



Project Based Learning, its Realization and Influence on Pupil's Learning

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Abstract

Project based learning (PBL) is one of the organizational forms of teaching in line with the ideas of the founder of pragmatic teaching John Dewey. However, the word "project" is often overused and features many school activities that do not meet the principles on which PBL is based. From the above information, it is clear, that realizing PBL instruction in accordance with its original principles involves a detailed examination of its methodology by the teacher. Project instruction is primarily based on group work. The pupils' teams solve the themes that are associated with their everyday life. These topics must have an inter-subject character. The specific topics of PBL must be based on the interests of pupils themselves. The aim of the paper is to monitor the implementation of PBL in science lessons in the Czech, with respect to the original philosophy of PBL instruction formulated by John Dewey and the PBL methodical pillars. The data was obtained through semi-structured interviews and the attendance method. It has been found that teachers often fail to comply with the PBL methodology. The subject of our research was the extent to which teachers respect the idea of project-based learning with respect to the initial pillars defined by Dewey, defined by Dewey. The results of the interviews were recorded in tabular form.

Keywords: *Project based learning, Realization of project based learning, Secondary school, Biology education;*

1. Introduction

The first ideas about the design of the PBL were based on the criticism of the Herbart school, the basic model of teaching in America and Europe at the turn of the 17th and 18th centuries [5]. In connection with the criticism of the Herbart school, the PBL began to be implemented to the school education. The roots of PBL can be found in the United States of America at the turn of the 19th and 20th centuries in the pragmatic pedagogy of John Dewey [2], [5]. The principles of PBL can be found by authors, compare e.g. [2], [3], [8], [10], [11], [12]; the works of the authors show an emphasis on the interdisciplinary character of PBL. The principles of the work are the team solution of situations, problems or activities related to pupils' lives. All the sub-activities and methods used during the work on the school project must then lead to the creation of the final product. This is either visual or written and is properly reflected and evaluated in the final.

At present, PBL is very popular in Czech education, as is evident from school education programs that are based on the requirements of the Framework Educational Programs [1]. Although design education is often found in schools at present, the question remains whether the term "project" is implemented in the teaching process in accordance with the principles of this organizational form [10]. Another question remains whether there is no confusion between PBL and Problem based learning [9].

According to Thomas [12], we base our research on the following PBL pillars: a) PBL must be a central form of teaching, so it is not possible to repeat or practice the already studied substance; b) PBL must be planned in conjunction with the interest of pupils, so the teacher should not think of the subject himself without any interaction with pupils; c) The subjects taught through PBL should be of an interdisciplinary character; d) The output of PBL should be a realistic product, it should go beyond school boundaries, only presenting pupils' results is not the required output; e) PBL theme should be authentic in line with the world in which we live, that is, the pupil's everyday life.

PBL is very closely linked to the internal motivation of pupils, if the teacher respects the pillar regarding the choice of the subject of project instruction by the pupils themselves, this teaching is very effective [9].



2. Aims and methods

The aim of the paper is to present how PBL is methodologically included into classes in observed schools in accordance with the principles of PBL pillars. There were 3 research questions: How do the selected teachers take into account the pupils' interests when designing the PBL? Is the principle of the interdisciplinary character of PBL respected? What benefits do teachers see in PBL for pupils' learning?

The data was obtained using a qualitatively designed study, with semi-structured interviews and participating observations. The selection of respondents was done by studying information on the realization of project instruction in science subjects on the website of the Prague grammar schools. Selected were grammar schools, where PBL featured in the School Educational Program. The school directors contacted by the authors connected them to the certain teacher who was involved in the project teaching in natural sciences. These teachers were subsequently approached and the term of interview and participating project observation was agreed. Finally, four teachers were recruited to carry out the research.

The semi-structured interview method was selected for personal contact with the respondent and thus the possibility of obtaining authentic answers with the possibility of asking if necessary. The conversations were recorded on the recorder with the consent of the teachers. The open encoding method was used to evaluate semi-structured interviews. In addition, the method of participating observation was used, when the author was present at one or several hours during project instruction at the grammar schools. A record sheet was used to record the research data, which was used to obtain more accurate information about the design and course of PBL. The method of participating observation was evaluated by qualitative analysis and subsequent description of the phenomena and processes observed in their context.

3. Results and their comments

The results of the semi-structured interviews are presented in the Table 1. In the table, we use codes from the open encoding method, according to which the interviews were evaluated. In the fourth column, we provide the entire sentences with the answers given by the teachers.

Teacher (T)	Sources of information regarding the implementation of PBL	Who initiates topics for PBL	Influence on pupil's learning in the opinion of teachers	Inter-disciplinary character of PBL	Way of PBL output
T I.	practice from university internet	both the teacher and the pupils	<i>Pupils learn to formulate questions and search for answers.</i>	no – only biology	oral presentation of the results
T II.	internet	pupils	<i>PBL links pupils' own experiences and the topic of lessons.</i>	no – only biology	practical demonstration + subsequent processing on posters
T III.	internet	teacher	<i>Pupils practice and fix the topic discussed in previous hours.</i>	no – only geology	oral presentation of the results
T IV.	inspiration from lessons of colleagues magazines internet	teacher	<i>Pupils learn to collaborate and communicate in a group through their own activities.</i>	no – only biology	oral presentation of the results

Table 1: Results of semi-structured interviews and participating observations

From the data results, it can be stated: only one teacher said that “his pupils have absolute freedom to choose the subject”, that is, “the theme stems from their current interests”. In one case, the teacher



replied that “the theme was left to the pupils' interests”, but on the basis of the participating observations of the PBL, it emerged that the teacher commissioned the topic; the pupils had only the freedom to choose some subtopics.

The result of PBL is not realistic and usually ends with a mere presentation of the results before the class and the teacher.

In all four cases, PBL lacked an interdisciplinary character; three projects concerned biology, one geology.

On the basis of the participating observations, it was found out that PBL are repeated, practically practiced, or extended topics from previous lessons.

Teachers often use already prepared suggestions on PBL acquired from the Internet, books, and his colleagues.

4. Discussion and contemplation

PBL is currently very widespread, among other things due to the introduction of Framework Educational Programs that emphasize activating methods and forms in teaching [1], [10]. From the results, it is possible to see the fact that the supervised teachers integrate the project teaching into their hours, but without deeper study of its methodology and principles.

However, this is not in line with the principles of PBL that can be traced to a number of designers, compare e. g. [5], [10].

The interviews also showed that teachers are inspired by each other. This can be assessed positively. However, they also accept mistakes, including the presentation of pupils' results without any concrete further output.

On the other hand, it is commendable that an organizational form such as PBL is incorporated into Czech schools, since any change from frontal education can cause curiosity and interest in pupils.

Although there are many literature presenting ready-made project ideas, which can lead teachers to be only mechanically taken over and implemented in teaching, we consider it is necessary to adapt these finished materials to the current conditions in the every single classroom.

Considering this fact and also one of the above mentioned pillars that project instruction stems from the interest and motivation of the pupils themselves, it is advisable to subject already prepared materials to criticism and at least minimal transformation for the class. This pillar can be considered as one of the most important, as pupils are always much better motivated if a topic arises from them themselves [11].

5. Conclusion

The paper presents the issue of PBL, an organizational form of teaching, in accordance with the original methodical pillars defined on the basis of professional literature. At present, the word project is used in many connotations, which can lead to misinterpretation of PBL in schools. The main objective was to map the methodology and implementation of PBL on selected Prague grammar schools, using the method of semi-structured interviews and the method of participating observation.

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