

STUDENTS OPINION CONCERNING REALIZATION OF INTERDISCIPLINARY CORRELATIONS WITHIN THE SCIENCES LESSONS

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Abstract

Since from the first half of XXth century have been emphasized the importance of establishing interdisciplinary correlations within the lessons. At present, according to the school programs, the teachers carries out compulsory and minimal correlations within the lessons. In order to enrich the general culture of pupils and create a global image on the world and life, teachers can establish, along with the imposed interdisciplinary correlations, links between the taught notions and other fields of knowledge. The aim of our work was to emphasize the opinion of students concerning the realization of interdisciplinary correlations within the sciences lessons, in order to improve initial training of the future teachers of biology, physics and chemistry. We used the questionnaire as method of investigation, this being applied to a population sample of 81 students from the Faculty of Sciences, within the University of Pitești. By analyzing the answers, it was found that most of students consider necessary that the teacher have to establish the interdisciplinary correlations. Within the lessons they have given during their pedagogical practice in schools, they established correlations with disciplines belonging to curricular area Mathematics and natural sciences, but also with other disciplines (romanian language and literature, music, geography), as well as with notions belonging to other fields of knowledge (astronomy, phytotherapy). Following rethinking of the mode of transmitting knowledges within the lessons, only 9.87% from the students have considered that they cannot realize any interdisciplinary correlation. We consider that the study with more attention of the content of lessons by the students, at the moment when they carry out the lesson plan design, as well as the supplementary documentation, which allows the enrichment of students general culture concerning the possibility of establishing of some interdisciplinary correlations, contribute to formation of the future teachers according to the present requirements of education.

Key words: interdisciplinary correlations, students, pedagogical practice, lessons, science

The interdisciplinarity “involves a certain degree of integration between various fields of knowledge, different approaches and use of a common language, allowing conceptual and methodological exchanges” (UNESCO, 1986). It stand at the basis of the occurrence of border disciplines, such as: biochemistry, biophysics, biomathematics, biogeography etc.

In the education process, the interdisciplinarity aims at the transgression of “frontiers between disciplines”, facilitating the establishment of closer relations between them (Nicola, I., 2003).

In the Romanian educational practice, establishment of some interdisciplinary relations in treating various themes does not represent a novelty. Thus, since from the first half of the XXth century, Simionescu, professor of biology, emphasized their importance in his first manual entitled “Concepts of Zoology and Botany for the secondary first grade”, elaborated in 1902. In this manual are mentioned both intradisciplinary

relations between old and new knowledges, and interdisciplinary relations between the notions of zoology and those of romanian language and literature, geography and history. For instance, with each theme of zoology, the author mentioned a saying or a proverb about the studied animal, a fragment from a poem known by the pupils, or indicated a lecture for the independent study. In relation to the extent of animals which does not live in our country, the pupils were asked to localize areas on maps from the atlas (Petruța, G. P. 2006; Petruța, G. P., 2007).

At present, the most of teachers realize compulsory and minimal correlation within the lessons, in other words the interdisciplinary correlations stipulated by the school programs or imposed by the logic of teaching new knowledges (Cucoș, C., 2006).

By the use of interdisciplinary correlations, it is aiming at the formation to pupils of a global vision on objects, organisms, processes, phenomena, etc. analysed separately within a

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discipline. Thus, it will be easier for the pupils to integrate the knowledges acquired by the study of various disciplines, and they will not have the feeling that in different school disciplines, where the same study problems are approached, the teachers speaks “in diferent languages” (Dudnicenco, I., Dudnicenco, T., 2001).

For the improvement of initial formation of the future teachers in such way to establish relations between the notions acquired by the pupils from various disciplines, in this study we were aiming at establishing their opinion concerning the realization of interdisciplinary correlation within the lessons. In this respect, we focussed on the following objectives:

- to establish the interest level for making interdisciplinary correlation within the lessons;
- to emphasize the disciplines to which they have realized correlations within the lessons;
- to emphasize the discipliens to which they could have realize interdisciplinary correlations.

MATERIAL AND METHOD

In order to know the opinion of students from the Faculty of Sciences, within the University of Pitesti, concerning to realization of interdisciplinary correlations within the lessons, an empirical study was carried out, based on the questionnaire method. The questionnaire, elaborated for the students, included questions concerning their interest in using some interdisciplinary correlations within the lessons given during the pedagogical practice, notions taught within the disciplines to which they have given the final lesson, disciplines with which they have realized correlations, exemplification of the mode in which they established these correlations, reasons for which they used or didn't use the interdisciplinary correlations within the lessons, and the disciplines with which they consider that correlations can be realized, in the case they would teach again the final lesson. The questionnaire was applied at the end of second semester, after the second pedagogical practice, carried out in gymnasium.

