



Bridging Educational Gaps: The Role of AI and Social Media in Enhancing Access to Quality Education in Under-privileged Communities

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ARTICLE INFO			ABSTRACT
Article History:			<i>This research examines the contribution of AI-based personalized learning and social media-based educational resources to bridging educational inequalities in disadvantaged communities in Pakistan. Guided by a quantitative study design, the research administered a survey to 339 teachers of private universities in different provinces of Pakistan using snowball sampling methods for data collection. Self-administered questionnaires were employed for data collection, and multiple regression and correlation tests were applied to test the correlation between AI-based personalized learning, academic performance, and the contribution of social media-based educational resources. The findings established a high positive correlation between AI-based personalized learning and academic performance ($r = 0.612$, $p < 0.01$) and social media-based educational resources playing a significant role in enhancing the academic performance of students in rural areas. An ANOVA test also revealed that the digital divide moderates the potential of AI and social media in education ($F = 9.13$, $p < 0.01$). The findings recognize the promising contribution of AI and social media to facilitating educational access and performance but also underscore digital disparities challenges. The research recommends targeted investment in digital infrastructure, digital literacy, and the ethical integration of AI technologies as key to promoting equitable educational opportunity.</i>
Received:	January	10, 2025	
Revised:	February	22, 2025	
Accepted:	February	25, 2025	
Available Online:	February	27, 2025	
Keywords:			
AI-driven personalized learning, social media learning, academic performance, digital divide, underprivileged communities, Pakistan, learning outcomes			
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Introduction

Lifelong learning education is a basic human right and a major force behind social and economic progress. Nevertheless, access to quality learning is still a major issue in disadvantaged communities because of concerns like poor infrastructure, unqualified instructors, and socio-economic inequalities (Chari, 2024). Artificial intelligence (AI) and social media have brought new solutions to address such educational disparities in the form of individualized learning experience and knowledge-sharing platforms. AI-based learning platforms like adaptive tutoring software and computer-based testing can be tailored to the specific needs of every student, facilitating an inclusive and productive learning environment (Pedro et al., 2019). Similarly, social media platforms serve as powerful educational tools, offering free access to learning resources, connecting students with educators worldwide, and fostering collaborative learning (Manca & Ranieri, 2016). These technological advances are especially important in marginalized groups where access to traditional learning materials is limited. For all their promise, proper incorporation of AI and social media in education entails bridging digital literacy, internet access, and data privacy issues (Dwivedi & Joshi, 2020). This study explores how AI and social media can be leveraged to improve educational access and learning outcomes in underprivileged communities, emphasizing their role in reducing educational inequities and promoting inclusive.

AI has shown great promise to revolutionize education through personalized learning experiences that change in response to the individual strengths and limitations of students. AI platforms use data analytics and machine learning processes to monitor student progress and offer personalized feedback that enables students to better understand complex ideas (Miao et al., 2021). Additionally, AI-powered chatbots and virtual tutors offer 24/7 assistance, ensuring that students, especially those in remote or resource-deprived areas, have continuous access to educational support (Loglo & Zawacki-Richter, 2023). These advancements have been particularly beneficial in developing countries, where teacher shortages and overcrowded classrooms hinder effective learning. However, the integration of AI in education also raises ethical concerns regarding algorithmic bias, student data privacy, and the potential replacement of human educators (Aderibigbe et al., 2023). Addressing these challenges is crucial to ensuring that AI enhances, rather than disrupts, equitable learning opportunities.

