Revolutionizing Political Education in Pakistan: An AI-Integrated Approach

Muhammad Saqlain*

Department of Mathematics, Faculty of Science, King Mongkut's University of Technology Thonburi, 10140 Bangkok, Thailand

* Correspondence: Muhammad Saqlain (muhammad.saql@kmutt.ac.th)

Abstract: The efficacy of political education is pivotal in developing critical thinkers and informed citizens. Traditional methods, however, face challenges such as low engagement, accessibility issues, slow adaptation to changes, and underutilization of technological advancements. This research investigates the transformative impact of integrating Artificial Intelligence (AI) and cutting-edge design strategies into political education courses at Pakistani universities. The study adopts a methodological approach that synergizes AI-based network media with traditional educational practices, subsequently evaluating the implementation's outcomes through empirical data. The integration of AI into the educational framework has shown remarkable results: a 57% increase in the rate of education post-implementation, a 71% satisfaction rate among students regarding their learning experience, and a political accomplishment (PA) score of 81 ± 4. These metrics indicate a substantial enhancement in the quality of political education. The research underscores the potency of AI-supported communication coaching in elevating political education standards, thereby nurturing political and ideological competencies among students. This modernization, characterized by dynamic, interactive, and globally accessible learning experiences, promises to redefine political education. It effectively dismantles historical barriers, equipping individuals to navigate the complexities of the contemporary geopolitical landscape.

Keywords: Artificial Intelligence; Geopolitical environment; Political Courses; Communications; Political accomplishment

1. Introduction

In Pakistani Universities, political education is extremely important because it provides the foundation for producing future leaders and knowledgeable citizens within the complex socio-political framework of the country. These classes are essential for promoting civic engagement and awareness because they give students the critical thinking abilities needed to evaluate political trends. Tolerance, pluralism, and a wider grasp of national and global viewpoints are encouraged by political education in a nation with a diverse population and a complicated geopolitical environment. Additionally, it prepares students for civic leadership responsibilities by laying the groundwork for understanding governance and ethical leadership. It is impossible to overestimate the significance of political education in universities as Pakistan navigates the opportunities and difficulties of the twenty-first century. It provides a means of developing a citizenry capable of making constructive contributions to the democratic process and advancement of the country. University students are essential to the socialist construction process because of their high professional caliber and knowledge (Li, 2018). The cultivation of intellectual and moral attributes in university students is highly valuable. University-mandated Political Courses play a major role in developing university students' political accomplishment and moral values (Cao, 2020). A successful PC guides the psychological growth of university students and promotes the right political and lifestyle decisions by having a favorable impact on their worldview, life perspective, and moral orientation. This helps to foster general societal growth and the construction of a harmonious society (Johnson & Ferguson Jr, 2018; Men, 2021).

University students' academic performance and the practical benefits of PC are improved by a variety of enhanced classroom learning strategies (Haq & Saqlain, 2023; Van der Linden et al., 2021) efficient learning

models (Zulqarnain & Saqlain, 2023), and feedback systems (Li, 2020; Saqlain, 2023). The most common PC learning technique is still offline classroom instruction, but online network instruction based on Artificial Intelligence (AI) is becoming more and more common, especially in response to the ongoing COVID-19 epidemic (Chen, 2020; Hofer et al., 2021; Mishra et al., 2020). While online learning requires a great deal of self-control on the part of students, learning outcomes may be impacted by the lack of monitoring and little teacher-student interaction (Albrahim, 2020). Enhancing and innovating virtual learning environments have practical importance. University students' interest in learning can be piqued and their ability to acquire PC knowledge on their own can be fostered by diversifying PC communication channels (González-González et al., 2020; Van der Spoel et al., 2020). Students' academic performance and PA are improved by additional PC learning via television shows and multimedia networks (Yuan, 2020; Zhu, 2020).

