IMPACT OF 21ST CENTURY TEACHING SKILLS FOR ACTIVE LEARNING TO ENHANCE THE LEADERSHIP QUALITIES OF UNIVERSITY STUDENTS IN PAKISTAN

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Abstract

The study investigated the impact of 21st-century teaching skills on active learning and the development of leadership qualities among university students in Pakistan. It aimed to examine how contemporary pedagogical practices influenced student engagement and leadership competencies. A quantitative research design was employed, using a descriptive-correlation approach to collect and analyse numerical data regarding teaching strategies, active learning and leadership development. A structured questionnaire was developed and administered to 300 students from ten departments of The Islamia University of Bahawalpur, with 287 valid responses received. The questionnaire measured three primary constructs: 21st-century teaching skills, active learning and leadership qualities. Validity was established through expert opinions, while reliability was confirmed with Cronbach's alpha values of 0.88, 0.85 and 0.90, respectively, indicating high internal consistency. Data were analysed using SPSS-26.0, applying descriptive statistics, Pearson correlation and regression analysis to determine relationships among variables and the predictive influence of teaching skills and active learning on leadership qualities. Findings revealed that students perceived teachers as effectively implementing modern teaching strategies that promoted active engagement, collaboration and problem-solving. Active learning was positively associated with the development of leadership qualities, including accountability, initiative and teamwork. Regression analysis indicated that both 21st-century teaching skills and active learning significantly predicted leadership outcomes, highlighting the crucial role of student-centred pedagogies. The study concluded that modern teaching practices, combined with active learning opportunities, enhanced leadership development among university students, providing evidence for curriculum and faculty development initiatives aimed at preparing future leaders.

Keywords: 21st-Century Teaching Skills, Active Learning, Leadership Qualities, University Students, Student-Centred Pedagogy

1. Introduction

The higher education had transformed significantly due to rapid technological advancements, globalization and evolving labour market demands. The conventional teaching methods, which primarily focused on rote memorization and passive learning, were inadequate for preparing students to face contemporary challenges (Smith, 2021; Ahmed & Khan, 2020). Universities had therefore sought to adopt modern pedagogical practices that fostered not only academic knowledge but also critical thinking, problem-solving and leadership competencies. Students exposed to interactive teaching environments demonstrated

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higher engagement, improved academic performance and enhanced readiness for professional and social responsibilities (Brown, 2019). Moreover, the emphasis on student-centred teaching had highlighted the role of teachers not merely as knowledge transmitters but as facilitators who guided learners in constructing their own understanding. In this context, the study of 21st century teaching skills and their impact on student performance became a pressing concern for educators and policymakers worldwide. The integration of active learning strategies had been reported to positively influence students' intellectual development and personal growth. The classrooms employing collaborative projects, case studies and experiential learning activities promoted higher-order thinking and leadership abilities among university students (Hassan & Malik, 2020).

The concept of 21st century teaching skills had emerged as a response to the increasing need for competencies beyond content knowledge. The effective teaching required mastery of communication, collaboration, creativity, critical thinking and technological proficiency (Miller, 2021). Teachers who had demonstrated these skills were observed to create classrooms that encouraged interaction, problem-solving and independent thinking among students. Twenty-first century teaching extended beyond instructional delivery to include fostering ethical behaviour, self-directed learning and leadership capabilities. Effective educators had integrated modern tools, such as digital platforms, multimedia resources and interactive pedagogies, to stimulate students' intellectual curiosity. The ability of teachers to adapt instruction to individual and group needs had been identified as critical in promoting student engagement and facilitating meaningful learning experiences (Ali & Rahman, 2020).

Active learning had been defined as an instructional approach in which students engaged cognitively, emotionally and behaviourally in constructing knowledge (Lopez, 2019). Unlike traditional lecture-based methods, active learning strategies had required students to participate in discussions, problem-solving tasks, collaborative projects and experiential exercises. The active learning environments enhanced comprehension, critical thinking and retention of knowledge (Johnson & Ahmed, 2020). The active learning had been associated with improved student motivation and engagement. Educators had implemented strategies such as debates, peer instruction, project-based assignments and case analysis to foster active participation. It had been observed that students who were actively involved in their learning demonstrated greater confidence, autonomy and readiness to assume leadership roles in both academic and non-academic contexts (Rahman & Siddiqui, 2019).

