

PROJECT ORIENTED CHEMISTRY INSTRUCTION AT A SLOVAK BASIC SCHOOL: LEARNERS', TEACHERS' AND SCHOOL VISITORS' OPINION

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Abstract

The paper deals with an example of the project oriented instruction. The described school project "Healthy and Non-healthy Nutrition" ran at Basic School Jarok, Slovak Republic. In the first part of the article, authors analyze the theoretical background of the project instruction, its advantages, disadvantages, threads and limits. In the second part, the entire project is described. It is structured into two phases. The first one involves project work of pupils, i.e. searching, collecting, processing information on the topic; in the second phase results are introduced to other pupils, teachers and the public. The materials were presented in the form of workshop which was attended by both active participants (i.e. pupils working on the project and their teachers) and visitors (i.e. other pupils, teachers, parents and guests). The project covers five topics (Vitamins, Carbohydrates, Cereal products, Lipids, Drinks). Materials relating to each topic were presented by pupils in attractive ways at separate checkpoints, being supported by competitions and games. At the final checkpoint the feedback (participants' opinion) was collected from all participants and visitors in the form of questionnaires. They aimed at three groups: pupils, teachers and visitors. Totally 186 pupils, 27 teachers and 67 visitors participated in the project or attended the workshop. The questionnaires monitored the attractiveness of the project instruction for pupils and teachers, evaluated the suitability of the project method for teaching Chemistry and other subjects, etc. Generally said, the topic and method were highly appreciated by the participants and visitors, they supported motivation and created positive image of the school. The project instruction was recognized to be suitable for extended application in the future.

Key words: project oriented instruction, school project, opinions of learners, teachers and school visitors, school climate.

Introduction

The project instruction, an alternative activating method of instruction, naturally and spontaneously following intersubject relations, is based on searching and processing information, self-study and independent work, co-operation and presentation of project results. It enables pupils not only to work in accordance with their own personality, creativeness, individualized point of view and way of presenting outputs, but also choose the topic they are interested in (Řádková, Bílek, 2005).

The Educational Dictionary (Průcha, Walterová, Mareš, 1998) defines the project method as a method of instruction heading pupils towards solving complex problems and gaining experience by practising and experimenting. It is derived from pragmatic educational science and the principle of instrumentalism, which is one of the methods highly supporting pupils' motivation and cooperative learning. Projects can be in the form of integrated topics, practical problems of common life or practical activities resulting in creating a product (e.g. of literary or art type). Skalková (1995) indicates that problems solved in projects correspond to the complex view of real world; they are not structured according to the scientific system of single subjects. They develop the initiative, self-activity, creativeness and understanding the lifelong importance of pupils' cognition. Pupils receive skills to plan and be responsible for their own work, finish it despite constraints etc. Černochová, Komrska and Novák (1998) say the success of the project instruction starts with providing an attractive problem and managing the process of problem solving successfully.

These are the features and possibilities which develop key competences (e.g. the problem-solving, communication, learning competences etc.) which recommend the project instruction to be applied in current innovative topics of educational programmes, both in educational areas and single subjects (Řádková, Bílek, 2006).

The project instruction is a progressive method which is organizationally demanding for both pupils and teachers. Pupils do not aim at collecting and organizing information but activities like making proposals, planning, analyzing and synthesizing etc. are required. They are led to searching, classifying and creating new informational structures, defining the core, formulating new pieces of knowledge, concluding and presenting the results, and finally defending them in discussions (Brestenská, Nagy, Ganajová, 2002).

The main positives of the project method are defined as follows (Mojžíšek, 1982):

- individual and team efforts, which awakes in every pupil,
- simulating the real work, which every man does in his home and work environment (knowledge and experience developed in such a way result in long-lasting and higher applicability in the real problem-solving process),
- non-separatedness of such knowledge (a project is the only area of compact set of information and applications),
- factualness and certainty of interpersonal relations, which usually are part of projects,
- intrinsic motivation, or intrinsically-motivated learning, which is more contributive than learning under the extrinsic pressure.

The project method induces conditions for not only school learning during the project instruction but it runs on after finishing the project work in the form of self-study and lifelong learning.

