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SELF-STUDY AND COOPERATION OF PUPILS IN PROJECT BASED INSTRUCTION

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Abstract

This paper is focused on the use of cooperative and individualized concepts of instruction in project based learning. Part of the paper includes partial results of the questionnaire survey carried out within the grant project KEGA No. 031-035 SUT – 4 "Project models of teaching at the secondary vocational schools".

Key words

individualized instruction, self-study, cooperative instruction, cooperation, project based learning

Introduction

One of the serious contradictions at secondary vocational schools is a contradiction between frontal teaching and the individual character of learning. Vocational schools usually fail to teach their graduates everything what will be needed in their professional and personal lives, yet they should teach them to think, learn and work independently. On the other hand, the disadvantage of individualized concepts of teaching is that they do not sufficiently develop social and communicative competences of the learners. The companies employing the graduates of secondary schools require them to be ready for teamwork. Therefore, it is important to find optimal proportions of individualized and cooperative teaching approaches at secondary vocational schools. This also should be applied for the integration of independent work and cooperation of pupils in project based learning. Participation in a theoretical or practical, individual or social action during project work is an important way of pupils´ personal development. It bridges and connects school situations and real life with the practical development of pupils´ experience based on their active relation to the natural and social environment [1].

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Individualized instruction and independent work of pupils

Individualization and internal differentiation are needed for effective instruction; it means to take into account physical, psychological, social and experiential specifics and opportunities of the learners, e.g. by taking into account an individual pace of work and differentiating the difficulty of tasks for each pupil according to his/her knowledge and abilities. Individualized concepts of instruction include the Dalton plan, Winet system, programmed instruction, open learning, mastery learning and others. Actually, the permanent and entire individualization of instruction is not suitable for organizational and pedagogical reasons; it is therefore necessary to find the optimal proportions between the different social forms of teaching and individual work of the pupils [2].

Independent work of pupils means their theoretical or practical activity which is relatively independent from the direct management of the teachers. Independent work aims to objectives of the instruction based on their own efforts. We distinguish independent school work (e.g. independent problem solving of tasks and exercises, programmed work, individual work in laboratories, etc.) and extra-curricular work (e.g. home study from textbooks, preparation to exercises, essay writing, etc.) Extra-curricular individual work of pupils takes place without the personal presence of the teacher; individual school work of the pupils takes place with personal presence of the teacher, but without immediate management and control. In each developmental stage of the personality, the optimal intensity, scope and methods of individual work are different. The period of secondary education is a very important period in the development of personal independence and the development of study and work skills and habits. It is not only due to this fact that the secondary curriculum is more difficult for memory learning, but also because workshop, laboratory, engineering, computing and other tasks are requiring a certain level of independent work of pupils [2].

Cooperative instruction and pupils´ team-work

When group teaching, small groups of usually 3-5 pupils are formed, which is typical for cooperation in solving difficult tasks or problems. Pupils' work within groups can be *undifferentiated*, where each pupil works on the solution to a common task, or *differentiated*, where each pupil solves a part of the group task or processes using an individual method. According to the pupils' efficiency, it is possible to generate *homogeneous* groups in which pupils have approximately the same knowledge and capabilities, and *heterogeneous* groups in which pupils have different knowledge and capabilities [3].

Increased activity of pupils, development of social, communication and organization capabilities, responsibility for work results, partial possibility to choose the pace of work etc. can be considered the advantages of group work. The disadvantages of group work include the fact that it is time consuming, there are problems with discipline and noisiness, imbalanced load on particular pupils, and increased demand on assessment and organization skills of the teacher. The division of pupils into groups does not however guarantee the cooperation among the pupils. The cooperative vision of instruction is based on full-value cooperation of pupils in achieving the objectives. The group of pupils benefits from the activities of individuals, while the results of individuals are based on the activities of the whole group. Cooperative learning is characterized by cooperation and mutual support. It is necessary to arrange a positive mutual dependence and good contact of the group members to

assure effective cooperative learning, and to invigorate personal responsibility of individual members for group work and its results. The way of cooperative instruction depends not only on the objectives and level of the pupils´ capabilities, but also on the organizational and management skills of the teacher [4].

