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THE EFFECT OF ACTIVE TEACHING IN THE PRIMARY SCHOOL'S ECOLOGICAL CONTENT

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ABSTRACT

The aim of the research was to determine how active students' involvement influences the quality of acquired knowledge, as well as students' motivation and attitudes towards active teaching. The survey was conducted on a sample of 64 students in three sixth grade classes of elementary school. The students were divided into experimental and control group. The experimental group was learning about the topic of broadleaf forest, taking active learning in the group, independent work and work in pairs through different tasks and in the field work. The control group got classical frontal lecturing. Three written tests, examining knowledge and a survey for students were used as data collection tools. Written examination was carried out prior to the research and after each sequence of active learning. The survey of students' motivation and attitudes took part at the end of the research. The results show increased students' motivation, as well as the success in learning, especially when the activities involved field work. Each active learning technique, that allowed students applying independent research steps and work outside of the classroom, was positively evaluated. The logarithmic form of regression better explains the learner's achievement, but the linear model still shows satisfactory reliability and reduces the importance of a few individual performance results so it is better to use it to show overall image performance in knowledge testing. The research results confirm the need for using active learning, with an emphasis on field work in the nature, as well as various teaching methods that encourage student activity. In this way, students' satisfaction, as well as their learning success, would be significantly increased.

Keywords: *learning success, student motivation, pupil attitudes, teaching theme deciduous forest, age 12*

INTRODUCTION

In student-centered teaching, the student should be more active than the teacher, as teaching in which students just sit, listen and watch cannot meet their biological and social needs, and the need for self-reliance, their curiosity, and the desire to act (Matijević, 2008). Field teaching is very important for student motivation (Rickinson et al., 2004) and certainly one of the ways to actively involve students into the teaching process and research conducted by numerous authors point to its positive impact on the development of social competences, knowledge acquisition and attitudinal development (Martin et al., 1981; Bogner, 1998; Preston et al., 2004; Dillon et al., 2006). Modern teaching of Nature and Biology should involve students more intensively in the teaching process, encourage them to get acquainted with the world around them and direct them to the learning of life which is in harmony with the nature and the social community they are part of (Labov et al., 2010). The research was conducted to determine how active teaching in the form of student projects within the field teaching can influence the pupil's competence, the outcomes of their learning and their satisfaction and motivation.

Research objectives have been identified: 1) how many students of the sixth grade of elementary school are able to create a project in nature within a regular course; 2) what is the attitude of the student towards the active teaching and especially the field teaching; 3) how much active teaching in

the form of student projects and their inclusion affects student motivation; 4) how much active involvement of students in teaching (through assignments, field teaching, group work and work in pairs) affects the quality and permanence of acquired knowledge.

METHODS

The research was conducted in the school year 2006/2007. in the elementary school and included students of six grades during the period of the teaching of the unit *Deciduous forests*. It was performed on a sample of 64 students in three sixth grades. Pupils of 6.a and b were experimental and pupils of 6.c control group. Three sets of questions for written knowledge checking and student survey were used as data gathering tools. An initial knowledge assessment was carried out to compare the control and experimental group foreknowledge. During the curriculum, the students of the experimental group carried out two independent assignments. The entire teaching with the experimental group was organized so that the students actively participated in the work independently, in groups and in pairs. Also, during the repetition the accent was on student activities. Pupils of the control group at the same time were taught by the classical frontal form of work using the method of conversation.

The first test of knowledge was carried out after the completion of the first task and repetition. The second check was carried out after the completion of the second task and repetition. The first task *The visit to the deciduous forest* included field work in nature. The students visited the forest, observed nature, and collected the poster material. The purpose of the task was to develop the observation skills as a basis for the conclusion through staying in nature.

In the second assignment, the students developed co-operative learning in a pair by making an essays *Protected animal species of deciduous forest* or *Healing herbs of deciduous forests*. This should encourage the development of natural literacy and the use of additional literature. After the research was completed, a student survey was conducted on their learning experience. Statistical analyzes and graphs were implemented using the Microsoft Excel data analysis package.