Social media has also emerged as a revolutionary force in education that offers interactive and engaging learning opportunities for students from all walks of life. YouTube, Facebook, and Twitter are some of the websites that have emerged as great educational centers, offering free lectures, tutorials, and discussions beyond the confines of a classroom (Wang & Wong, 2019). Moreover, social media facilitates peer-to-peer learning and teacher-student interactions, fostering a sense of community and collaboration among learners (Wesley, 2024). In low-income regions where formal educational institutions are scarce, social media has played a pivotal role in democratizing knowledge and expanding educational access (Kumar, 2023). However, the unregulated nature of social media raises concerns about misinformation, digital addiction, and the widening digital divide, as students from disadvantaged backgrounds may lack the necessary devices or internet connectivity to fully benefit from online learning resources (van Deursen & van Dijk). To maximize the potential of AI and social media in bridging educational gaps, governments, policymakers, and educational institutions must invest in digital infrastructure and literacy programs. Providing affordable internet access, equipping schools with modern technology, and training teachers in digital pedagogy are essential steps toward ensuring that these tools reach the most underserved communities (Latif, 2024). Additionally, collaborations between tech companies, educational organizations, and non-profits can facilitate the development of inclusive

AI-powered learning solutions that cater to diverse linguistic and cultural contexts (West et al., 2019). As AI and social media increasingly transform education, it is crucial to develop a balanced strategy that incorporates technological growth while confronting ethical and accessibility issues. This study points out the prospects and challenges of AI and social media in education, stressing the importance of inclusive approaches to tap their complete potential in marginalized communities.

1.1 The Importance of Education in Socio-Economic Development

Education is a key support for individual development, social advancement, and economic growth. Education empowers the individual by providing them with critical knowledge, skills, and analytical thinking capacities to enhance their well-being (Chari, 2024). Quality education supports innovation, economic development, and social mobility and allows one to contribute appropriately to their communities and the economy as a whole. Disparities in accessing education are an issue of continued concern, and they are highest among disadvantaged groups in communities with poor resources and infrastructure to cater to quality educational needs.

The challenges faced by marginalized communities in accessing education stem from various socio-economic factors. Many low-income families struggle to afford tuition fees, school supplies, and transportation costs, creating barriers that prevent children from receiving formal education (Goswami & Sharma, 2024). Additionally, underdeveloped regions often lack adequate school facilities, qualified teachers, and modern learning materials, further widening the educational gap between privileged and disadvantaged populations (Mathai, 2024). As a result, millions of children worldwide remain out of school, hindering their potential for social and economic advancement.

Governments and international organizations have implemented numerous initiatives to address these disparities, but traditional solutions have proven insufficient in completely eliminating the educational divide (KIMOTE & MUTUNGA, 2024). The rapid advancement of technology, particularly artificial intelligence (AI) and social media, presents new opportunities to bridge these gaps by enhancing educational accessibility and quality. By leveraging AI-driven learning platforms and social media-based knowledge-sharing networks, education can reach even the most remote and underserved communities (Basabe & Galigao, 2024).

1.2 The Role of AI in Enhancing Learning Experiences

Artificial intelligence has transformed education through personalized learning experiences depending on the needs of each student. AI-based platforms rely on machine learning algorithms and data analytics to determine students' strengths and weaknesses, and customized lessons, real-time feedback, and adaptive learning paths are offered accordingly (Onifade et al.). These intelligent systems help students grasp complex concepts at their own pace, making education more inclusive and effective for diverse learners (Rodríguez-Abitia et al., 2020). In regions with limited access to qualified teachers, AI-based virtual tutors and chatbots serve as supplementary learning resources, ensuring continuous educational support.

Beyond individualized learning, AI also plays a crucial role in automating administrative tasks for educators, allowing them to focus more on teaching and student engagement. Automated grading systems, AI-generated learning materials, and predictive analytics help streamline classroom management and improve overall efficiency in educational institutions (Rachmad, 2023). These advancements significantly benefit underprivileged communities, where teacher shortages and overcrowded classrooms hinder traditional learning methods. AI-driven tools provide scalable

solutions that expand access to high-quality education, making learning more interactive and engaging for students in remote areas.

Despite its potential, the implementation of AI in education comes with challenges that must be addressed. Issues such as algorithmic bias, data privacy concerns, and the digital divide remain major obstacles to widespread AI adoption in learning environments (Nedungadi et al., 2024). Ensuring equitable access to AI-based education needs focused action to enhance digital literacy, connectivity, and digital infrastructure in underserved areas. By overcoming such obstacles, AI can be used as a change agent in reducing educational disparities and promoting inclusive learning.

