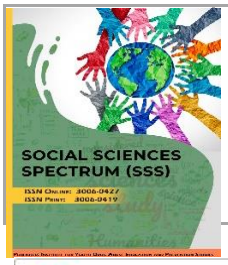

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Impact of Teaching Styles on Critical Thinking Skills of Students: Evidence from Higher Secondary Schools Punjab, Pakistan

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Abstract

The present study examines the impact of various teaching styles on the development of critical thinking skills of 12th standard students of Punjab, Pakistan. While national education policies have focused on competency-based learning and critical inquiry, classroom practices in the region are still often stuck in more traditional and teacher-led approaches. A quantitative cross sectional survey design has been used and the data were gathered from a stratified random sample of 351 students in three districts namely Khanewal, Okara and Rawalpindi. The pedagogical perceptions were evaluated using the Teaching Styles Inventory (TSI) and the cognitive attainment was measured with the Critical Thinking Disposition Scale (CTDS). The multiple regression analysis showed that the "Facilitator (β = .45)" and "Delegator (β = .38)" teaching styles are the best positive predictors of critical thinking while the traditional "Expert" and "Formal Authority" styles have a negligible effect. However, R^2 (.42) shows significant effect of teaching styles on critical thinking of students. Besides, no statistically significant differences were found between gender and among three districts by using ANOVA. The results indicate that the use of transmissive instruction as a teaching method is one of the important systemic obstacles for developing independent analytical thinking. The study suggests that the need for educational reform is for teachers to learn and practice facilitative and inquiry-based pedagogies and that summative assessment system should shift away from merely memorizing facts and towards critical inquiry.

Keywords: Critical Thinking, Grasha-riechmann Model, Higher Secondary Schools, Pedagogical Practices, Quantitative Survey, Teaching Styles, Punjab, Pakistan.

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Introduction

In an increasingly complex and digitalized global world, critical thinking is defined as an intentional and self-regulatory judgment that leads to interpretation, analysis, evaluation and inference (Raza et al., 2021), is considered an essential skill. The demand for people with higher order thinking skill, problem solving and innovative decision making has grown with the changing nature of traditional labor market which has been affected by the process of automation (Bibi & Hanif, 2023). Schools in Pakistan are similarly urged to instill these cognitive dispositions in their students for civic participation and to meet the requirements of the contemporary workplace (Naseer et al., 2022).

However, it is unfortunate that the shift from memorization to inquiry learning has been a major challenge in Pakistani education system even in the light of the global need and demand. Although the development of critical thinking, problem-solving, and self-directed learning are explicitly mentioned in national policies such as the National Education Policy (2009) and the actual implementation of Single National Curriculum (SNC), the actual achievement in education remains limited (Bibi & Hanif, 2023). The existing study shows that in many educational institutes of Pakistan, instruction is still mostly teacher-centred and rather focused on imparting factual knowledge than developing analytical abilities (Hassan, 2020; Khan, 2017). The traditional didactic approach of teaching and learning frequently leads to less interaction between teachers and students, and a lack of teaching higher order thinking skills which are important for academic and personal development (Naseer et al., 2022).

The educator plays a crucial role in making curriculum goals and outcomes real for learners. Instructional practices, also known as pedagogical approaches, affect students' information processing, argumentation and complex tasks (Ali & Awan, 2021). Collaborative learning, inquiry-based teaching and discussions have been proven to be more effective than traditional lectures in developing curiosity and critical thinking towards deep learning (Ekeyi, 2013; Raza et al., 2021). In the case of higher secondary education in Punjab, Pakistan, the localized evidence to show the impact of particular teaching styles on the critical thinking skills of adolescents in higher school education is lacking. Thus, the present study is designed to explore the impact of different teaching styles on the critical thinking abilities of the students of higher secondary schools of Punjab and provide empirical data for any pedagogical changes needed to improve the quality of secondary education in Punjab.

