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Analyzing the influence of learning styles on academic achievement among teacher training students

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Abstract
The present study aims to investigate the relationship between learning styles and academic achievement among students enrolled in teacher training courses, including B.Ed., M.Ed., B.P.Ed., and M.P.Ed. programs. Learning styles, categorized into visual, auditory, and kinesthetic preferences, play a significant role in shaping students' academic performance. A quantitative research design was adopted, utilizing standardized learning style inventories and academic records as primary data sources. A total of 200 students from teacher education institutions were selected through stratified random sampling. Statistical tools such as descriptive statistics, correlation, and analysis of variance (ANOVA) were applied using SPSS software to analyze the data. The results revealed noticeable differences in academic achievement across different learning style categories. Students with dominant kinesthetic and auditory learning preferences exhibited slightly higher academic scores compared to visual learners, though variations were moderate. The study highlights the importance of recognizing diverse learning preferences in teacher education curricula to enhance student engagement and academic success. The findings suggest the need for flexible teaching strategies tailored to individual learning styles, fostering a more inclusive and effective educational environment. This research provides valuable insights for teacher educators, policymakers, and curriculum developers aiming to improve the academic outcomes of future educators through personalized learning approaches. The policy makers must provide a sustainable solution to reduce the overexploitation of forest resources.

Keywords: Academic achievement, learning styles, teacher training, visual learners, auditory learners, kinesthetic learners

Introduction
Academic success is important for students, especially those in teacher training programs, as it affects their future careers. Teacher trainees are expected to excel in both academics and teaching skills, providing a rich learning experience. Their success is influenced by various factors such as personal learning styles, study habits, and even athletic skills. Understanding these factors is vital for improving teaching methods and outcomes in teacher training.

Academic success is measured through grades, test scores, and overall performance, and it plays a key role in shaping educational research and policies. Individual traits like intelligence, motivation, and self-discipline can significantly impact a student's educational achievements. For example, internal motivation can lead to better academic results, while cognitive skills also play a crucial role.

In India, academic achievement is often assessed through standardized tests following the National Educational Policy (NEP) 2020, which seeks to improve evaluation standards. Teacher training programs in India are offered at various levels, including pre-primary, primary, and secondary education, overseen by organizations like the NCTE. Key programs include Diploma in Elementary Education (D. El. Ed.), Bachelor of Education (B. Ed.), and Master of Education (M. Ed.).

While these programs prepare future educators, challenges remain, such as limited practical experience and varying quality among training institutions. The government has initiated programs like the NEP 2020 to address these issues and enhance teacher education.

Learning styles also play a critical role in education. Many students learn best through different methods, such as visual aids, auditory lectures, or hands-on activities. Recognizing these diverse learning styles can help teachers utilize a variety of teaching strategies, improving overall student understanding and success. The VARK model categorizes learners

as Visual, Aural, Read/Write, or Kinaesthetic, highlighting the need for teacher training to accommodate these different preferences effectively.

Professional development programs that educate teachers about learning styles can link teaching methods to student needs. Singh and Gupta (2020) [13] suggest that using technology in classrooms can help cater to different learning styles through personalized learning experiences. However, applying this approach in classrooms faces challenges. Many educators may not fully grasp learning styles and their significance. Additionally, rigid curriculums can limit the flexibility needed for various teaching strategies. There is also often a lack of resources and training for effectively accommodating different learning styles.

Learning styles are essential for understanding how students engage with their education. Despite mixed research results on the effectiveness of tailored educational methods, recognizing learning styles is vital for creating inclusive and successful educational settings. The diverse population of India incorporates various learning styles influenced by cultural and social factors. Understanding the relationship between student performance and learning preferences is crucial for enhancing educational practices.

Learning styles refer to individuals' preferred methods of taking in and interpreting information, including visual, auditory, and kinesthetic types. In India, Vark's Model categorizes learners into four styles: visual, auditory, reading/writing, and kinesthetic, providing a useful framework for understanding these preferences (Fleming and Mills). Identifying these styles helps educators tailor their approaches to better engage students. Research, such as a study by Dutta and Roy (2021) [7], shows that matching teaching strategies to learning preferences can lead to improved academic performance.

