



Exploring Gender Differences in the Effects of Experiential Learning on Achievement Motivation in Secondary School Students

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ABSTRACT

Achievement motivation is a key form of acquired motivation. It plays a vital role in a student's success at any stage of their education. As students develop self-concepts, values, and beliefs about their abilities early on, fostering achievement motivation at an early age has significant implications for their future academic paths. The objective of this research was to examine the effectiveness of experiential learning compared to traditional teaching methods in enhancing achievement motivation among secondary school students. The study focused on ninth-grade students enrolled in Haryana Board-affiliated schools in Gurugram city. A sample of 116 students (66 boys and 50 girls) was selected using a multi-stage random sampling technique. A series of pedagogical experiments involving 116 ninth graders was carried out on arithmetic and geometry topics to validate the research objectives. The study employed a pretest-posttest control group design to assess the intervention's effectiveness. The t-test was used for data analysis. The findings showed that (a) students who were exposed to experiential learning programs exhibited more achievement motivation than those who were taught using traditional methods, and (b) there is more positive effect in boys as compared to girls students in their raise in achievement motivation.

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Introduction

Achievement motivation is described as "an individual's drive to excel in a task, overcome challenges, outperform others, and take pride in demonstrating their abilities" (Murray, 1938). The need for achievement refers to the aspiration to accomplish goals, attain a standard of excellence, and strive for continuous improvement and success. Achievement motivation varies among individuals, with those possessing high achievement motivation exhibiting a greater drive for success compared to the average person (Singh, 2014). Such individuals are often highly goal-oriented and persistently work toward achieving their objectives.

Understanding what drives students to succeed is crucial for secondary school teachers, administrators, and policymakers (Legault et al., 2006). Research has consistently shown that students who exhibit high levels of academic motivation generally achieve better academic outcomes and demonstrate lower dropout rates (Blank, 1997). In many cases, underachievement is more closely associated with insufficient effort rather than a lack of intellectual ability. In words of Legault et al. (2006), "A lack of motivation toward academic activities remains one of the most pressing academic challenges faced by today's adolescents." In the same vein, Lens and Decruyenaere (1991) noted that students in secondary education frequently lack the motivation necessary to complete their school tasks.

The results and grades of students from different boards indicate that most students lack interest in mathematics, perceiving it as a dull, dry, and difficult subject. The Council of Boards of School Education in India has already given considerable attention to this issue, particularly regarding the way the subject is taught and its curriculum delivery. As a teacher educator in mathematics, the investigator recognized that traditional teaching methods were inadequate for inspiring students, capturing their attention, and cultivating an interest in the subject. To address this, alternative teaching approaches were needed to enhance student comprehension, foster interest, and increase motivation. Experiential learning emerged as a viable solution. By engaging students in activities and experiments, this approach aimed to make learning mathematics enjoyable while helping them grasp mathematical concepts effectively.

The benefits of experiential learning on mathematics learning outcomes have been acknowledged (Avelino et al., 2017; Mutmainah et al., 2019, Sahni, 2023). This approach provides several advantages in the classroom. When educators and institutions incorporate experiential activities, they create effective programs, cultivate a positive educational and cultural atmosphere, and build a supportive



learning environment (Tong et al., 2020). However, such studies are scarce in the Indian context, particularly in the field of mathematics education.

The researcher thought it was appropriate to look into the impact of the experiential learning approach in teaching mathematics. Considering the facts outlined above, the present study was undertaken to investigate the comparative impact of experiential and traditional instructional methods on the achievement motivation of secondary-level students. Additionally, the study explored gender differences in achievement motivation, given that previous research has reported significant variations based on gender (Shekher, Chandra et al., 2016).

Objectives of the Study

1. To investigate the difference in mathematics achievement on the pretest between the experimental and control groups of secondary school students.
2. To investigate the impact of experiential learning on the achievement motivation of secondary school students.
3. To examine the impact of experiential learning on achievement motivation among secondary school students with respect to their gender.

Hypotheses

1. There is no statistically significant difference in the pretest mathematics scores between the experimental group and the control group of secondary school students.
2. Experiential learning does not significantly influence the achievement motivation of secondary school students.
3. Gender does not significantly moderate the effect of experiential learning on the achievement motivation of secondary school students.

Design of the Study

This study is an experimental investigation utilizing a 2x2 factorial design and a pretest-posttest control group structure. The dependent variable is students' achievement in mathematics, while the independent variables are the instructional method and gender. The study was conducted in three phases for both the randomly assigned experimental and control groups.



- i. In the **pre-test phase**, students' achievement in mathematics was assessed in both groups.
- ii. During the **treatment phase**, The experimental group was taught mathematics through an experiential learning approach for a period of three weeks, whereas the control group received instruction using traditional teaching methods during the same time frame.
- iii. In the **post-test phase**, the achievement in mathematics was again measured for both groups to evaluate the impact of the instructional methods.