This study is based on the fact that Pakistan's national education system has a huge gap between its vision and the practices in classrooms. Though the government of Pakistan has repeatedly urged the transition from rote learning to competency based learning, a major problem is that the pedagogical system is still strongly focused on summative assessments and standardized exams, as highlighted by the introduction of the Single National Curriculum (SNC). The widespread dependence on high-stakes testing results confuses students into rote memorizing over critical thinking, analytical reasoning, and complex problem-solving which now are considered essential skills for both personal and professional success in the knowledge-based 21st century. Higher secondary education in Punjab is a pivotal step between primary and secondary education and higher education. Students should be moving from receiving information to being autonomous scholars of information at this age. Transition is, however, hindered in many classrooms in the region that still employ traditional, teacher-centered approaches. The need of the hour is to shift away from anecdotal evidence and produce empirical findings which explain the relationships between specific pedagogies (inquiry-based, collaborative and/or democratic approaches in

teaching) and the unique sociocultural and infrastructural challenges of Punjab's colleges, whether they promote or impede critical thinking.

Finally, this study is an important step toward pedagogical change in the context of evidence-based teaching. The research explored the relationship between a variety of teaching styles and critical thinking outcomes in a systematic manner to give educators and policymakers actionable data to move beyond the lecture model of teaching. This clarity is crucial to ensure that the classroom reflects the country's educational vision and goals. The study aims to make contributions towards systemically enhancing the quality of secondary education in the province of Punjab and for its graduates to be able to ensure cognitive flexibility for dealing with the rapidly changing and unpredictable world.

Research Objectives

The main purpose of this study was to find out the relationship between the different teaching styles with the critical thinking ability of higher secondary students of Punjab. In particular, the study seeks:

1. To find out the teaching styles used in higher secondary schools of Punjab.
2. To assess the critical thinking of students studying in higher secondary schools of Punjab.
3. To find out how various teaching styles affect the students' critical thinking skills.
4. To examine the difference in critical thinking of students on the base of demographic factors i.e. gender and district.

Research Questions

The following research questions were postulated as the direction for the quantitative study:

1. How are the teaching styles being used by teachers of higher secondary schools in Punjab as perceived by the students?
2. What is the status of the critical thinking skills of higher secondary school students of the province of Punjab?
3. How well do the various teaching styles (expert, formal authority, demonstrator, facilitator, and delegator) predict the ability of students to think critically?
4. Is there a statistically significant difference in critical thinking skills of the students in terms of their demographics (Gender and District)?

Literature Review

Critical thinking, as a key cognitive skill, is recognised as a crucial ability to thrive in today's complex world (Alsaleh, 2020). It has been described as a purposeful and deliberate application of cognitive strategies that allows people to analyze, synthesize, and evaluate information to make informed decisions (Heard et al., 2025). These skills are becoming more important in the 21st century as students need to work in information-rich environments and be able to assess the credibility of information sources, such as those produced using generative AI (Sarvary & Schmidt, 2026). It is important to develop these skills at higher secondary level as it will enable students to move from learners who rely on experts for knowledge to learners who can solve problems in real situations (Heard et al., 2025; Suleymanova, 2026).

With these global demands, however, many schools in Pakistan continue to focus on memorization and imparting knowledge rather than developing analytical abilities (Zaman et al., 2021; Jamil et

al., 2024). Research has been conducted in the region consistently shows that traditional teacher-centered learning methods which are used in classrooms are not effective enough in challenging students to think deeply and think for themselves (Hassan, 2020; Jamil et al., 2021). Moreover, although critical thinking has been given due consideration by the national education policies in Pakistan, the literacy of critical thinking in classrooms shows that there is still a long way to go in this area (Jamil et al., 2024).

One theoretical framework that has been used to analyze such pedagogical interactions is the Grasha-Riechmann model of teaching that classifies pedagogical interactions into five archetypes: Expert, Formal Authority, Personal Model, Facilitator, and Delegator (McLaughlin, 1996). Each style demonstrates the teacher's own way of facilitating the learning process, where it affects the emotional and intellectual atmosphere of the class (Sim & Mohd Matore, 2022). The "Expert" and "Formal Authority" styles have been suggested to impart basic knowledge which can set the tone for the "cool" emotional climate but may constraint student autonomy (McLaughlin, 1996; Sim & Mohd Matore, 2022). However, the blended model of "Facilitator" and "Delegator" helps to create a learning atmosphere in a collaborative way that involves students in critical thinking and reflecting on their learning process (Tulang et al., 2023).