The connection between academic success and learning styles is particularly significant in the Indian education system. Accommodating diverse learning preferences can enhance performance and foster equity in education. Understanding how learning styles, study habits, and physical abilities influence student success enables educators to devise effective teaching methods. Knowledge of these factors is vital for improving teacher training programs, ultimately benefiting students' educational achievements as they enter the teaching profession and beyond.

Statement of the Problem

Teacher training students come from diverse educational backgrounds with varying learning preferences, which may influence their academic performance. Despite the emphasis on educational psychology in teacher education programs, limited attention is given to understanding how individual learning styles affect academic achievement. This gap in knowledge can result in generalized teaching methods that may not cater to students' specific learning needs, potentially hindering their academic growth. Therefore, it is essential to analyze the relationship between learning styles—visual, auditory, and kinesthetic—and academic achievement among teacher training students. This study aims to identify whether learning preferences significantly impact academic success, helping future educators and institutions adopt more inclusive and effective teaching strategies. ‘

Objective of the Research

- To identify the dominant learning styles (visual, auditory, kinesthetic) among teacher training course students.
- To assess the academic achievement levels of teacher training students.
- To determine the relationship between learning styles and academic achievement.
- To recommend teaching strategies that align with various learning styles to improve academic outcomes.

Hypotheses

- **H_o1:** There is no significant relationship between learning styles and academic achievement among teacher training students.
- **H_o2:** There is no significant difference in academic achievement among students with different dominant learning styles.

Delimitations

The current study will be limited to the following conditions: -

- The research was limited to teacher training programs specifically B. Ed, M. Ed, B. P. Ed. And M.P.Ed. From Guru Ghasidas Vishwavidyalaya, Bilaspur (Chhattisgarh).
- Learning styles are regarded as independent variables for this study and Academic achievement was chosen as a dependent variable
- The sample was delimited to 200 students, comprising 100 from the Department of Education and 100 from the Department of Physical Education age ranged 22 to 33 years.

Limitations

The current research will be confined to these specific conditions.

1. The respondents' level of interest and involvement while completing the questionnaire was seen as a limitation.
2. No specific motivational methods were used during the distribution of the research tools, which might have affected the responses.
3. The research was limited to Guru Ghasidas Vishwavidyalaya in Bilaspur (C. G.) and included only individuals from the Department of Physical Education and the Department of Education.

Significance of the Study

1. The results of the study may offer insights to teachers, coaches, and trainers regarding the various learning styles of their students or players.
2. The students and athletes may also gain from the results of the study.
3. The outcome may offer insights into how learning styles affect the academic performance of students in teacher training programs.

4. The outcome may provide insight into the connection between the chosen dependent and independent variables of the research study.

Methodology

Selection of Subject

For the purpose of present study purposive sampling technique was used for the collection of data. Hundred (100) physical education students (50 B.P.Ed. and 50 M.P.Ed.) and hundred (100) education students (50 B.Ed. and 50 M.Ed.) total 200 students from the department of physical education and education respectively of Guru Ghasidas Vishwavidyalaya has taken part as subjects for the study. Their age will be between 22 to 33 years.

Table 1: Selection of Subjects

Sr. No	Department	Stream	Sample Size	Total
1.	Physical Education	B.PED	50	200
		M.PED	50	
2.	Education	B. ED	50	
		M. ED	50	

Selection of Variables

The researcher went through available reviews of literature and had a discussion with experts and his own supervisor before selecting the variables.

Table 2: Learning Style as the independent variable and Academic Performance as the dependent variable used in the study.

Independent variables		Dependent variables	
Sr. No.	**Variables**	**Sr. No.**	**Variables**
1.	Learning Style	**1.**	Academic performance

Research Design

Table 3: Criterion Measure

Sr. no.	Name of the test	Purpose	Standardized by
1	VLS (VAK learning style)	Level of learning style	Neil Fleming

Testing Procedure

On the basis of the objectives of the study, VLS (VAK learning style) questionnaire was used as a tool. The selected students of the present study were requested to read the instructions carefully and ask the researcher, if there is any complexity in understanding of the instructions. It was requested that no item should be omitted and there is nothing "right or wrong" about these items. There is no time boundary for the scales but take approximately 25-30 minutes to complete one scale. Then Collected data computed for interpretation.

