The Project Method for Teaching Mathematics: An Overview

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Abstract: The subject Mathematics became the essential area in every all technological and scientific innovations in the present 21st century and it has big change over on today’s professional and social daily life events. School Mathematics education has always been treated as an important section of general education and specifically science education. It is believed that a teaching method is essential to any meaningful development effort. This paper deals with the problem of using the project method for the 21st century school mathematics teachers. Project method is of American origin and is an outcome of Dewey’s philosophy and this is originated and developed by Dr. Kilpatrick. Here, the project is depends on the learning by doing idea. This method is a concept way of encouraging interest, intelligence, motivation etc. Latest educational methods appliances learning by self with the help of developing technologies, the aim of which is not only to lead knowledge to school going learners, but also to check and build the imaginative absorption and skills of all school students, to energizing an individual self fruitful learning activities. The study highlights about the project method training, which join learning and cognitive project of students, having a same target and which contain about developing the power of 21st century all types of school teachers to have an analytical, ingenuity, self-possession of missing mathematical knowledge from various different origins like rational which is based on knowledge of mathematical truths, the laws of science and ability to work as a team for all students success at school level.

Keywords: teaching, mathematics, project method, 21st century, teachers

I. INTRODUCTION

At present, the theory type of teaching will not work for any types of teachers at school level because of rapid changes in science, technology and communication. The project method is a way to achieve an educational aims by which the full development of the problem leads with a real, measurable and finally a practical result. Major importance of this method is to give all school going learners a chance to self-acquire learning and abilities in the operation of solving the problems by combining all the essential knowledge from different subject concepts. The meaning of this method in school teaching for 21st century math educators is to encourage the motivation of next
generation teachers in some mathematical problems, the answers of these involves both keeping of a definite quantity of understanding and, by design tasks, and real life applications of present and gained comprehension. This method permits by merging both theory knowledge and practical experience of their usage in the teaching by the 21st century mathematics school teachers. This method for any student is a chance to magnify an individual imaginative ability, a procedure of self-awareness and this is an activity that authorizes by communicating a person individually or in a group, applies knowledge, enjoy, and show achieved outcomes openly. For a teacher, the project method is an integrative instructional way of improvement, teaching and education, which sanctions for the progress of certain expertise and capacities of project activities, as well as the joint search for information, self study, research and creative activities by all the 21st century school teachers.

II. OBJECTIVES
- To study about the project method in the usage of teaching mathematics at school level.
- To focus mathematics teacher role towards usage of the project method in the classroom.
- To examine about the basic principles and stages of the project method in the teaching mathematics at school level.
- To analyze an example about the project method in the teaching mathematics at school level.
- To highlight about the merits and demerits of the project method in the teaching mathematics at school level.

III. METHODOLOGY
This study is based on secondary sources evidence gathered for the review which came from research articles, journals, government data, position papers, websites etc. which are all related to the “The Project Method for Teaching Mathematics: An Overview.”

IV. DEFINITIONS
- Dr Kilpatrick mentions a project is a unit of wholehearted purposeful activity, carried out in natural setting.
- Ballard say that the project is a bit of real life that has been imported in school.
- Project is a plan of action by the oxford’s advanced learner’s dictionary.
- A project is a troublesome action taken to complete in its real set up by Stevenson.

V. TACHING METHODS
Learning is a very important characteristic of present perception, in which different types of these theories and teaching methods are all utilized in the field of educational system all over the universe and teaching methods traditional like teacher-centered, problem solving like teacher and student centered and discovery learning like learner center which are based on the different learning theories such as behaviorism, cognitivism and constructivism. Teaching methods involves the use of learning theories and each theory has different end results in mathematics learning. Success in teaching math, the 21st century school teachers must conscious of various teaching methods so, they can execute this comprehension as a base in the teaching and learning, and the teachers conveyed that this is a continuous procedure by which learners able to build a firm knowledge of correct mathematical postulates, ideas and strategies at all levels of school grades. Here, all the subject teachers must provide students sufficient trust to invent of their self math calculations and trust inconsistently and continuously to answer them.
VI. CONCEPT OF THE PROJECT METHOD

Problem solving as well as discovery learning skills not only gives us better mathematics knowledge but also increase student’s interest to manage towards life problems and provide students a chance to imagine productively. In classes using problem solving method student are more active, they think better, and they have less anxiety for exams. In sum, the results indicate that students who learn mathematics by problem solving and discovery learning methods are more active in comparison with the students under the traditional teacher-centered method and enhance students to think critically in their daily life and enhance their thinking, reasoning, knowing, and applying skills. Using these methods prepare student to solve problems appropriately and encounter with challenges in their life.

Within the framework of the competence-based approach, content for students is valuable, meaningful, interesting, and has an applied character. The interaction of the teacher and students is based on parity: the teacher performs the function of the organizer of the educational process (tutor), while the students mostly work independently which means to look for the necessary information, analyze it, process it, present it, make decisions in non-standard situations, set a goal, make a plan to achieve it, implement this plan, put forward and prove hypotheses, etc. The project method involves a system of actions of the teacher and students to develop a certain project and it is translated from the Latin as thrown forward which is the interrelation of two factors like design and implementation.

