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AN EFFECTIVENESS OF TECHNO-PSYCHO-AXIOLOGICAL APPROACH IN REFERENCE TO ACADEMIC ACHIEVEMENT OF SECONDARY SCHOOL STUDENTS

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ABSTRACT

Realizing the grimness of the present times when standards related to quality teaching and learning are facing challenges, various concerns are being raised and rigorous steps are being taken at all levels for improvement. Since, quality teaching-learning is a sensitive issue involving human cognition and emotions along with sociology. Moreover, teaching and learning practices are expected to be based on philosophical principles, and evolve with the advances in technology and psychology. Therefore, focusing only on any one of the various factors affecting teaching and learning cannot be justified for integration of values and quality. Therefore, the present study examined the effect of Techno-Psycho-Axiological (TPA) approach on the academic achievement of the secondary school students Quasi-Experimental research method with One-Group Pre test-Post test design involving a purposive sample of 60 students of VI standard studying in a school in Agra was employed for the present research. The analysis using t-test showed a significant difference between control and experimental groups, indicating a positive effect of the TPA approach on the academic achievement of secondary school students.

KEYWORDS: *Techno-Psycho-Axiological Approach, Quality Learning, Academic Achievement*

INTRODUCTION

The present scenario of brisk nuclear and technological advancements has enabled humans to relish the fruits of rapid industrialization, modernization, commercialization and globalization, but undoubtedly, this has come at the price of humanization. In fact, it would not be an exaggeration to point out that in their efforts to glorify quantification and cut-throat competition; men have inevitably ignored the sublime aspects of quality. Although, the realization of the grimness of the present scenario and anticipated consequential apprehensions has compelled everyone to ponder on these issues, and to take remedial actions for rectification, but there is still a lot which needs to be done in this direction. Perhaps, substantial success can be achieved in infusing quality in the teaching-learning process, only if persistent efforts are made to deal with the problem at the grass-root levels, and therefore, the responsibility seems to be more on the community of educators along with others such as scientists, sociologists, psychologists, etc. to probe into these issues and be the initiators of a

culture which will be based on quality learning, so that these high ideals may gradually become part and parcel of the human society.

With this background in mind in the present study, efforts were made to develop the strategies based on the techno-psycho-axiological approach for integrating quality in the teaching-learning process at the secondary level. Secondary level science teaching was in focus owing to the persistent need for reformation in it as highlighted by the related research literature (Biswal, 2011, p. 22; Kumar, 2012, p. 91; Rani, 2007, p. 24; Rashtriya Madhyamik Shiksha Abhiyan, 2009, p. 1).

Techno-Psycho-Axiological Approach in Teaching

Realizing the grimness of the present times when standards related to quality teaching and learning are facing challenges, various concerns are being raised and rigorous steps are being taken at all levels for improvement. Since, quality learning is a sensitive issue which involves human feelings and behaviour, therefore, simply focusing on only technology, or psychology, or sociology, or philosophy for their integration in teaching cannot be justified. Each of these can help in combating the problem only partially. Therefore, there appears a need for an approach which can combine important aspects of technological advancements in a psychologically sound manner with an axiological perspective for integrating quality learning with the teaching-learning process. Although, utilization of technological facilities can equip the teachers to make the teaching process interesting and more effective, but it needs to be combined with research findings and theories of psychology so as to make the classroom interactions more worthwhile and objective oriented. Understanding the characteristics of learners and the measures for improving learning through the appropriate stimulation of the senses, are some essentials in the absence of which the use of technology becomes superficial only. Furthermore, utilization of technology and psychological principles can result in real and sustainable improvements in teaching and the learners, only when these are founded on the strong grounds of axiology (the philosophical study of values).The axiological perspective widens our perspective enabling us to understand how all the objects, events, living beings are inter-connected in a form of esoteric system, and also makes us realize the need for striving for ideals and perfection for a better world order. Without consideration for axiological perspective, even the most advanced use of technology and psychology can never lead to true success of teaching. Therefore, the present study was based on the integrated approach which consists of technology, psychology and axiology termed as 'Techno-Psycho-Axiological' approach.

