

# INTEGRATION OF ENVIRONMENTAL STUDIES INTO MATHS LESSONS AT 1<sup>ST</sup> LEVEL OF PRIMARY SCHOOL – OUTCOME ANALYSIS

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**Abstract:** *The article deals with issue of school educative programmes and gives guidance of how the multidisciplinary subject „Environmental studies“ can be integrated into maths lessons in a suitable way.*

**Keywords:** *outcome analysis, methods, problem assignments, projects in maths, cross-sectional topic, environmental studies (education)*

## Introduction

To teach the pupils how to utilize theoretical knowledge in the practical life is one of the core objectives of maths lessons. It means that the (model) situations, reflecting truly our environment, environmental problems and indicating possible solutions through maths in the real situations, have to be created and a induced with the children in maths as early as in the kindergarten and then in the primary school.

Because the General Education Programme for Primary Schools (RVP ZV), valid in the primary schools since 2007, by which the current students and the future teachers will be governed, assumes that more time will be devoted in schools to environmental education, solution of topical issues of the current environmental world not only in separate environmental subjects, but also within the framework of individual subjects (i.e. even in maths).

## Research Analysis

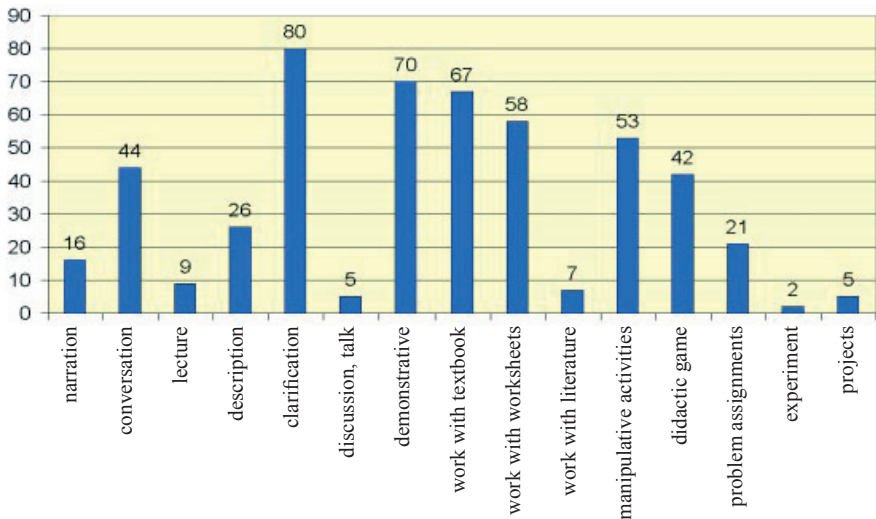
We have addressed several schools in the whole Czech Republic. The questionnaire was responded by 89 teachers in total, of which 8 men and 81 women from 4 schools.

According to answers in the questionnaire the teachers teaching maths prefer most frequently the verbal method – clarification and explanation (80), the demonstration method (70), method of work with text – textbook (67), with work sheets (58) and manipulative methods (53). From time to time they apply nearly all methods, in particular the methods of heuristic character – the problem assignments (61), projects

