

The Impact Of Teaching Styles On Student Academic Performance: A Case Study At The University Of Peshawar, Pakistan

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Abstract

Education is essential for both individual and societal development, enhancing knowledge, skills, and overall well-being. Teachers play a pivotal role in this process, utilizing various teaching styles to influence student learning outcomes. This study examines the impact of five teaching styles demonstrator, facilitator, delegator, formal authority, and expert on the academic performance of students at Peshawar University. Through the use of questionnaires and statistical tools such as descriptive statistics, multiple linear regression, independent sample t-tests, and ANOVA, the study evaluates how these styles affect student achievement. The findings show that facilitator and delegator teaching styles, which emphasize active, student-centered learning, significantly improve academic performance, while more authoritative styles have a comparatively lower¹ impact. Additionally, the study reveals differences based on gender and location, with urban students and males performing better under participatory teaching methods. The significance of the relationship between teaching styles and academic performance is confirmed by the t-test, with a P-value of 0.05, showing that male and female students perceive teaching styles differently. The explanatory variables accounted for 57% of the variation in the dependent variable, student academic performance. These findings provide valuable insights for educators and policymakers, highlighting the importance of adopting interactive teaching methods and region-specific strategies to enhance student outcomes and promote equitable education.

Keywords: Teaching style, Students Academic Performance, Descriptive statistics, Multiple Regression, ANOVA and Independent Sample T-Test.

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Introduction

Education is a fundamental pillar of individual and societal development. It involves the systematic process of acquiring knowledge, skills, values, and attitudes that contribute to personal growth and social progress. Education equips individuals with the tools necessary for critical thinking, problem-solving, and effective participation in society. It plays a pivotal role in shaping future generations and fostering innovation, economic development, and cultural enrichment (UNESCO, 2022). Teaching is a core component of the educational process. It encompasses the methods and practices employed by educators to facilitate learning and enhance student outcomes. Effective teaching involves a range of approaches and strategies designed to engage students, promote understanding, and support their academic and personal development. Teachers play a crucial role in creating an environment conducive to learning, adapting their methods to meet diverse student needs, and fostering a positive educational experience (Hernández-Martín et al., 2019). Both education and teaching are dynamic fields that continuously evolve to address the changing needs of students and society. Innovations in teaching methods and educational technologies are continually reshaping how knowledge is delivered and received, underscoring the importance of ongoing research and adaptation in these areas (UNESCO, 2022). Education is a fundamental element in fostering personal and societal development, and it plays a crucial role in shaping individuals' futures and contributing to the overall well-being of society. It is a crucial element in the development of human capital and is linked to people's prospects for a better life as well as their general well-being and health (Abbas, F., et al (2021)). In recent years, the trend toward privatizing education has become increasingly prevalent globally. This shift provides students and parents with a broader range of educational choices, allowing them to select institutions that best fit their preferences and needs. Despite these advantages, the growth of private education has also led to several negative consequences. These issues have prompted concern among governments and policymakers, who are now closely examining the impact of privatization on educational equity and access (Bray, (2020) People become prosperous and fulfill their obligations through education, which promotes social, political, and economic progress According to UNESCO (2014), education enhances intellectual, social, and emotional development, which is essential for the advancement of both individuals and societies. Teaching styles refer to the various approaches educators use to deliver instruction and engage students. These styles can significantly affect how students learn and perform academically. Some commonly recognized teaching styles include. Education is the cornerstone of societal advancement, closely connected to the skill of teaching. Teachers can spark passions, foster critical thinking, and mold the minds of future generations. They are the architects of young minds, and their teaching methods, which strike a careful balance between inspiration and knowledge transfer, have a significant impact on students' performance (Felder R. M., & Brent, R. (2005). The behavior and attitude that teachers exhibit when delivering a lesson and interacting with students in the classroom are referred to as their teaching styles (Hesson, M. & Shad, K.F. (2007), Primarily, the educator needs to have a sufficient understanding of the curriculum's goals and expectations, as well as teaching techniques, passions, values, and admiration. To help kids or pupils live large, full, interesting, and satisfying lives, he must put forward effort. While some students have an innate enthusiasm for learning, many students require or anticipate that their instructors or teachers will motivate, test, or excite them. "The ability of the teacher to sustain the students' initial interest in the subject matter is crucial for effective learning in the classroom (Greitzer, F. A. (2002), The foundation of education for a child begins at home, and it is a lifelong process that only ends with death. Education determines the quality of an individual's life by improving knowledge, skills, and developing personality and attitude (Ayeni, A. J. (2011). It enables individuals to express their views more efficiently and helps in spreading knowledge throughout society (Coffield, F., et al (2004). Education is essential for both