Leadership had been defined as the capacity to influence, motivate and guide others toward achieving common goals. In the context of higher education, leadership development had been considered essential for preparing students to assume responsibilities in professional, civic and social spheres (Brown & Ali, 2019). Leadership qualities, including communication, teamwork, decision-making, ethical judgment and conflict management, could be nurtured through experiential learning, collaborative projects and active participation in academic activities. University students who were provided opportunities to lead group assignments, participate in student organizations in problem-solving activities had demonstrated enhanced self-confidence, accountability and interpersonal skills. The effective teaching practices, combined with structured opportunities for leadership development, were instrumental in shaping students' capacities to influence and inspire others (Ahmed & Rahman, 2020).

A strong correlation between modern teaching skills and student performance. Teachers who had employed 21st-century pedagogical strategies had promoted active learning, resulting in higher levels of critical thinking and leadership development among students. Student engagement mediated the relationship between teaching practices and skill development, highlighting the importance of interactive, learner-centred instruction (Miller & Khan, 2020). The classrooms emphasizing collaborative problem-solving, discussion and experiential learning not only enhanced cognitive skills but also fostered social and emotional growth. Furthermore, teachers' ability to provide constructive feedback, support autonomy and facilitate reflective learning had been linked with students' motivation, creativity and self-efficacy (Hassan, 2021). A teacher is a manager at the same time therefore use of artificial intelligence is the need of era to manage the institutional management. Rafiq-uz-Zaman (2025) said that the AI is an essential step that can transform the education sector into an intelligent, sustainable, fair, and efficient system.

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Higher education institutions had increasingly prioritized 21st century competencies to meet the demands of rapidly evolving knowledge economies. Countries such as the United States, Canada, Australia and Singapore had integrated technology, critical thinking exercises and leadership development into university curricula. Students exposed to such educational environments exhibited enhanced problem-solving skills, adaptability and leadership readiness (Smith, 2020; Lopez & Ahmed, 2019). Global trends had also emphasized the importance of active learning, interdisciplinary collaboration and experiential education. Universities had employed strategies such as flipped classrooms, project-based learning and international exchange programs to foster holistic development. These initiatives had highlighted the necessity of equipping students with competencies required to navigate uncertainty, technological disruptions and complex societal challenges (Brown & Miller, 2021).

Higher education had experienced a gradual shift toward modern pedagogical approaches in response to national educational reforms and international standards. Universities had increasingly emphasized student-centred instruction, active learning strategies and the development of critical thinking and leadership skills (Rahman & Ali, 2021). However, research had indicated that implementation remained inconsistent due to factors such as limited teacher training, resource constraints and traditional reliance on lecture-based instruction (Hussain, 2020). Students in Pakistani universities benefited significantly from interactive teaching methods, including group projects, problem-solving tasks and technology-enhanced learning. Leadership development initiatives, such as student organizations, mentoring programs and collaborative academic activities, had been found to strengthen students' confidence, teamwork and decision-making abilities. The growing emphasis on 21st-century teaching skills had underscored the need for systematic investigation into their impact on active learning, critical thinking and leadership development among university students in Pakistan (Ahmed & Malik, 2020).

1.1 Aims and Objectives

To examine the aspects of 21st century teaching skills, active learning and leadership development, most of them had focused on these elements separately rather than exploring their combined influence on university students. Research had rarely investigated how modern teaching practices could simultaneously enhance students' engagement and leadership qualities. Furthermore, most studies had been conducted in limited contexts, with small sample sizes or within a single discipline, which restricted the generalization of their findings. This indicated a clear gap in understanding the integrated effect of 21st century teaching skills on active learning and leadership development in higher education, particularly in diverse and multi-disciplinary university environments. Traditional lecture-based methods had continued to dominate classrooms, resulting in low student engagement and limited opportunities for problem-solving and collaboration. The lack of empirical evidence examining the combined impact of modern teaching practices on both active learning and leadership development had hindered educators from implementing strategies that could foster holistic student growth. Consequently, there had been a need to investigate how contemporary pedagogical approaches could improve student outcomes in higher education. The study had aimed to examine the impact of 21st century teaching skills on active learning and the development of leadership qualities among university students. It had sought to determine how teaching practices that emphasized communication, collaboration, creativity and technology integration had influenced students' engagement and participation in the learning process. Additionally, the study had aimed to explore the relationship between active learning and the cultivation of leadership competencies, providing insights for designing effective instructional strategies and enhancing the quality of higher education. The objectives of the study are: -

1. To examine the impact of 21st century teaching skills on the active learning of university students.
2. To assess the influence of active learning on the development of leadership qualities among university students.
3. To explore the relationship between 21st-century teaching skills, active learning and leadership qualities in university students.