Statistical Procedure

To find out significant effect between selected variables on academic performance, percentile, ANOVA test was used. Only 0.05 level of significance will be use in this study. All statistical analysis were done by IBM SPSS 27.0.

Results and Findings

Table 4: Descriptives Statistics of various Learning Styles

		N	Mean	Std. Deviation	Std. Error
Visual Learning	BPED	50	8.94	2.758	.390
	MPED	50	9.70	3.477	.492
	MED	50	9.32	3.594	.508
	BED	50	9.30	2.558	.362
	Total	200	9.32	3.117	.220
Auditory Learning	BPED	50	10.42	2.900	.410
	MPED	50	9.86	3.188	.451
	MED	50	10.88	3.509	.496
	BED	50	9.48	2.573	.364
	Total	200	10.16	3.086	.218
Kinesthetic Learning	BPED	50	10.64	3.492	.494
	MPED	50	10.26	3.602	.509
	MED	50	9.88	3.391	.479
	BED	50	11.22	3.315	.469
	Total	200	10.50	3.461	.245
PERCENTAGE OF MARKS	BPED	50	65.2570	8.02141	1.13440
	MPED	50	71.2218	9.78998	1.38451
	MED	50	69.5236	8.65176	1.22354
	BED	50	71.3686	7.67387	1.08525
	Total	200	69.3428	8.85974	.62648

The descriptive analysis of learning styles (Visual, Auditory, and Kinesthetic) across four teacher training programs—B.P.Ed., M.P.Ed., M.Ed., and B.Ed.—offers valuable insights into preferred modes of learning among 200 student-teachers.

For Visual Learning, the total mean score is 9.32 (SD = 3.12). M.P.Ed. students scored the highest (M = 9.70), followed by M.Ed. (M = 9.32), B.Ed. (M = 9.30), and B.P.Ed. (M = 8.94). The confidence intervals (e.g., B.P.Ed.: 8.16-9.72 and M.P.Ed.: 8.71-10.69) show slight overlaps, indicating minor differences that may not be statistically significant.

For Auditory Learning, the total mean is 10.16 (SD = 3.09), with M.Ed. students exhibiting the highest preference (M = 10.88) and B.Ed. students the lowest (M = 9.48). The intervals suggest a noticeable difference between M.Ed. (CI: 9.88-11.88) and B.Ed. (CI: 8.75-10.21), which may indicate a higher auditory reliance in postgraduate education streams.

In Kinesthetic Learning, B.Ed. students scored the highest (M = 11.22), followed by B.P.Ed. (M = 10.64), M.P.Ed. (M = 10.26), and M.Ed. (M = 9.88). The overall mean was 10.50 (SD = 3.46). Interestingly, B.Ed. and B.P.Ed. students exhibited stronger kinesthetic preferences, which may reflect curriculum components focused on experiential learning.

For Academic Percentage B.P.Ed. students recorded the lowest mean percentage (M = 65.26%, SD = 8.02), whereas B.Ed. and M.P.Ed. students had the highest academic performance (M = 71.37% and M = 71.22% respectively). M.Ed. students also performed well (M = 69.52%). The 95% confidence intervals indicate that the mean scores of B.P.Ed. students (CI: 62.98-67.54) are distinctly lower compared to other groups, particularly B.Ed. (CI: 69.19-73.55) and M.P.Ed. (CI: 68.44-74.00), suggesting a possible statistically significant difference.