personal growth and societal progress. It equips individuals with the knowledge, skills, and values necessary to navigate life and contribute meaningfully to their communities. Education has an important role in today's national development and is closely related to social development. Alumran (2008) states that education enables individuals to prosper and fulfill their responsibilities, contributing to social, political, and economic progress. According to Adunola (2011), an effective education system is essential for the smooth achievement of a nation's goals. Similarly, Ahmed (2021) emphasizes that education plays a key role in promoting national development and progress.

Aims of the Study

The purpose of this study to examine the impact of teaching styles on student academic performance.

Objectives of the Study:

1. To assess the effectiveness of various teaching styles
2. To evaluate the impact of student-centered teaching styles
3. To analyze variations in academic performance based on gender and location

Materials and Methods

Target Population:

The target population for this study comprised all university students enrolled at University of Peshawar.

Sampling Techniques:

The sampling technique used for data collection in this research was multi-stage cluster sampling. In the first stage, the University of Peshawar was selected from a pool of 12 universities in Peshawar. In the second stage, two faculties from the University of Peshawar were chosen at random. In the third stage, five departments were randomly selected from each of the two faculties. Finally, students from these departments were selected using convenient sampling.

Sample Size:

The Taro Yamane formula was used to estimate the required sample size for this study. The formula is given by:

$$n = \frac{N}{1 + N(e^2)}$$

Where;

N represents the population of students at the University of Peshawar, which is approximately 14,000. n is the calculated sample size. e is the margin of error, set at 0.05.

Data Collection Method

A well-designed, self-developed questionnaire titled "Teaching Styles and Student Achievements" was used to collect the required information from the students. The questionnaire was divided into three sections: Section 1 focused on the demographic

information of the students, Section 2 addressed teaching styles, and Section 3 covered student achievements.

The following are the statistical techniques used for achieving the study objectives

Descriptive/Summary Statistics

Descriptive statistics involve quantitatively summarizing the main features of a dataset. Unlike inferential statistics, which use probability theory to make predictions about a population, descriptive statistics focus on summarizing a sample. Even when inferential statistics are the primary focus, descriptive statistics are typically presented, such as in studies involving human subjects, where tables often display sample sizes, demographic information, and key characteristics like average age or sex distribution.

Multiple regression

evaluates the impact of multiple explanatory (independent) variables on an outcome (dependent variable) of interest. It assesses the relative effect of each independent variable while holding the others constant. Multiple regression analysis is a statistical modeling process that helps estimate the relationships between several independent variables and a dependent variable. The formula for multiple regression can be represented as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + \epsilon$$

Where:

Y is the dependent variable,

X_1, X_2, \dots, X_n are the independent variables,

β_0 is the intercept,

$\beta_1, \beta_2, \dots, \beta_n$, are the coefficients for each independent variable and ϵ is the error term.

In our study, student achievement is the dependent variable, while teaching styles (expert, delegator, facilitator, formal authority, and demonstrator) serve as the independent variables.

ANOVA

ANOVA (Analysis of Variance) is a statistical technique that partitions the total variation in a dataset measured by the sum of squares of deviations from the mean into its component parts, each associated with a different source of variation. These components are analyzed to test specific hypotheses. The technique is based on the principle that greater differences between sample means result in larger variances, and the components provide independent and unbiased estimates of the common population variance. ANOVA compares two estimates of variance using the F-distribution to determine whether the population means are equal. It is a powerful and widely used method, especially when data can be grouped into categories. In a one-way ANOVA, observations are classified into samples based on a single criterion, allowing for the comparison of group means. The null hypothesis for ANOVA analysis there is no significant difference in student achievement across the different teaching styles. Dependent Variable: Student achievement (e.g., test scores, grades). Independent Variables: Teaching styles (expert, delegator, facilitator, formal authority, demonstrator).