RESULTS

By analyzing the general characteristics of the students in experimental and control group, it was found that the overall success of the student is significantly related to his work during the course. No significant difference between individual grades (experimental vs. control group of students) was found in the success of solving initial tests, enabling a credible comparison of the results of all grades. The difference in the performance of the assessment is visible in the written examination only after the second project task when the control group's students reached 22% compared to the 65% solution of the experimental group. In the analysis of learning outcomes based on written tests, the expected significant differences in solutions between I and II written tests were confirmed ($F_{(3,91)}$ = 6,96; p<0,009). Data obtained by research shows that the success of learning with tasks increases and that growth is more pronounced after the first task, while after the second task it is slower and more irregular but reaches 100%. It was noted that the learning outcomes are present in the control group and are growing, but overall weaker than experimental ones. There was no statistically significant difference in learning outcomes, which indicates a high level of teaching with the conversation, and the students of the group achieve 57% of success and 66% of active learning in active learning. There was a greater success of students after their first assignment. This can be explained by the fact that a

large number of students in the survey evaluate the first task more interesting due to field teaching. This information tells about, probably, more motivation that could have a better impact on learning.

In a survey conducted among pupils at the end of the research with the aim of collecting data on the experience of teaching and applying projects in Biology teaching, the students in high percentage in all three grades have estimated that Biology teaching is very interesting and achieves very good results. Students react positively to group work as well as learning through play and entertainment. Pupils of the experimental group accepted the research very well (mean grade 4.0) while the control group did not respond well (mean 1.5). The pupils of the control group have particularly negatively assessed their isolation from active teaching. 65% of the experimental groups are very satisfied with the way they worked. Most of the students (71%) with the possibility of independent work need support and guidance as well as systematization conducted by teachers.

In the attitudes of the students, a positive attitude towards the activities of creating mental maps and introducing animals (more than 5% of students) is emphasized. The best accepted was group work (18%). Student activities were estimated at a mean grade of 4.7, but significant differences were found in accepting activity ($F_{(2.66)} = 3.68$, $p < 0.01$). The lowest score gained the worksheet based on posters (3.7). The average score of 5.0 gained the use of two-color text, competition, game suck, mental map creation. The control group assessed the lower rating of experimental activity: going to the board, oral description of mental maps, use of literature. According to survey reports, the first task was most appealing to the students mostly because of their interest, group work, forest visits, easier arrangements and better understanding.

When assessing knowledge, as many as 64% of students prefer a written form of knowledge assessment, 30% oral, while 6% of students did not choose a form of knowledge. 91% of students think that they have learned more by doing assignments, while 9% of students do not accept classes that include active tasks and believe that it does not contribute to better learning outcomes. Pupils particularly enjoyed active classes because they are more entertaining because of group work, paired work, and outdoor work opportunities. The results of the survey show that 70% of students after completing the survey find it interesting to learn through project assignments and during field work.

DISCUSSION

Pupils involved in active teaching during the survey responded very well, while the students in the control group did not accept the research well because they do not like it when they are separated and do not participate in something that is sure to be interesting and fun. Such pupil reactions are also confirmed by Bilić (2001). In evaluating the form of work, all the students best evaluated collaborative learning with group work, and work in pairs was very well evaluated. The effectiveness of learning apart from collaborative learning was also influenced by the application of active learning, which according to Dryen and Vos (2001), mentions 90% of the learner. In assessing different types of work, the students reacted the worst to the work without evaluation. Evaluation is an important indicator of success and probably influences motivation as confirmed by many authors (Ros and Gott, 2003).

The results show that the students were more successful in solving the first task and that their first task was to prefer the other because it allowed them to go to nature independently, work in groups, collect and arrange materials and present them. Being able to stay in nature, get acquainted with

nature and its legitimacy encourages motivation, gives students the feeling of independence and the ability to discover new and unfamiliar. Such research results are also confirmed by Jensen (1995). According to Matijević (2008), the activities of students, in relation to other learning strategies, contribute more to acquiring knowledge, but also to developing skills and raising motivation for learning and other teaching activities.