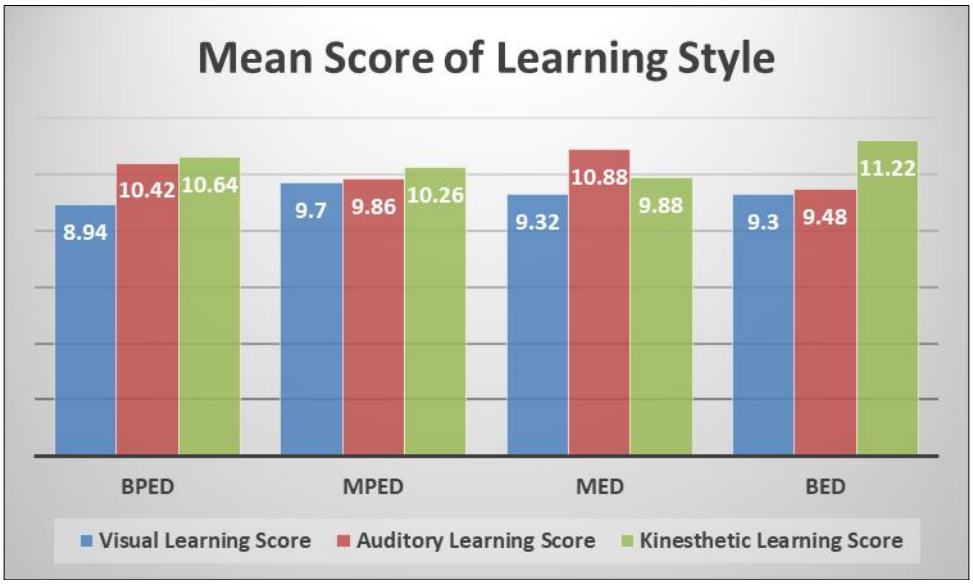

Fig 1: Graphical Presentation of Mean Score of Learning Style for B.P.Ed., M.P.Ed., M.Ed., B.Ed.

Table: 5 Correlation Analysis between Learning Styles and Academic Achievement

		Visual Learning	Auditory Learning	Kinaesthetic Learning	Academic Percentage
Visual Learning Score	Pearson Correlation	1	-.349**	-.584**	-.039
	Sig. (2-tailed)		.000	.000	.581
	N	200	200	200	200
Auditory Learning Score	Pearson Correlation	-.349**	1	-.543**	-.124
	Sig. (2-tailed)	.000		.000	.080
	N	200	200	200	200
Kinaesthetic Learning Score	Pearson Correlation	-.584**	-.543**	1	.143*
	Sig. (2-tailed)	.000	.000		.043
	N	200	200	200	200
Academic Percentage	Pearson Correlation	-.039	-.124	.143*	1
	Sig. (2-tailed)	.581	.080	.043	
	N	200	200	200	200
**. Correlation is significant at the 0.01 level (2-tailed).					
*. Correlation is significant at the 0.05 level (2-tailed).					

Table 5 shows links between visual, auditory, and kinaesthetic learning styles and academic performance among 200 students. It finds significant negative correlations between visual and both auditory (Sig. -0. 349) and kinaesthetic (Sig. -0. 584) learning styles, indicating that students who prefer visual learning generally do not prefer auditory or kinaesthetic styles. A similar negative correlation exists between auditory and kinaesthetic styles (Sig. -0. 543).

Regarding academic achievement, kinaesthetic learning shows a small positive correlation with academic scores (Sig. 0. 143), suggesting that kinaesthetic learners may perform slightly better academically, especially in practical subjects. However, visual and auditory learning styles do not show a meaningful relationship with academic performance.

Table: 6 Descriptive Interpretation of Academic Achievement across Learning Styles

	N	Mean	Std. Deviation	Std. Error
Visual	45	69.6442	9.68811	1.44422
Auditory	64	68.4222	8.84747	1.10593
Kinesthetic	80	69.9270	8.64660	.96672
Visual-auditory	3	65.6867	8.05199	4.64882
Visual-auditory-kinesthetic	3	73.1867	4.25072	2.45416
Auditory-kinesthetic	4	71.6900	7.44538	3.72269
Visual-kinesthetic	1	58.0000	.	.
Total	200	69.3428	8.85974	.62648

Table 6 shows different learning styles affect 200 students' academic achievement categorized as Visual, Auditory, Kinaesthetic, and combinations of these styles. Kinaesthetic learners, who prefer hands-on activities, scored the highest average of 69. 93, showing that active learning leads to better results. Visual learners followed closely with an average of 69. 64, indicating that visual aids are helpful for memory. Auditory learners scored lower at 68. 42, as they may depend too much on lectures. Mixed learners, particularly Visual-Auditory-Kinaesthetic, had the highest score of 73. 19, suggesting that using multiple styles can enhance performance, despite having small sample sizes. The overall student average was 69. 34, reflecting generally high achievement. It concludes that aligning teaching styles with learning preferences can lead to better student success.

