

Use of Research Based Pedagogical Tools in Science Education

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Abstract:-

In present scenario of flooding information and overuse of technology, Research-Based Pedagogical Tools (RBPTs) is prove to be a highly effective tool to inculcate the research attitude and provide firsthand experience to the science students who need practical knowledge to understand the concepts. The present study concentrates the use of RBPT to explain the topic like Identification and classification of Fishes and how this technique involves more number of students and creates interest, enthusiasm, leadership quality, communicative skills, and applicability knowledge among the students. RBPT helps to inculcate the Research attitude and firsthand experience enhances critical thinking, analytical skills, decision making, data interpretations and troubleshooting. This method is useful to apply the knowledge in their real life experiences.

Keywords:-

Research Based Pedagogical Tool, Identification and classification of fishes, Enthusiasm, Leadership quality, Communicative skills, Data interpretations, troubleshooting.

I. INTRODUCTION

RBPTs are pedagogical tools that recognise, require, refine, reward and report research activity. They are pedagogical tools not research. They exist primarily to teach science and mathematics although authentic research will occur. Through RBPTs, students develop their research experience and skills and acquire relevant domain knowledge. To apply this tool one need A research question, Data that can be collected that informs the research question, an insight to form the patterns or relationships in the data.

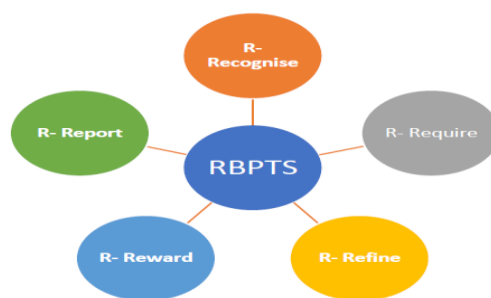
According to theory of social facilitation, the people often perform better in the presence of others than alone (Cook, 2001). Working in groups is thought to better enhance students' learning perceptions, problem solving skills and overall learning abilities than learning alone (Hiltz et al. 1999). Blending research with teaching can acts as an effective vehicle for developing true scientific understanding, vital knowledge for the world community now and in the future (mooKIT). Research based pedagogical tools (RBPTs) are one of such methods in which students work in a groups to find the solution of real life problems with scientific temperament. In this paper we will discuss about elements of Research-Based Pedagogical Tools (RBPTs) for teaching science at Higher Education Institutes (HEIs).

In the present study plan students would attempt to the learn the topic of their syllabus –Identification and classification of fishes using RBPT.

II. IDENTIFICATION AND CLASSIFICATION OF FISHES USING ELEMENTS OF RESEARCH-BASED PEDAGOGICAL TOOLS

Research Based Pedagogical Tools (RBPTs) are pedagogical tools used to infuse research with teaching. RBPTs have many other name like research-based learning (RBL), problem-based learning (PBL), inquiry based learning (IBL), project based learning (PBL) and learning by doing, co-operative learning, science in the real world, etc. The main purpose of the RBPTs is to provide learner centric environment in the classroom, providing exercise wherein the student is engaged in research activity to develop the knowledge of a particular topic in inquiry mode. They are pedagogical tools and not the research. They are primarily used to teach science and mathematics although authentic research occur. The RBPTs develops research skills and deep content understanding among the students and acquired a relevant domain knowledge. RBPTs focus on process of science rather than routine for conceptual understanding. They includes methods and essential elements of logic, critical thinking, interpretation, analysis and help to imbibe problem solving, research skill with domain knowledge. (mooKIT and handbook STEM workshop).

Teaching by this method, research is an integral component. The entire pedagogy should consist of **4 Rs**: there should be a component of **R**esearch; which should get **R**efined along the way and the outcome of the learning exercise should be **R**eported. Students' work should be **R**ewarded for the research component —by way of grades or equivalent. Students do an activity designed by the teacher to find about or understand a concept. The teacher's role is more of a facilitator, helping students refine their research, to overcome glitches or obstacles in their investigations.



These components would help the facilitator to frame a problem. The first requirement for framing a problem is the context. It may be a news headline, Television news, any doctrine by a philosopher or a scientist, etc.

So for the present study the **Context** was a newspaper headline as- “Due to Eutrophication Menace fishes found dead on the bank of the Ambazari lake”.

On the basis of this context students would be asked to frame a **problem** as- How Fishes play important role to maintain the pond ecosystem?

To answer this problem students need to study different fishes, their habits and habitat, etc.

Content of their study are their learning objectives.

As-

- Students should be able to Collect and identify the fishes from the source (in this case its Ambazari lake).
- They should be able to collect and document their collection. E.g. Size, shape, color, fin formula, lateral line system, time, temperature, oxygen demand of the fishes.
- They should be able to identify them as edible, Weed, Carnivorous, predatory, herbivorous fishes. On the basis of their learning objectives **Activity** will be planned.
- Collection of fishes with the help of local fisherman.
- They would document their collection in their personal diary and release the fishes back to the water.
- They will refer the literature for identification of fishes.

To collect this data they would require some resources such as

Camera, Fish net, Boat, basket, Chloroform (optional), Online resources, Identification keys.

Assessment-

To know the authenticity and significance of the collected data the teacher who is now a facilitator will assess the data and collection. He will help the students to identify the fishes up to genus level.

Teacher will ask the students to display the picture of each fish with its information on a cardboard.

III. OUTCOME

- This activity will create a huge collection of fish biodiversity and its information. This information will serve as a guide to the researchers for the conservation and other research purposes
- During the fish collection if new species found, which remained unidentified it will further send it to Zoological survey of India and nomenclature would be done by the name of the students (Publication).
- This firsthand experience students will be able to apply this knowledge in their real life correlate it with human existence and its significance in life.

IV. CONCLUSION

In the era of ICT, when every information is available on the fingertips, conservative classroom teaching i.e. Lecture method or Chalk duster method is going through a transition period and to face this new change, as a teacher one must evolve new techniques and tools of the teaching. Research Based Pedagogical Tool proves to be a very useful technique which can be used to teach a topic for the better understanding of the students. The present study concentrates the use of RBPT to explain the topic like Taxonomy of Pisces (fishes) and how this technique involves more number of students and creates interest, enthusiasm, leadership quality, communicative skills, applicability knowledge among the students. RBPT helps to inculcate the Research attitude and firsthand experience enhances critical thinking, analytical skills, decision making, data interpretations and troubleshooting. This method is useful to apply the knowledge in their real life experiences.

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VI. REFERENCES

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Weblinks-

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