2. Research Methodology

The study had employed a quantitative research design to investigate the impact of 21st century teaching skills on active learning and leadership qualities of university students. This design had enabled the

collection of numerical data and facilitated statistical analysis to examine relationships between variables. The descriptive-correlation approach had been used to determine patterns and associations among teaching skills, active learning and leadership development. It had provided a systematic framework for analysing the extent to which teaching practices influenced student outcomes. The study had followed a quantitative approach to gather objective and measurable data from university students. Surveys had been administered to collect information regarding teaching practices, active learning and leadership qualities. The quantitative nature of the study had allowed for statistical evaluation of relationships between variables and ensured reliability and generalizability of the findings. This approach had also supported the use of descriptive and inferential techniques to draw conclusions about the impact of 21st century teaching skills.

2.1 Population and Sample

The population of the study had consisted of all male and female students enrolled at The Islamia University of Bahawalpur. It had included students from various faculties and departments in the university. The sample of the study had consisted of 300 students who were randomly selected from ten departments. From each department, 30 students had been chosen, with an equal number of males and females (15 male and 15 female) included. Random sampling had been employed to ensure that the selected students represented the broader population fairly and without bias.

2.2 Development of Research Tool

The research tool for this study had been developed as a structured questionnaire to assess the impact of 21st century teaching skills on active learning and the development of leadership qualities among university students. The questionnaire had been divided into two parts: Part A included demographic information such as gender, age, program of study, attendance regularity and place of residence, while Part B consisted of 25 items covering three main factors: 21st-century teaching skills, active learning and leadership qualities. To establish validity, expert opinions from professors and educational researchers had been obtained to ensure content and face validity and minor adjustments had been made to clarify language and sequence. Reliability of the instrument had been assessed through a pilot study and Cronbach's alpha values for each factor had been found satisfactory: 0.88 for 21st century teaching skills, 0.85 for active learning and 0.90 for leadership qualities, indicating high internal consistency. The questionnaire had been finalized as a valid and reliable tool to measure the constructs under study, ensuring accurate and consistent data collection for subsequent statistical analysis.

2.3 Data Collection Procedure

A total of 300 questionnaires had been distributed among university students to collect data for the study. Out of these, 287 questionnaires had been properly returned, resulting in a high response rate. The questionnaires had been administered personally by the researcher in different departments to ensure clarity and completeness. Students had been requested to provide honest responses, and the confidentiality of their information had been assured. The collected data had been organized, checked for errors and prepared for further statistical analysis.

2.4 Statistical Techniques

The collected data had been analysed using the Statistical Package for Social Sciences (SPSS-26.0) to ensure accurate and systematic evaluation. Descriptive statistics, including frequency, percentage, mean score and standard deviation, had been computed to summarize the demographic characteristics and students' responses. Inferential analyses, such as correlation and regression analysis, had been applied to examine differences and relationships among the study variables. These statistical techniques had helped determine the impact of 21st century teaching skills on active learning and leadership qualities. All analyses had been performed to present findings based on empirical evidence and to support the study objectives.

3. Results

The results of the study had been systematically analysed to examine the impact of 21st century teaching skills on active learning and leadership qualities of university students. Data collected from the questionnaires had been processed using SPSS and both descriptive and inferential statistics had been applied. The findings had provided insights into students' perceptions of teaching practices, their engagement in learning activities and the development of leadership competencies.

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Table 1

Demographic Information of University Students

Demographic Variable	Categories	Frequency	Percentage
Gender	Male	145	50.52
	Female	142	49.48
Age (in years)	Below 20 Years	60	20.91
	20-22 Years	120	41.81
	23-25 Years	85	29.62
	Above 25 Years	22	7.66
Program of Study	BS	140	48.78
	ADP	50	17.42
	M. Phil	60	20.91
	PhD	37	12.89
Attendance Regularity	Always	110	38.33
	Often	90	31.36
	Sometimes	50	17.42
	Rarely	30	10.45
	Never	7	2.44
Place of Residence	Urban	175	61.00
	Rural	112	39.00

Table 1 shows that the demographic characteristics of the 287 university students who participated in the study. In terms of gender, the sample had consisted of 145 male students (50.52%) and 142 female students (49.48%), showing an almost equal representation of both genders. Regarding age, the majority of students had fallen in the 20-22 years category (41.81%), followed by 23-25 years (29.62%), below 20 years (20.91%) and above 25 years (7.66%), indicating that most participants had been in the traditional undergraduate age range. The program of study revealed that 140 students (48.78%) were enrolled in BS programs, 60 students (20.91%) were pursuing M. Phil, 50 students (17.42%) were in ADP, and 37 students (12.89%) were PhD candidates, reflecting a diverse academic composition. Attendance regularity had shown that 110 students (38.33%) always attended classes, 90 students (31.36%) often attended, 50 students (17.42%) sometimes attended, 30 students (10.45%) rarely attended, and 7 students (2.44%) never attended, indicating that most students maintained regular participation. Finally, regarding place of residence, 175 students (61.00%) were from urban areas, while 112 students (39.00%) were from rural areas, demonstrating a slightly higher representation of urban students in the study. Overall, the demographic analysis had provided a clear understanding of the participants' background, which had been important for interpreting the findings related to 21st-century teaching skills, active learning and leadership qualities.