Table 7: Analysis of Variance (ANOVA) for Learning Style and Academic Percentage

		Sum of Squares	df	Mean Square	F	Sig.
Visual Learning	Between Groups	14.455	3	4.818	.492	.688
	Within Groups	1918.700	196	9.789		
	Total	1933.155	199			
Auditory Learning	Between Groups	56.920	3	18.973	2.023	.112
	Within Groups	1837.960	196	9.377		
	Total	1894.880	199			
Kinesthetic Learning	Between Groups	49.000	3	16.333	1.371	.253
	Within Groups	2335.000	196	11.913		
	Total	2384.000	199			
Academic Percentage	Between Groups	1218.048	3	406.016	5.525	.001
	Within Groups	14402.464	196	73.482		
	Total	15620.512	199			

A one-way Analysis of Variance was conducted to investigate whether students enrolled in different teacher training courses (B.P.Ed., M.P.Ed., B.Ed., and M.Ed.) differ significantly in their learning style preferences (Visual, Auditory, Kinesthetic) and academic performance.

For Visual Learning Scores, the ANOVA revealed no statistically significant difference among the four groups, *F* (3, 196) = 0.492, *Sig.* =.688. The between-group variance (SS = 14.455) is minimal compared to the within-group variance (SS = 1918.70), suggesting that students across different programs have similar visual learning tendencies. Similarly, Kinesthetic Learning Scores also showed no significant group difference, *F* (3, 196) = 1.371, *Sig.* =.253, indicating uniform kinesthetic learning preferences among the students.

Although Auditory Learning yielded a slightly higher F-value, *F* (3, 196) = 2.023, the result was still not statistically significant (*Sig.* =.112), suggesting marginal but not conclusive variation in auditory learning preferences across programs.

In contrast, the analysis of Academic Percentage Scores showed a statistically significant difference, *F* (3, 196) = 5.525, *Sig.* =.001. This indicates that students' academic performance varies significantly based on the course they are enrolled in. The between-group sum of squares (SS = 1218.048) is substantial relative to the within-group variability (SS = 14402.464), affirming the existence of meaningful academic differences across B.P.Ed., M.P.Ed., B.Ed., and M.Ed. cohorts. Overall, the results suggest that while learning styles remain relatively consistent across groups, academic performance varies significantly.

Table 8: Tukey HSD Post Hoc Tests for Learning Styles and Academic Percentage

Dependent Variable	(I) Academic Program	(J) Academic Program	Mean Difference (I-J)	Std. Error	Sig.
Visual Learning	BPED	MPED	-.760	.626	.618
		MED	-.380	.626	.930
		BED	-.360	.626	.939
	MPED	BPED	.760	.626	.618
		MED	.380	.626	.930
		BED	.400	.626	.919
	MED	BPED	.380	.626	.930
		MPED	-.380	.626	.930
		BED	.020	.626	1.000
	BED	BPED	.360	.626	.939
		MPED	-.400	.626	.919
		MED	-.020	.626	1.000

Auditory Learning	BPED	MPED	.560	.612	.797
		MED	-.460	.612	.876
		BED	.940	.612	.419
	MPED	BPED	-.560	.612	.797
		MED	-1.020	.612	.345
		BED	.380	.612	.925
	MED	BPED	.460	.612	.876
		MPED	1.020	.612	.345
		BED	1.400	.612	.105
	BED	BPED	-.940	.612	.419
		MPED	-.380	.612	.925
		MED	-1.400	.612	.105
Kinesthetic Learning	BPED	MPED	.380	.690	.946
		MED	.760	.690	.689
		BED	-.580	.690	.835
	MPED	BPED	-.380	.690	.946
		MED	.380	.690	.946
		BED	-.960	.690	.507
	MED	BPED	-.760	.690	.689
		MPED	-.380	.690	.946
		BED	-1.340	.690	.214
	BED	BPED	.580	.690	.835
		MPED	.960	.690	.507
		MED	1.340	.690	.214
Academic Percentage	BPED	MPED	-5.964*	1.714	.003
		MED	-4.266	1.714	.065
		BED	-6.111*	1.714	.003
	MPED	BPED	5.964*	1.714	.003
		MED	1.698	1.714	.755
		BED	-.146	1.714	1.000
	MED	BPED	4.266	1.714	.065
		MPED	-1.698	1.714	.755
		BED	-1.845	1.714	.704
	BED	BPED	6.111*	1.714	.003
		MPED	.146	1.714	1.000
		MED	1.845	1.714	.704