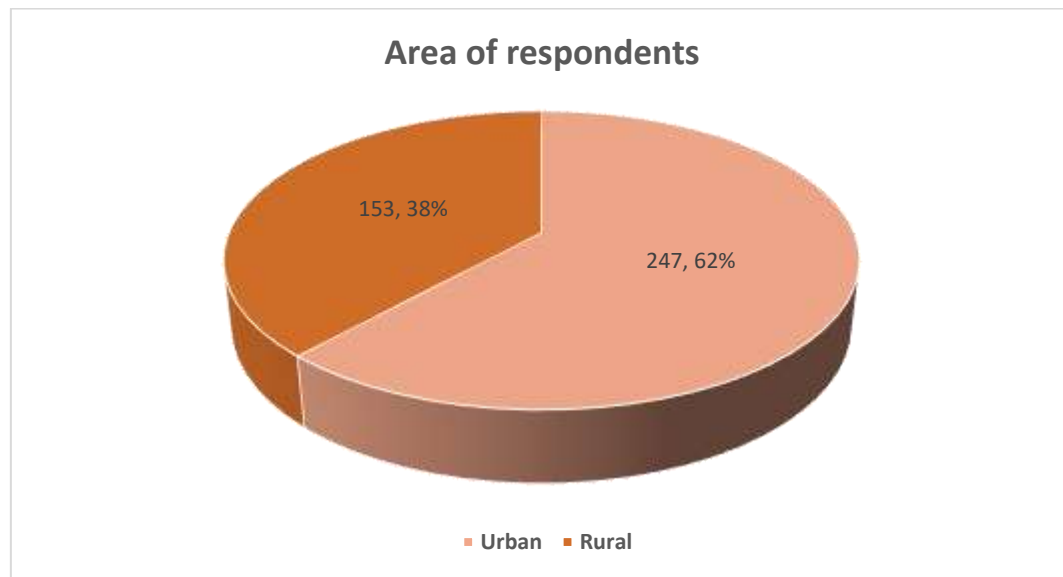
Independent Sample t-test

The independent t-test, also known as the two-sample t-test, independent-samples t-test, or Student's t-test, is an inferential statistical test used to determine whether there is a statistically significant difference between the means of two unrelated groups. The null hypothesis for the independent t-test states that the population means of the two unrelated groups are equal. In this study, the null hypothesis is that there is no significant difference in perceptions of different teaching methodologies between male and female students. The independent t-test assumes that the dependent variable is approximately normally distributed within each group. IBM SPSS software is used for the analysis of the collected data.

Result And Discussion

In the pursuit of understanding the impact of various teaching styles on academic performance, this study has uncovered several intriguing patterns and insights. The following sections not only present the core findings but also delve into their implications, providing a nuanced discussion of how these results align with or challenge existing theories. By examining these outcomes in detail, we aim to offer a comprehensive perspective on how different teaching methods influence student success and contribute to the broader educational landscape.

Figure 4.1 presents data collected from 400 students at the University of Peshawar, illustrating the distribution of students from urban and rural areas. The pie chart shows that 38.35% of the data comes from students in rural areas, while 61.8% comes from students in urban areas. The diagram also distinguishes between male and female students within these regions.



Pie Chart for Area

Table 4.2 presents data collected from 400 students at the University of Peshawar. The table shows that there are 248 male students and 152 female students. The frequencies are expressed as percentages in the percentage column, with females accounting for 38% and males 62%. The valid percent column reflects the same values. These percentages would vary if there were missing data.

TABLE 4.1 FREQUENCY TABULATION OF GENDER

	Frequency	Percent	Valid Percent	Cumulative Percent
Female	152	38.0	38.0	38.0
Male	248	62.0	62.0	100.0
Total	400	100.0	100.0	

Figure 4.2 displays a bar chart showing the distribution of students by study program and area (urban vs. rural) at the University of Peshawar. The chart indicates that in the rural area, there are 111 bachelor's students, 31 master's students, 3 Ph.D. students, and 8 students in other programs. In the urban area, there are 181 bachelor's students, 54 master's students, 7 Ph.D. students, and 5 students in other programs. The data encompasses both male and female students.