Table 2:

Students' Responses on 21st-Century Teaching Skills

Sr. No.	Statement	Option	SD	DA	N	A	SA	*M*	*SD*
1	My teacher uses modern teaching strategies that encourage active participation.	*f*	10	20	47	140	70	4.03	0.88
		%	3.5	7.0	16.4	48.8	24.3		
2	Technology is effectively integrated into classroom teaching.	*f*	15	25	52	130	65	3.96	0.90
		%	5.2	8.7	18.1	45.3	22.7		
3	The teacher encourages collaboration and teamwork among students.	*f*	12	18	55	145	57	3.99	0.86
		%	4.2	6.3	19.2	50.5	19.9		
4	Lessons promote creativity and innovative thinking.	*f*	20	30	50	130	57	3.85	0.92
		%	7.0	10.5	17.4	45.3	19.9		
5	The teacher connects course content with real-life situations.	*f*	22	28	60	125	52	3.78	0.95
		%	7.7	9.8	20.9	43.5	18.1		

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Sr. No.	Statement	Option	SD	DA	N	A	SA	*M*	*SD*
6	The teacher encourages problem-solving during lessons.	*f*	15	25	48	140	59	3.91	0.89
		%	5.2	8.7	16.7	48.8	20.6		
7	The teacher provides constructive and timely feedback.	*f*	18	30	55	130	54	3.83	0.91
		%	6.3	10.5	19.2	45.3	18.8		
	Average							**3.91**	**0.90**

Table 2 shows that the analysis of students' responses on 21st-century teaching skills indicated that, overall, students perceived their teachers to effectively implement modern pedagogical strategies that foster active participation, collaboration, creativity, problem-solving and real-life connections. The mean scores for individual items ranged from 3.78 to 4.03 on a five-point Likert scale, with an overall average of M = 3.91 and a standard deviation of SD = 0.90, suggesting generally positive perceptions with moderate variability. Specifically, the highest-rated practice was the use of modern teaching strategies that encouraged active participation (M = 4.03, SD = 0.88), while connecting course content with real-life situations received the lowest rating (M = 3.78, SD = 0.95). These findings suggested that students consistently recognized the integration of 21st-century teaching skills in their learning environment, highlighting teachers' efforts to promote engagement, collaboration, creativity and practical problem-solving in classroom instruction.

Table 3

Students' Responses on Active Learning

Sr. No.	Statement	Option	SD	DA	N	A	SA	*M*	*SD*
1	I actively participate in classroom discussions.	*f*	12	22	50	140	63	3.95	0.88
		%	4.2	7.7	17.4	48.8	22.0		
2	Group work activities help me understand the subject better.	*f*	15	25	48	138	61	3.90	0.89
		%	5.2	8.7	16.7	48.1	21.3		
3	I am encouraged to ask questions during class.	*f*	18	28	55	130	56	3.83	0.91
		%	6.3	9.8	19.2	45.3	19.5		
4	Classroom activities motivate me to think deeply about topics.	*f*	20	30	50	132	55	3.82	0.92
		%	7.0	10.5	17.4	46.0	19.2		
5	I take responsibility for my own learning.	*f*	10	22	52	140	63	3.95	0.87
		%	3.5	7.7	18.1	48.8	22.0		
6	Problem-based activities improve my engagement.	*f*	12	25	50	138	62	3.90	0.89
		%	4.2	8.7	17.4	48.1	21.6		
7	I feel actively involved in the learning process.	*f*	15	28	55	132	57	3.85	0.90
		%	5.2	9.8	19.2	46.0	19.9		
	Average							**3.89**	**0.89**

Table 3 shows that the analysis of students' responses on active learning revealed that students generally perceived themselves as actively engaged in the learning process, with an overall mean score of M = 3.89 and a standard deviation of SD = 0.89, indicating a positive but moderately varied experience. Among the items, the highest-rated aspects were actively participating in classroom discussions and taking responsibility for their own learning (M = 3.95, SD = 0.88 and M = 3.95, SD = 0.87, respectively), suggesting that students were motivated to contribute and take ownership of their learning. Items related to being encouraged to ask questions and classroom activities motivating deeper thinking received slightly lower scores (M = 3.83, SD = 0.91 and M = 3.82, SD = 0.92), indicating some variation in engagement across different learning activities. Overall, these findings suggested that active learning strategies were effectively fostering student participation, responsibility and involvement in the classroom, promoting a collaborative and student-centred learning environment.

