

A Review on Critical Analysis of Traditional Teaching Methods in Science Teaching

Himanshu Bahuguna

Research Scholar, Kumaun University, Nainital

Abstract:

Globally an exponential transition has been observed in the methods of teaching from the traditional to modern. A critical analysis of traditional teaching approaches has been observed in the present work by considering lots of literature. In traditional method, teacher has a power to influence the students to achieve milestone in the field of science. Also, teacher is solely responsible to motivate and develop the subject interest, knowledge, and enhance the personality skills of the students. A deep analysis is essential to suggest the appropriate teaching strategy for science teaching.

Keywords: Teaching Methods, Traditional method, Science Teaching

1. Introduction: The education emphasizes the improvement of behavior, knowledge, achievement, different skills and vision for professional development of a student. The thrust of adequate strategy to utilize appropriate teaching methods to teach the science have long been a subject of study. The term 'teaching method' is regarded as a procedure of teaching whose successful completion leads an effective learning among the students [1-3]. Methods are essential to develop the knowledge of the students. Also, it provides a variety of teaching activities involving book learning, observation, interviewing, surveying, interpreting, reviewing, recording, reporting and evaluating [4]. Methods are needed to achieve the objectives of science studies such as acquisition of knowledge, concepts, development of attitudes, as well as skills. The teaching behavior focuses on subject matter knowledge and on the learning approach of a student in a particular subject. Teaching and learning in science are discursive activities [5]. Learning the science is not only a matter of participation in an immediate conversation, but it also involves developing conceptual understanding, confidence and competence in tackling a wide range of 'real world' technological tasks.

The science teacher's teaching method crucially influence a student's achievement in the class. In today's science classes, low student achievement in the sciences is a problem. A number of potential contributing factors could explain the low achievement of a science student, such as not interested in the learning process, not participating in the events and objects related to the subject, having poor or negative

attitudes about a class and not enjoying the learning process [6,7]. It is the responsibility of a teacher to identify and analyze the student's behavior and try different delivery methods to enhance student's interest in the concerned subject. Currently, educators and researchers show enthusiasm regarding the wide variety of approaches under the cooperative learning umbrella in schools. Several studies have conducted studies comparing problem based learning method classrooms to traditional teaching methods classrooms. Moreover, students, especially in the secondary grades, may become bored with the one-way communication found in teacher-centered instruction. However, study conducted by Dibiase et. al., [8], Manuaba et. al., [9], Yilmaz et. al.[10], Kulgemeyer et. al. [11], and Sugano et. al. [12] pointed out that science students taught in the problem based learning method scored lower than students did in a traditional basic science class.

There is a connection between the teaching method and the depth and complexity of the learning [13]. This review aims to investigate not just how context-based learning affects students' motivation and achievement in science, but also how various teaching approaches affect these outcomes. Active learning techniques should be considered while creating a scientific curriculum for kids.

2. Conceptual Framework of Traditional Teaching Methods in Science: The quality of science education among secondary students in India has been a longstanding issue of national concern; however, this concern has not led to any significant improvements [14]. There has been an increasing awareness in recent times that offers an opportunity to compare "active learning methods" with the conventional lecture style. The term "traditional teaching methods" refers to wide array of techniques that educators utilize to varying extents. These techniques consist of: (a) attending lectures and taking notes; (b) providing students with practice problems on paper; (c) giving pen and paper assessments to students; (d) conducting laboratory activities in science classrooms with predefined outcomes; and (e) engaging in discussions.

A significant number of research studies have demonstrated to researchers that active learning approaches yield in enhanced learning outcomes. Various recent publications [15–18] have explored the potential for improving secondary education by employing these instructional strategies. This comprehensive review offers compelling evidence that any educational institution offering scientific subjects through traditional lectures is not giving an adequate education to their students. To establishing accountability for active learning methods, the administrators should pay attention to the teaching methods being used in their classrooms, and monitoring them [19]. Some of uttermost important characteristic to enhance traditional teaching methods are briefly discussed below:

1. Since students have right to ask for more pertinent information during the communication process, the teacher must be a native speaker or have excellent subject-matter knowledge.
2. A successful approach to enhance student participation in science classrooms is the adaptation of scientific concepts into the mother language.
3. The lecture plan should be design specifically as it developed in such a way that the students spontaneously attract and interest toward the subject.

As per several experimental survey the teachers can capture the attention in the classroom among the students [20, 21]. Some important highlights for effective teaching are mentioned below:

1. **Authority:** A teacher plays a significant role in the teaching process. A teacher must have ability to conduct a lesson with enthusiasm and extra efforts. It will enhance his/her authority and contribute to winning the students' favor, which is vital for effective learning.
2. **Infantilization:** It refers to maintain the learning environment which provides favorable learning conditions of mutual trust apart from stress and harassment. It refers to preserving an atmosphere free from harassment and stress that fosters mutual trust and positive learning conditions. Also, sometime extra activity such as science quiz, role-playing games, a debates on science can create a comfortable environment for students which provides opportunities for learning.
3. **Double-Planedness:** Teachers should make proper attention and eye contact with the students using gestures, facial expressions, and intonation in order to influence or win the favor of student. A mutual understanding is necessary in between the students and teachers in order to effective traditional teaching.
4. **Use of Adequate E-Technology:** The dominant tools for effectively teaching science courses are communication and the use of relevant technologies for knowledge exchange.