Political science courses are crucial for producing knowledgeable and involved citizens because they give students the mental skills necessary to understand, evaluate, and actively engage in the complicated world of political ideologies and institutions. Recent research has improved the effectiveness of political education by utilizing state-of-the-art technologies, particularly Convolutional Neural Networks (CNN) and deep learning techniques (Van der Spoel et al., 2020; Yuan, 2020; Zhu, 2020). With the use of these sophisticated computer techniques, large datasets can be analyzed, and complex patterns and insights may be extracted from speeches, political literature, and social media (Abid & Saqlain, 2023; Khan et al., 2020). Research using CNN, for example, has shown impressive results in sentiment analysis, following dynamics of public opinion, and identifying important patterns in political debate (Valueva et al., 2020). Deep learning techniques can create complex models for comprehending political ideas and forecasting election results because of their capacity to handle complex data structures (Dhillon & Verma, 2020; Han et al., 2020). Researchers hope to transform political education by utilizing these method advances to create a more responsive and dynamic learning environment that keeps up with the complexity of today's political environments (Jha et al., 2020).

Convolutional neural networks (CNNs), one of the deep learning algorithms, are useful for feature extraction, dimension reduction, and performance prediction (Niu et al., 2021; Yao, 2022; Zhao & Yuan, 2022). Online teaching was quickly adopted for political education in response to the COVID-19 pandemic's challenges. Like universities everywhere else, Pakistani universities have embraced digital platforms and integrated cutting-edge technologies like deep learning techniques and Artificial Intelligence (Jiang, 2021; Lapitan Jr et al., 2021). This shift allowed for continuous political education by utilizing Convolutional Neural Networks (CNN) to improve the interpretation of virtual data (Cutri et al., 2020). In addition to mitigating interruptions, the incorporation of these technologies highlights a wider tendency towards inventive pedagogical methods, signifying a revolutionary change in the online political education environment within the pandemic (Tartavulea et al., 2020). Many other machine learning approaches has been adopted by (Saqlain et al., 2023a; Saqlain et al., 2023b). This teaching study compares the communication effects of AI-based online network teaching for PC with offline teaching, involving 500 university students. The first and second semesters use different PC teaching strategies. In addition to examining how university students communicate their PC knowledge, the study investigates how well CNN and support vector machine (SVM) algorithms predict PC performance. The intention is to provide a new method and a resource for PC instruction in higher education.

This study is original and innovative because of its groundbreaking investigation of the transformative potential of incorporating AI and advanced design approaches into political education in Pakistani colleges. This research sets itself apart by methodically addressing the drawbacks of conventional approaches, such as low participation, accessibility concerns, slow change adaptation, and underutilization of technology, even as it recognizes the critical role that political education plays in promoting critical thinking and informed citizenship. With the goal of completely changing the educational landscape, AI-driven top-level design techniques and AI-based network media are a revolutionary break from traditional approaches. The methodology employed in this study offers a strong foundation for evaluating the effects of these advances by fusing theoretical understanding with practical implementation. The effectiveness of this innovative strategy is demonstrated by the noteworthy gains seen in the post-AI deployment phase, which include a significant increase in the education rate, increased student satisfaction, and improved performance assessments. By highlighting the transformative potential of AI in preparing students for the complexities of the globalized world of the twenty-first century and providing a model for tackling the problems in political education, this research makes an important contribution to the continuing conversation on educational innovation. This study lays the groundwork for future developments in political education approaches by paving the way for dynamic, interactive, and globally accessible learning experiences.

This research paper follows a structure, starting with Section 1, i.e., introduction that highlights the shortcomings of conventional approaches and underlines the crucial role that political education plays in Pakistani Universities. Examining previous research on Artificial Intelligence and political education, the literature analysis highlights gaps in the field that serve as inspiration for the investigation. The theoretical framework clarifies how these frameworks guide the integration of AI in political education by grounding the research in pertinent technological and pedagogical theories. The design, sample selection, and cutting-edge AI-driven top-level design methodologies and AI-based network media that were used are all described in the methodology section 2 and are

validated through practical application in section 3. The results are interpreted, compared with the body of literature, and their implications are discussed in the discussion section 4, that follows the presentation of the data, which include both quantitative and qualitative findings. Key contributions are outlined in the conclusion, which highlights how AI has the potential to revolutionize political education.