Operational Definitions of the Terms used in the Study

Techno-Psycho-Axiological (TPA) Approach

In the present study, strategies were developed based on techno-psycho-axiological approach. This approach includes the ideas and strategies based on technology and psychological insights, founded on axiological perspectives. It focuses on a meaningful combination of *technological advancements* (and how these can be used for improving teaching practices for facilitating better learning) with *psychological* theories and research findings related to learning and teaching, keeping in view the sublime axiological perspective (so that values remain the focal point of the approach).'

Academic Achievement

Academic achievement scores were the marks which students got in science subject during the class - test-II of the first semester of the session of 2017-2018 used as pre-test scores and marks of science subject in a class - test-Iof the second semester of the session of 2017-2018 were used as post-test scores. Maximum marks of class-test were 40.

Purpose and Research Questions

The main purpose of the study was to determine the effect of the TPA approach on academic achievement in a science subject at secondary level. More specifically, the study addressed the following questions:

- How the techno-psycho-axiological approach could be employed in the science teaching process at secondary level in Indian scenario?
- Is techno-psycho-axiological approachable to increase secondary school students' academic achievement?

OBJECTIVES OF THE STUDY

The objectives of the present study were laid down as:

- To evaluate the effectiveness of techno-psycho-axiological (TPA) approach on the academic achievement of secondary school students:
- Comparison between pre-test scores of controlled and experimental group.
- Comparison between pre-test and post-test scores of experimental group.
- Comparison between pre-test and post-test scores of controlled group.
- To compare the academic achievement of an experimental and controlled group of secondary school students.

HYPOTHESES OF THE STUDY

In order to test the objectives of the present study, following null hypotheses were formulated:

- There exists no significant effect of the techno-psycho-axiological approach on the academic achievement of secondary school students.
- There exists no significant difference between the academic achievement scores of an experimental and controlled group of secondary school students.

DELIMITATION OF THE STUDY

The present study was delimited as under:

- Secondary school affiliated to Dayalbagh Educational Institute, Deemed University, Agra.
- Students studying in secondary level classes (Class VI).

VARIABLES OF THE STUDY

The variables of the study could be categorized as follows:

- Independent Variable: Techno-Psycho-Axiological Approach.
- Dependent Variable: Academic achievement.
- Control Variables- Class (i.e.VI Class), Subject (i.e. Science)

DESIGN OF THE STUDY

The researcher adopted Quasi-Experimental research method with One-Group Pretest-Posttest research design for testing the effectiveness of the TPA approach.

SAMPLE OF THE STUDY

The sample selection in the present study carried out in two distinct stages mentioned as under:

Stage 1: Sampling of School

The researcher purposively selected an Intermediate School of Agra affiliated to Dayalbagh Educational Institute (Deemed University), Dayalbagh, Agra with the required consents and approvals.

Stage 2: Selection of Students

The researcher randomly selected VI standard and divided the group of 60 students into two separate groups, each containing 30 students. From the two groups, one group was treated as a controlled group and the other one as an experimental group.

