

## APPROACHES TO BIOLOGY ON INTEGRATING PEDAGOGICAL TRAINING FOR FUTURE SCIENCE FACULTY

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### Introduction:

Pedagogy is a highly complex blend of theoretical understanding and practical skill. Pedagogy is a nebulous concept; it is essentially a combination of knowledge and skills required for effective teaching. The more traditional definitions describe pedagogy as either the science/theory or art/practice of teaching that makes a difference in the intellectual and social development of students. Pedagogy is the science and art of education; it is the study and practice of how to teach best. It aims the range from general to narrower specifics of vocational education (the imparting and acquisition of specific skills). The pedagogue's job usually differs from a teacher's by primarily focusing on teaching children social skills and cultural norms, etc. There is also a very big focus on care and well-being of the child. Connecting human beings and nature through conservation experience is effective vehicle for developing true scientific understanding. Technology enables experiential teaching and learning in the 21<sup>st</sup> century classroom, making science education more rigorous, relevant, and based on relationships that extend beyond academic walls. A program that links skilled educators and research scientists with teachers and students, either virtually or in the field can use technology to build new and effective multimedia learning environments and strategies for effective science teaching and learning.

These programs will use technology where possible to build new and effective multimedia learning environments and strategies that transition students out of simple inquiry-based learning tools and toward professional science practice itself. In 21<sup>st</sup> century science classrooms should have the power of experiential teaching and learning should have technology of colour coded diagrams, power point slides, animated programs, educational applications, suggested websites, etc. Because of this, science education will be more satisfactory.

### Senerio of India:

Almost all high schools in India have computer labs not more than one lab in each school. Most of colleges have computer labs. The nature of technology used by teachers varies in different

contexts and is based on the degree of technology-enabling. Teachers have reported pedagogical difficulties and that extra time is required to design technology-based learning activities. Most teachers believe that lab sessions do not help students to succeed in the performance in exams.

Technology in India is transforming because of new objectives and learning outcomes. Computer tools such as power point, simulations, and web based conferencing systems, multimedia visualizations and modeling tools can be utilized to support inquiry in science teaching and learning. Study based on computer technology was confined to three states in India, Kerala, Tamilnadu and Karnataka states. Because their schools were frequently undertaking bold and innovative curricular experiments, involving computer labs, technology-enabling ways, and this development had the support of local IT companies.

Students are also responsible for learning. The evaluation of college-level teachers is not tied up with student performance. And poor student's performance is not only blamed on students but also on unmotivated issues. This difference no doubt has its roots in the past, when primary, secondary education is compulsory. But on the other hand, in college / university attendance is not necessarily. Students attend an institution of higher learning only if they felt that such attendance is valuable and they could judge the product and value for themselves. But times have changed; as our economy have become more knowledgeable. There is overflow of students at the doors of colleges and universities seeking a coveted and much needed college degree for advancement in the world.

Pedagogical Models is a theoretical framework that teachers can use to reflect critically upon their current classroom practice, i.e a vehicle to use as a professional vocabulary around which to have conversations about teaching practice with colleagues and to focus on individual student needs. There are four dimensions for productive pedagogies.

- 1) High degrees of intellectual quality
- 2) High levels of demonstrable relevance or connectedness
- 3) Highly supportive classroom environments
- 4) Strong recognition of difference

#### **A quality teacher:**

Pedagogical model or strategies teachers choose, educational research demonstrates that teacher quality is the key determined by students learning. “Teacher quality is the single greatest

factor in explaining student achievement, more important than classroom related issues such as resources, curriculum guidelines and assessment practices.