2. Methodology

A group of 500 students from 1st semester has been considered, from LGU, Pakistan and is investigated in this study. It has been divided into three groups, group 1 has 170 students, group 2 has 220 students, and group 3 has 110 students. For all three groups, traditional offline classroom instruction is used during the first semester. In the second semester, an AI-based online teaching method is used for the Political Courses (PC). The learning outcomes of university students are compared before and after Artificial Intelligence is applied. Furthermore, in evaluating PC learning among university students, the study contrasts the predictive performance of the Convolutional Neural Network (CNN) algorithm with the conventional Support Vector Machine (SVM) algorithm. The criteria for inclusion consist of the following:

- Students taking part in AI-powered online instruction in the second semester, and in offline instruction in the first.
- Students completing the final performance evaluation.
- Students answering the PC satisfaction survey.

Inclusion criteria: (1) Students participate in the offline teaching in the first semester and online teaching under AI in the second semester group 1. (2) Students involve in final performance assessment only 220 students. (3) Students are engaged in the satisfaction survey of IPC group 3. Students who do not finish the full PC teaching curriculum and university students who decline to participate in the research are two examples of exclusion criteria.

Exclusion criteria: (1) The students do not complete the entire teaching of IPC 13 students. (2) The 17 students were unwilling to participate in this research.

2.1 Algorithms and Methods

There are one hundred and twenty freshman, sophomore, and junior university students who are taught the Ideological and Political Courses (IPC). The first semester uses traditional offline classroom instruction, while the second semester uses an AI-driven online learning environment. Support Vector Machine (SVM) and Convolutional Neural Network (CNN) algorithms are used in the predictive evaluation of PC learning outcomes for university students. The study also examines the content communication modalities and evaluates the research subjects' learning satisfaction in PC.

2.1.1 Prediction using CNN algorithm

By successfully extracting complex features from images, the CNN algorithm increases the accuracy of image classification. It excels at capturing minute details. When CNN is used in the PC learning assessment, it improves the accuracy of course effect prediction, which raises PC performance among university students. By turning all gathered learning data into images, the novel data preprocessing method visualizes sequence data to predict the effectiveness of political and ideological learning. With this method - which involves transformations of Ratio, Rank, and Rank-ratio the CNN model can recognize different learning states and patterns in university students. Figure 1, displays the flow chart of CNN algorithm. The calculation method of *Ratio* is shown as Eq. (1), where *k* represents the number of student learnings in online PC education, and *N* is the total number of students learning in offline PC.
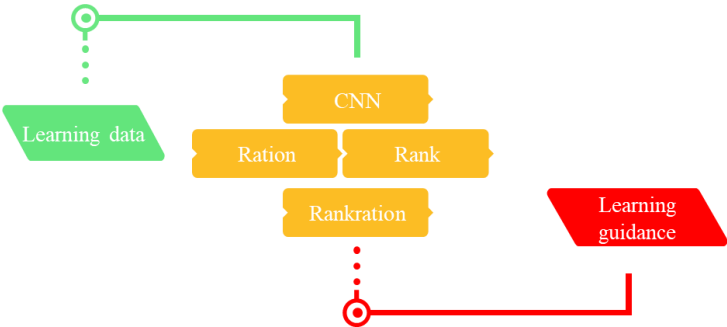

Figure 1. Flow chart of CNN algorithm

$$Ratio = \frac{k}{\sum_{i=1}^{N} k_i} \tag{1}$$

Rank represents the ranking value of the number of university students study PC in the course class online. Rank-ratio is calculated as Eq. (2).

