

POSSIBILITIES FOR THE USE OF MINI-PORTFOLIO IN BIOLOGY

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Abstract

The portfolio is an alternative method that synthesizes the work of student assessment to a particular school discipline for a period of time (a phase of a semester, a semester, school year, etc.). Making pieces that are part of a portfolio gives each student the opportunity to work at your own pace and to apply their theoretical knowledge and practical skills, talent and creativity. Also, the student has the opportunity to be actively involved in achieving individual, pair or group work tasks proposed, but also to evaluate oneself. Assessment of the components of portfolio gives the teacher an insight into student progress in school cognitive level, attitude and behavior. The aim of this paper is the proposal of mini-portfolios content that can be achieved by secondary school students in biology. In the research we used analysis method curricular documents, given curriculum and textbooks developed for middle school biology discipline. Given the information content of the subjects studied biology in secondary school, we mentioned components mini-portfolios that can be achieved by students in fifth grade for each class of higher plants studied, and in sixth grade for each class vertebrate, respectively. The varied work tasks listed in the proposed mini-portfolios was followed proper understanding and ownership of content by students studying biology concepts, systematization of knowledge learned, stimulating students' different intelligences, giving them the pleasure to participate in the realization of components, and increasing the student's ability of self-assessment.

Key words: evaluation, mini-portofolio, biology lessons, multiple intelligences, self-evaluation

Analysis of the evolution of the concept of assessment, carried out by the specialists in pedagogy, emphasized the existence of several categories of definitions for it. Thus, initially, assessment meant “operation to measure the school children achievements (E=M)” (Manolescu, M., and Panțuru, S., 2008). Then, the evaluation is done “by reporting student learning performance at predetermined operational objectives”, existing a concordance between evaluation and educational objectives (Soare, E., 2013). In the subsequent definitions, evaluation represented “an assertion/formulation of value judgements on the learning processes, but also on student achievements, on the basis of qualitative criteria” (Manolescu, M., and Panțuru, S., 2008). A last category of definitions emphasizes that “evaluation focuses on processes of building knowledge (E=P)” (Soare, E., 2013). Thus, the design and teaching-learning activities must be carried out taking into account the “continuous and contextual analysis and interpretation of student achievement” (Soare, E., 2013).

At the micro level, the assessment is a fundamental part of the education process, along with teaching and learning. It aims knowledge of school efficiency, i.e. the ratio of the performance achieved and demonstrated by students, and

performance anticipated and projected by the teacher.

As mentioned by Cucoș (1994), the evaluation “is not a supra or superimposed stage of learning, but an act integrated within the pedagogical activity”. It “should be seen not only as a control instrument of knowledge or as a tool for objective measurement, but as a way of training which involves a comprehensive training strategy” (Cucoș, C., 2006).

Manolescu and Panțuru provides a summary of the activities included in the evaluation process, and appreciate that to assess means, at present:

- a) to check what has been learned, understood, retained;
- b) judging a student's activity or effort according to specific recommendations;
- c) to judge the level of a student in relation to certain predetermined rules;
- d) to assess the competence of a student;
- e) to assess the school child with respect to its capabilities or relative to others;
- f) to assess the product of a school child in relation to the overall school children;
- g) to represent by a score or grade a school production's degree of success of the school child, according to different criteria;

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f) to give a verdict on the knowledge and skills that a school child has, etc (Manolescu, M., and Panțuru, S., 2008).

Within the concrete educational activities conducted at Biology, may be applied different evaluation strategies. Among these, we can mention the formative assessment and cumulative assessment. Formative assessment, also known as continuous or permanent assessment “is realized predominantly during the educational process in Biology and consists of a systematic check of school children progress” (Petruța, G.P., 2010).

Checking the knowledge, skills and abilities of school children is performed on small segments of activity, and the teacher can intervene immediately with improvement measures, according to the results obtained by school children. Cumulative assessment, called also summative assessment, is achieved through multiple partial checks during the training program and an assessment survey applied at the end of the program. The performance of the school children throughout the program are gathered with those obtained at the end of it.

The evaluation methods that can be selected to be implemented by the teacher in the strategies mentioned above, can be either traditional methods (e.g. oral, written or practical tests) or modern methods (e.g. essay, investigation, portfolio, project, self-evaluation, etc).