In the pedagogical literature and the practice of teaching, the project is understood in different ways and on the one hand, it is interpreted as a result of students' activities. On the other hand, it is “learning through doing” (J. Dewey), a form of organization of activity, as a result of which students will definitely get the final specific result.

VII. BASIC PRINCIPLES OF THE PROJECT METHOD

- Psychological Principles of Learning
  - Learning by doing
  - Learning by living
  - Children learn better through association, co-operation, activity etc.

- Psychological Laws of Learning
  - Law of readiness
  - Law of exercise
  - Law of effect

VIII. THE PROJECT METHOD STEPS

- Creating the situation: The teacher creates problematic situation in front of students while creating the appropriate situation student’s interest and abilities.
- Proposing and choosing the project: While choosing a problem teacher should stimulate discussions by making suggestions.
- Planning the project: For the success of the project, planning is very important.
- Execution of the project: Every child should contribute actively in the execution of the project.
- Evaluation of the project: When the project is completed the teacher and the children should evaluate it jointly discussed whether the objectives of the project is reached or not.
- Recording of the project: The children maintain a complete record of the project work.
IX. THE PROJECT METHOD STAGES

- **Preparation**: This stage involves selection of the topic and objectives of the project, as well as determining the number of project participants, the composition of groups. Concerned students discuss the established theme of the project with the teacher, receive additional information if necessary.

- **Planning**: Here, the sources of information are determined that are necessary to obtain knowledge of the mathematical design object various planning of ways to collect and analyze the information received and planning of the implementation of the final product like result presentation form a newspaper issue, an oral report with a demonstration of materials also establish criteria for evaluating results, distribution of responsibilities among the members of the group involved in the project in mathematics.

- **Practical activities**: This stage involves summation of information collected by each of the students during their participation in the project here the students will conduct a research. The teacher observes, advises, directs the work, organizes and coordinates, if necessary, the activities of all the concerned students.

- **Presentation**: Here, the presentation of the finished product to a wide audience of listeners takes place, peer group, students from other groups, teachers, students and other invited guests can play the role of such students finally the results of the project can be also exhibit in the form of a presentation.

- **Results**: Here, the activity done by the students will be graded and points can be noted for further corrections.

X. SOLVING THE MATHEMATICAL PROBLEM BY THE PROJECT METHOD

Examples

BUILDING OF A SCHOOL PLAY GROUND

Step 1: Formation of committee consisting of management, parents, school staff etc.

Step 2: The expected expenditure will be calculated.

Step 3: Play ground check list preparation.

Step 4: Budget will be prepared with the funds and resources.

Step 5: The account of collections from all areas will be gathered.

Step 6: Actual expenditure will be calculated and analyzed.

Step 7: Contacting vendors for finalizing the construction

Step 8: Monitoring can be done all the times during the works.

Step 10: Daily expenditure and costs of materials can be noted down.

Step 11: Progress and suggestions can be taken care.

Step 12: Evaluation of the entire process and completion of the project can be recorded.
XI. MERITS AND DEMERITS OF THE PROJECT METHOD

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<tr>
<th>MERITS</th>
<th>DEMERITS</th>
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<tr>
<td>This is based on various psychological laws and principles</td>
<td>It takes more time and economical.</td>
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<td>It develops self-confidence and self-discipline among the students</td>
<td>The knowledge is not acquired in a sequential and systematic manner</td>
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<td>It provides ample scope for training.</td>
<td>It is very difficult to complete the whole syllabus by the use of this method.</td>
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<td>It provides score for independent work and individual development.</td>
<td>Textbooks and instructional materials are hardly available.</td>
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<td>It promotes habits of critical thinking and encourages the students to adopt problem-solving.</td>
<td>The project method does not provide necessary drill and practice for the learners.</td>
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<td>This method the children are active participants in the learning task.</td>
<td>The project method is uneconomical in terms of time and is not possible to fit into the regular time table.</td>
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<td>This is based on principle of activity, reality, effect, and learning by doing etc.</td>
<td>Teaching is not organized properly.</td>
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<td>It develops discovery attitude in the child.</td>
<td>This method is not suitable for a fixed curriculum.</td>
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<td>It provides self-motivation as the students themselves select plan and execute the project.</td>
<td>Syllabus can’t be completed on time using this method.</td>
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XII. CONCLUSION

Project method provides a practical approach to learning and it is difficult to follow this method for teaching mathematics. However this method may be tried along with formal classroom teaching without disturbing the school timetable. This method leads to understanding and develops the ability to apply knowledge. The teacher has to work as a careful guide during the execution of the project. The new educational strategy implements self-education with the help of developing technologies, the goal of which is not only to bring knowledge to students, but also to identify and develop the creative interests and abilities of each student, to stimulate his/her independent productive learning activities. The project method involves joint learning and cognitive activity of students, having a common goal, agreed ways of working. The study highlights about the school teachers which have an ability to be logical, reasonable and self-acquisition of lost mathematical knowledge from various sources, thinking, depend on knowledge of mathematical facts, the laws of science; and ability to work in a team for the 21st century schools.
XIII. REFERENCES