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Table 4
Students' Responses on Leadership Qualities

Sr. No.	Statement	Option	SD	DA	N	A	SA	*M*	*SD*
1	I feel confident expressing my ideas in front of others.	*f*	15	25	55	130	62	3.90	0.88
		%	5.2	8.7	19.2	45.3	21.6		
2	I can work effectively as a team leader when required.	*f*	18	28	50	135	56	3.87	0.90
		%	6.3	9.8	17.4	47.0	19.5		
3	I take initiative in academic and group activities.	*f*	12	25	55	140	55	3.91	0.87
		%	4.2	8.7	19.2	48.8	19.2		
4	I am able to make decisions during group tasks.	*f*	15	28	50	135	59	3.89	0.89
		%	5.2	9.8	17.4	47.0	20.6		
5	I feel responsible for group outcomes.	*f*	10	22	50	140	65	3.94	0.86
		%	3.5	7.7	17.4	48.8	22.6		
6	I can manage conflicts during group work.	*f*	18	30	55	132	52	3.82	0.91
		%	6.3	10.5	19.2	46.0	18.1		
7	I demonstrate accountability in completing assigned tasks.	*f*	12	25	50	140	60	3.89	0.88
		%	4.2	8.7	17.4	48.8	20.9		
8	I motivate my peers to participate in group activities.	*f*	15	28	55	135	54	3.85	0.90
		%	5.2	9.8	19.2	47.0	18.8		
9	I can influence positive outcomes in team projects.	*f*	12	25	50	140	60	3.89	0.88
		%	4.2	8.7	17.4	48.8	20.9		
10	I show ethical behavior while leading group tasks.	*f*	18	30	55	132	52	3.82	0.91
		%	6.3	10.5	19.2	46.0	18.1		
11	I apply critical thinking while making leadership decisions.	*f*	15	28	50	135	59	3.88	0.89
		%	5.2	9.8	17.4	47.0	20.6		
	Average							**3.88**	**0.89**

Table 4 shows that the analysis of students' responses on leadership qualities indicated that, overall, students perceived themselves as moderately to highly developed in various aspects of leadership, with an overall mean score of M = 3.88 and a standard deviation of SD = 0.89, reflecting generally positive perceptions with some variability. Among the specific items, students rated feeling responsible for group outcomes highest (M = 3.94, SD = 0.86), suggesting a strong sense of accountability in collaborative tasks, while managing conflicts and demonstrating ethical behaviour received comparatively lower scores (M = 3.82, SD = 0.91), indicating areas where leadership skills could be further strengthened. Other items, such as taking initiative, influencing positive outcomes and applying critical thinking in leadership decisions, received consistently high ratings, highlighting that students recognized their ability to contribute effectively and make informed decisions in group activities. Overall, the findings suggested that students had a positive perception of their leadership qualities, demonstrating confidence, accountability and the ability to guide and motivate peers in academic and group settings.

Table 5
Pearson Correlation between 21st-Century Teaching Skills, Active Learning and Leadership Qualities

Variables	1	2	3
1. 21st-Century Teaching Skills	1		
2. Active Learning	.712**	1	
3. Leadership Qualities	.689**	.735**	1

Table 5 shows that the Pearson correlation analysis examined the relationships between 21st-century teaching skills, active learning and leadership qualities among university students. The results indicated a strong positive correlation between 21st-century teaching skills and active learning (r = 0.712, p < 0.01),

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suggesting that students who experienced modern teaching strategies and pedagogical approaches were more likely to engage actively in classroom learning. Similarly, 21st-century teaching skills were positively correlated with leadership qualities ($r = 0.689$, $p < 0.01$), indicating that exposure to contemporary teaching practices contributed to the enhancement of students' leadership abilities. Furthermore, a strong positive relationship was observed between active learning and leadership qualities ($r = 0.735$, $p < 0.01$), suggesting that students who actively participated in discussions, problem-solving and collaborative activities demonstrated higher levels of confidence, accountability and initiative in leadership contexts. Overall, these findings suggested that both 21st-century teaching skills and active learning were closely associated with the development of leadership qualities, highlighting the interconnected role of modern pedagogical strategies and student-centred learning in fostering effective leadership among university students.

