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Innovative Strategies and Practices of Physics Teaching In Teacher Education

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As there are dynamics of instructions varying in today's contemporary physics pedagogy teaching, eventually this leads to incorporate various apt strategies and practices. This in turn elevates higher orders of thinking abilities of disciples. In recent days NCF-2005 is prioritising empirical hands on learning activities here in which any educational milieu to teach science curriculum nevertheless it would link to life situation. Most of the physics notions are abstract in nature require mental exercises and processes. Construction of knowledge should be obtained through based on hands-on experiences. This attitude suppose to happen in the mind of the pupil at the training root itself. The five dimensions are identified and incorporated while teaching pedagogy of physics at teacher-trainee colleges which strengthen knowledge and skills of numerous practices. They are mentioned as below.

1. Promoting Interactions among students - teachers,
2. Pupil's Reflections soon after concept learning,
3. Enhancing Pupil's abilities during learning,
4. Teacher as Facilitator throughout learning session and
5. establishing Joyfulness in Learning.

NCF-2005 Recommendations on learning Physics

NCF – 2005 was cited, emphasis should be laid on following basic elements of physics/science teaching to incorporate for science learning among the students. Hence utmost concern should be laid on while establishing appropriate learning setting.

- ▶ active participation of learner in their construction of knowledge
- ▶ Hands on experiences and inquiry based
- ▶ Space for learners to perform activities / experiment
- ▶ Science has to be presented as growing body of knowledge rather than finished product
- ▶ Apply to life situation
- ▶ Discarding rote methods

Methods of Teaching Physics

As we know various methods to teach physics / science at the primary and secondary level to learn basic concepts of day today science. Though they exhibited with different steps but show many similar features overlapping in various methods and approaches.

- ▶ Constructivism- 5Es' model
- ▶ Problem Solving Method / Scientific Method
- ▶ Experimental method
- ▶ Laboratory method
- ▶ Heuristic method

- ▶ Demonstration method
- ▶ Role playing method
- ▶ Project method
- ▶ Discussion method
- ▶ Lecture- cum -Demonstration method
- ▶ Discovery method, etc.

The five dimensions highlighted for physics teaching are

1. **Promoting Interactions** in the educational setting are the core responsibility of teacher-educator to motivate pupil-trainees. The teacher-educator becomes a participant and co-learner in discussion, asking questions and perhaps correcting misconceptions, but not telling learners what they need to know. To succeed in his task, teacher-educator provides complete autonomy to pupil by discarding conventional control over pupil. Creation of verbal and non-verbal communications led to interactions in the form of responding, writing, observing, recording, concluding, performing of given empirical situation etc.
2. **Pupil's Reflections** are noticed in Student-centered assessments where in open-ended questions that force learners to reflect and synthesize what they have learned. They demand that student's access to higher orders of thinking. Reflections are the rational opinions/responses of certain experiences of given learning situations originated in the pupils mind. This is candidly own opinion as a result of inquiry of mental exercises on activities of content assigned.
3. **Enhancing Pupil's Strength**, to activate this strength takes flexibility, resourcefulness, sensitivity to student needs, and a deep understanding of physics content all of which require even the most experienced teacher to stay on his or her toes. It should cater to all the students prior existing multiple knowledge and skills. Without knowing existing knowledge it is hard for teacher to upgrade efficiency in the particular areas. Therefore identification of present capacities would supplement further selection of strength of learner here.
4. **Teacher as Facilitator**
This truth is that twenty first-century learning is focused more on creation and critical thinking than on compliance. Most of us were formed in a teaching crucible that emphasized our wisdom and students' compliance. Shifting our perspective means that students take on more active roles as learners and that our roles change, too. Various learning situations would be created according to situations countered and dependant on learners multiple disciplines. This altogether requires instruction, guiding, performing skill based activity, demonstrating, counselling,
5. **Joyfulness in Learning**
In the conventional teaching setting there is no scope for interaction. Teacher simply delivers the information of the content and student mere passive listener. In such hard dictatorship environment how can joyful learning could exist. In such situation it's difficult, because it asks us to consider the learner as a part of our community, rather than just a mind to fill. Hence this is high time towards shifting our entire philosophy towards joyful learning. If we sincerely believe in lifelong learning and commit to modelling it, we'll be honest with one another, cajoling, encouraging, and mentoring with challenging and appropriate dialogue.

The aforesaid five strategies should be made as part and parcel of physics pedagogy transformation irrespective of mode of various methods and approaches in the teaching – learning situation. These expose features of democratic elements of teaching- learning based on autonomy of pupil incited for truth exploration. Teacher education is the right platform for preparation future teachers and right stage of inculcation of such attitudes.

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