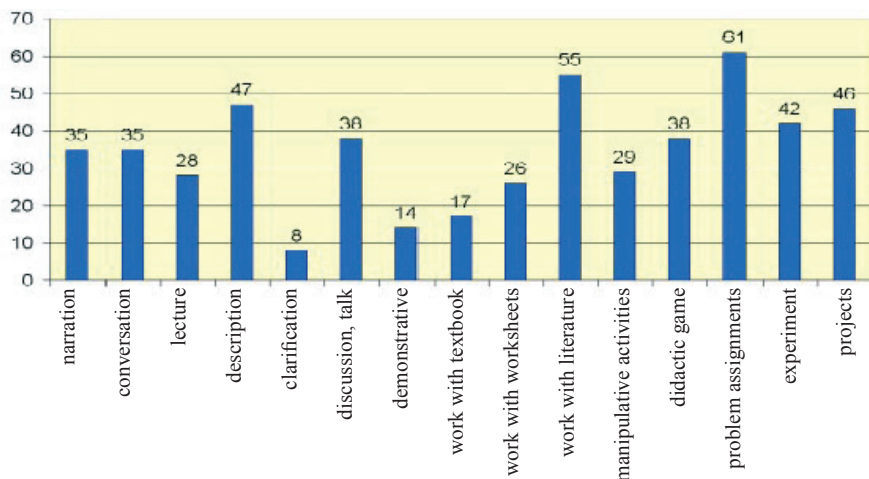
(46), methods of work with test (55) and verbal method – description (47). The verbal methods – narration, lecture and discussion/talk – are applied only very rarely or not at all. It follows from the questionnaires that preferences of individual methods do not differ anyhow in the teachers teaching in the country or municipal school, small or large school. Length of teachers’ experience is also not of decisive character. The Table No. 1 shows what methods are applied by the teachers in maths lessons very frequently, from time to time and what methods are applied only rarely or not at all. The Graph No. 1 reflects what methods are applied most frequently by the teachers in maths lessons and the Graph No. 2 – what methods are applied occasionally.

methods	very frequently	occasionally	rarely	never
narration	16	35	34	3
conversation	44	35	9	
lecture	9	28	26	21
description	26	47	10	3
clarification	80	8		
discussion, talk	5	38	26	11
demonstrative	70	14	3	
work with textbook	67	17	2	
work with worksheets	58	26	4	
work with literature	7	55	25	
manipulative activities didactic	53	29	3	
game	42	38	5	
problem assignments	21	61	5	
experiment	2	42	39	3
projects	5	46	29	5

Table No. 1

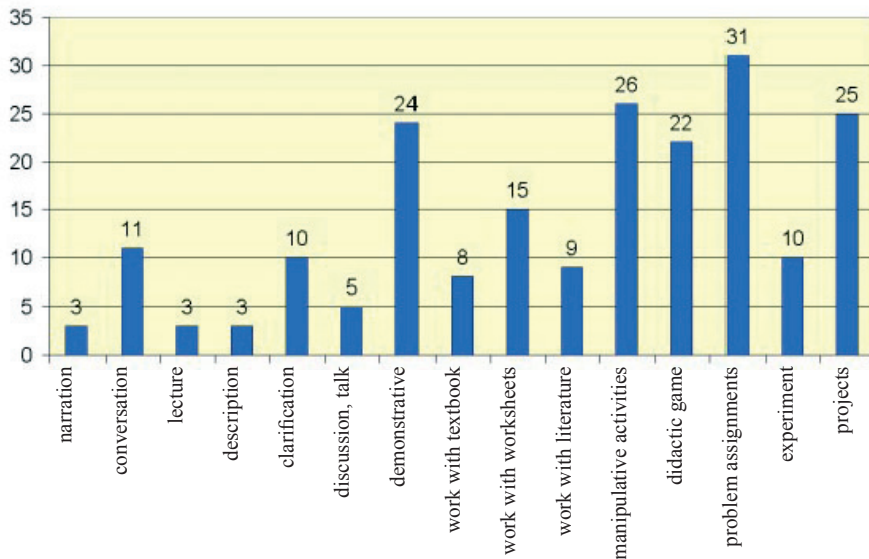


Graph No. 1: Most frequently used methods of maths teaching



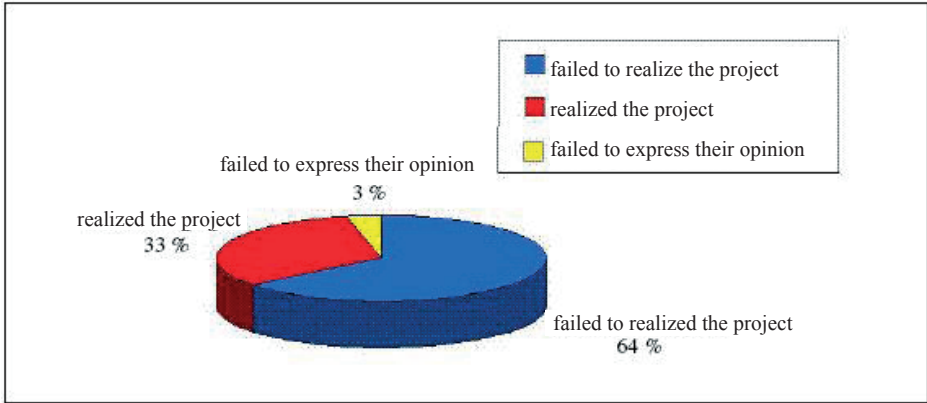
Graph No. 2: Occasionally used methods of maths teaching