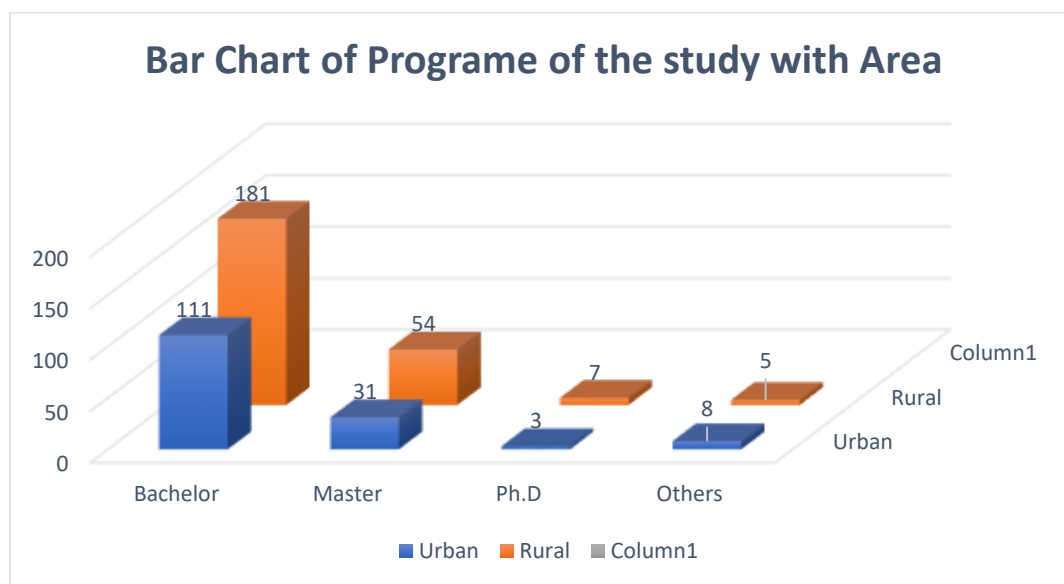


Figure 4.2

Table 4.3 of interest is the Model Summary table, which provides the values of R, R², adjusted R², and the standard error of the estimate. The "R" column represents the multiple correlation coefficient, R, which measures the quality of the prediction of the dependent variable, Student Achievement. A value of 0.654 indicates a strong positive relationship. The "R²" column represents the R² value (also known as the coefficient of determination), which indicates the proportion of variance in the dependent variable that can be explained by the independent variables. Our R² value of 0.547 means that the independent variables explain 57.7% of the variability in the dependent variable, Student Achievement.

TABLE 4.3 MODEL SUMMARY OF REGRESSION MODEL

Model	R	R Square	Adjusted R square	Std. Error of the Estimate
1	.654 ^a	.547	.298	3.378
Predictors: (Constant), demonstrator, delegator, formal Authority, facilitator, expert				

The **Table 4.4** ANOVA table, which reports how well the regression equation fits the data. This table indicates that the regression model predicts the dependent variable significantly well. The "Regression" row and "Sig." column indicates that the statistical significance of the regression model that was run. The $p < 0.0005$, which is less than 0.05, and indicates that, overall, the regression model statistically significantly predicts the outcome variable (i.e., it is a good fit for the data).

TABLE 4.1 ANOVA TABLE OF REGRESSION MODEL

Model	Sum of Squares	d.f	Mean Square	F	Sig.
Regression	3320.542	5	664.108	34.656	.000 ^b
Residual	7511.842	392	19.163		
Total	10832.384	397			

Dependent Variable: student achievement

Predictors: (Constant), demonstrator, delegator, formal Authority, facilitator, expert

The Coefficients table provides us with the necessary information to predict student achievement from teaching styles (expert, delegator, facilitator, formal Authority, demonstrator) as well as determine whether the independent variables contribute statistically significantly to the model. Furthermore, we can use the values in the B column under the Unstandardized Coefficients column to present the Regression Model of the equation as.

Student achievement = 10.096 + expert (0.495) + delegator (0.383) + facilitator (0.444) + formal authority (0.268) demonstrator (0.255)

TABLE 4.2 COFFICIENTS OF REGRESSION MODEL

Model	Unstandardized coefficients		Standard Coefficients	T	Sig
	Beta	Standard Error			
(Constant)	9.594	1.012		9.477	0.000
Expert	0.485	0.138	0.202	3.504	0.001
Delegator	0.353	0.149	0.131	2.375	0.018
Facilitator	0.434	0.143	0.174	3.039	0.003
formal Authority	0.238	0.135	0.092	1.756	0.080
demonstrator	0.245	0.135	0.102	1.810	0.071

Dependent Variable: student achievement

Table 4.6 presents the gender-wise descriptive statistics for the variable's expert, delegator, facilitator, formal authority, and demonstrator. The sample consists of 247 males and 153 females for each variable. For the variable "expert," males have a mean of 6.92, with a standard deviation of 2.245 and a standard error of 0.143. In comparison, females show a mean of 7.23,

a standard deviation of 2.028, and a standard error of 0.164. Similar statistics are provided for the other variables delegator, facilitator, formal authority, and demonstrator.