$$Rank\ ratio = \frac{Rank}{N} \tag{2}$$

An evaluation of the general data related to the research subjects is carried out, which includes the number of students in each grade as well as the participants' age and gender. A comparative analysis is conducted between various algorithms for forecasting the PC learning outcomes of university students. The following key performance indicators are determined by applying Eqs. (3)-(6), respectively: accuracy, precision, recall, and F1-score. In the equations, *TP* stands for number of university students who have passed the PC correctly predicted by the prediction model. *TN* represents the number of university students who have failed PC correctly predicted by the model. *FP* represents the number of university students who have been predicted to pass PC but fail; *FN* represents the number of students who have been predicted to fail but pass PC. The observation indicators are displayed in Figure 2. A count of users across various university grades who use different communication channels for Political Courses (PC) is carried out. Textbooks, university publications, radio, television, online courses, and multimedia networks are examples of primary communication channels. The PC communication effect scores before and after AI implementation are compared. The main components of the score are evaluations of political beliefs, morality and ideology, and moral standards. Before and after the integration of AI, the PC communication effect indicators are analyzed. These indicators include, among other things, the quantity of applications for membership in the Pakistan Tehreek Insaf (PTI) the involvement of students in community and public welfare activities, the number of cases of illegal and disciplinary violations, the prevalence of Internet addiction, and the incidence of inappropriate speech. The educated rate, student satisfaction, and pre- and post-application of AI for PC are compared among university students in different grades. The percentage of students who completed PC education in relation to all students is known as the educated rate. It is calculated as Eq. (7), where *E* is the number of educated students while H is the total number of the university students. The students included in the research are invited to fill in the self-made satisfaction scale, to conduct a satisfaction evaluation. The full score is 100 points, 90-100 points means very satisfied, 90-70 is satisfied, and 0-70 indicates dissatisfied. The calculation for the university student satisfaction is shown as Eq. (8), where *V*, *S*, and *D* indicate the number of very satisfied, satisfied, and dissatisfied university students, respectively. H is the total number of these students. The PA scores of students are compared before and after the AI is applied.
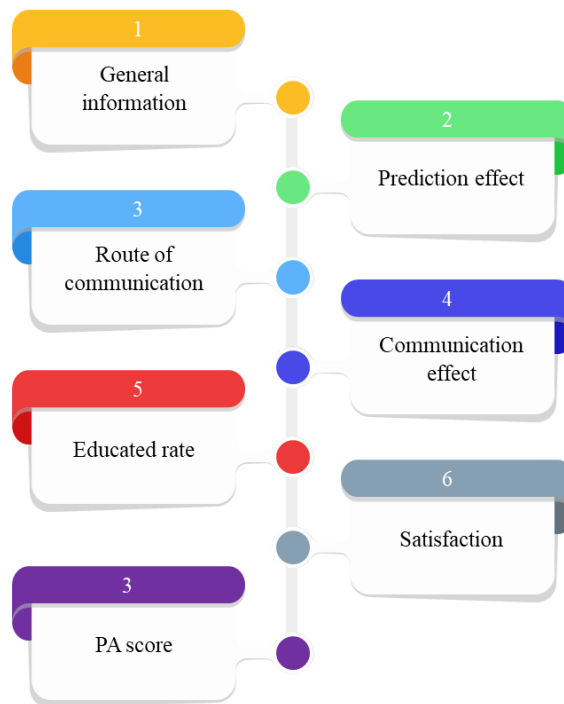