Learning Project "Healthy and Unhealthy Food"

A good idea stands at the beginning of every school project. Details which will support pupil's motivation must be clearly thought over so that pupils are strongly engaged in the project work, i.e. planning the project, running it and presenting the results. Having set the topic of the project, the phase of planning starts, which should be consulted and set right and realistic in the way of reaching project objectives according to the situation at each school and its environment. The entire phase of running the project is under the pupil control only, starting from using sources from textbooks, journals, the Internet, mass-media etc., up to creating the final output; the teacher takes the back seat in this phase and becomes a tutor, mentor, advisor, on pupils' demand only. The teacher's role is more active in the following phase of preparing the presentation and presenting results and. S/he helps pupils with solving technical problems in creating presentations, e.g. animations, simulations, graphic etc. so that the presentation is attractive, eye-catching, speaks to "possible customers", i.e. other pupils, teachers, parents, the public etc.

The learning project "Healthy and Unhealthy Food" ran in the 8th grade of the basic school in Jarok, Slovakia. Twenty-three participants were divided into five groups. The content covered five subtopics: Vitamins, Carbohydrates, Cereal Products, Lipids and Drinks.

It was a long-time project; pupils were provided three-month period for each topic. The project objective was to prepare materials promoting healthy food, and focused on other pupils, teachers and the public. The project results were presented and evaluated during the workshop which pupils, teachers, parents and others participated in.

The project work ran in groups at six project centres – checkpoints (Figures 1–6), five of them dealing with single topics, in Checkpoint 6 Questionnaires for evaluation of the project were provided to the participants and visitors.



Figure 1. Checkpoint One – Vitamins.



Figure 2. Checkpoint Two – Carbohydrates.



Figure 3. Checkpoint Three – Cereal Products.

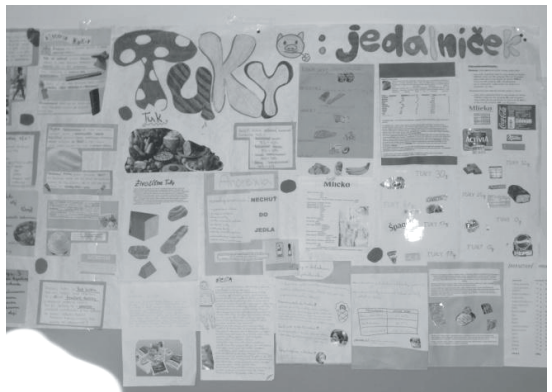


Figure 4. Checkpoint four – Lipids.



Figure 5. Checkpoint Five – Drinks.



Figure 6. Checkpoint Six – Questionnaires.

Surveying Project Participants' and Visitors' Opinion

During the workshop project participants presented the collected information to other pupils, teachers and visitors. The presentations were supported by various competitions to attract their attention. Totally 186 pupils of the 1st–9th grades, 27 teachers and 67 visitors (i.e. parents, public leaders, sponsors and other guests) participated in the workshop.

The questionnaire provided at the Checkpoint Six consisted of several scaled statements; respondents expressed their dis/agreement with them. The statements focused on the project instruction and course of the presented project. Three types of questionnaires were provided – for pupils, teachers and guests.

Questionnaire One for pupils contained three statements and three open-answer questions. The statements were as follows:

1. I like the project instruction, and I envy those pupils who could participate in the project.
2. I have learnt much new. It would be difficult to gain such information without working on the project
3. I would like to participate in another project, dealing with another topic or subject.

The statements were evaluated by 5 – level scale: 1 – strongly agree, 2 – agree, 3 – do not know, 4 – disagree, 5 – strongly disagree. Totally 186 respondents participated (pupils in 1st–3rd grade were supported by teachers).

Most of respondents strongly agreed with the offered statements. Results are presented in the graph below (Figure 7).

