synergetic paradigm. The variety of quests and approaches. Moscow: Progress Publishers. Tradition, 2000. p. 14-22.
2. Zagvyazinsky V.I learning theory: a contemporary interpretation. Moscow: Academy, 2007. 192 p.
3. Zagvyazinsky V.I, Strokova T.A Pedagogical Innovations: problems of strategy and tactics. Tyumen Tyumen State University, 2011. 176 p.
4. Zorina L.Y The reflections of the ideas of self-organization in the content of education / / Pedagogy. 1996. Number 4. p. 105-109.
5. Ignatov S.B modern-day education: transformation in the context of sustainable development / / Philosophy of Education. , 2012. Number 3 (42). p. 130-136.
6. The integration of modern scientific knowledge. Methodological analysis. Kiev: Visha School, 1984. 183 p.

7. Kiyaschenko L.P, Mosaic V.I Philosophy transdisciplinary Moscow Institute of Philosophy, Russian Academy of Sciences, 2009. 205 p.
8. Knyazev E.N, Kurdyumov S.P Synergetics as a tool for integration of science and humanities education // Higher Education in Russia . 1994. Number 4. p. 31-36.
9. Rubinstein S.L Being and Consciousness: The place in the general relationship of mental phenomena of the material world. Moscow: Academy of Pedagogical Sciences of the RSFSR, 1957. 370 p.
10. Belousov A. A new concept of science education. Chelyabinsk: Torch, 1996. 45 p.
11. Xutorskoj A.V. Theory and technology of creative learning. Moscow: Moscow State University, 2003. 416 p.
12. Chapaev N.K Integration of pedagogical and technical knowledge in vocational pedagogy. Yekaterinburg: UrGPPU, 1992. 223 p.