Problem assignments (31), manipulative activities (26), projects (25), demonstrative methods (24) and didactic games (22) are considered the most contributive and beneficial methods from the point of individual pupil development by the teachers. Survey of the most contributive and beneficial methods can be seen in the Graph No. 3.

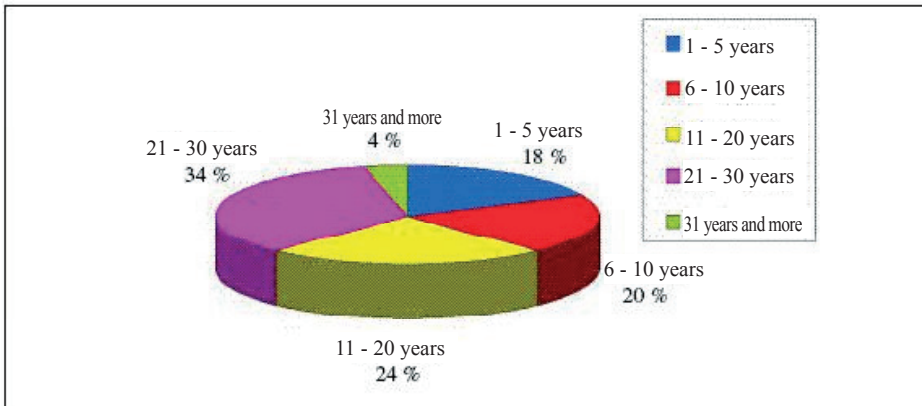


Graph No. 3: Most contributive and beneficial methods from the point of individual pupil development

The project dealing with optional topic was realized in maths lessons by 57 teachers from 89, i.e. 64 % of all respondents. 29 teachers (33 %) have never tried any project in maths lessons, 3 teachers (3 %) failed to express their opinion (see Graph No. 4). The majority of teachers applying the project method in mathematics have the length of experience ranging from 21 to 30 years, the teachers with the length of service over 31 years apply the projects at least (see the Graph No. 5).



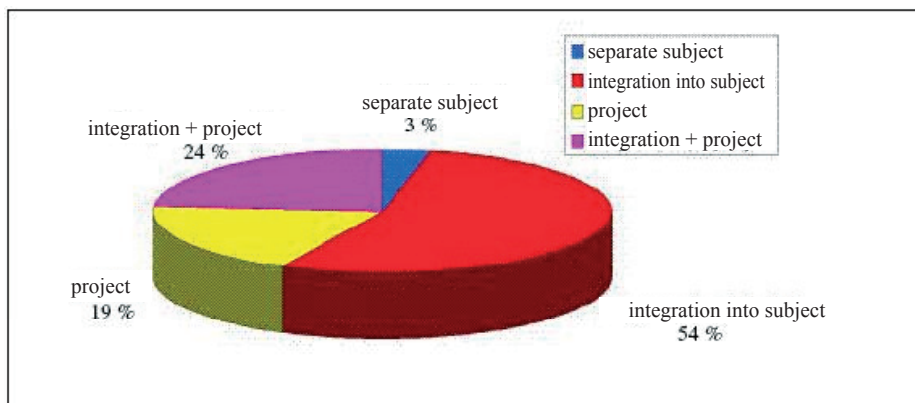
Graph No. 4: Realization of projects in mathematics