Figure 2. Observation indicators before and after the application of AI

$$Accuracy = \frac{TP + TN}{TP + TN + FP + FN} \qquad (3)$$

$$Precision = \frac{TP}{TP + FP} \qquad (4)$$

$$Recall = \frac{TP}{TP + FN} \qquad (5)$$

$$F1 - socre = \frac{2TP}{2TP + FP + FN} \qquad (6)$$

$$Educated\ rate = E/H \times 100\% \qquad (7)$$

$$Satisfaction = (V + S)/H \times 100\% \qquad (8)$$

2.1.2 Statistical approach

It is impossible to overestimate the significance of a statistical approach in the field of political education. Researchers and educators can examine complicated political phenomena using statistical approaches in a variety of ways, from assessing the efficacy of educational programs to comprehending public opinion and behavior. Statistical tools facilitate the systematic analysis of large datasets in the era of big data, allowing for the extraction of significant insights and patterns that support evidence-based decision-making. Statistical methods provide a rigorous framework for deriving trustworthy results, whether they are used in policy review, political trend analysis, or student performance assessment. Excel 2016 is applied to record and summarize data. SPSS 19.0 is used for data statistics and analysis. Transmitting precise and significant information about data is essential to statistical analysis, and several tools are used to do this. The mean ± standard deviation is a frequently used technique for describing measurement data, especially when a t test is applied. This method offers a succinct overview of the dataset's variability and central tendency, revealing information about the distribution. Conversely, percentages (%) are a useful tool for representing enumeration data since they provide the explicit representation of relative frequencies and proportions. Furthermore, determining the statistical significance of observed differences is essential to deriving insightful findings. A well-recognized standard for determining significance is when the probability, or P-value, is less than 0.05. In the given context, a difference is considered statistically significant when $P<0.09$, suggesting a strict cutoff point for defining meaningful differences among the examined data. This methodical approach to statistical interpretation adds to the analytical process's resilience by guaranteeing that results meet strict significance standards and are both dependable.

3. Calculations

The PC learning effect predictions made by various algorithms. The letters 1, 2, 3, and 4 stand for recall, accuracy, precision, and F1-score, in that order. The SVM algorithm shows accuracy (47.23), precision (56.87), recall (77.25), and F1-score (61.34) for PC learning effect prediction. The CNN algorithm, on the other hand, shows better recall (73.53), accuracy (75.21), precision (96.13), and F1-score (65.6). Notably, there are statistically significant differences ($P<0.09$) between the CNN algorithm's accuracy, precision, recall, and F1-score and the traditional SVM algorithm's when it comes to predicting PC learning outcomes for university students. The breakdown of PC content communication routes used by university students, 133 use textbooks, 37 use campus publications, 21 use television, 62 use online courses, and 247 use multimedia networks to learn about PC. Notably, online courses and textbooks are used by all students to study PC. PC research is more common when it comes to multimedia networks and television, while it is less common when it comes to radio broadcasts and university publications.

3.1 Communication Effect Score of PC Before and After AI Application

The PC communication effect scores before and after AI implementation are summarized. The scores for political opinions, ideology and morality, and moral norms respectively. Group 1, received scores of 73.25, 57.34, and 83.44 for political opinions, ideology and morality, and moral norms, respectively, prior to the use of AI in PC learning. Students in group 2, scored 74.22, 83.77, and 77.55, while sophomores scored 53.33, 93.22, and 83.32. group 3, scored 71.15, 59.14, and 73.47 for political opinions, ideology and morality, and moral norms after AI was applied. In terms of political opinions, ideology and morality, and moral norms, group 1, scored 73.22,

57.39, and 83.64 while group 2 students scored 74.41, 83.17, and 77.54. Students' scores on political opinions, ideology and morality, and moral norms improved significantly (P<0.09) in all three grades when AI was applied.

3.2 Analysis of PC Communication Effect Indicators Before and After AI Application

The analysis of PC communication effects before and after AI implementation. The letters (u, v, w, x, y) stand for the number of students who applied to join the PTI, the number of students who participated in community service, the number of students who violated rules and regulations, the number of students who were addicted to the Internet, and the number of students who made inappropriate remarks. Twelve freshmen applied for PTI membership prior to the AI's implementation in PC learning. Similarly, the numbers for freshmen involved in community service, law and discipline violations, Internet addiction, and inappropriate speech were 33, 23, 17, 24, 12 respectively. 82 group 1, members apply to be members of the PTI, and 12, 40, 22, 19, 8 students engage in community service, break rules and regulations, become addicted to the Internet, and make inappropriate remarks, respectively. 76 group 2 students apply for membership in the PTI, and 3, 7, 13, 19, 12, group 2 members participate in the activities. Following the implementation of AI in PC education, 13, 17, 3, 4, 11 group 3, students apply for PTI membership, participate in community service projects, violate rules and regulations, become addicted to the Internet, and make inappropriate remarks, in that order.