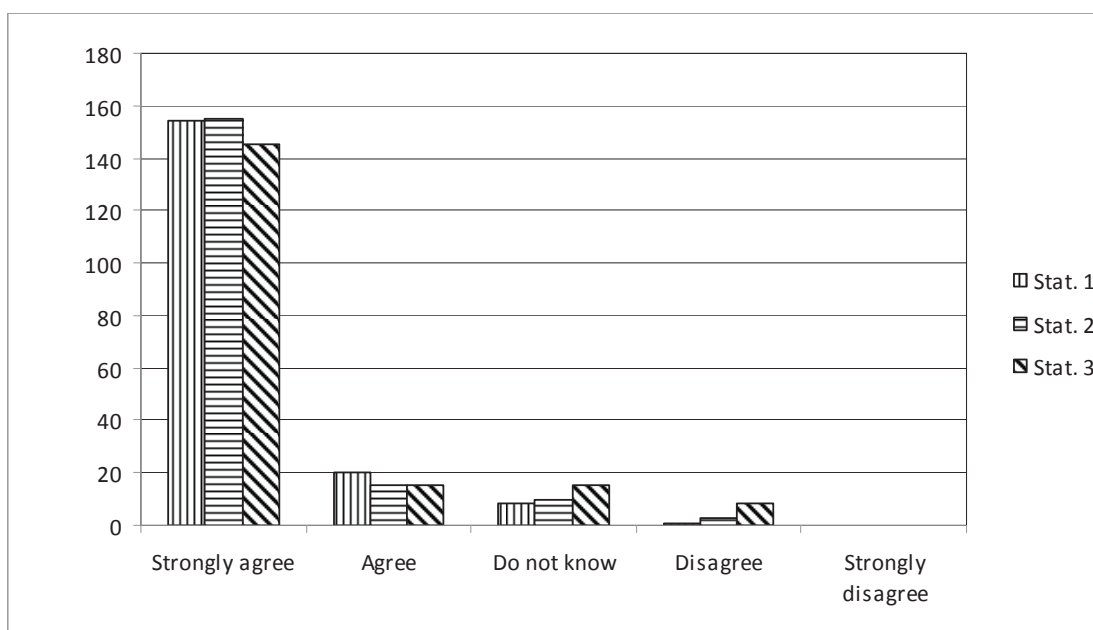


Figure 7. Evaluation of the project instruction by pupils (Statements 1–3).

The second part of the pupils' questionnaire contained three questions with open answers. In answers to question one "What do you consider the most interesting and amusing in the workshop?" pupils appreciated the checkpoints where they received much information, were motivated by competitions and games, including small presents receiving for correct answers, and experiments which they could run.

In question two they were asked to complete the sentence "I would like to learn more about". Pupils recommended to run projects more often, in other subjects (e.g. Geography, History ...), even primary school pupils could run projects and learn this way etc.

No answers to question three "What was the least interesting thing for you?" appeared in the questionnaire.

The results prove that this innovative approach to teaching a complex topic motivated pupils and took their interest and attention. This result pays both for those who prepared the project and participated in presentation of results in the workshop.

Questionnaire Two for teachers participating in the project contained four statements evaluated by a 5-level scale and two open-answer questions. The statements are as follows:

1. The project instruction is interesting and supports the active engagement of pupils into the instruction.
2. This way of instruction is interesting and efficient for pupils.
3. This method of instruction increased pupils' activity.
4. The project instruction would suit to me and my subject(s).

Totally 27 respondents participated in the survey. Almost statements were strongly agreed or agreed. Results are presented in the graph below (Figure 8).

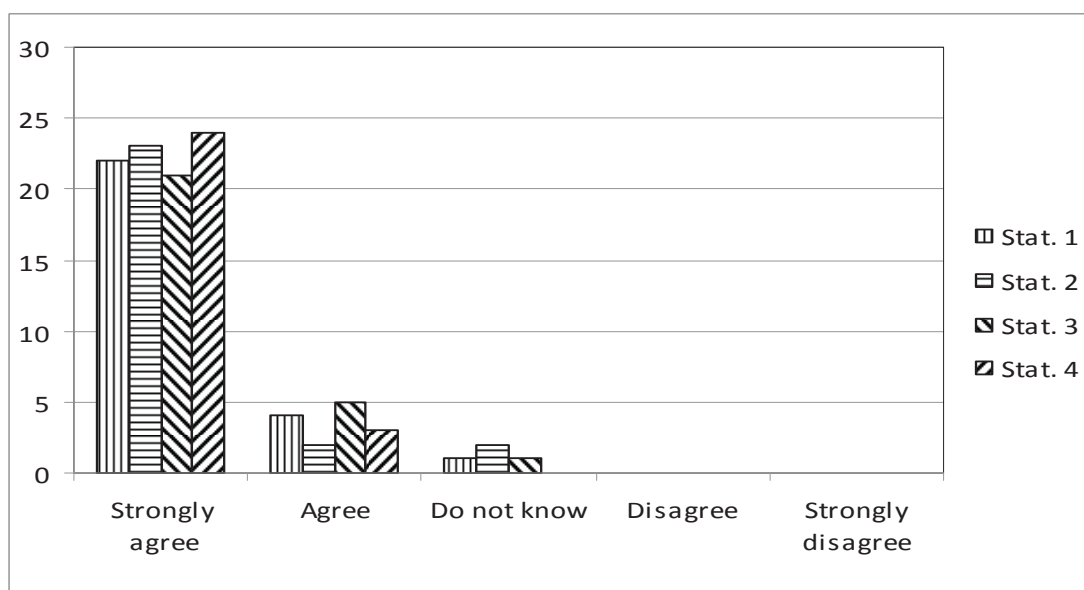


Figure 8. Evaluation of the project instruction by teachers (Statements 1–4).