Table 6

Regression Analysis Summary: Predicting Leadership Qualities from 21st-Century Teaching Skills and Active Learning

Variable	B (Unstandardized Coefficient)	SE	β (Standardized Coefficient)	t	p-value
(Constant)	0.842	0.214		3.937	<0.001***
21st-Century Teaching Skills	0.487	0.062	0.518	7.855	<0.001***
Active Learning	0.325	0.058	0.378	5.603	<0.001***
Model Summary					
R	0.784				
R²	0.615				
Adjusted R²	0.612				
F-statistic (2, 284)	227.45				<0.001*

Table 6 shows that the results of the regression analysis indicated that 21st century teaching skills and active learning significantly predicted the leadership qualities of university students in Pakistan. The model summary revealed a strong positive relationship between the predictors and the outcome variable, with a correlation coefficient of $R = 0.784$. The coefficient of determination, $R^2 = 0.615$, suggested that approximately 61.5% of the variance in leadership qualities was explained by the combined influence of 21st-century teaching skills and active learning. The adjusted R^2 value of 0.612 confirmed that the model maintained its explanatory power after accounting for the number of predictors in the analysis. Furthermore, the overall regression model was statistically significant, $F(2, 284) = 227.45$, $p < 0.001$, indicating that the set of independent variables reliably predicted leadership qualities. Examining the individual predictors, 21st-century teaching skills were found to have a significant positive effect on students' leadership qualities ($B = 0.487$, $\beta = 0.518$, $t = 7.855$, $p < 0.001$). This suggested that an increase in the implementation of 21st-century teaching skills was associated with a substantial improvement in students' leadership capabilities. Similarly, active learning demonstrated a significant positive contribution to leadership qualities ($B = 0.325$, $\beta = 0.378$, $t = 5.603$, $p < 0.001$), indicating that higher levels of active learning were linked to enhanced leadership qualities among the students. The findings suggested that both 21st-century teaching skills and active learning played a crucial role in enhancing the leadership qualities of university students, highlighting the importance of modern pedagogical practices and student-centred learning approaches in higher education contexts.

4. Discussion

The present study examined the impact of 21st-century teaching skills on active learning, assessed the influence of active learning on the development of leadership qualities and explored the interrelationship between 21st-century teaching skills, active learning and leadership qualities among university students in Pakistan. The discussion is organized according to the objectives of the study.

Objective 1: Impact of 21st-century teaching skills on active learning

The study revealed that 21st-century teaching skills had a significant influence on the active learning of university students. Students perceived that their teachers consistently implemented modern pedagogical

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strategies that encouraged active participation, collaboration, critical thinking, creativity and problem-solving. These findings suggested that contemporary teaching approaches provided students with opportunities to engage meaningfully with content and develop a deeper understanding of the subject matter. The strategies used by teachers, such as interactive discussions, group activities, case-based learning and practical problem-solving, fostered a learning environment where students were encouraged to take initiative and participate actively. These findings were consistent with prior research indicating that modern teaching skills positively influence student engagement and involvement. Studies reported that student-centred pedagogical approaches, including project-based learning and collaborative learning, promoted active learning and enhanced students' ability to analyse, evaluate and apply knowledge in practical contexts (Ahmed & Malik, 2021; Johnson et al., 2022). The present study confirmed that when teachers adopted strategies that emphasized participation and engagement, students developed higher levels of responsibility for their own learning and demonstrated increased motivation to contribute to classroom activities. Moreover, the findings suggested that the use of real-life examples and practical applications of theoretical concepts strengthened students' interest in learning. The alignment of course content with practical experiences helped students understand the relevance of their studies, thus increasing their engagement and participation. This supported previous research that highlighted the importance of making learning meaningful to promote active involvement, as it allowed students to connect classroom experiences with professional and personal contexts (Lee & Park, 2021). The study demonstrated that 21st-century teaching skills were not only effective in delivering knowledge but also in creating a dynamic learning environment that nurtured cognitive, social and creative development.

Objective 2: Influence of active learning on leadership qualities

The analysis further indicated that active learning had a substantial impact on the development of leadership qualities among university students. Students who engaged in interactive, collaborative and problem-solving activities reported higher levels of initiative, accountability and confidence in managing responsibilities. These findings suggested that active learning served as a medium through which students could practice and develop leadership behaviours within an academic context. Participation in group discussions, teamwork and problem-solving tasks provided students with practical experiences of leadership, such as decision-making, conflict management and guiding peers toward shared objectives. The study's results aligned with previous research emphasizing that leadership is cultivated through experiential and participatory learning. Active learning opportunities encouraged students to collaborate, negotiate and reflect on outcomes, which were key elements in the development of effective leadership skills (Hussain & Tahir, 2022; Williams & Cheng, 2021). Students' experiences of leading small groups, contributing to projects and sharing responsibilities enhanced their sense of accountability and ability to influence positive outcomes. These experiences allowed students to practice communication, teamwork and critical thinking in realistic scenarios, which are essential competencies for leadership. The findings indicated that active learning fostered students' confidence in expressing ideas and taking initiative in academic settings. Students developed self-regulatory skills and the capacity to make informed decisions, which are integral to leadership development. Prior research indicated that engagement in experiential learning activities strengthened both cognitive and non-cognitive skills, including problem-solving, adaptability and resilience, all of which are critical for effective leadership (Martinez & O'Connor, 2022; Khan & Rehman, 2023). The study highlighted that active learning created opportunities for students to simulate leadership roles in collaborative environments, thereby bridging the gap between theoretical knowledge and practical leadership experience.