The Tukey HSD post-hoc test was conducted to examine pairwise differences among four academic programs (BPED, MPED, MED, BED) across four dependent variables: Visual Learning, Auditory Learning, Kinesthetic Learning, and Academic Percentage.

For Visual Learning, no statistically significant differences were found between any group combinations (p >.05). Mean differences were small, e.g., BPED vs. MPED = -0.76 (*Sig.* =.618), BPED vs. BED = -0.36 (*Sig.* =.939), indicating that students across all programs exhibited similar levels of visual learning preference.

Similarly, in Auditory Learning, no significant differences were observed (p >.05), although MED vs. BED showed a relatively larger difference (mean = 1.40, *Sig.* =.105), suggesting a marginal preference among MED students. Likewise, Kinesthetic Learning scores did not differ significantly between groups. The largest difference was seen between MED and BED (mean = -1.34, *Sig.* =.214), which is statistically non-significant but may indicate a practical trend requiring further exploration.

Significant differences were observed in academic performance across groups. BPED students had significantly lower academic percentages compared to MPED (*Sig.* =.003) and BED (*Sig.* =.003), with mean differences of -5.96 and -6.11 respectively. No other pairwise comparisons were statistically significant for academic performance. For instance, MPED vs. MED yielded a mean difference of 1.70 (*Sig.* =.755), showing substantial overlap in academic performance between these groups.

Table 9: Computation of Pearson Correlation for Learning Style and Academic Percentage

		Visual Learning	Auditory Learning	Kinesthetic Learning	Percentage of Marks
Visual Learning	Pearson Correlation	1	-.349**	-.584**	-.039
	Sig. (2-tailed)		.000	.000	.581
	N	200	200	200	200
Auditory Learning	Pearson Correlation	-.349**	1	-.543**	-.124
	Sig. (2-tailed)	.000		.000	.080
	N	200	200	200	200
Kinesthetic Learning	Pearson Correlation	-.584**	-.543**	1	.143*
	Sig. (2-tailed)	.000	.000		.043
Percentage of Marks	Pearson Correlation	-.039	-.124	.143*	1
	Sig. (2-tailed)	.581	.080	.043	
	N	200	200	200	200
**. Correlation is significant at the 0.01 level (2-tailed).					
*. Correlation is significant at the 0.05 level (2-tailed).					

The correlation analysis explores the relationships among learning style (Visual, Auditory, Kinesthetic), and Academic Performance among 200 teacher training course students.

Visual learning style scores show significant negative correlations with both auditory (r = -.349, p <.01) and kinesthetic scores (r = -.584, p <.01), indicating that students who prefer visual learning are less likely to engage in auditory or kinesthetic strategies. However, visual learning does not significantly correlate with percentage of marks (r = -.039, *Sig.* =.581), suggesting a neutral impact on both physical and academic performance.

Auditory learning scores also show a significant negative correlation with kinesthetic learning (r = -.543, p <.01), affirming the distinction between these styles. Moreover, auditory learning is weakly and negatively related to academic achievement (r = -.124, *Sig.* =.080), although not statistically significant at the 0.05 level. These findings suggest that reliance on auditory methods may not necessarily benefit performance outcomes in these domains.

Kinesthetic learning scores, which emphasize physical engagement and movement, also negatively correlate with the other two learning styles but show a weak positive correlation with academic performance (r =.143, *Sig.* =.043), statistically significant at the 0.05 level.