The effectiveness of inquiry-based learning and interactive teaching methods in developing critical thinking skills is also confirmed by the latest evidence, which proves that these teaching methods are much more effective than traditional lectures in developing critical thinking skills (Suleymanova, 2026). In Pakistan, the latest research on instructional approaches has revealed that a teacher's role as a facilitator fostering collaborative learning, application of questioning, and the use of real-life problems has led to significant improvements in student analytical and problem-solving skills (Jamil et al., 2021). But the Pakistani school education system is ridden with systemic challenges, such as large class size, lack of teacher training, and high pressure on securing good summative assessment scores (Jamil et al., 2021; Jamil et al., 2024). Hence, this study seeks to fill the gap between policy and practice by examining the effect of these teaching styles on critical thinking ability of higher secondary level students in Punjab which can serve as evidence for pedagogical reform.

Research Methodology

Research Design

The design of this study is quantitative as well as cross-sectional survey research design, so as to examine the effect of teaching styles on the critical thinking of students in grade 12. For this research, a cross-sectional approach is fitting as it is the best way to collect data from a large, diverse population at one time and capture possible correlations between pedagogical variables and student cognitive outcomes (Gregar, 1994). Considering the aim of the study is to establish predictive relationships and to also compare group differences, this is a design that will enable the researcher to conduct strong inferential statistical analyses (Field, 2018).

Population and Sampling

The target population is 3,961, 12th standard students among whom 1,330 are male and 2,631 are female in three geographically distinct districts of Punjab namely Khanewal, Okara and Rawalpindi. A stratified random sampling technique was used for the findings to be representative and generalizable for the overall student population. A proportional stratification of the population was done based on district and gender so that each sub-group of the population is proportionately represented in the final sample (Lakens, 2022). A sample size of 351 participants selected based

on the statistical power required for the study to have a 95% confidence level and a 5% margin of error. Such stratified approach is crucial in reducing the selection bias and achieving the internal and external validity of the study as the three districts have different socioeconomic and educational settings (Etikan et al., 2016).

Instrumentation

Data were collected using two closed-ended survey instruments, with established validity. Students' perceptions of the five teaching styles (Expert, Formal Authority, Personal Model, Facilitator, Delegator) (Grasha, 1994) were measured using the Teaching Styles Inventory. This instrument was used because of the many applications in educational research in defining the emotional and intellectual climate of the classroom (Sim & Mohd Matore, 2022). Critical Thinking Disposition Instrument (Shin et al., 2015) were adapted and validated in the context of the study to assess proficiency in critical thinking skills from the students, with a focus on analysis, evaluation, and inference. These instruments were tested for their reliability in Pakistani context through pilot study and internal consistency. Cronbach alpha test value of the instrument was 0.70 considered as acceptable value for social science research (Taber, 2018).

Data Collection and Ethical Considerations

After obtaining ethical clearance and formal permissions from the relevant education authorities of Khanewal, Okara and Rawalpindi the survey was administered to the participants selected. The instruments administered via a carefully designed digital platform to maximize return and data quality; however, in-person administration was used in schools that have limited access to technology. The study was conducted without any coercion and with the utmost respect for proper ethical procedures, such as informed consent, anonymity, and the confidentiality of the data. These measures are essential to establish participants' confidence and promote the ethical clarity demanded for educational research (Bryman, 2016).

Data Analysis Plan

The data twere analyzed by SPSS following a hierarchical analysis process. Descriptive statistics (Mean, Frequency, Standard Deviation) was used initially to outline the existing pedagogical context and baseline level of critical thinking ability of the sampled districts. After that, multiple regression analysis was performed to determine the predictive power of the independent variables (teaching styles) with regard to the dependent variable (critical thinking). Lastly, a study aimed at meeting the demographic goals employed independent sample t-tests and one-way ANOVAs to test for any statistically significant differences in score on the critical thinking items between the gender and academic stream (Field, 2018).

Results

This section provides empirical results of the quantitative survey data. The data analysis was performed to find the relationship between perceived teaching styles and students' critical thinking skill among the 12th students in Khanewal, Okara and Rawalpindi.

Descriptive Statistics of Teaching Styles and Critical Thinking

The first phase of analysis was related to the perception of the main teaching styles by the students and the evaluation of critical thinking ability level. The style of teaching most perceived was the "Expert" as indicated in Table 1.