The starting hypothesis was the following: The use of some interdisciplinary correlations within the lessons depends on the interest showed by the students for their realization, but also on their conscientiousness in designing the lesson plan. The population sample included in our study was formed from 81 students in the third year of study, in the academic year 2010 – 2011. From the questioned students, 11 were from the study program in Biology, 21 students from the study program in Ecology and environment protection, 10 students from the study program in Horticulture, 25

students from the study program in Environmental engineering, four students from the study program in Chemistry, four students from the study program in Physical engineering, and six students from the study program in Nursing, respectively.

RESULTS AND DISCUSSIONS

The analysis of student's answers revealed that all of them consider that is necessary to use interdisciplinary correlations within the lessons. Thus, 80.24% from the students consider that the teacher should establish to a great extent such correlations. A lower percentage of students (19.75%) consider that the teacher should realize correlations only to a certain extent. None of the students considered that the teacher should not use interdisciplinary correlations within the lessons.

Concerning the notions taught within the discipline in which the students have given the final lesson, we found that the students in Biology and Horticulture have taught notions of botanics, e.g. about angiosperms (Biology, the 5th grade). The students in Ecology and environment protection have taught notions of botanics concerning the plants kingdom (Biology, the 5th grade) and of zoology, e.g. about reptiles, birds and mamifers (Biology, the 6th grade), and those in Nursing have taught notions of human anatomy and physiology, e.g. about respiratory, circulatory and excretory systems (Biology, the 7th grade). Some students from the study programs in Environmental engineering and Physical engineering have taught notions concerning the light and sound, such as: light reflection, plane mirror, light refraction, lenses, graphical building of images through lenses, optical instruments (the eye; spectacles; magnifying glass), light disperssion, rainbow, sound sources, sound propagation and sound perception (Physics, the 7th grade). Other students from the program in Environment engineering have taught notions concerning the radiations (X and γ radiations) and notions of nuclear energetics, concerning the nuclear power plants, nuclear weapons, and nuclear accidents (Physics, the 8th grade). The students from the study program in Chemistry have taught notions concerning the simple substances with practical uses – physical properties of the oxygen, iron, and copper (Chemistry, the 8th grade).

Within the final lessons, 75.30% from the students have established relations between the taught notions and notions belonging to other disciplines (Table 1). Thus, the students who have taught notions concerning to various angiospermae plants have realized interdisciplinary relations with geography, asking the pupils to

mention and to show the plant's area of origin, the geographical region where it grows or is cultivated, or to show the cardinal point indicated by the mosses from the tree trunks. Some students have realized connections with phytotherapy, pointing out the use of plant (e.g., cabbage, potato) in curing some disorders. The students who have transmitted to pupils knowledges concerning various animal species realized correlations with the romanian language and literature, asking the pupils to mention proverbs about the analyzed species (for instance, about the cat). They have established relations with the geography, asking the pupils to indicate region or geographic area where certain animals are living. Also, they realized relations with physics within the lessons in which were used notions of temperature and speed. For instance, the pupils have been asked to point out and explain the relation between the body temperature and temperature of environment in reptiles, or to explain the increase of speed in birds of prey when they descend to the target. The students who have transmitted to pupils knowledges about light have established relations with the astronomy, asking pupils to recognize the source of light and lighting bodies in the solar system, to give examples of stars from the Universe, and to explain the mode in which sun and moon eclipses occurs. They have realized connections with geography, reminding to pupils notions studied in previous years about Terra. They have realized connections with mathematics within the lessons in which they reactualized the notions of "angle" and "perpendicular", they have realized graphics, or they solved problems. Also, they have realized correlations with biology, giving examples

of organisms which produces light (glow worms, some fishes) and explaining the anatomy, physiology and hygiene of eye. Students who transmitted to the pupils knowledges concerning the sound have realized relations with biology, emphasizing the role of ear in perception of sound and exemplifying with sounds which cannot be perceived by the human ear, for instance the beating of the butterfly's wings, or with animals which orientate spatially and communicate each other with the help of sound waves (dolphin, whale). They have realized connections with music, using the tuning fork or an musical instrument for emphasizing the height and intensity of sounds. The students who have transmitted knowledges of nuclear energetics realized connections with chemistry, asking the pupils to remember themselves what they learn about uranium and plutonium. Also, they have realized connections with the biology, emphasizing the effects of nuclear accidents on the human body. The students who have taught notions concerning the physical properties of oxygen, have realized connections with biology, reactualizing the knowledges of the pupils about oxygen production as result of photosynthesis and its transport in the human body by the red blood cells. The students who have taught notions concerning the physical properties of copper, have realized connections with physics, emphasizing the capacity of this element to conduct electricity. The students who have taught notions concerning the physical properties of iron, have realized connections with biology, emphasizing the role of iron in the human body.

