

# Development of Cognitive Affective and Psychomotor Domain by Using Hands on Minds on School Science

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**ABSTRACT:** This research paper aimed to investigate the effectiveness of learning by doing method and hands on, minds on activities in the science syllabus of Maharashtra textbook of grade 6<sup>th</sup> to 8<sup>th</sup> in Ashramshala school Of Maharashtra. This paper deals with the reconceptualization of science education by hands on science kit and observe the qualitative parameter of the tribal students of class 6<sup>th</sup> to 8<sup>th</sup>. And why students have problem of learning science. This research study also aimed to enhance the knowledge of how school science teachers in Tribal schools in Maharashtra perceive and apply science teaching learning practices by applying hands-on (psychomotor domain), minds-on (cognitive domain) and hearts-on (affective domain) in Ashramshala school. This research aimed to explore the constructivist approach based on 7E learning cycle i.e., Engage, Encourage, Explore, Evidence, Elucidate, Elaborate and Evaluate. It summarize how school science teachers applied the techniques of presenting the conceptual and comprehensive aspects of primary/secondary level of and learning and teaching. For the study we have selected 42 Ashramshala school of Taloda PO, Nandurbar district of Maharashtra in which science teacher, lab attendant, and students of class 6<sup>th</sup> to 8<sup>th</sup> have included and their participation boost the research effectiveness. The results of this study are important especially for curriculum design, assessment and evaluation and teacher training and also for developing countries that can not use expensive materials to make students physically active in science hands on activities. And through science kit, to make science education more playful/joyful and more imaginative and inspiring for today's tribal students, the citizens of tomorrow's world. Teachers, trainers, experts in Science education are working together to help them build a better world for everyone.

**KEYWORDS:** Hands on Activities, Science Kit, Inquiry-based learning, Assessment

## I. INTRODUCTION

Science get ahead with children when they recognise that they can learn about the nature and construct their self understanding of events/phenomena through their deed and insight. A child best learns to swim by getting into water; likewise, a child best learns science by doing science" (Rillero, 1994, p.1). Doing science, as opposed to simply hearing or reading about it, engages students and allows them to test their own ideas and build their own understanding (Ewers, 2001). Therefore, it is teething trouble to imagine a science-teaching program without doing science experiment. If we used hands on in classroom, it is aha moment for the children.

Some terms such as materials-centered science and activity-centered science are used synonymous with hands-on science or terms such as materials-centered activities, manipulative activities and practical activities are used synonymous with hands-on activities (Doran, 1990; Hein, 1987).

The mission of the "Hands On, Minds, On Science" Research is to provide resources and opportunities for teachers and students to help them make science education more attractive and relevant to students' lives.

During these pilots, teachers/students will be accessing science kit, educational games and and integrating them with extra-curricular activities, such as science exhibition, science fair, field trip to science centres and science corner, and virtual visits to online. Teachers will also have the possibility to do experiment at home and access online labs material, and relevant science material for their use in the school classroom and in school lab.

## II. LITERATURE REVIEW

Many research had been done in implementing hands on activities and discuss about its outcome during science teaching and learning process, Several studies in the literature show that hands-on activities help students to boost their academics performance and their practical abilities and make outperformed students. Hofstein et al (1982) emphasizes that minds-on science activity have used for higher order thinking, and problem solving. Haury & Rillero et al, (1994) emphasizes that children learn better when they can touch, feel, measure, manipulate observing, testing, finding evidence, and collect data and when they find answers for themselves rather than being given the answer in a textbook or lecture. According to the U.S. National Science Education Standards (1995), students should have minds-on experiences during hands-on activities. Karen Haydock (2011) emphasizes why do we have problems learning and teaching science and she had suggested teachers need to have ideas for activities. And the role of teacher training is crucial in this kind of learning. Dr. Mihaela Garabet et al. (2015) emphasizes to motivate and to inspire the science learning by using Inquiry-based learning (IBL) to embrace curiosity, fundamental human trait, as a natural impulse to learn and think. Kamal Prasad Acharya, (2018) emphasizes Science instructional practices help to increase science achievement by relating cognitive (minds-on), affective (hearts-on) and psychomotor (hands-on) activities

## III. MISCONCEPTION ABOUT SCIENCE

Science is not a list of facts to memorise and to cram. It is a process of defining questions, hypothesizing, observing, testing, finding evidence, collecting data, analysing, modifying conclusions, communicating, and requesting again and again.