The portfolio or “assessment report”, as is termed by Radu (2007), is a form of summative assessment of the school child’s achievements and of his/her concerns. It is “a genuine pedagogical portrait of the school child, revealing: the overall level of preparation, the outstanding results achieved in some areas, as poor results in others, interests and skills demonstrated, capabilities formed, attitudes, difficulties encountered in learning”, etc. (Radu, I. T., 2007). It represents the school child’s “visit card” (Ciobanu, M., 2008) by which the teacher can track his/her school development/progress and results in a certain discipline, over a longer period of time (e.g. one stage from a semester, a semester, school year, etc.). It “brings together traditional evaluation tools (written tests, practical tests, etc.) and alternative (different types of essays, projects, investigations, etc.)” and “the school is entitled, and even stimulated to introduce in his/her portfolio the components/activity results which he/she consider representative for illustrating progress in his/her evolution” (Iancu, M., 2011).

As stated by Cerghit (2002), the portofolio includes “a selection of the best works or personal achievements of the school child, those which represent him/her and which underline his/her

progress [...]“ school children having the opportunity to self-assess concurrently with setting up their portfolio (Cerghit, I., 2002).

The content of portfolio, mandatory components and assessment criteria are established by the teacher when designing it. A portfolio may contain:

- school child’s personal data;
- list of its content (summary);
- individual worksheets;
- summaries;
- essays;
- reports;
- papers;
- written works which proves that the school child has understood correctly the different concepts;
- photographs, audio and/or video recordings made individually or in group, within the activities carried out at school or at home;
- crosswords;
- graphical organizers;
- literary works made individually on topics of biology (poems, riddles, etc.);
- diplomas obtained by the school child in various school contests;
- self-assessments conducted by the school child or group members;
- assessment report made by the teacher, etc.

Considering that the portfolio is one of the methods used in modern assessment, which allows the teacher a flexible and complex evaluation of the school children work, the aim of this paper is to highlighting the possibilities of using mini-portfolio as a complementary method of evaluating teaching activities carried out at the gymnasium. We defined mini-portfolio as the assembly of components that will be realized by school children as an activity carried out at home, individually, pair, or within a group, for a longer period of time during a semester. In conducting the research we considered the following objectives:

- identifying a set of lesson themes belonging to some biology disciplines studied in gymnasium, where the teacher may ask the school children to create/build mini-portfolios;
- identifying working tasks that represent mandatory components of mini-portfolios;
- highlighting the different intelligences of school children which will be challenged for achieving the content of mini-portfolios.

MATERIAL AND METHOD

Analyzing the actual contents of Biology curricula and textbooks for secondary school, we have identified a set of themes of plant biology, animal biology and human anatomy, for the study of which the school children might be required to create mini-portfolios.

RESULTS AND DISCUSSION

In the fifth grade, school children study for the first time Plant Kingdom, especially the plants that are commonly encountered in everyday life.

Given the fact that the establishment of a mini-portfolio's content should be for the teacher an opportunity to stimulate learning motivation of school children and the different intelligences, which typically are not enabled within the lesson, we turned our attention on the topics in which will be studied plants belonging to the gymnosperms and angiosperms. The school children will learn, in the 2nd semester, about spruce and other conifers, from gymnosperms. From the dicotyledonous angiosperms, they will study rosehip, pea, cabbage, potato, sunflower, sugar beet, grapevine and other plants related to them. Further, they will acquire knowledge about the monocotyledonous angiosperms by studying the tulip, wheat, maize and plants related to them.

Considering the above mentioned information content, the age peculiarities of school children and knowledge they learned in the 1st-4th grades, we propose the following content of the mini-portfolio, mentioning the score that will be used for its evaluation:

1. A descriptive graphic organizer for a species belonging to gymnosperms and two species belonging to angiosperms (20 points);
2. A graphic organizer with pictures for a tree, a shrub and a herb from the plants

studied (20 points);

3. A riddle about one of the plants studied (10 points);
4. A rebus for one of the plants studied, constructed by using biology concepts (10 points);
5. Examples of literary texts in which one of the plants studied within the lessons should be presented (10 points);
6. A collection of five plants or pressed parts of them, indicating the plant name and the group of plants to which it belongs (30 points).

An extra 10 points are added to the obtained score.