#### **Characteristics of good teacher:**

- 1) Know your content: Keep up with your field of expertise. No matter if this is your first year or thirtieth, keeps up with the changing trends in the field of teaching.
- 2) Exhibit enthusiasm: Show that teaching can be fun and this enthusiasticness in teaching will have impact on motivation of students.
- 3) Be organised: Organisation allows you to spend more learning time with students.
- 4) Teach actively: Quality teachers are involved in various activities with students and other staff.
- 5) Show a good attitude: The most courageous decision one makes each day is the decision to be in a good mood. Children need teachers with positive attitudes. Listen to what you say to others and to your tone of voice.
- 6) Establish successful classroom management: Discipline and reasonable structure are essential for students to be on task.
- 7) Maintain good people skills: If people don't like your behaviour as a teacher, they won't be around you. Good human relations skills are imperative.
- 8) Create a pleasant atmosphere: Cheerful and happy classrooms stimulate the percentage of success learning.
- 9) Communicate clearly: Effective teachers give information clearly. Demonstrate as well as explain. It includes explaining, outlining, summarising and reviewin.
- 10) Question effectively: Questioning is a powerful teaching tool, through which productive thinking occurs. Ask contextual open / closed questions at the appropriate times to students.
- 11) Build success into your class. Success rate is important. Research indicates that a success rate of at least 80% is optimal. When students are not successful, provide further instruction or simplify the task until they can master it.
- 12) Hold high expectation. High expectations must be introduced for good performance. Students respect teachers who expect them to do their best.
- 13) Be flexible. Teaching requires flexibility. You should adjust and adapt when timely topics come up instead of staying with your lesson plan.

### **Pedagogy for Biology teachers:**

Biology is a branch of science which deals with study of living things / life. It is also known as a life science. A growing revolution is under way in the teaching of introductory science to undergraduates. Discipline-based educational research in the life sciences and other areas has identified several innovative promising practices and demonstrated their effectiveness for increasing student learning.

As a biology teacher, our vision for higher education includes real-world scientific activities and exchanges that are relevant, state-of-the-art, and based on relationships, whether local, state, national, or international. Technology allows teachers to reimagine programs and pedagogical tools for the 21st century that enable teachers and their students to engage in real-world.

In life science / biology, meaningful learning means that are the students able to apply what they know about biology to present situations? Are they able to predict and explain the responses of a biological system? Meaningful learning involves building multiple representations (mental models) of knowledge. A science student is formally supported by two teacher-mentors. One of the mentors is the subject teacher in school or colleges, while other is a science specialist professional teacher other than school or colleges. In practice, many students also receive additional useful support and guidance from other teachers whom they work alongside in the partnership with schools and others.

While teaching any lessons on life science, how do experienced biology teachers draw upon their topic-specific pedagogical content knowledge? There are a number of questions that arise while teaching lesson is:

- 1) What is the nature and sources of the experienced biology teachers?
- 2) How does a teacher use knowledge of representations and instruction?
- 3) Experienced teacher should apply various models / charts / ppt in teaching.
- 4) What is the nature of students understanding of science and how does this knowledge of science learners inform their teaching practice.
- 5) How experienced teachers integrate the topic-specific components of their pedagogical content knowledge when teaching life science / Biology.
- 6) How teacher using computational applications in their teaching.

- 7) Intensifying the policy drive to recruit physics and chemistry specialists.
- 8) Creating a single, authoritative collection of resources to provide accurate and validated science subject knowledge for trainee teachers and NQTs, for all science topics in the National Curriculum. This collection might be hosted and validated by a national organisation such as the Association for Science Education or the National Science Learning Centre.
- 9) A quiet classroom is needed for learning.
- 10) Homework for answering textbook questions is good.
- 11) Instruction should include clear answers that are easily grasped.
- 12) Learning depends on background knowledge and facts

**Assessment against the standard of teachers is based on:**

- 1) To understand the contribution of teacher in a subject to develop key skills.
- 2) To create opportunities to contribute to pupils' personal, spiritual, moral, social and cultural development.
- 3) Use teaching methods which sustain the momentum of pupils work and keep all pupils engaged through.
- 4) The individual and collaborative study skills needed for effective learning, including information retrieval from libraries, texts or other sources.

**Summary:**

We must improve the undergraduate teaching of biology and disciplines to remain competitive in the global economy and educate Indian citizens adequately. Recent research in educational psychology, cognitive science, pedagogy and neurobiology has yielded important new insights into how people learn and the optimal conditions for learning. Discipline-based educational research (DBER) has led to the development of teaching approaches. Applying these promising practices widely in lower classes can have a major impact on better preparing our undergraduate biology students for their future endeavors. General pedagogy skills and methods applicable across all subjects.

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