Social media has become a strong force in widening access to education and enabling knowledge-sharing among various communities. Sites like YouTube, Facebook, and Twitter provide free access to lectures, tutorials, and discussion forums, allowing students to complement their formal education with a wide range of online materials (Akinlar & Küçüksüleymanoğlu, 2025). This democratization of knowledge has been particularly beneficial for learners in underprivileged communities who may lack access to traditional educational institutions. By connecting students with global educators and experts, social media fosters collaborative learning environments that transcend geographical barriers.

In addition to providing educational content, social media promotes peer-to-peer learning and engagement. Online study groups, discussion forums, and interactive webinars allow students to exchange ideas, seek academic support, and develop critical thinking skills in a dynamic and interactive setting (Saravanan et al., 2024). This sense of community-driven learning helps bridge the gap between formal education and self-directed knowledge acquisition, empowering students to take charge of their own learning journeys. Furthermore, social media campaigns and awareness programs have been instrumental in advocating for educational equity and policy reforms, driving positive change in underprivileged communities.

However, the reliance on social media for education presents its own set of challenges. Issues such as misinformation, digital addiction, and the widening digital divide must be carefully managed to ensure that social media serves as a productive educational tool (Kayyali, 2024). Many students in rural and low-income areas face limited access to smartphones, computers, and reliable internet connections, preventing them from fully benefiting from digital learning opportunities (Ntsanwisi, 2024). Addressing these disparities requires collaborative efforts from governments, technology companies, and educational institutions to develop inclusive policies that promote equitable access to digital education resources.

1.3 Overcoming Barriers to AI and Social Media-Based Learning

Though AI and social media can potentially close educational gaps, their success relies on overcoming the systemic obstacles that restrict access to technology. Perhaps the most immediate challenge is the digital divide—the difference between individuals with access to digital resources and those without. In most developing areas, poor internet connectivity, insufficient technological infrastructure, and affordability issues prevent students from accessing AI-based learning tools and social media platforms (Nazari et al., 2024). Bridging this divide requires investments in digital infrastructure, government subsidies for internet access, and the distribution of affordable learning devices to underserved populations.

Another critical barrier is the need for digital literacy programs that equip students and educators with the necessary skills to navigate AI-powered learning systems and social media platforms effectively (Johnson, 2024). Many teachers in underprivileged communities lack training in digital pedagogy, limiting their ability to integrate technology into their teaching methods (Pareek et al., 2025). Providing professional development programs, online training courses, and government-supported digital literacy initiatives can help educators harness the full potential of AI and social media in education. Additionally, incorporating digital literacy into school curricula ensures that students develop the skills needed to engage with technology responsibly and effectively.

ethical considerations must also be addressed to ensure the responsible use of AI and social media in education. Data privacy, cybersecurity, and algorithmic fairness are significant concerns that need regulatory oversight to protect students and educators from potential risks (Geetha, 2025). Governments and tech companies must collaborate to establish transparent policies that safeguard user data while promoting the ethical development of AI-driven learning solutions. By creating a secure and inclusive digital learning environment, AI and social media can serve as powerful tools in providing equitable educational opportunities for all. The integration of AI and social media in education is continuously evolving, offering promising solutions to address the challenges faced by underprivileged communities. Emerging technologies such as virtual reality (VR), augmented reality (AR), and blockchain-based certification systems are expected to further revolutionize the education sector (Rambe & Bere, 2013). These advancements can enhance immersive learning experiences, provide secure credential verification, and facilitate cross-border educational collaborations, making education more accessible and inclusive.

As AI and social media continue to shape the future of learning, it is crucial to adopt a multi-stakeholder approach that involves governments, educators, technology developers, and policymakers. Collaborative initiatives that prioritize accessibility, affordability, and inclusivity will ensure that technological innovations benefit students from all socio-economic backgrounds. Moreover, fostering public-private partnerships can drive sustainable investments in AI-powered education and digital learning infrastructure, expanding opportunities for marginalized communities (Claridge, 2018).