Table 1: *Descriptive Statistics for Teaching Styles and Critical Thinking (N=351)*

Variables	Mean (M)	Std. Deviation (SD)
Expert	4.12	0.65
Formal Authority	3.85	0.72
Personal Model	3.20	0.81
Facilitator	2.85	0.94
Delegator	2.45	0.98
Critical Thinking Score	3.12	0.78

Note: *Scale ranges from 1 (Strongly Disagree) to 5 (Strongly Agree).*

From the data, it is inferred that teacher centered classroom is the most reported one, and "Facilitator" and "Delegator" type of teachers had lower mean scores which indicates a pedagogical imbalance in the current higher secondary classroom environment.

Relationship between Teaching Styles and Critical Thinking

A multiple regression analysis was conducted to calculate the extent of the teaching styles' prediction of critical thinking. Table 2: Model Summary shows that the teaching styles significantly predict students' critical thinking skills ($p < .001$).

Table 2: *Multiple Regression Analysis Predicting Critical Thinking*

Predictor Variables	*β*	*t*	p
Expert	0.12	1.45	.148
Formal Authority	0.08	0.98	.327
Personal Model	0.22	2.65	.008
Facilitator	0.45	5.21	<.001
Delegator	0.38	4.12	<.001

Note: *R^2 = .42; Adjusted R^2 = .40.*

The Facilitator ($\beta = .45$) and Delegator ($\beta = .38$) styles have the highest positive standardized coefficient (β) for critical thinking skills. In contrast, the Expert and Formal Authority styles are not associated with student critical thinking outcomes.

Demographic Differences in Critical Thinking

Independent samples t-tests were used to compare critical thinking scores between males and females, and one-way ANOVA was used to compare critical thinking scores based on district of enrollment.

Table 3: *Analysis of Demographic Differences in Critical Thinking Scores (N=351)*

Demographic Variable	Category	n	Mean (M)	SD	*t*	p-value
Gender	Male	118	3.15	0.72	0.84	.401
	Female	233	3.10	0.81		
District	Khanewal	115	3.10	0.75	1.82	.164
	Okara	118	3.05	0.80		
	Rawalpindi	118	3.22	0.77		

The results of the critical thinking scores comparison between male and female students as presented in table 3 are not significant between the score of male students (M = 3.15) and the score of female students (M = 3.10) t = 0.84, p = .401. This indicates that gender is not a major factor in determining the level of critical thinking skills in the sampled population. Likewise, there were no statistically significant differences in the critical thinking scores of the three districts, Khanewal, Okara and Rawalpindi, F (2, 348) = 1.82, p = .164. Thus, in the context of this study, these results suggest that geographical location and gender identity have no significant role as predictors of the critical thinking skills of 12th-grade learners, which indicates the possible influence of pedagogical and systemic factors on critical thinking skills.

Discussion

The results of this study offer empirical evidence of the relationship between pedagogical styles and critical thinking development of the 12th grade students in Punjab. From the data, it will be seen that teaching with the style of "Expert" and "Formal Authority" is the most common teaching style in higher secondary classroom and it has the lowest effect on critical thinking of students. On the other hand, "Facilitator" and "Delegator" were considered as the most significant positive predictors of critical thinking ability. The results do support the Grasha-Riechmann model (1996) which holds that teacher-centred teaching is effective in transmitting information but it is not effective in facilitating higher-order thinking because it does not trigger the cognitive dissonance and active learning found in higher-order thinking (Sim & Mohd Matore, 2022).

The results indicate that in the sampled districts, the medium of instruction is education focused on written tests, which is a systemic dominance of transmissive teaching. The literature review indicates that standardized board exams are a major obstacle to the implementation of the student-centered approach to inquiry, with prior studies by Jamil et al. (2021) and Hassan (2020) suggesting that the pressure to score high in board exam is an obstacle. To cover the curriculum in limited time, teachers often find it convenient to have students in the 'Expert' role, so they do not require students to think about the content or concepts, but rather to regurgitate what they have been taught (Zaman et al., 2021). Based on our findings, it seems that even if teachers perceive the advantages of facilitative approaches to student learning, they might still be tempted to stick with the traditional approach until the assessment system encourages them to do so.