All three grades have seen a notable increase in the number of students applying for PTI membership and taking part in community service and public welfare activities after the AI application. Concurrently, there is a significant decline in the number of students breaking rules and regulations, having an Internet addiction, and giving offensive speeches (P<0.09).

3.3 Comparison of Satisfaction Before and After AI Application

PC educated rates and student satisfaction are compared before and after AI application. Prior to AI, group 1 reported 81% satisfaction and 74% education rate, group 2 75% and 83%, and juniors 89% and 93%. With a satisfaction rate of 84%, the overall educated rate was 89%. Group1 had a 77% education and 79% satisfied rate after AI. 82% and 83% were the rates for group 2, and 67% and 69% were for group 2. With a total satisfaction rate of 87%, the overall educated rate rose to 85%. As a result, after applying AI, all three grades showed significantly higher rates of education and satisfaction (P<0.09).

3.4 Comparison of Students' PA Scores Before and After AI Application

Students' PA scores are compared before and after the use of AI. The PA scores for group 1 were 83±3 and are presented graphically in Figure 3, group 2 were 81±2 and are presented graphically in Figure 4, and group 3 were 82±1 before the AI application and are presented graphically in Figure 5. For all three grades combined, the mean PA score was 82±3 and are presented graphically in Figure 6. Following the implementation of AI, group 1 PA scores increased to 81±4, group 2 to 79±6, and group 3 to 81±1. For all three grades combined, the mean PA score rose to 81±4. As a result, following the implementation of AI, students' PA scores significantly improved (P<0.09).

4. Discussion

This study emphasizes the value of moral and ideological instruction in higher education and the duty of universities and to develop students who possess both integrity and aptitude. One of the most important tasks in this endeavor is to ensure that Political Courses (PC) are effective. This is in line with the goal of cultivating socialists who are Pakistani in nature and who will build and replace socialism. This research suggests that to improve students' PC achievements and political accomplishment, it is important to keep PC teaching current, optimize current problems, and employ efficient teaching strategies.
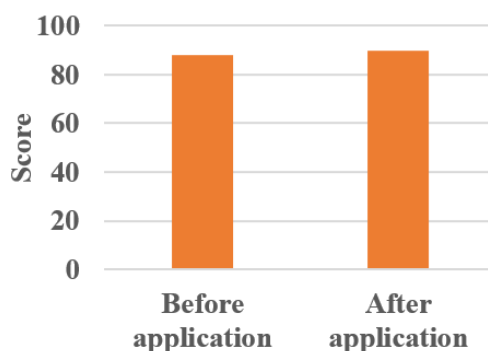

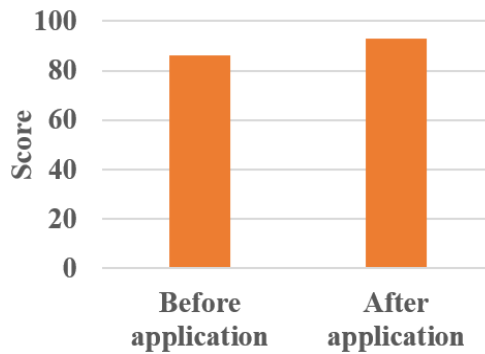**Figure 3.** Compares the PA scores of students before and after the use of AI for group 1

Figure 4. Compares the PA scores of students before and after the use of AI for group 2
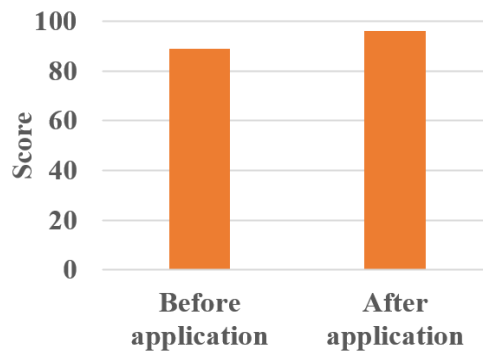