TABLE 4.3 T-TEST GENDER WISE

	Gender	N	Mean	Std. Deviation	St. Error Mean
Expert	Female	153	7.23	2.028	0.164
	Male	164	6.72	3.32	0.231
Delegator	Female	247	6.92	2.245	0.143
	Male	323	7.52	3.345	0.432
Facilitator	Female	153	7.14	1.941	0.157
	Male	276	8.62	1.923	0.423
formal Authority	Female	247	7.18	1.941	0.124
	Male	342	7.54	1.853	0.435
demonstrator	Female	153	7.51	2.016	0.164
	Male	254	6.43	3.432	0.243

Table 4.7 presents the results of the independent sample t-test, showing the t-values, degrees of freedom (d.f), and p-values. The p-values for the three variables Expert, Delegator and Facilitator are highly insignificant, indicating that the means of these variables do not differ significantly between genders. In other words, the average values for males and females are essentially the same for these variables. Conversely, the P-values for the variables "Formal Authority" and Demonstrator are statistically significant, indicating that the means of these variables differ by gender

TABLE 4.4 INDEPENDENT SAMPLE T-TEST GENDER WISE

	Sig	T	d.f	Sig (2. tailed)	Mean Difference	St. Error Differences	95% C.I Lower Upper	
Expert	0.113	1.391	398	0.165	0.310	0.223	-	0.74
		1.424	346.9	.0155	0.302	0.217	.012	0.73
Delegator	0.845	-	397	0.877	-0.31	0.213	-	0.36
		0.155	322.5	0.877	-0.34	0.217	0.42	0.36
Facilitator	0.281	-	397	0.4331	0.171	0.206	-	0.59
		0.155	335.4	0.421	0.175	0.195	0.25	0.90
formal Authority	0.008	0.788	396	0.014	0.510	0.222	0.10	0.91
		0.800	372.6	0.009	0.515	0.218	0.12	0.89
Demonstrator	0.085	2.401	398	0.17	0.534	0.234	0.09	0.97
		2.453	344.3	0.15	0.542	0.254	0.10	0.94

t-test for Equality of Means

Table 4.8 presents the area-wise descriptive statistics for the variable's expert, delegator, facilitator, formal authority, and demonstrator. The data includes 247 males and 153 females for each variable. For the variable "expert," the mean for individuals from rural areas is 6.97, with a standard deviation of 2.278 and a standard error of 0.184. In comparison, the mean for those from urban areas is 7.08, with a standard deviation of 2.100 and a standard error of 0.134. Similar statistics are provided for the other variables delegator, facilitator, formal authority, and demonstrator.

TABLE 4.5: AREA WISE T-TEST

	Area	N	Mean	St. Deviation	St. Error Mean
Expert	Rural	153	6.97	2.27	0.184
	Urban	247	7.08	2.10	0.134
Delegator	Rural	155	6.98	1.98	0.160
	Urban	243	7.29	1.90	0.121
Facilitator	Rural	158	7.25	2.21	0.179
	Urban	253	7.50	2.02	0.129
formal Authority	Rural	158	6.91	2.12	0.172
	Urban	232	7.32	1.92	0.123
demonstrator	Rural	154	7.04	2.22	0.180
	Urban	265	7.02	2.14	0.137

This study examined the impact of various teaching styles on the academic performance of students at Peshawar University. Data were gathered from 400 students across departments such as statistics, economics, international relations, mathematics, social work, and political science. A multi-stage cluster sampling technique was used to select these departments, and convenient sampling was employed for student selection. The sample included 247 male and 153 female students, with 73% pursuing bachelor's degrees, 21.3% master's, 2.5% Ph.D., and 3.3% enrolled in other programs. The average age was 22.86 years, ranging from 18 to 43, representing both traditional and non-traditional students. Most students (61.8%) were from urban areas, while 38.35% were from rural areas. The study analyzed five teaching styles: expert, facilitator, delegator, formal authority, and demonstrator. Regression analysis revealed that these styles explained 30.7% of the variation in academic performance, with an R value of 0.554. The "expert" style had the most positive impact, followed by the facilitator and delegator styles. Conversely, the formal authority and demonstrator styles, while still effective, had less influence on performance. Significant differences were observed between male and female students in response to the formal authority and demonstrator styles, with male students responding more positively. No significant gender differences were noted for the expert, facilitator, and delegator styles, indicating their broader effectiveness. Urban and rural students

showed similar responses, except for the formal authority style, which was less effective for rural students.