What's interesting about this study is that there were no statistically significant differences among the critical thinking of males or females, or by district. This finding of no gender difference in critical thinking skills does not align with some previous research which indicated that social conditioning could affect cognitive skills differently for men and women (Naseer et al., 2022). The findings, however, support the view that, if pedagogical conditions are relatively stable between classrooms, then educational factors have a larger influence on student outcomes than do individual demographic factors (Suleymanova, 2026). This uniformity in the districts also implies that pedagogical problems of reform are systemic and pervasive throughout all of Punjab and not localized to any administrative area.

In conclusion, these results have important policy and practice implications for the provincial education system. It is important to move away from teacher-centred training and professional development methods and focus on facilitative and delegative approaches in order to foster independent and critical thinking amongst students. As recommended by recent pedagogical literature, using these styles together can develop inclusive learning environments which are interactive and cognitively stimulating and better suited to the aims of the Single National Curriculum (SNC) (Farooqi et al., 2024). In the future, there is a need to reward teachers' change in role from information giver to facilitator of discovery, and to create an environment that supports their learners' cognitive flexibility in a rapidly changing global environment.

Conclusion

In this study it was aimed to analyze the relationship between teaching styles and the critical thinking abilities of class XII of districts Khanewal, Okara and Rawalpindi. The results show empirically that student autonomy-based pedagogical approaches (the Facilitator and Delegator styles) are most important factors explaining the development of critical thinking skills. On the other hand, the existing dominant styles of teaching in the schools of Punjab, the Expert and Formal Authority style, have a negligible effect on the development of higher order thinking skills. In addition, the non-significant difference between the genders and districts indicates the difficulties in developing critical thinking are not contextualized or limited to specific groups of students or districts. The most important finding in this research is that the current teacher-centered teaching methods prevent the attainment of the critical inquiry goals specified in national education policies.

Recommendations

Based on these findings the following recommendations are presented to improve pedagogical practice and cognitive outcomes related to students:

1. Provincial education department should develop comprehensive training programs based on facilitative and inquiry-based pedagogical techniques. Teachers need to be supported in moving from a role of information provider to the role of facilitator to guide students in collaborative problem-based learning.
2. For pedagogical change to be encouraged, assessment frameworks need to be changed to assess analytical reasoning, evaluation, and inference, and not rote memorization. To change classroom culture, the administration of board exams must support the objectives of the Single National Curriculum (SNC).
3. Assessment of curriculum materials should be undertaken and re-designed so that there are more open-ended real-life scenarios that involve active critical engagement. The integration of questions, analysis and synthesis of information should be explicit and regular in all academic streams and encouraged by students. School administrators should be encouraged to not be so

rigidly focused on transmissive teaching and make time and resources available for teachers to engage in small group or critical discussion, despite the large class size.

4. Additional longitudinal studies are suggested to see the long-term effects of facilitative teaching styles on students' outcomes. Further, qualitative research is required to investigate cultural and resource-based challenges to the teachers' efforts to depart from the traditional lecture-based approach.

Limitations of the Study

Although this study offers empirical evidence of the pedagogical picture in higher secondary schools of Punjab, a few limitations are highlighted to offer a balanced interpretation of the results of this study. First, the cross-sectional design only provides a snapshot of the relationship between teaching styles and critical thinking when they are measured at one point of time, making it impossible to ascertain directionality, so further longitudinal research is needed to explore the relationship between changes in pedagogical practice and longer-term changes in cognitive development. Second, student self-reported data is common in educational research, but is subjective and could be affected by the rapport or classroom environment between student and teacher, instead of being a purely objective representation of pedagogical archetypes. Third, the study included three different districts, but the results might not be applicable to other provinces in Pakistan where cultural norms and administrative practices vary in numerous ways. Finally, some other factors that could have a significant impact on teaching and learning practices were not included in this study, including: socioeconomic status, home learning environments, and specific constraints in the classroom (e.g., student-teacher ratios, classroom facilities). Therefore, these missing variables could account for part of the differences in critical thinking scores and the findings should be interpreted as a glimpse into the influence of pedagogy in a larger, more complex learning landscape.

Conflict of Interest

The authors showed no conflict of interest.

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