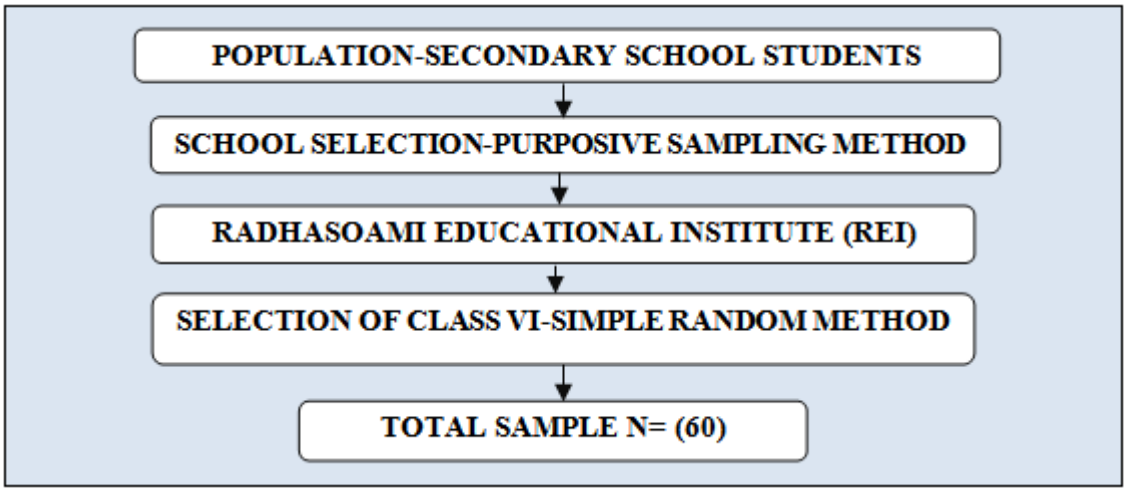

Figure 1: Sample of the Study

Method of the study

Quasi-Experimental method was employed in order to test the effectiveness of the techno-psycho-axiological (TPA) approach in reference to the academic achievement of the secondary school students. The most common Quasi-Experimental method i.e. One-Group Pretest-Posttest design is mentioned in the table 1

Table 1: Method of the Study

S. No	Groups	Sample Size	Pre Test	Treatment	Post Test
1.	Experimental Group	30	Academic Achievement	TPA Approach Based Lesson Plans	Academic Achievement
2.	Controlled Group	30		Traditional Approach Based Lesson Plans	

Tools used in the Study

Self-developed techno-psycho-axiological approach based strategies and lesson plans for secondary school students.

Procedure of the Study

The present study was carried out in the following phases;

- Planning and construction phase
- Implementation phase

These phases are vividly described in Figure 2

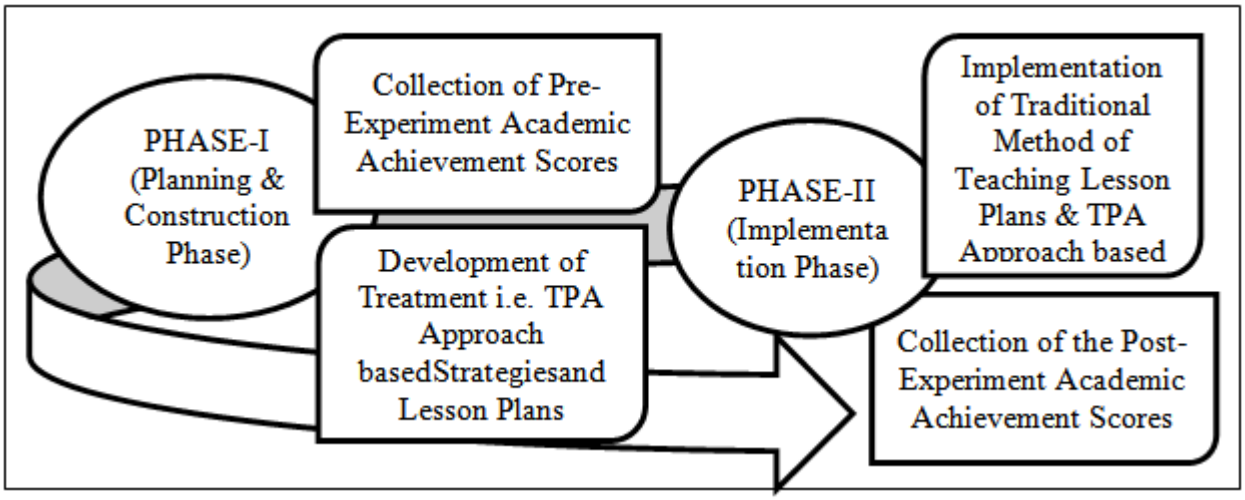

Figure 2: Developmental and Implementation Phases of the Study

Phase 2: Planning and Construction Phase

The primary phase of the present study was related to planning and construction, which involved the subsequent stages as follows:

Stage 1: Development of a traditional teaching approach based lesson plans.