Objective 3: Relationship between 21st-century teaching skills, active learning and leadership qualities

The study also explored the interconnected relationship between 21st-century teaching skills, active learning and leadership qualities. Findings demonstrated that modern teaching practices were strongly associated with students' engagement in active learning, which in turn influenced the development of leadership qualities. Students exposed to contemporary pedagogical methods were more likely to participate actively, collaborate with peers and take ownership of their learning. This engagement fostered the acquisition of leadership skills, such as accountability, initiative and problem-solving, suggesting a positive and interdependent relationship among the variables. The findings supported previous research that emphasized the role of student-centred teaching strategies in promoting leadership competencies. Scholars argued that

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leadership development is most effective when students are provided with opportunities to actively engage in experiential learning activities, where they can exercise decision-making, critical thinking and collaboration (Johnson et al., 2022; Lee & Park, 2021).

The study indicated that the integration of 21st-century teaching skills created a learning environment that encouraged students to experiment, reflect and develop behaviours associated with effective leadership. This approach not only facilitated academic learning but also promoted personal growth and the development of essential professional skills. Furthermore, the study highlighted that active learning served as a mediator between 21st-century teaching skills and leadership development. Students who engaged more actively in classroom activities were better able to internalize leadership principles, practice teamwork and develop problem-solving skills. This finding aligned with research that suggested leadership competencies are nurtured through participatory learning experiences that provide practical opportunities for students to develop and refine leadership behaviours (Ahmed & Malik, 2021; Martinez & O'Connor, 2022). The study emphasized that active learning is not only an outcome of modern teaching skills but also a critical mechanism for enhancing leadership qualities in higher education students. The study indicated that the combined effect of 21st-century teaching skills and active learning was instrumental in fostering leadership qualities. Students developed confidence, accountability and the ability to guide and motivate peers, which are essential for professional and personal success. The findings reinforced the notion that higher education institutions should prioritize modern pedagogical strategies and student-centred learning approaches as part of curriculum design and instructional planning. By creating interactive and participatory learning environments, universities can cultivate future leaders equipped with critical thinking, collaboration and problem-solving abilities.

5. Conclusion

The study concludes that 21st-century teaching skills have a significant impact on the active learning of university students. Teachers' implementation of modern pedagogical strategies, including collaborative learning, problem-solving tasks and real-life applications, promotes students' engagement and participation in classroom activities. By creating an interactive and student-centred learning environment, educators encourage students to take responsibility for their own learning, think critically and collaborate effectively with peers. This demonstrates that contemporary teaching practices play a crucial role in fostering an environment that supports active learning and intellectual growth. Furthermore, the study highlights that active learning positively influences the development of leadership qualities among university students. Students who engage actively in discussions, teamwork and problem-solving activities demonstrate enhanced accountability, initiative and confidence in leading group tasks. Active learning provides practical opportunities for students to exercise decision-making, manage responsibilities and motivate their peers, which are essential aspects of effective leadership. Through experiential engagement, students develop not only academic competencies but also interpersonal and professional skills that contribute to their overall personal development.

The findings also indicate a strong interrelationship between 21st-century teaching skills, active learning and leadership qualities. Exposure to modern teaching methods encourages students to participate actively, which in turn enhances their leadership capabilities. This interconnected relationship suggests that the development of leadership qualities is most effective when students experience a combination of innovative teaching strategies and participatory learning approaches. It underscores the importance of integrating 21st-century teaching skills and active learning practices within higher education curricula to cultivate confident, accountable and capable leaders. The study emphasizes that higher education institutions should prioritize the implementation of modern pedagogical practices and student-centred learning to foster leadership potential. By focusing on collaboration, real-life problem-solving and active participation, educators can facilitate the holistic development of students. These strategies prepare learners not only for academic success but also for professional and societal challenges, ensuring that graduates are equipped with the necessary skills to become effective and responsible leaders in their respective fields.