Project-based instruction

Project based instruction is based on the solution of complex multi-subject theoretical or practical problems by pupils, and stems from an assumption that it is not suitable to split cognition and activity. The participation in theoretical or practical, individual or social activity is an important means to develop pupils´ personality. Well-prepared projects, often designed in cooperation between the teacher and pupils, lead to actual results and strong inner motivation. Projects link school and practical life, they give the possibility to step outside the classes and school and connect learning with pupils' life experience [1].

Project based instruction enables pupils to understand the whole structure of activities, i.e.: to participate in the selection of the project topic and its specifications, to determine the activity objectives, to plan the project solution, to carry out partial processes and suggest changes (corrections), get feedback on procedures, to present the results of activities and evaluate the whole project. Benefits of project work are also pupils' experience resulting from the cooperation and overcoming obstacles and the feeling of responsibility for one's own activity as well. Project based instruction is therefore of a huge educational importance. Projects can be suggested by pupils, teachers or both. The teachers' role in projects is that of organizer, facilitator and supervisor. According to the objective, projects can be divided into problem, drill (e.g. focused on development of the capabilities to search and analyse information), structural, evaluative and others [5].

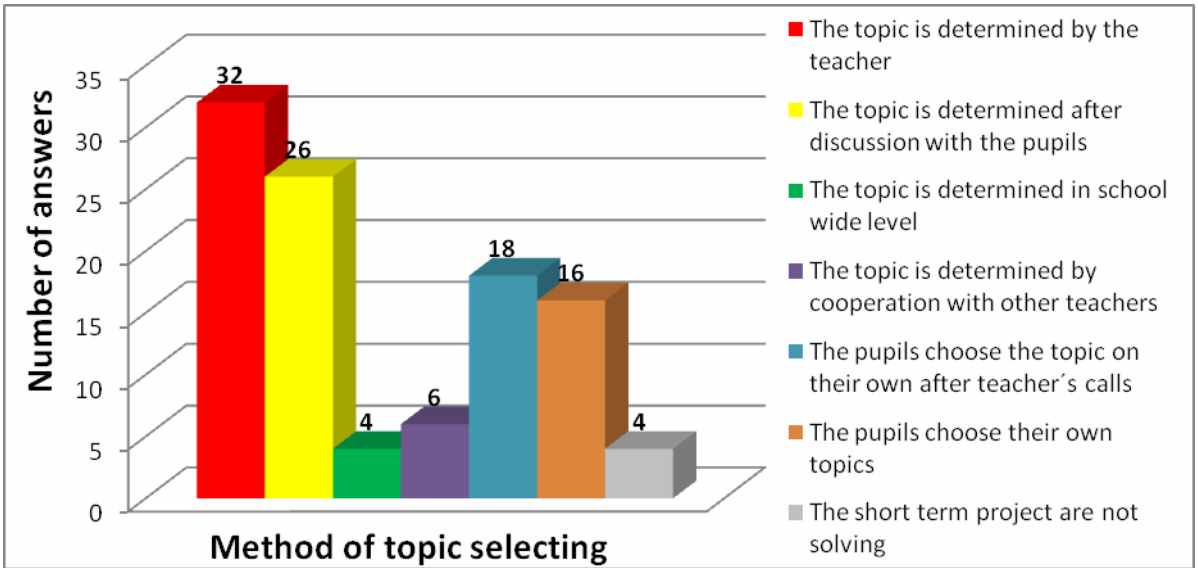
A usual policy of project based instruction includes the choice of a particular life situation or practical problem by the teacher together with pupils. At the beginning, it can be a freely formulated idea or topic – for example water quality of the Danube, alternative energy resources, healthy food, etc. Together with pupils, the teacher then discusses possible solutions to the situation or problem. The tasks, which the pupils will deal with either individually or in groups, are formulated. The required form of the result is defined. Then, individual work of the pupils and cooperation in groups start. Pupils gather and analyse necessary information, collect and assort material, measure, experiment, account, compare, make, etc. In the end of project based instruction, pupils present and evaluate results of their own individual work or cooperation [1].