Stage2: Development of techno-psycho-axiological approach based lesson plans.

Techno-psycho-axiological approach is an amalgamate approach which can combine important aspects of technological advancements and quality teaching strategies in a psychologically sound manner with an axiological perspective for ensuring quality learning. On the basis of related research literature review specific types of triplets that could be used with the content to bring the desired changes in the learning were formulated. A single triplet is sufficient for a lesson, although more than one triplet could be used to base a lesson plan. The content of the class was prepared and

arranged in accordance with the triplets to be used. These triplets were combinations of Techno (T), Psycho (P) and Axiology (A). A few examples of these triplets are: 'mentoring learning' (T) with 'creating self-learning environment' (P) while ensuring 'responsibility (A)' on the part of the teacher and among the students. 'task analysis' (T) with providing 'motivation' (P) while ensuring the 'objectivity' (A) on the part of the teacher and among the students. 'systems approach' (T) with 'regular use of reinforcement' (P) while ensuring 'co-operation' (A) with the students and among the students. 'Digitalization of content' (T) and 'respect diverse talent' (P) while ensuring 'fairness' (A) during the classroom teaching and evaluation. 'Linking and integrating materials' (T) with the 'teaching according to learning styles' (P) by showing and maintaining 'unconditional love' (A) for the students. 'Learning deeply' (T) along with use of 'repetition' (P) from brain-based approach of teaching by developing curiosity (A) among the students. 'Engaging problems' (T) with 'providing support to the students' (P) by focusing and ensuring 'creativity' (A) among the students 'Connecting peers' (T) with 'brainstorming' (P) technique of learning which will develop the value 'curiosity' (A) among the students Other possible combinations of the introduced approach (TPA) were used throughout the period of intervention by the researcher. They were social networking tools (Like what's App) (T)-showing affection to students (P)-punctuality (A) and open learning tools (Khan Academy) (T)-Self-paced learning (P)-Hard work (A). These triplets based on the techno-psycho-axiological approach were incorporated into the lesson plans and these lesson plans were used by the researcher during the classroom teaching.

Phase 2: Identification and Implementation Phase

The second phase was the identification and implementation phase. This phase involved the following subsequent stages.

Stage 1: Identification of the sample: The sample selection on which the experimental try-out was carried is already discussed in the section 'Design of the study'.

Stage 2: Collecting academic achievement scores of controlled and experimental groups prior to experimental try-out

Stage 3: This phase included implementation of traditional lesson plans on control groups, which included 20 lectures of 40 minutes each spread over 20 working days.

Stage 4: Implementation of techno-psycho-axiological approach based lesson plans on experimental group, which included 20 lectures of 40 minutes each spread over 20 working days.

Stage 5: Collecting academic achievement scores of controlled and experimental groups after experimental try-out.

Stage 6: This stage dealt with the evaluation of the secondary school students of the experimental group and controlled group to whom instructions were given on the lines of techno-psycho-axiological (TPA) approach based lesson plans and traditional approach based lesson plans respectively, which was followed by testing of the hypothesis on the basis of obtained academic achievement scores.

Statistical Techniques

According to the requirements of the study, the researcher used Quantitative Research Approach along with the Descriptive Statistics for analysing and interpreting the data. Mean, Standard Deviation was used as descriptive statistics and t-test was applied as inferential statistics.

DATA ANALYSIS

Objective 1: To Evaluate the Effectiveness of Techno-Psycho-Axiological (TPA) Approach on the Academic Achievement of Secondary School Students

In order to achieve this objective, the t-test was employed for finding out the effectiveness of Techno-Psycho-Axiological *(*TPA) approach on the academic achievement of secondary school students.