The second part of the teachers' questionnaire contained two questions with open answers. In answers to question one "What do you consider positive on the presented project instruction?" teachers mostly emphasized pupils' co-operation, team work, and communication, presentation of results, creativeness and independent work.

Answers to question two "What would you recommend to change next time?" contained e.g. proposals to dividing pupils to groups according to their decision, further improving pupils' communication skills. Teachers as well as pupils considered the project instruction very contributive, motivating (for both teachers and pupils), increasing pupils' activity and interest in the field.

Questionnaire Three for visitors contained three statements evaluated by a 5-level scale and two open-answer questions. The statements were as follows:

1. Pupils are interested and active in the project instruction.
2. Project activities and outputs were interesting for pupils.
3. The workshop was useful and supported learning of the given topics.

Totally 67 respondents considered the project activities to be positive. Results are presented in the graph below (Figure 9).

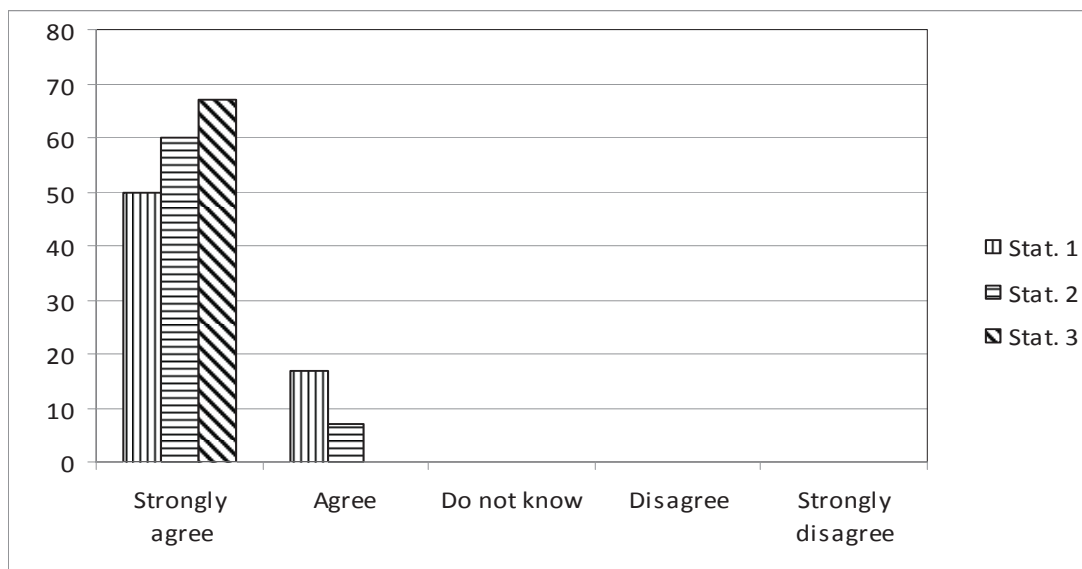


Figure 9. Evaluation of the project instruction by visitors (Statements 1–3).

The second part of the visitors' questionnaire contained two questions with open answers. In answers to question one "What do you consider the most interesting and amusing for you in the workshop?" visitors emphasized pupils' presentations and general organization of the workshop. On the other hand, visitors either did not provide any answers to question "What do you consider to be of least importance and interest?", or evaluated the workshop positively.

Conclusions

Having finished the project and taken the pupils', teachers' and visitors' favourable responses into account, we can join those who consider the project instruction contributive for building the interest in Natural Science education. All participants and evaluators appreciated creativeness, flexibility and increased motivation of both pupils and teachers. Pupils develop not only knowledge, skills, team work etc. but also their approach to the subject, appreciated positive climate in the class and image the school in the public.

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