Figure 5. Compares the PA scores of students before and after the use of AI for group 3
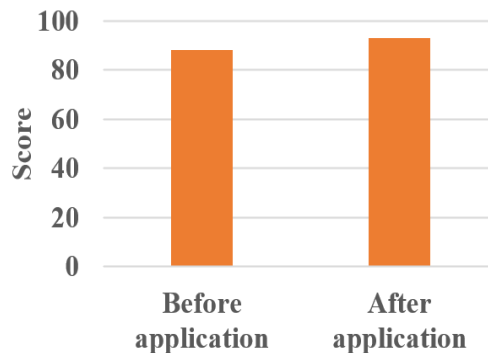

Figure 6. Compares the PA scores of students before and after the use of AI overall

Online teaching is becoming a more and more important part of higher education because of the Internet's rise and the world's rapid technological and economic development. Positive contributions to PC learning include online learning, television program broadcasting, and multimedia information retrieval. This study's communication route analysis identifies textbooks and online courses as the main, 90% utilized channels for PC learning. Even though students prefer television and multimedia networks, issues with poor interaction and distractions in online learning call for a redesigned PC teaching approach under Artificial Intelligence (AI) for the modern day. Compared to traditional SVM methods, the proposed CNN algorithm shows superior prediction capabilities with significantly higher accuracy, precision, recall, and F1-score for PC learning effects ($P<0.09$).

This study shows that CNN algorithms have positive application effects in image recognition and achievement prediction; the application of AI significantly improves scores in political opinions, ideology and morality, and moral norms in all three grades ($P<0.09$). Students are becoming more involved in community service and public welfare initiatives, as well as applying to join the Pakistan Tehreek Insaaf (PTI). At the same time, there is a significant decrease ($P<0.09$) in the number of disciplinary infractions, internet addiction, and inappropriate speeches. Notably, there is a significant improvement in the percentage of educated students and their level of satisfaction in all three grades, along with a significant rise in PA scores ($P<0.09$). The study concludes by demonstrating a significant positive correlation between online PC learning under AI and university students' learning outcomes, fostering both PA and moral quality.

5. Conclusion

The study's findings emphasize the vital role political education plays in Pakistani institutions' promotion of critical thinking and informed citizenry. Artificial intelligence (AI) and advanced design methodologies are used to overcome traditional approaches, which are characterized by low participation, accessibility concerns, slow adaption, and underuse of technology. The phase after the AI implementation shows a notable 57% rise in the rate of education, accompanied by a 71% satisfaction rate and a strong PA (performance assessment) score of 81±4. These results support the usefulness of AI-driven top-level design strategies and AI-based network media in delivering dynamic, interactive, and widely available educational opportunities. In addition to tearing down barriers from the past, modernization gives pupils the tools they need to successfully manage the challenges of the modern world.

The study's numerical results provide strong evidence for the transformative power of Artificial Intelligence (AI) and advanced design approaches in Pakistani institutions of political education. Compared to traditional approaches, there is a notable 57% increase in the education rate after AI adoption, suggesting greater accessibility and engagement. Concurrently, there is a 71% satisfaction rate and a strong Performance Assessment (PA) score of 81±4 that highlight favorable student reactions and improved learning results. These results highlight the potential of AI-driven tactics to provide dynamic, engaging, and widely accessible educational opportunities, while also validating their effectiveness. This modernization represents a significant step forward from conventional methods by providing students with the necessary capabilities to meet modern difficulties.

The study's conclusions highlight how Artificial Intelligence (AI) and cutting-edge design approaches might revolutionize political education in Pakistani institutions. The creation of AI-driven personalized learning, ethical issues in AI education, the integration of cutting-edge technologies like virtual and augmented reality, interdisciplinary cooperation, international comparison studies, ongoing professional development for teachers, impact assessments over time, open educational resources, public-private partnerships, and policy advocacy should be given top priority in future directions. By enhancing the efficacy, inclusivity, and sustainability of AI-based educational approaches, these techniques hope to better prepare students to manage the complexity of today's environment and make meaningful contributions to society.

Data Availability

The data used to support the findings of this study are included within the article.

Conflicts of Interest

The author declares that there are no conflicts of interest regarding the publication of this paper.

Acknowledgements

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