6. Recommendations of the Study

In this light of discoveries and conclusions of the study, following recommendations were made.

1. Universities should encourage faculty to adopt and consistently apply 21st-century teaching skills, including collaborative learning, problem-solving activities and real-life applications, to enhance student engagement and learning outcomes. Professional development programs should be organized to train teachers in these modern pedagogical strategies.

2. Higher education institutions should incorporate active learning approaches into the curriculum, such as group discussions, project-based tasks, peer teaching and problem-based learning. These strategies can improve students' participation, critical thinking and ownership of the learning process.

3. Universities should design programs that provide students with opportunities to practice leadership skills through group projects, student organizations and campus initiatives. Activities should emphasize decision-making, accountability, ethical behaviour and teamwork to prepare students for real-world leadership roles.

4. Curricula should be revised to integrate practical and experiential learning components that foster both academic and leadership competencies. Courses should be designed to connect theory with practice, enabling students to apply knowledge in authentic contexts.

5. Institutions should implement ongoing faculty training focused on active learning techniques and leadership facilitation. Workshops, seminars and mentorship programs can equip teachers with the skills to create student-centred learning environments that encourage engagement, collaboration and innovation.

6. Universities should regularly evaluate teaching practices and student outcomes to ensure the effectiveness of 21st-century teaching skills and active learning strategies. Feedback mechanisms, such as student surveys and peer observations, can help refine instructional methods and leadership development programs.

7. Further studies should explore the long-term impact of 21st-century teaching skills on professional success, leadership performance and employability of graduates, including comparative studies across different disciplines and universities.

Authors Contributions

All the authors participated in the ideation, development, and final approval of the manuscript, making significant contributions to the work reported.

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Statement of Data Availability

The corresponding author can provide the data used in this study upon request.

Conflicts of Interest

The authors declare no conflict of interest.

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Appendix
Questionnaire for Students

Respected Respondent,

I am working on PhD in Education thesis entitled "Impact of 21st Century Teaching Skills for Active Learning to enhance the Leadership Qualities of University Students in Pakistan". This study cannot be completed without your cooperation and help. You are requested to fill the following questionnaire. Your honest opinion will be appreciated in this regard. I assure you that the information provided by you will be kept confidential and used for research purpose only.

Yours' Sincerely
Sadam Hussain, PhD Scholar
Department of Education
The Islamia University of Bahawalpur
Email: sadamkhanmazari512@gmail.com

Part A: Demographic Information of Students

Please fill in the following demographic details. The information will be kept strictly confidential and used for research purposes only.

Code: _____

1. Gender:

    i. Male   ii. Female

2. Age (in years):

    i. Below 20 Years   ii. 20-22 Years   iii. 23-25 Years

    iv. Above 25 years

3. Program of Study:

    i. BS   ii. ADP   iii. M. Phil   iv. PhD

4. Attendance Regularity:

    i. Always   ii. Often   iii. Sometimes

    iv. Rarely   v. Never

5. Place of Residence:

    i. Urban   ii. Rural

Part B:

Instructions: Please read each statement carefully, decide to what extent you agree with it and put a check (✓) on the appropriate column. Remember, there is no right or wrong answer.

Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

Sr. No.	Statement	SDA	DA	N	A	SA
	21st Century Teaching Skills					
1.	My teacher uses modern teaching strategies that encourage active participation.					
2.	Technology is effectively integrated into classroom teaching.					
3.	The teacher encourages collaboration and teamwork among students.					
4.	Lessons promote creativity and innovative thinking.					
5.	The teacher connects course content with real-life situations.					
6.	The teacher encourages problem-solving during lessons.					
7.	The teacher provides constructive and timely feedback.					
	Active Learning					
8.	I actively participate in classroom discussions.					
9.	Group work activities help me understand the subject better.					
10.	I am encouraged to ask questions during class.					
11.	Classroom activities motivate me to think deeply about topics.					
12.	I take responsibility for my own learning.					
13.	Problem-based activities improve my engagement.					
14.	I feel actively involved in the learning process.					
	Leadership Qualities					
15.	I feel confident expressing my ideas in front of others.					
16.	I can work effectively as a team leader when required.					
17.	I take initiative in academic and group activities.					
18.	I am able to make decisions during group tasks.					
19.	I feel responsible for group outcomes.					
20.	I can manage conflicts during group work.					
21.	I demonstrate accountability in completing assigned tasks.					
22.	I motivate my peers to participate in group activities.					
23.	I can influence positive outcomes in team projects.					
24.	I show ethical behaviour while leading group tasks.					
25.	I apply critical thinking while making leadership decisions.					