Sample Selection

A sample of 116 students was selected using a multistage random sampling technique, which involved successive random selection at three levels: regions, schools, and individual students. Experimental group students who were subjected to experiential learning were in total 58 from class 9th. Control group students who were exposed to traditional method of learning were also in total 58 from class 9th. The two groups were formed by randomly assigning 58 participants to each group, ensuring they were matched based on their pre-test scores on the criterion assessment.

Group	Boys	Girls	Total
Experimental	32	26	58
Control	34	24	58
Total	66	50	116

Statistical Analysis

1. Descriptive statistics, including means and standard deviations, were calculated for both Achievement Motivation and Mathematics Achievement scores.
2. Independent samples t-tests were conducted to assess the significance of differences in mean scores of Achievement Motivation and Mathematics Achievement across the pre-test, post-test, and gain scores.

Tools Used

1. A criterion test on topics of arithmetic and geometry, i.e., 'Real numbers', 'Polynomials', 'Quadrilaterals', 'Construction of different Geometrical Shapes' was prepared by the investigator. After carefully reviewing the test construction processes, the test was created.



Twenty five multiple-choice questions made up the test. The test items were constructed in alignment with the four objectives of the cognitive domain, i.e., knowledge, understanding, application, and skill.

2. Experiential learning program on the concepts of ‘Real Numbers’, ‘Polynomials’, ‘Quadrilaterals’, ‘Construction of different Geometrical Shapes’ was developed by the investigator.
3. The Achievement Motivation Scale developed by Deo and Mohan (2011) was employed to assess students' achievement motivation. The scale encompasses three domains: academic factors, general field factors, and social interests, and consists of 50 items.

Analysis and Interpretation

Analysis and interpretation was carried out with respect to each objective and related hypothesis was tested under the following subheads.

Hypothesis 1: There is no statistically significant difference in the pretest mathematics scores between the experimental group and the control group of secondary school students.

This hypothesis was evaluated through an analysis of the differences in pre-test mean scores between the experimental and control groups. The result has been tabulated as under:

Table 1: Comparison of Pretest Mean Scores Between Experimental and Control Groups

.Group	N	Mean	S.D.	t-value
Experimental	58	29	2.9	.262 (Not significant)
Control	58	30	3.1	



According to Table 1, the observed t-value fails to achieve significance even at the 0.05 level, suggesting equivalence in pretest performance between the experimental and control groups.

Hypothesis 2: “There is no significant effect of experiential Learning on Achievement motivation of secondary school students”.

This hypothesis is tested through three kinds of comparisons:

- I. Comparison of “pretest and post test scores on achievement motivation in respondents of control group”.
- II. Comparison of “pretest and post test scores on achievement motivation in respondents of experimental group”.
- III. Comparison of “the difference in Pretest and Post test scores of Achievement motivation in control and experimental group”.

I. Comparison of “the pretest and post test scores on Achievement motivation in respondents of control group”

The test on achievement motivation administered both prior to and after the experiment on respondents of control group was scored. The difference in the scores was estimated using t-test. The same has been tabulated below:

Table 2 : Pretest vs. Posttest Scores of Achievement Motivation for the Control Group

	Pre-test	Post-test	N	t value
Mean	30	32.2	58	4.27 (Significant)
SD	3.1	2.4		

Table 2 demonstrates that the post-test achievement motivation scores of the control group differ significantly from their corresponding pretest scores. The post test scores on of achievement motivation show an increase when compared with the scores on the pre-test. Hence, it is evident that traditional teaching has a significant positive effect on achievement motivation of respondents.



II. Comparison of “the pretest and post test scores on achievement motivation in respondents of experimental group”

The test on achievement motivation administered both prior to and after the experiment on respondents of experimental group was scored. The difference in the scores was estimated using t-test. The same has been tabulated below:

Table 3: Pretest vs. Posttest Scores of Achievement Motivation for the Experimental Group

	Pre-test	Post-test	N	t value
Mean	29	33	58	8.23 (Significant)
SD	2.9	2.3		

Table 3 indicates a statistically significant difference between the pretest and post-test achievement motivation scores of the experimental group, suggesting that the experiential learning approach had a positive and significant impact on the achievement motivation of secondary school students.

III. Comparison of “the difference in Pretest and Post test scores of Achievement motivation in control and experimental group”.

The test on achievement motivation administered both prior to and after the experiment on respondents of experimental group was scored. The difference in the scores was estimated using t-test. The same has been tabulated below:

Table 4: Comparison of “the difference in Pretest and Post test scores of Achievement motivation in control and experimental group”

	Control Group (Mean Difference)	Experimental Group (Mean Difference)	t -value
Mean Difference	2.2	4	4.00



SD	2.7	2.1	(Significant)
N	58	58	

Both the control and experimental groups exhibited significant differences in pretest and post-test achievement motivation scores with in both the control and experimental groups. However, a comparison of the overall mean scores indicates that the experimental group demonstrated a greater increase in achievement motivation compared to the control group. Furthermore, the analysis shows that experiential learning has a more positive impact on achievement motivation among secondary-level students in mathematics compared to traditional teaching method.

Hypothesis 3: “There is no significant difference in the effect of experiential learning on achievement motivation of secondary school students with respect to their gender”.