Table 1

Interdisciplinary correlations realized by the students within the lesson

Correlations with	Students who have taught					
	Biology 5 th grade (%)	Biology 6 th grade (%)	Biology 7 th grade (%)	Physics 7 th grade (%)	Physics 8 th grade (%)	Chemistry 8 th grade (%)
Mathematics	-	-	-	8.64	1.23	-
Biology	-	-	-	3.70	2.46	3.70
Chemistry	-	-	-	-	-	-
Physics	-	4.93	-	-	-	1.23
Romanian language and literature	-	2.46	-	-	-	-
Geography	27.16	8.64	-	2.46	-	-
Music	-	-	-	2.46	-	-
Astronomy	-	-	-	3.70	-	-
Phytotherapy	4.93	-	-	-	-	-
None	6.17	2.46	7.40	4.93	3.70	-

Among the reasons which motivated the realization of interdisciplinary correlations, the questioned students have mentioned: the possibility of a better understanding of the new concepts studied from another point of view within

a discipline; the necessity of formation to the pupils of an overall image on the world and life; the possibility of realizing a better communication between pupil and teacher, and also between teacher and pupil, making the lesson more

attractive, and contributing to the formation of a rich general culture; the possibility of activating the pupils during lessons.

Some of the students, who didn't realize interdisciplinary relations, have pointed out the fact that the theoretical content of the lesson comprised only notions specific to the taught discipline. Other students have mentioned that they didn't intend to establish such correlations during the lesson, or that the disciplines to which they wished to realize correlations were not studied yet by the pupils. Some other students have mentioned that the volume of knowledges which they have to teach was too large, and from this reason they had not enough time to establish interdisciplinary correlations.

Concerning the disciplines to which they consider that correlation can be realized, in the case they would teach once again the final lesson, 73.37% from the students have mentioned that they would make the same correlations. A small percentage of students (4.93%), have mentioned supplementary a discipline with which they would realize correlations, in addition to those mentioned previously. Thus, 3.70% from the students, who have taught notions of botanics (about hip rose, carrot and onion), noted the possibility of establishing correlations with phytotherapy, in addition to correlation with geography. A student, who have taught notions related to light propagation, stated precisely the possibility of establishing a supplementary connection with the Romanian language and literature, asking the pupils to explain the first three verses of the poem "To the star", written by Eminescu. A significant percentage of students (14.81%), who initially didn't realize interdisciplinary connections, have identified the possibility of establishing such relations with at least one discipline. Thus, 4.93% from the students, who have taught notions of human anatomy and physiology, have mentioned the possibility of establishing some correlations with chemistry. Other students (3.70%), who have taught notions referring to X and γ radiations, noted the possibility of establishing some relations with biology, and 6.17% from the students, who have taught notions of botanics, have mentioned the possibility of establishing a correlation with geography. From the students who have considered that they cannot make any interdisciplinary connection within the lesson, representing 9.87%, about a quarter (2.46 %) have taught notions of human anatomy, another quarter (2.46%) have taught notions of zoology, and about a half (4.93%) have taught notions concerning the light.

CONCLUSIONS

Most of the students consider necessary for the teacher to realize interdisciplinary connections to a great extent within the lessons.

The students who have taught lessons of Biology, Physics and Chemistry at the gymnasium, realized connections with other disciplines studied previously by the pupils within the curricular area Mathematics and natural sciences, but also with other disciplines (Romanian language and literature, music, geography), as well as with notions belonging to other fields of knowledge (astronomy, phytotherapy).

Most of the students are aware of the importance of establishing interdisciplinary connections. However, some students didn't establish such relations due to their insufficient training for teaching the lesson.

Rethinking of the mode of teaching the final lesson by the students, emphasized the possibility of establishing interdisciplinary correlations or realizing some new relations with notions belonging to other disciplines or sciences.

In order to improve the initial formation of the future teachers in such way to be able to establish interdisciplinary correlations, we recommend the study with a greater attention of the lessons content by the students, as well as to encourage their documentation in order to identify some relations which can be established between the notions intended to be taught and those studied by the pupils in other disciplines, or belonging to other fields of knowledge.

BIBLIOGRAPHY

- Cucoș, C., 2006** – *Pedagogie*. Ediția a II-a revăzută și adăugită. Editura Polirom. Iași, p. 222.
- Dudnicenco, I., Dudnicenco, T., 2001** - *Realizarea principiului interdisciplinarității la lecțiile de biologie în Didactica Pro. nr 4 (8)*. 2001. Chișinău, p. 56-60.
- Nicola, I., 2003** - *Tratat de pedagogie școlară*. Editura Aramis. București. p. 555
- Petruța, G.P., 2006** - *Manuale școlare alternative utilizate în predarea științelor naturale în școala secundară românească din prima jumătate a secolului XX*, în *Lucrări Științifice*, anul XLIX, vol 1 (49), seria Horticultură. Editura "Ion Ionescu de la Brad". Iași, p. 447-452.
- Petruța, G.P., 2007** - *Manuale școlare utilizate în predarea științelor naturale în învățământul gimnazial și liceal românesc, din prima jumătate a secolului XX*. Editura Universității din Pitești. Pitești, p. 24-30.
- *** UNESCO, 1986** – *Interdisciplinaritatea și științele umane*. Colecția Idei contemporane. București, p.11..