Comparison between Pre-Test Scores of Experimental and Controlled Group

In this sub-section, academic achievement of the experimental and controlled group before the implementation of traditional lesson plans and techno-psycho-axiological based lesson plans were compared. For achieving this objective, two samples assuming equal variance t-test was used. The descriptive and inferential statistics of the groups are shown in the following table:

Table 2: t-Value for the Pre-Test Scores of the Controlled & Experimental Group

S. No	Group	N	Mean	SD	t-Value	p-Value	Level of Significance
1	Controlled Group	30	20.73	12.48	1.86	0.68	Not significant
2	Experimental Group	30	15.33	9.85			

p > 0.05 Level of Significance, df= 58

The data in the above table 2 enumerates the nature of the sample. The calculated t-value is 1.86 and p-value is 0.68 which is not significant at 0.05 level of significance It means that there is no significant difference between the academic achievement of the experimental and controlled group before the implementation of traditional approach based lesson plans and techno-psycho-axiological (TPA) approach based lesson plans. Hence, the groups were considered similar**.**

Comparison between Pre-Test and Post-Test Scores of Experimental Group

In this sub-section academic achievement scores, before and after the implementation of TPA approach based lesson plans were compared. For achieving this objective, paired sample for mean t-test was used.

Table 3: t-Value of the Experimental Group Regarding Academic Achievement

SN	Test	N	Mean	SD	t-Value	p-Value	Level of Significance
1	Pre-test	30	15.33	9.85	-5.56	0.000	Significant
2	Post-test	30	28.66	6.86			

p < 0.05 Level of Significance

For testing the null hypothesis that *there exists no significant effect of the TPA approach on the academic achievement of secondary school students.* From the above table 3, it is clear that the calculated t-value is -5.56 for the pre-test and post-test scores of the experimental group, which is significant at the 0.05 level of significance at 29 degrees of freedom. Hence the null hypothesis was rejected. Since, gain was found in the academic achievement scores of secondary

school students during the post-test, it could be said that TPA approach had a significant effect on the academic achievement of secondary school students.

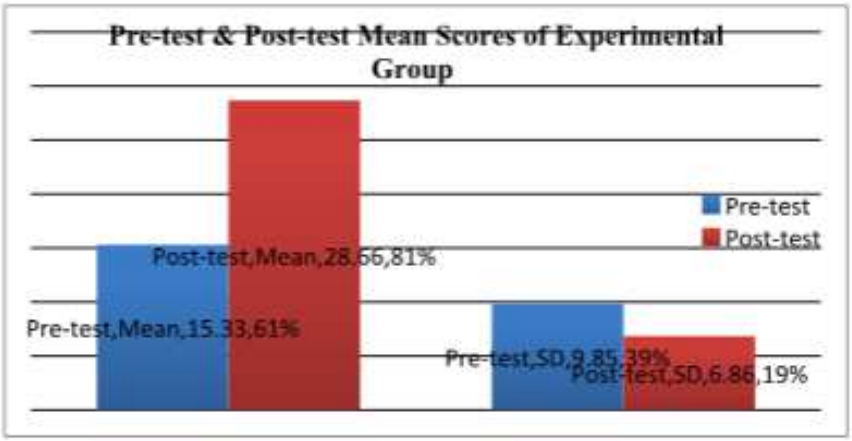

Figure 3: Graphical Representation of Pre-Test Mean and Post-Test Mean Values of Experimental Group

Comparison between Pre-Test and Post-Test Scores of Controlled Group

In this sub-section, academic achievement scores, before and after the implementation of traditional approach based lesson plans were compared. For achieving this objective, paired sample for mean t-test was used.

Table 4: t-Value of the Controlled Group Regarding Academic Achievement Scores

S. No	Test	N	Mean	SD	t-Value	p-Value	Level of Significance
1	Pre-test	30	20.73	12.48	-0.244	0.80	Not Significant
2	Post-test	30	21.53	13.24			

p > 0.05 Level of Significance

The table 4 reveals that calculated t-value is -0.244 and the p-value is 0.80 which is not significant at 0.05 level of significant at 29 degree of freedom. It means that after the implementation of traditional lesson plans on the controlled group, no change was found in the academic achievement scores of the secondary school students. Hence, it could be concluded that traditional lesson plans do not play significant role in increasing the academic achievement of secondary school students.

