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Visual Arts and Science – Opportunities and Limitations of Their Integration in the First Cycle of Primary Education

Extended summary

Integrative teaching is based on the wholeness of the reality that surrounds us and, consequently, on a holistic approach to school subjects. As such, it involves not only linking the content, but also the processes and procedures, as well as the actors in education, for the purpose of achieving the common goal and the individual goals of the teaching disciplines involved in the process. This form of work has the capacity to integrate the knowledge and mindsets typical of two or more disciplines and bring about cognitive progress in ways that would be inconceivable if we relied only on the resources of a single discipline (Boix Mansilla, 2005; Kostović-Vranješ and Vickov, 2013).

In the last few decades, different educational concepts based on the integration of the visual arts and sciences have particularly attracted attention. For instance, one of these concepts is STEAM (Science, Technology, Engineering, Art & Math), mainly implemented in the USA, which fosters integration of arts and science. Although these areas appear to be completely different in terms of content and methodology, they share a common starting point in the child's natural curiosity, sensory cognition and research activities (Cutting & Kelly, 2015).

Teaching in Serbia is predominantly subject-based and classroom-oriented, but there is still room for using the integrative approach, especially at early primary school stage where early primary school teachers teach almost all subjects. In this sense, a possible link among school

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subjects can be made between the Science and Social Studies classes and Fine Arts classes, where the content on materials, included in the curricula of both subjects, represents the most evident link between them.

For this reason, the aim of our research was to examine whether primary school teachers in Serbia manage, and in what ways, to integrate the subjects Fine Arts and Science and Social Studies in the first cycle of primary education. The research tasks were formulated as follows: 1. Determine whether and in what way the possibilities of integrating the teaching of Fine Arts and the teaching Science and Social Studies are pointed out in the curricula for the first cycle of primary education; 2. Examine whether, and in what way, the integrative potentials of the teaching content on materials are used in teaching Fine Arts, and what the challenges are that teachers identify in this context. The aim and purpose of the research required that descriptive method should be the dominant research method. By combining content analysis (syllabuses), a systematic observation of ten Fine Arts classes in the third grade of primary school, and subsequent interviews with teachers teaching these classes, we analysed the extent to which teachers integrate, and how they integrate, teaching Fine Arts and Science and Social Studies, and whether they encourage students to identify the links between material properties. During class observations we focused on the lessons about clay, as this material is suitable for teaching both at Fine Arts and Science and Social Studies classes. The recommendations for teaching Fine Arts lessons clearly state that clay is considered to be one of the most suitable materials for making three-dimensional shapes, and also that it represents a good choice of materials for Science and Society lessons when examining different properties of materials - *hardness, plasticity, water permeability, (non) water permeability, reversible and irreversible changes* (PNP1234, 2005; PPNU1, 2017; PPNU2, 2018; PPNU3, 2019).

The obtained results show that the curricula for the first cycle of primary education stress the possibility of integrating the classes of Fine Arts and Science and Social Studies, given that there are general recommendations on using the integrative approach. However, we have a different situation when it comes to integrating specific teaching contents of the two subjects, with a focus on *materials* as a common segment. Materials and their properties appear in different contexts in the curricula for these two school subjects, which complicates observing the link between the two closely connected subjects.

Given that the possibilities for an integrative study of the educational content of the Fine Arts and Science and Social Studies are not clearly perceived and clearly recognized in the curricula, the linking of the common content is carried out superficially in the classroom, without sufficient understanding of the content and the essence of the integrative approach. Namely, the observed classes showed that even when the knowledge and skills related to the use of clay are combined in these two subjects, this integration usually comes down to recognizing and naming only two mechanical properties of clay (*hardness, plasticity*), while other properties (*water solubility, (in) permeability of water*, changes in properties during *reversible and irreversible changes*), for which students need greater support in learning, were not mentioned or they were merely hinted at, frequently imprecisely or ambiguously. Although clay is presented in the curricula for Fine Arts for the first three grades of primary school as one of the most appropriate materials for three-dimensional shaping (PNP1234, 2005; PPNU1, 2017; PPNU2, 2018;

PPNU3, 2019), most teachers indicated that they needed additional education to feel more secure when using clay in their teaching.

It can be concluded that the lack of knowledge about the content related to different properties of materials and the possibilities of working with clay is one of the crucial factors why the integration in this research was not successful enough. Such findings indicate that it is necessary, in the initial education of future teachers and in their subsequent professional development, to focus more on the improvement of professional knowledge and the development of methodological strategies that support an integrative approach to the teaching content of different school subjects.

Keywords: integrative approach to teaching, teaching Fine Arts, teaching Science and Social Studies, properties of materials.

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