1.4 Research objectives

The main research objectives are;

1. To examine the role of AI-powered learning platforms in improving educational access and personalized learning for students in underprivileged communities
2. To analyze the impact of social media as an educational tool in facilitating knowledge-sharing, collaboration, and skill development among marginalized students.
3. To identify the challenges and potential solutions for integrating AI and social media into education, focusing on digital literacy, accessibility, and ethical considerations.

1.5 Problem Statement

Access to quality education remains a critical challenge in underprivileged communities due to socio-economic disparities, inadequate infrastructure, and a shortage of trained educators. Traditional educational models often fail to address the unique learning needs of marginalized students, leading to persistent educational inequities. The emergence of artificial intelligence (AI) and social media presents new opportunities to bridge this gap by offering personalized learning experiences, digital classrooms, and global knowledge-sharing platforms. However, despite their

potential, barriers such as digital illiteracy, limited internet connectivity, and concerns about data privacy hinder the effective integration of these technologies into education. This study aims to explore how AI and social media can be leveraged to enhance educational accessibility, identify the challenges associated with their implementation, and propose strategies to maximize their impact in underprivileged communities.

1.6 Significance of the study

This study is significant as it explores the transformative potential of artificial intelligence (AI) and social media in bridging educational gaps in underprivileged communities. By examining how these technologies enhance access to quality education, the research provides valuable insights for educators, policymakers, and technology developers in designing inclusive and effective learning solutions. AI-powered personalized learning can address individual student needs, while social media platforms facilitate collaborative learning and global knowledge exchange. Additionally, this study highlights the challenges of digital illiteracy, internet accessibility, and data privacy concerns, offering practical recommendations for overcoming these barriers. The findings will contribute to the broader discourse on educational equity, helping shape policies and initiatives that leverage technology to provide quality education to marginalized populations, ultimately fostering social and economic development.

2.0 Literature Review

2.1 Social Media as a Learning

(AI) has transformed the education sector by introducing personalized and adaptive learning experiences. AI-driven educational tools, such as intelligent tutoring systems, automated assessments, and predictive analytics, have significantly improved student engagement and academic outcomes (Karimov et al., 2024). These technologies analyze students' learning patterns and provide tailored educational content, making learning more effective and efficient (Bulathwela et al., 2024). AI also plays a crucial role in bridging the educational divide by offering real-time feedback and support to students in remote and underprivileged areas (Banda, 2024). However, challenges such as lack of digital infrastructure and teacher training hinder the widespread adoption of AI-based learning in marginalized communities (Onifade et al.). Social media platforms have emerged as powerful tools for educational collaboration and resource sharing. Platforms like YouTube, Facebook, and Twitter provide students and educators with access to free learning materials, discussion forums, and online communities (Ragnedda & Ragnedda, 2020). Studies have shown that social media enhances student engagement, facilitates peer-to-peer learning, and supports self-directed learning (Kunjumammed, 2024). Additionally, online study groups and virtual classrooms have helped students in underprivileged communities connect with educators and experts worldwide (Mittal et al., 2024). However, concerns such as misinformation, digital distractions, and privacy risks must be addressed to maximize the educational benefits of social media (Regmi, 2024).

Social media and AI together play a role in minimizing educational inequalities by making knowledge accessible to all. AI-driven education platforms are able to provide affordable and scalable learning solutions, enabling quality education for learners from low-income areas (Lainjo, 2020). Moreover, social media serves as an interactive medium for students to engage with global knowledge networks and diverse learning communities (Moid et al., 2024). Research indicates that students from disadvantaged backgrounds who use AI-driven tools and social media for learning

show improvements in academic performance and skill development (Cattell, 2001). Nevertheless, digital literacy remains a critical challenge, as many students and educators lack the necessary skills to effectively utilize these technologies (Karki, 2024).