This hypothesis is tested through two kinds of comparisons:

- i. Comparison of “the difference in Pretest and Post test scores of achievement motivation of girls in control and experimental group”.
- ii. Comparison of “the difference in Pretest and Post test scores of achievement motivation of boys in control and experimental group”.

Table 5: Pretest–Posttest Difference in Achievement Motivation Scores of girls in Control and Experimental Groups

	Mean	SD	N	t value
Control	28	2.4	24	4.16 (Significant)
Experimental	31	2.7	26	

Above table shows significant difference in, the increase in the achievement motivation scores of the two groups, as shown in Table 5. The overall mean difference (post- pre) in the scores of control and experimental groups on achievement motivation in girls are found to 28 and 31 respectively. The t-ratio between the two groups comes out to be 4.16 which is significant at 0.01 level of significance”. This suggests a significant difference in the pretest and post-test achievement motivation scores between the control and experimental groups among female students.



The comparison of mean score further shows that experiential learning shows more positive effect on achievement motivation in girl respondents of the secondary level students in mathematics than traditional teaching

Table 6: Pretest–Posttest Difference in Achievement Motivation Scores of boys in Control and Experimental Groups

	Mean	SD	N	t value
Control	27	2.6	34	3.58 (Significant)
Experimental	29	1.9	32	

Table 6 demonstrates a significant difference in the increase of achievement motivation scores between the two groups. The overall mean gain (posttest minus pretest) in achievement motivation scores for boys in the control and experimental groups was 27 and 29, respectively. The calculated t-ratio of 3.58 is statistically significant at the 0.01 level, indicating a significant difference between the groups. The findings suggest that male respondents in the control and experimental groups demonstrated significantly different achievement motivation scores from pretest to post-test. Furthermore, the comparison of mean scores reveals that experiential learning has a more positive impact on achievement motivation among male secondary school students in mathematics compared to traditional teaching methods.

On the basis of above observation it can be said that the hypothesis “There is no significant difference in the effect of experiential learning on achievement motivation of secondary school students with respect to their gender” is rejected. Both boys and girls demonstrated an increase in achievement motivation; however, the improvement was greater among girls than boys.

Discussion of the Results

The study's findings highlight that both conventional teaching methods and experiential learning approaches contribute significantly and positively to enhancing students' achievement motivation. However, experiential learning was found to exert a more pronounced positive influence on the achievement motivation of secondary-level students in mathematics compared to traditional teaching.



Furthermore, the results indicate that the positive effect of experiential learning on achievement motivation is particularly stronger among female students at the secondary level. These results are consistent with previous research; for instance, Devakumar and Mary (2018) reported higher achievement motivation scores among girls compared to boys. Likewise, Kavitha et.al. (2016) reported a significant difference in achievement motivation among adolescents based on gender.

Several factors may explain why experiential learning has a more significant positive impact on achievement motivation among girls, particularly in the context of secondary-level mathematics. Research indicates that girls generally prefer collaborative, contextualized, and socially engaging learning environments, all of which are central features of experiential learning (Sadker & Zittleman, 2009). This approach also fosters a stronger sense of self-efficacy through active participation and hands-on tasks, which can be particularly empowering for girls who may internalize negative stereotypes about their mathematical abilities (Bandura, 1997). Moreover, experiential learning reduces performance pressure by emphasizing process over product, allowing students to learn through trial and error in a less judgmental atmosphere (Dweck, 2006). It also provides more opportunities for reflection and communication, aligning with the relational and verbal strengths often observed among female students (Gilligan, 1982). Finally, by contextualizing mathematics in real-world applications, experiential learning challenges traditional gendered perceptions of the subject and helps girls view it as more relevant and accessible (Boaler, 2002). These factors collectively contribute to the increased motivation observed in girls under experiential learning frameworks.

Educational Implications of the Study

1. **The findings of the study highlight the effectiveness of the experiential learning approach in improving students' achievement motivation.** In light of this, it is recommended that educational stakeholders integrate experiential strategies into classroom practices to enrich the teaching-learning process. Special emphasis should be placed on equipping mathematics educators with structured training and orientation to develop experiential learning modules—particularly for complex or abstract mathematical concepts that often hinder student understanding.
2. **While the current study highlights significant gains in achievement motivation among male students,** its implications are especially relevant for male learners, who may benefit equally



from experiential learning methodologies. This warrants further investigation into gender-specific responses to such pedagogical strategies.

3. **Since the study was conducted on a relatively small sample confined to Gurgaon city**, the generalizability of the findings is limited. Expanding future research to include larger and more diverse populations will offer a more robust and comprehensive perspective on the efficacy of experiential learning.
4. **The scope of experiential learning should not be restricted to mathematics or a single discipline.** Future research is encouraged to explore its impact across various academic domains, which can inform interdisciplinary curriculum reforms and teaching innovations.
5. **To better understand the broader applicability of experiential learning**, further studies should examine its influence on achievement motivation across different academic majors and geographic locales. Such comparative analyses would provide valuable insights for context-specific educational policy development.

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