Objective 2: To Compare the Academic Achievement of an Experimental and Controlled Group of Secondary School Students

After implementation of techno-psycho-axiological approach based lesson plans and traditional approach based lesson plans on experimental and controlled group respectively, post-test academic achievement scores of both the groups were taken. The null hypothesis formulated was that 'there exists no significant difference between the academic achievement scores of the experimental and the controlled group of secondary school students'. The obtained statistics are shown in Table 5

Table 5: t-Value for the Post-Test Scores of the Experimental & Controlled Group

S. No	Group	N	Mean	SD	t-Value	P Value	Level of Significance
1	Experimental Group	30	28.66	6.86	-2.61	0.011	Significant
2	Controlled Group	30	21.53	13.24			

p <0.05 Level of Significance, df= 58

For testing the formulated null hypothesis, two sample assuming equal variance t-test was used. The table 5 is showing that the mean values of the academic achievement of the experimental and controlled group in post-test are 28.66 and 21.53 respectively. The t-value calculated was -2.61 which is significant at the 0.05 level of significance and null hypothesis were rejected. Hence, a significant difference was found between the academic achievement of an experimental and controlled group of secondary school students.

DISCUSSIONS OF THE FINDINGS

The findings of the present study are as follows:

- In the first sub-section of objective-1, the calculated t-value was found to be 1.86 and p-value was 0.68 which was not significant at 0.05 level of significance As such there was no significant difference between the academic achievement of experimental and controlled groups before the implementation of traditional approach based lesson plans and techno-psycho-axiological (TPA) approach based lesson plans. Hence, it was found that both the groups were almost equal in terms of academic achievement scores prior to the experimentation.
- In the second sub-section of objective: 1, t-value was found to be -5.56 and the p-value was 0.00 calculated between the pre-test and post-test scores of the experimental group, which was significant at the 0.05 level of significance. Hence the null hypothesis was rejected. Since, gain was found in the academic achievement scores of secondary school students during the post-test, it could be said that ***TPA approach had a significant effect on the academic achievement of secondary school students.***
- In the third sub-section of objective: 1, calculated t-value was found to be -0.244 and the p-value was 0.80 which is not significant at 0.05 level of significance. It means that after the implementation of traditional lesson plans on the controlled group, no change was found in the academic achievement scores of the secondary school students. Hence, it could be concluded that the traditional approach of teaching and learning is not found effective in increasing the academic achievement scores of the secondary school students.
- In the second objective of the present study, null hypothesis formulated was that 'there exists no significant difference between the academic achievement scores of an experimental and controlled group of secondary school students'. Mean values of the academic achievement scores of the experimental and controlled group during the post-test were found 28.66 and 21.53 respectively. Mean of the post-test scores of the experimental group was found higher than the controlled group. The calculated t-value was found to be -2.61 and the p-value was 0.01 which is significant at the 0.05 level of significance, hence the null hypothesis was rejected. A significant difference was found between the academic achievement scores of the experimental and the controlled group of secondary school students. Thus, it was concluded that ***techno-psycho-axiological approach was significantly better than the traditional approach of teaching and learning in increasing the academic achievement of the secondary school students.***

CONCLUSIONS OF THE STUDY

It could be concluded that the TPA approach proved to be highly beneficial in increasing the academic achievement of the secondary school students. Proposed techno-psycho-axiological approach played a critical role in

improving secondary level students' academic achievement and lifelong learning. Students' academic achievement was found to be changed positively and improved after applying the proposed techno-psycho-axiological approach. TPA based lesson plans were found significantly better than the traditional approach of teaching. Policy makers and the curriculum planners should incorporate the idea of TPA approach while framing the educational policies and the curriculum. Teachers can encourage students to participate in daily classroom activities, class meetings and thus try to make students as active learners. By doing this, the classroom learning will become less stressful, more interesting and comfortable. Students will also learn how to manage their emotions, curiosities and doubts since they will feel as an integral part of the teaching-learning community. Parents should act wisely in front of their children in order to inculcate the values like, hard work, co-operation, responsibility, creativity, fairness, unconditional love, etc.

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