In terms of the number of project team members and the instruction objectives, there are individual and group projects. The key question is, whether we want to develop independence or social-communication capabilities of the pupils. In individual projects, a pupil does all basic activities on his own, including the inquiries and analysis of the information and presentation of the output. His/her capabilities of thinking, learning and solving complex tasks independently are developed. In group projects based on cooperative instruction principles, pupils learn to cooperate and communicate, argue and accept ideas of the others solve human and work conflicts etc. Suitable integration of individual and group projects at secondary vocational schools can be an effective, authentic and motivating way of instruction [6].

Partial results of the questionnaire research

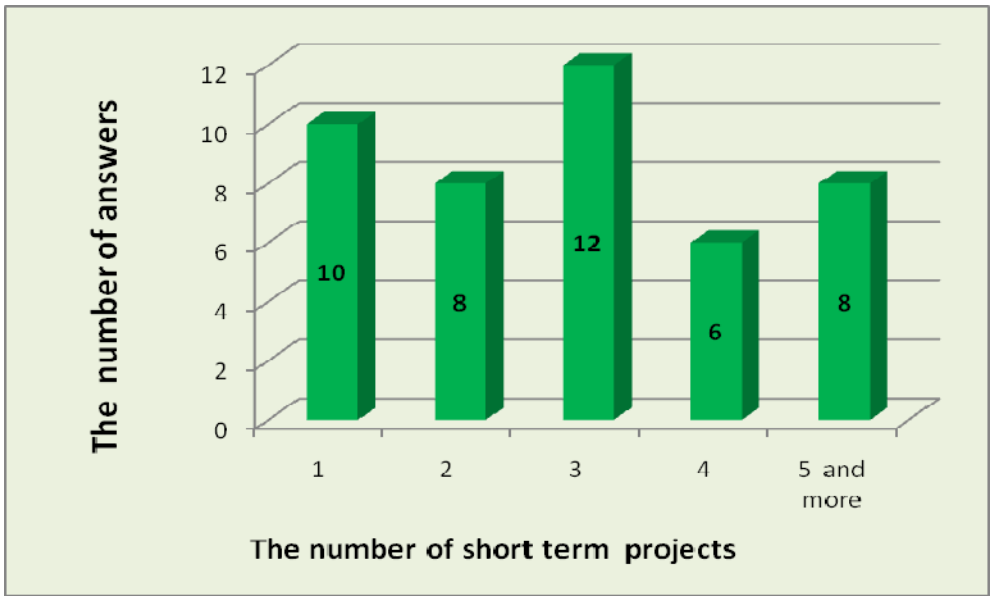
In 2010, we carried out a questionnaire research focused on project based instruction at fifteen secondary vocational schools. The questionnaire included 28 items, which were responded by 116 teachers of technical subjects. The number of respondents in each item varied. This paper illustrates only the answers to three items, namely the method of topic selection for short term projects (lasting one lesson, a double lesson up to one school day), number of short term projects solved during the school year in one class and determination of tasks and processes of work in short term projects.

In the item focused on the method of short term project topic selection, respondents could choose or add one or possibly more of the offered answers. There were 60 respondents. As Graph 1 clearly shows, the topic of short term projects is most often determined by the teacher (53.3% responds) or teacher in cooperation with the pupils (43.3% responds). Less frequent responds were that the topic is chosen by the pupil after teacher's challenge (30% responds) or the pupils themselves address the teacher with their own idea for a topic (26.7% responds).