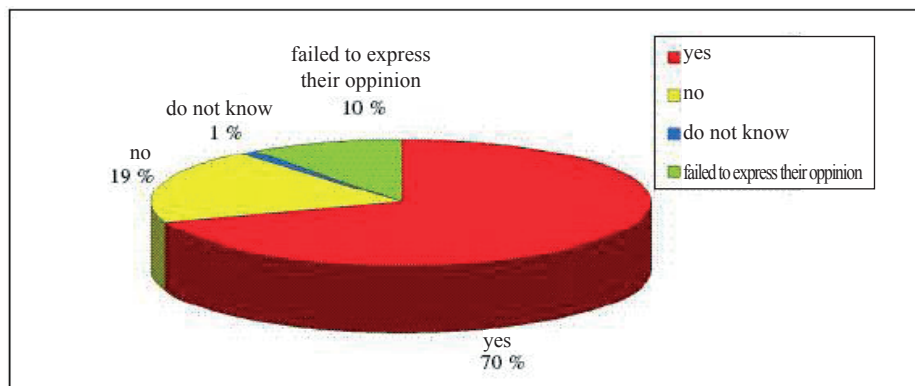
Graph No. 5: Length of service of the teachers realizing projects in mathematics

The Graph No. 6 presents what method of teaching of the cross-sectional topic “Environmental Studies” is preferred by the teachers. It follows from the research that there are explicit differences neither between small and large schools nor between municipal or country schools. The Graph No. 7 shows that the majority of teachers consider integration of environmental studies into maths lessons contributive and beneficial for the following reasons: teaching is linked with the real life, it verifies certain knowledge practically, the problem relating to the child directly tries to be resolved, the pupils integrate knowledge into context, environmental education offers interesting topics for

mathematic tasks and assignments, mathematics as well as environmental education are the integral parts of everyday life, verbal problems with environmental topic can persuade by precise calculations about importance of environment-friendly behaviour, the opinion that environmental issues cannot be resolved without mathematics has even appeared.



Graph No. 6: Methods of teaching of environmental issues



Graph No. 7: Integration of environmental studies into maths lessons

23 teachers of all respondents have at least once tried to apply the projects focused on environmental education in maths lessons. The projects are mostly realized in the 4<sup>th</sup> or 5<sup>th</sup> year and are focused on the following topics: Water, Ecosystems, Environmental Protection, Air Pollution, Rainforest Deforestation, Traffic, Saving Electric Energy, Wastes, Waste Sorting, etc. Not a single project was realized during the 1<sup>st</sup> year of the primary school.

The majority of respondents show that though preparation of the projects is time consuming, the project method is attractive, interesting, contributive and beneficial for

the pupils. The pupils enjoy themselves by the projects, consider them the interest activity, have a more responsible approach to them, learn more quickly, remember more, have perfect experience and therefore the projects are worth preparing and realizing.

## **Projects with Environmental Topic**

The newly formulated educational assignments for the 21<sup>st</sup> century put the accent on development of all aspects of personality so that the pupils may understand better the world where they live, so that they may gather the knowledge and skills necessary for life in the quickly changing world. They enable to introduce different new forms, in particular project teaching, into the maths lessons.

Interconnection of scattered knowledge and creation of integrated view of the said issue is an important requirement for environmental studies in the maths lessons. Mathematics should present simple and visual aids to the pupils for description of quantitative aspects of the world, how they identify it in everyday life and in other subjects. It learns to study, observe and describe the environment, relation of the people to the environment, to gather and classify the information concerning the environmental issues, to consider the acquired knowledge critically in their context, to imagine possible consequences of different human activities (positive and negative), and by imaginativeness and creativity motivates the interest in the methods of solution of the environmental issues. Mathematics thus leads the pupils to active participation in environmental protection.

## **INTEGRACE ENVIRONMENTÁLNÍ VÝCHOVY DO VYUČOVÁNÍ MATEMATIKY NA 1. STUPNI ZŠ – VÝSLEDKY ANALÝZY**

**Abstrakt:** Příspěvek pohlédne do problematiky školních vzdělávacích programů a vyhodnotí, jak lze průřezové téma „Environmentální výchova“ vhodným způsobem začlenit do vyučování matematiky.

**Klíčová slova:** analýza výsledků, metody, problémové úlohy, projekty v matematice, průřezové téma, environmentální výchova