The second project assignment was related to the development of natural literacy and the students sought to learn literature and use the Internet. Compared to the field task, such a method of work of most students has nevertheless been less interesting. In the experimental group with assignments the learning outcomes are growing and the growth is more pronounced and better after the first assignment, while after the second assignment it is a bit slower and more irregular but achieves 100% learning success with more students. The success of learning the control grade is present and growing, but far less intense and slower than in classes involved in active classes.

Student performance data can be a good basis for analyzing the success of a particular teaching assignment, as well as predicting students' success. The logarithmic form of regression better explains the student's achievement, but the linear model still demonstrates satisfactory reliability and reduces the importance of rare individual performance results. For this reason, the linear model is better used to display the overall image of performance in knowledge testing. Such results are supported by research by other authors and Freyberger et al. (2004) used logistic regression to predict the correct answer to the question of e-learning and determine the transfer model to predict student success while Myller et al. (2002) linear regression used to predict test results in distance education courses. Based on the results of the written results of the students, it has been established that a smaller oscillation on the axis y with the application of linear regression shows a lesser performance in solving the tasks, and the passage of the regression line indicates a greater level of success among the examined students, which is a good feedback on the characteristics of the check students who have solved it.

One of the key factors in the acceptance of project learning was a good student-teacher relationship for which the students responded positively to active teaching and expressed the desire to participate in such activities in the future. Most of the students prefer a combination of teacher structured leadership and independent work, fewer when they work independently, and only 6% of the students approve the traditional lecture frontal work of the teacher, which concludes that most students respond structurally driven active learning to free research (Kirschner et al., 2006). In the survey questionnaire, pupils better evaluated work techniques that require greater activity and a smaller connection to the traditional form of teaching. Accordingly, Labak et al. (2014) found that students think their learning and memory is easier when active methods are applied over a longer period of time and in blocks of hours. The performance of the student's control group decreases with great intensity, as well as their motivation decrease. Many authors point to the correlation between motivation and success (Matijević, 2008; Bilić 2001). Most students recognize the effects of independent work, but with continuous feedback and support, routing and systematization of teachers, confirming the necessary highly developed facilitator role of teachers as an inevitable competence in the application of active learning (Kirschner et al., 2006).

CONCLUSION AND TEACHING IMPORTANCE

Pupils of the sixth grade of elementary school experience Biology teaching the most fun when they go out of the classroom, in nature, and every form of work that allows them freedom of research and work outside the classroom is perceived positively. Pupils involved in active teaching become more free to express ideas and thought, they do not perceive the teacher as a strict figure, but as a mentor, a person to whom they can turn to help. In addition to the mentorship of the teachers, it is necessary to systematise, direct the students with continuous feedback. Developing the awareness that they are equal and capable of solving the problems themselves increases the motivation for work and learning success. It is desirable to introduce active teaching in all grades, as the results show that students are not responding well if they feel drowsy or excluded. Although most students accept work on project assignments, some students do not accept group work and work harder in the group. Therefore, the teacher should allow a combination of different sociological forms of work so that all students can develop their abilities.

It is also important to note that most students prefer a combination of teacher's more or less structured leadership and independent work, which points to the importance of systematization in active forms of work in teaching. For the analysis and prediction of students' success in solving written tests, a linear model that demonstrates satisfactory reliability and reduces the significance of rare individual performance results can be used. In this case, a smaller section on axis y shows a lesser performance in solving tasks, and the depletion of the regression line indicates a greater level of success among the students studied, which is a good feedback on the characteristics of the checks and the students who have solved it.

A good selection of topics and tailor-made projects to the psychophysical abilities of students will enable group work and research in nature to achieve the desired effect, the students will want to know more, will be more likely to be more successful in the work that this research has shown. The students were more motivated to learn Nature, more successful in learning and concluding, and enjoyed teaching in nature. Therefore, the actual use of active teaching, primarily field work, can be a good solution to maintain the motivation and interest of students for teaching and support the situation of interest in learning activities. This will mean that we continue to learn throughout the class how to teach and learn together with our students by adapting our teaching to their personality, interests and performance. The importance of the teacher's personality in the organization of field teaching is noticed by Scott and colleagues (2015) who have concluded that the predisposition of an individual for field activities in biology is crucial to the openness in finding the value of training related to field teaching, thus confirming the need to recognize personality as an important factor both in basic training and in teacher training.

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