The mini-portfolio can be done individually, or some of its components can be made in groups with the same work task. For example, the teacher and the school children will choose together the species of plants on which they will create the descriptive graphic organizer with pictures. Thus, a team consisting of 30 school children can be divided into 3 groups, each group having to prepare the same piece for the mini-portfolio. School children in Group 1 will create a descriptive graphic organizer for the fir, cabbage, potato, and a graphic organizer with pictures for apple (tree), grapevine and wheat. Those in Group 2 will create a descriptive graphic organizer for the spruce, pea, sugar beet, and a graphic organizer with pictures for pear (tree), rosehip and maize. School children in Group 3 will create a descriptive graphic organizer for the pine, rosehip and strawberry, and a graphic organizer with pictures for the plum (tree), acacia and tomato. The graphic organizer with pictures may contain images of the geographical area where the plant grows, the plant maintenance work, its importance for humans (including the mode of processing) and animals, their pests, etc.

Table 1

Intelligences stimulated by creating a mini-portfolio (5th grade)

Components	Types of intelligence
Descriptive graphic organizer	Visual, linguistic, logical-mathematical, and intrapersonal intelligence
Graphic organizer with pictures	Visual, linguistic, logical-mathematical, and intrapersonal intelligence
Riddle, rebus, literary text	Linguistic and intrapersonal intelligence
Collection of plants or pressed parts of them	Linguistic, naturalistic, and intrapersonal intelligence

By creating the mini-portfolio components, school children will activate their different intelligences (*table 1*) and will remind themselves some knowledge acquired in primary education,

which will be used by the teacher in the transition to the new lesson. Thus, if the teacher will ask school children to find or compose riddles whose answer is the name of a plant that will be studied in

the next lesson, these could be used within the lesson to capture the attention of school children. Also, the school children may be asked to give examples of literary texts (legends, stories, poems) in which is presented/mentioned the plant to be studied, and following discussions with the school children to reach the lesson title. For example, for the lesson in which will be studied the sunflower, school children could present an excerpt from "The Wonderful Grove" by Mihail Sadoveanu, in which he described this plant.

For establishing the content of mini-portfolio that can be created by school children in the sixth grade, we selected the chapter "General morphological and functional characteristics, behavior, adaptations and importance of some groups of living beings – Vertebrates", studied in the 2nd semester. Given the fact that there are five classes of vertebrates - fishes, amphibians, reptiles, birds, and mammals, we propose dividing the team of school children into 5 groups. School children from each group will create individually or in groups the components of a mini-portfolio for a class of vertebrates. Pieces of the mini-portfolio and the grading scale which will be applied for its assessment are the following:

1. A report on an animal belonging to a class of vertebrates, including species description and an argumentation of the importance of the class (20 points);
2. A graphic organizer by which to emphasize the classification of animals in a class of vertebrates, mentioning examples (10 points);
3. A poster, created by a group, which include photographs and drawings of various animals from the class of vertebrates concerned (20 points);
4. Literary texts (poems, stories, legends, etc.) containing the description of a species that have been studied, as well as proverbs or riddles (10 points);
5. A collection of feathers from different domesticated birds (work task organized in pair/group, for all groups) (10 points);
6. Self-evaluation form (10 points).

To the above mentioned score are added 10 points for the presentation of the mini-portfolio, and an extra 10 points.

The linguistic intelligence of the school children will be stimulated by writing the report, as well as by reading and interpreting the literary texts, proverbs and riddles. By creating the graphic

organizer, the visual, linguistic, logical-mathematical and intrapersonal intelligences will be stimulated. Visual and interpersonal intelligences are activated by making the poster. Naturalistic and interpersonal intelligences of the school children will be stimulated by making collection of feathers, and their intrapersonal intelligence will be challenged by filling out, and by argumentation of the self-assessment form. Among the literary texts that can be reminded to the school children when studying various vertebrate species we can mention "The Fisherman and His Wife" by Jacob and Wilhelm Grimm, "The Doe" by Emil Gârleanu, etc.

CONCLUSIONS

The mini-portfolio applied to evaluate the school children's knowledge of Biology is helping them in clarifying and acquiring correctly the content of biology concepts, and also to systematize the knowledge acquired.

By their content, the proposed mini-portfolios have proven to be valuable tools for valuing knowledge acquired by the school children during primary education, for stimulating their different intelligences, and for increasing their capacity for self-evaluation.

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