### Some basic reasons why learning science is difficult

1. We think science is a list of ‘facts’ and
2. We count on belief and reliability rather than scientific process.
3. We keep within bound to scientific methodology.
4. We use the inappropriate system of logic.
5. We have an unrealistic way of thinking about the world.
6. We don't promote hands on activities
7. Difficulty between superstition and science
8. Less emphasize on constructivism
9. Science subject is marks oriented
10. School science is not relevant to practical aspect of life
11. Science enable only understanding of events and phenomena
12. We are not realising what is the nature of science, and we are not realising what is the nature of our world.
13. We find textbooks full of contradictions and confusing statements
14. Students is like a copycat in science
15. Science is not a subject as a school of thought
16. Learn by rote not learn the ropes

This is not a complete list, and all of these aspects need not be present, but this gives an idea of what a generalised scientific method is. If we want to teach science in school classroom then first we have to teach the scientific methodology and scientific procedures. The way to teach it is to do it. We erroneously think that science is a naked truth or it is a list of facts, we think that it is possible for some reliable source to have the right facts and the genuine answers to our questions. When we rely on reliability, we are not undoubtedly relying on science.

We think that there are certain types of questions that cannot be answered by science, we may be needlessly restricting ourselves

Nowadays the studies are revealing the existence of a lack of interest in students' Science learning. They find the school science is not relevant, even boring and unrelated to the world around them. Current school science take oneself off from broad ideas of science that could help understanding of things around them and enable them to take part in decisions as informed citizens. The goal of science education is not knowledge of a body of facts and theories but a progression towards key ideas which enable understanding of events and phenomena of relevance to students' lives "(Harlen, 2010)".

#### IV. HANDS ON SCIENCE KIT OUTCOME

##### 1. Hands On Outcome by Hands on Science Kit Developed By HSTP Eklavya Bhopal.

Hands-on Science kit has been developed by Eklavya Foundation, Bhopal HSTP (Hoshangabad Science Teaching Program) with a view to provide a facility to the children of Ashramshala schools to gain hands-on practical experience in sciences. The science kit can be used by a teacher and an individual child or a group of 4-6 children as well as a demonstration set by the teacher and lab attendant. It is not only a comprehensive compilation of science instruments, equipment, chemicals box and miscellaneous items which are generally required for carrying out hands on activity or experiments by students in Physics, Biology and Chemistry but also includes items that would cater to their strong need to satisfy their curiosity and tinker with things around them.



##### (Hands On Science Kit)

- Hands on science kit support science teachers and teacher trainers in their teaching drive to make their teaching learning more thrilling, amusing and compatible for students.
- It is a platform that can be used by the ashramshala students and teachers to take science teaching beyond the classroom and convert classroom into the realms of extra-curricular learning.
- A variety of science tools (S-Tools) and science kit resources that provide opportunities for students to collaborate with each other (in or out of the classroom) or with others outside of the class.
- Hands on activities is a way in which students themselves can be explore in scientific research activities. And students painting the town red of science in the classroom.



- Hands On is a robust support network for academician.



(Students Performing Hands On Activities)

### 1.1 Difficulties in Hands On Activities:

During visit of different school the teachers complaining that they were used to teacher-centered learning environments and when used hands on activities that takes too much time and effort for preparing and guiding such activities. Consequently an ample reward needed for preparation and acquiring of legitimate or valid experiences are also very significant while implementing these hands on activities. Therefore, we cannot claim that drastic changes should be done in the syllabus/curriculum through Hands On, Minds On. But drastic times call for drastic measures for implementing Hands on activities. Proper Lesson Planning takes a lot of time, Teacher are busy in other work like admin and clerical job so they are not able to give much of time for preparing activities. Lab assistant/attendants in most of the schools are given clerical work due to which the labs aren't maintained properly. Many times when we visit, the lab keys are not present in the school. General teachers (teachers teaching std.6 and std. 7) are mostly from non-science background.

## V. CONCLUSION

This study examined psychomotor (hands-on) cognitive (minds-on), affective (hearts-on) activities in science instructional practices in the ashramshala schools of tribal areas. It was found out that using the practical activities in teaching and learning science showed a high degree positive effect on students interest, school science teachers were able to learn from experiments conducted either on the laboratory or during the excursions, showed the substantial positive effect on science achievement. Teachers who employed hands-on activities blending with minds-on and hearts-on activities in science lessons led to higher achievement in science than those who did not employ hands-on activities. However, we may give some recommendations. Like including hands-on/minds-on activities might be developed in college and universities and in teaching education course like B.Ed, M.Ed to familiarize prospective teachers with linking physics, chemistry, biology with daily life phenomena. Moreover in-service trainings, capacity building



workshops or science projects may be organized for the teachers allowing them to gain practical experience and proficiency with hands-on/minds-on activities. Science materials consisting simple set-ups or low-cost items that can be found and assembled very easily should be developed and provided to the schools in order to implement the curriculum productively and successfully, particularly for the specific chapter and topics in which low-cost hands on activities are easily available, e.g. simple machine, simple electric circuits, food and nutrition, parts of plant etc. Thus, students better realize that they do not need a special laboratory environment or complicated apparatus to perform hands-on and minds-on activities and learn science better. A small library corner in every school with the help of science books included story books for children and some reference books, picture books, Simple maths/science/technology related book plus the existing books of the school library will be made, where the students will be free to come and read the books of their interest.

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