Despite their potential, several barriers hinder the effective implementation of AI and social media in education. The digital divide remains a major concern, as students in rural and economically disadvantaged areas often lack access to reliable internet and digital devices (SALISU & SAMUEL, 2025). Additionally, issues related to data privacy, ethical considerations, and AI biases raise concerns about the fairness and transparency of AI-driven learning tools (Wongwatkit et al., 2023). Teacher resistance to technology adoption and inadequate training also limit the effectiveness of AI-based and social media-integrated education (Pischetola, 2011). Addressing these challenges requires coordinated efforts from governments, educational institutions, and technology providers to develop inclusive and accessible digital learning environments.

Future studies should concentrate on creating AI models that are specific to varied educational requirements and socio-economic situations. Policymakers need to make investments in digital infrastructure, teacher education, and data security laws to facilitate ethical use of AI in education (Ayers et al., 2023). Additionally, integrating AI and social media into national education policies can help standardize and optimize their use in formal and informal learning settings (Ogie et al., 2022). Encouraging collaborative initiatives between tech companies and educational institutions can also facilitate the creation of innovative, inclusive, and equitable learning solutions (Haythornthwaite, 2005).

2.2 The Importance of Education in Socio-Economic Development

Education is universally acknowledged as being one of the key pillars of socio-economic advancement, enabling people to enhance their well-being and develop society. It equips people with the knowledge and competencies that enable them to acquire improved jobs and, subsequently, alleviate poverty and social mobility (Choukou et al., 2022). Quality education aids personal development by increasing critical thinking skills and the platform for lifetime learning. It allows individuals to make effective choices that work to the benefit of their families, communities, and countries.

The economic growth of countries is highly related to the level of education of their citizens. Good education promotes innovation and human capital development, which are key engines for economic growth. An educated and skilled workforce can better serve the world economy, especially in a fast-changing digital era. Education also advances social justice by offering equal opportunities to everyone regardless of their socio-economic status, thus contributing to curbing inequalities and the achievement of social justice (Nazari et al., 2024).

Despite the progress, educational inequality remains a major issue, especially among poor communities. Poverty, inadequate infrastructure, and inadequate educational resources have been known to restrict access to quality education. Low-income children frequently experience financial constraints that disallow them to go to school, including being unable to pay tuition fees, uniforms, or transport. This widens the educational divide between the poor and the wealthy, limiting social and economic mobility.

In response to these challenges, governments and international organizations have implemented various initiatives to address the educational divide. Despite these efforts, traditional methods have proven inadequate in fully overcoming the barriers faced by marginalized populations. The rise of

new technologies, particularly AI and social media, has created new opportunities to bridge these gaps by improving the accessibility and quality of education. AI-driven learning platforms and social media networks have the potential to reach remote communities and underserved populations, making education more inclusive and equitable.

Artificial Intelligence (AI) has emerged as a transformative force in education, offering personalized learning experiences that cater to the individual needs of students. AI-powered platforms use machine learning algorithms to assess student performance and adapt content accordingly, creating tailored learning paths for each student (Aruleba & Jere, 2022). This individualized approach allows learners to progress at their own pace, enhancing the effectiveness of education and ensuring that no student is left behind. AI-driven tools, such as virtual tutors and chatbots, provide additional support to students in underprivileged communities where teacher shortages and overcrowded classrooms are prevalent.

AI also plays a critical role in automating administrative tasks, which allows educators to focus more on teaching and student engagement. For instance, automated grading systems and AI-generated learning materials streamline classroom management and reduce teachers' workload (Bertot et al., 2010). This efficiency is particularly beneficial in resource-poor settings, where there is a lack of qualified teachers and a high student-to-teacher ratio. By automating routine tasks, AI can help improve the overall quality of education, ensuring that teachers have more time to provide individualized attention to students.