The displaying of visual media during the lecture and to encourage the students to take notes during lecture, will make effective traditional teaching.

Critical Analysis of Traditional Teaching Methods: On the basis of several studies it is considered that the proper use of suggestion, relaxation by teachers can significantly enhance the value of traditional teaching approaches as discussed in section 2. To date, many educational schools are using traditional classrooms teaching including textbook, handwritten notes, black board, assignment, and tests based evaluation of students [22]. Sometimes, the poor performance in the classrooms can causes mental stress amidst the students. Traditional teaching methods subjected to lack of opportunities for students to freely choose the teaching strategies that they are interested to solve science problem.

The modern teaching has its own benefits in several aspects such as students can utilize their free time, lectures are accessible everywhere anytime, availability of wide variety of learning material, faster, easier and fun-filled learning, etc. One of the supreme advantage of e-learning for students is that it helps them to stay updated with the latest technological advancement [23]. On the other side student can misuse the e-learning platform by using it for other purposes like visiting social sites, playing games, watching videos restricted contents, etc. It causes the lack of concentration of students within the classroom. The decisions to select the appropriate teaching methods must be organized in such a way as to enhance the conceptual knowledge of science students.

In briefly, technology is always improving the standard of the educational system. While it is not displacing traditional classroom approaches in any way, it is integrating them to better prepare students for

the fast-paced world of technology [24]. Therefore, students can achieve great expertise in the science subject by e-learning without neglecting the traditional teaching methods.

Assumptions and Limitations:

It is recommended to implement a range of creative teaching approaches in order to enhance the educational component. In fact, implementing innovative teaching techniques gives instruction and curriculum a fresh perspective. Preparing pupils for participation in the scientific society, where information is the most important factor in a nation's social and economic progress, is a critical prerequisite for the future.

An experimental survey conducted by Cobern *et. al.*[25], Yilmaz *et. al.*[10], Sugano *et. al.*[12], Mešić *et. al.*, [26] predicted that for some subjects or topics, the best practices needed are traditional teaching methods. The education has been shown to be beneficial by incorporating active learning methods into education.

In addition, the use of traditional teaching methods requires special training for teachers. The limitations of traditional teaching methods are as follows:

1. The foundation of this approach is the activation of an individual's reserve capacity.
2. Anywhere and anytime access to information is impossible such as to deliver a lecture during holidays, vacations, etc.
3. Teachers will decide the teaching strategies for students so students can't choose the teaching strategies that they are interested to solving science problem.
3. A variety of paradigms, including web-based learning, virtual classrooms, computer-assisted learning, and digital communication are missing in traditional teaching methods and covered by e-learning problem solving.

Conclusion:

Overall, the study revealed that the traditional teaching approach is uttermost important and essential for science students to experience more conceptual knowledge. Although, it is considered that to understand the concept of science the innovative problem solving strategies as well as traditional methods are independently important. Currently, the use of flexible modes of lecture delivery has been developed in the learning of science education. The effective use of flexible delivery methods will play a significant role in the successful implementation by aspects of course content, characteristics of students as well as teacher. The findings of this analysis will be effective in scientific education research and science teaching in the future. The present review suggests that there is a need to direct the future science education toward modern learning techniques without neglecting the traditional teaching method.

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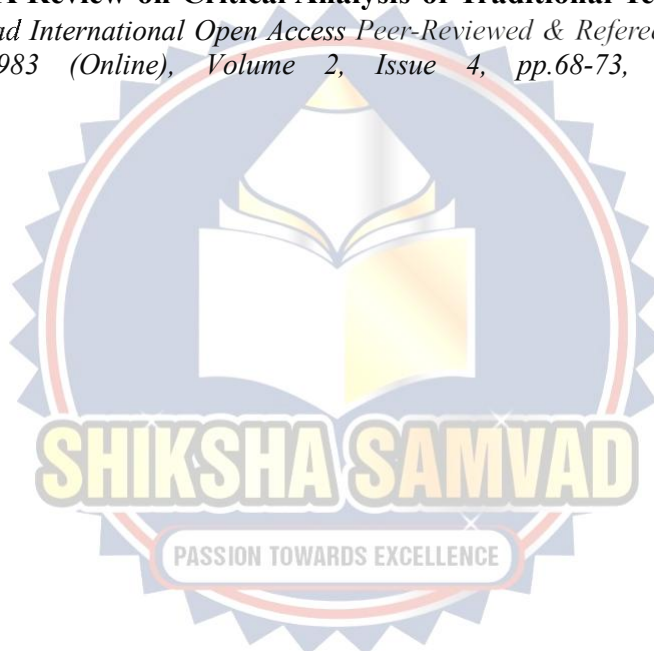
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