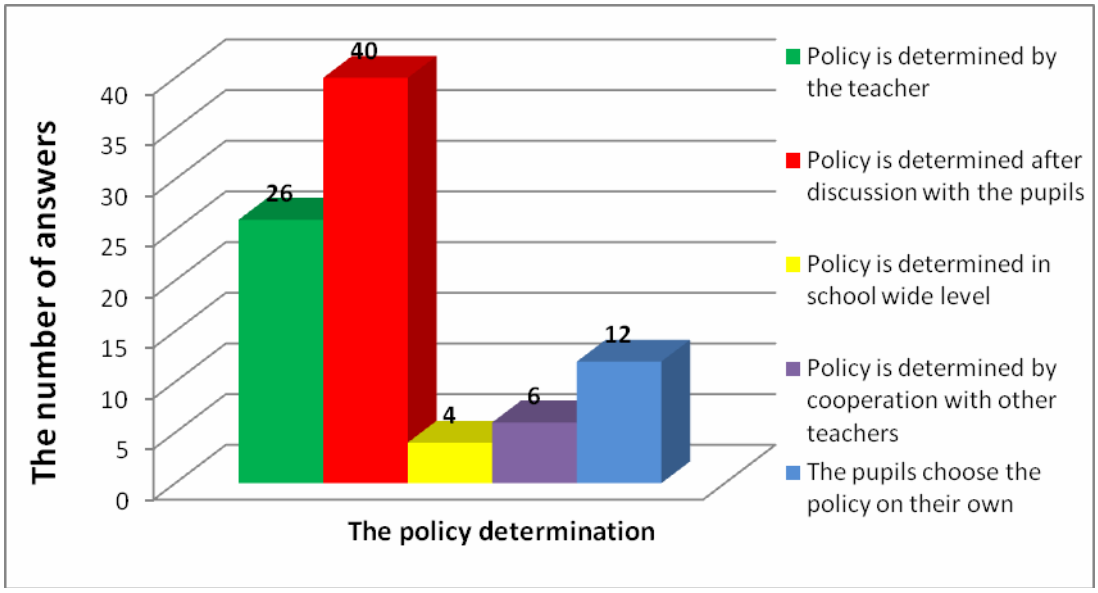
Graph 1 *Method of short term project topic selection*

In the next questionnaire item, respondents were asked about the number of short term projects solved by pupils in one class during the school year. There were 44 respondents who could choose or match just one response. Responses are shown in Graph 2. The most frequent (27.3% responds) responses state that pupils in one class solve three short term projects during the school year. The second most frequent respond was that pupils in one class solve only one short term project per school year.



Graph 2 *The number of short term projects in one class during the school year*

We were also interested in the determination of the policy for short term projects. There were 56 teachers of vocational technical subjects at secondary schools who responded to this item. Respondents could choose or add one or more from the offered options. In our opinion, the way of the policy determination is a cooperative decision of both teacher and pupils. This answer was chosen by most respondents (71.4%). The number of responses is shown in Graph 3.



Graph 3 *Determination of the policy of short term projects*

Conclusion

The advantages of individualized instruction involve the fact that pupils learn to think and work independently. Their ability to rely on their own abilities and their responsibility for their own actions is developed. The teacher can effectively use didactic principles of proportionality and individual approach, the pupils can choose, to a certain extent, their own pace of the work. The advantages of cooperative instruction also include the development of social, communicative and organizational skills of the pupils. Positive mutual dependence of each member of the group leads to mutual responsibility for the results of common work. In our contribution, we presented not only advantages, but also disadvantages and limitations of the above-mentioned concepts of instruction. Generally, a universal concept of instruction suitable for all didactic situations does not exist. The teacher always has to consider the objectives and content of instruction, readiness and motivation of the pupils, the time allotted etc. This applies also for the optimal proportion of integrating the independent work and cooperation of pupils in project based instruction at secondary vocational schools.

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