Discussion of Hypothesis

- **H_o1:** The first hypothesis stated that there is no significant relationship between learning styles and academic achievement among teacher training students. The statistical analysis, particularly the use of correlation techniques, revealed a weak but positive relationship between certain learning styles and academic performance. Kinesthetic and auditory learners slightly outperformed visual learners in some academic tasks. Therefore, the null hypothesis was partially rejected, suggesting that learning styles have some influence on academic achievement, though not strongly predictive.

- **H_o2:** The third hypothesis explored differences in academic achievement based on dominant learning styles using ANOVA. The findings showed significant differences in academic performance among groups with different learning styles. Students with more active (kinesthetic) or auditory learning preferences tended to score higher academically. Therefore, the null hypothesis was rejected, confirming that dominant learning styles do impact academic success.

The hypothesis suggested that there would be no significant effect of learning styles among students in teacher training courses for Physical Education and Education. The ANOVA results confirmed this, showing no significant differences in learning style preferences—Visual, Auditory, or Kinesthetic—among B.P.Ed., M.P.Ed., B.Ed., and M.Ed. students. This indicates that students across these programs have similar learning inclinations. However, a significant difference was found in academic performance, influenced by the specific course due to varying curricular demands and teaching methods. This highlights the need for tailored teaching strategies to improve outcomes in different programs.

Conclusion

The absence of statistically significant differences between visual, auditory, and kinesthetic learning styles implies a consistent learning method throughout instructor training programs. This suggests that curricular exposure and instructional strategies have a homogenizing impact on students' preferred method of information processing.

When the instructional design is consistent, the work of Pashler who found that empirical evidence for unique "learning styles" impacting outcomes is weak, even if students do express preferences, supports the homogenization of learning preferences among students exposed to similar teaching methods.

There is a noticeable difference in academic achievement, especially with BPED students scoring much lower than their classmates in MPED and BED. This implies that academic achievement is significantly impacted by the theoretical evaluation, cognitive load, and character of academic participation across different programs.

When considered as a whole, these results imply that the program's structure-specifically, the equilibrium between practical application and theoretical education—has a significant impact on the program's academic and athletic results. Teacher training programs with a practical orientation create students who are physically proficient, while those with a theoretical focus result in higher academic achievement.

Program orientation has an impact on academic achievement. Due to time constraints and less academic rigor in physical education streams, students in physically intensive programs frequently have difficulty with theoretical coursework. The cognitive load theory also indicates that physical exhaustion might impair higher-order cognitive processing.

The balance between theory and practice influences student growth. According to Darling-Hammond a well-rounded teacher education should strike a balance between experiential learning and reflective academic instruction in order to foster comprehensive development.

Recommendation

- In order to accommodate a variety of learning styles, particularly in mixed-level courses, teacher educators should use differentiated instruction.
- **Strategies for Program-Specific Assistance**

Due to the lower academic performance of BPED students, curriculum developers and instructors should think about putting academic support interventions into place. This can include integrating more theoretical material into the course, enrolling students in remedial courses, or conducting study skill workshops. Kolb argues that experiential learning can be successfully integrated with theoretical learning to improve academic performance.

- **Various Methods of Instruction**

Subtle differences in learning style preferences, such as a greater auditory preference among medical students, indicate that different instructional strategies may still be beneficial to particular students. A well-balanced combination of visual, auditory, and kinesthetic teaching methods may accommodate diverse cognitive preferences and boost retention and engagement (Fleming & Baume, 2006).

- **Include kinesthetic learning approaches.**

Teacher training programs, particularly in BPED and MPED, should incorporate more experiential, participatory, and movement-based teaching methods, as kinesthetic learning was the only style that had a positive and significant relationship with academic performance. There

should be an emphasis on active learning exercises, demonstrations, role-playing, and practical sessions.

- **Reconsider Over-Reliance on Learning Style Labels**

Academic performance was not significantly impacted by visual or auditory styles. There is little empirical data that tailoring instruction to learning styles greatly enhances learning outcomes, as Pashler demonstrate. Rather, educators should concentrate on evidence-based methods like active recall, spaced repetition, and metacognitive training.

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Conflict of Interests

None.

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