Conclusion

In conclusion, this study confirms the significant impact that teaching styles have on students' academic performance at Peshawar University. Facilitator and delegator styles, which emphasize active, student-centered learning, were found to significantly enhance academic success. This study highlights the critical role of adopting teaching styles that address the diverse needs of students. By emphasizing expertise, facilitation, and delegation, educators can foster a more engaging and inclusive learning environment. These methods promote active learning, allowing students from various backgrounds and genders to excel academically and reach their full potential. This approach ensures that all students benefit from a supportive educational experience that nurtures their growth and success. In contrast, more authoritative styles, while still beneficial, had a lesser effect. Additionally, the study identified differences based on gender and location, with urban students and male students performing better under participatory teaching methods. For future recommendations, educators should adopt interactive, student-centered approaches to improve academic outcomes. Tailoring teaching strategies to students' gender and regional needs is crucial for equitable education. Future research should examine the long-term effects of teaching styles and factors like socio-economic status or resources to improve student performance. Notable differences were found between male and female students in response to formal authority and demonstrator styles, with males responding more positively. However, no significant gender differences were observed for the expert, facilitator, and delegator styles, which were effective across genders. Urban and rural students responded similarly, except for the formal authority style, which was less effective for rural students.

References

1. Abbas, F., Noor, N., & Arshad, A. (2021). The role of education in human capital development and economic growth. *International Journal of Social Sciences and Education*, 11(3), 45-60.
2. Adunola, O. (2011). *The Impact of Teachers' Teaching Methods on the Academic Performance of Primary School Pupils in Ijebu-Ode Local Cut Area of Ogun State*. Ego Booster Books, Ogun State, Nigeria.
3. Alumran, J. I. A. (2008). Learning styles in relation to gender, field of study, and academic achievement for Bahraini University students. *Individual Differences Research*, 6(4), 303-316.
4. Ayeni, A. J. (2011). Teachers' professional development and quality assurance in Nigerian secondary schools. *World Journal of Education*, 1(2), 143-149.
5. Ahmed, S. N., Abbas, F., & Qureshi, A. M. (2021). The use of social-networking sites in English language education: An exploratory study using SWOT analysis technique. *PSYCHOLOGY AND EDUCATION*, 58(1), 4640-4650.
6. Bray, M. (2020). *Shadow education: Private supplementary tutoring and its implications for policy makers in Asia*. UNESCO Publishing.
7. Basheer, M., Siam, M., Awn, A., & Hassan, S. (2019). Exploring the role of TQM and supply chain practices for firm supply performance in the presence of information technology capabilities and supply chain technology adoption: A case of textile firms in Pakistan. *Uncertain Supply Chain Management*, 7(2), 275-288.

8. Coffield, F., Moseley, D., Hall, E. & Ecclestone, K. (2004). Learning styles and pedagogy in post-16 learning: a systematic and critical review. London, Learning and Skills Research Centre, Learning and Skills Development Agency.
9. Erikson, E. H. (1978). *Adulthood*. W. W. Norton & Company.
10. Erickson, F. (1978). Classroom discourse as improvisation: Relationships between academic task structure and social participation structure in lessons. *Sociology of Education*, 51(4), 280-294.
11. Felder, R. M., & Brent, R. (2005). Understanding student differences. *Journal of Engineering Education*, 94(1), 57-72.
12. Greitzer, F. A. (2002). Cognitive approaches to student-centered instruction. *Journal of Instructional Science*, 30(3), 43-58.
13. Hernández-Martín, A., Pérez-González, A., & García-Pérez, O. (2019). The relationship between teacher professional development and teaching practices: The mediating role of self-efficacy. *Journal of Teacher Education*, 70(5), 410-421.
14. Hesson, M., & Shad, K. F. (2007). A student-centered learning model. *American Journal of Applied Sciences*, 4(9), 628-636.
15. UNESCO. (2014). *Teaching and learning: Achieving quality for all*. EFA Global Monitoring Report 2013/4. Paris: UNESCO Publishing.
16. UNESCO. (2022). *Education for sustainable development: A roadmap*. Paris: UNESCO Publishing.