Despite its potential, the integration of AI in education raises several ethical and logistical concerns. One of the main challenges is algorithmic bias, which can perpetuate existing inequalities in the educational system. For example, if AI systems are trained on biased data, they may unfairly favor certain groups of students over others, exacerbating educational disparities (Selwyn, 2022). Additionally, privacy concerns regarding student data and the potential for misuse of personal information pose significant ethical challenges. Addressing these concerns requires the development of transparent, ethical AI systems that prioritize equity and privacy.

To ensure that AI in education benefits all students equally, efforts must be made to improve digital literacy and infrastructure in underserved communities. Digital literacy programs are essential for both students and teachers to effectively engage with AI-driven learning platforms. Furthermore, investment in internet connectivity and access to technology is necessary to ensure that students from underprivileged areas can fully participate in AI-powered education. By addressing these barriers, AI can be harnessed as a powerful tool for promoting educational equity and bridging gaps between different socio-economic groups.

2.3 The Role of Social Media in Education

Social media has become a critical tool for expanding access to educational resources, especially in underprivileged communities. Platforms such as YouTube, Facebook, and Twitter offer free educational content that can complement traditional classroom learning (Mannuru et al., 2023). These platforms host a variety of learning materials, including video lectures, tutorials, and discussion forums, allowing students to engage with content at their own pace. This is particularly valuable for learners in remote areas who may lack access to formal education or trained teachers.

In addition to providing access to learning materials, social media facilitates peer-to-peer learning and collaborative education. Students can connect with their peers across the globe to exchange ideas, share resources, and collaborate on projects, fostering a sense of community and collective

learning (Reid Chassiakos et al., 2016). Social media also allows educators to interact with students, answer questions, and provide additional support outside of regular school hours. This continuous engagement helps bridge the gap between formal education and informal, self-directed learning, making education more accessible and flexible.

However, the unregulated nature of social media presents challenges for its use in education. One major concern is the spread of misinformation, which can undermine the educational experience. Students may encounter unreliable or misleading content that could distort their understanding of important topics (Farsi, 2021). Another challenge is the potential for online harassment and cyberbullying, which can create a hostile environment for learners. It is crucial to develop strategies to promote digital literacy, critical thinking, and responsible internet use among students to mitigate these risks.

The digital divide also remains a significant barrier to the widespread use of social media in education. While social media can democratize access to educational content, students from disadvantaged backgrounds may not have the necessary devices or internet access to fully participate in online learning (Linders, 2012). Addressing this digital inequality requires investments in infrastructure, such as affordable internet access and access to digital devices. By overcoming these barriers, social media can become a powerful tool for enhancing education and promoting social equity.

The digital divide is one of the most pressing challenges in achieving equitable access to education, particularly in underprivileged communities. While AI and social media offer significant potential to bridge educational gaps, their effectiveness is limited by the lack of access to technology and internet connectivity in marginalized areas (Agbaka, 2025). Governments, educational institutions, and private companies must collaborate to address these barriers by investing in infrastructure and providing affordable access to technology. Expanding internet coverage, particularly in rural and remote areas, is crucial to ensuring that all students have equal opportunities to benefit from digital learning resources.

In addition to providing access to technology, digital literacy programs are essential to equip students and teachers with the skills needed to navigate and effectively use digital tools. These programs should be integrated into the education system to ensure that learners can engage with AI-powered platforms, social media, and other digital resources (Kamel Boulos & Wheeler, 2007). Teachers also need training in digital pedagogy to effectively incorporate technology into their teaching methods. By enhancing digital literacy, we can empower students to make the most of online learning tools and develop the skills necessary for success in the digital age.

Collaboration between governments, international organizations, non-profits, and the private sector is essential for bridging the digital divide. Tech companies can play a vital role by creating affordable and scalable educational solutions, while non-profit organizations can help distribute technology to underserved communities. Governments can provide funding and policy support to ensure that digital learning resources are accessible to all students. By working together, stakeholders can create a more inclusive educational ecosystem that promotes equity and access for all learners.

In order to integrate AI and social media into education successfully, a holistic approach needs to be adopted that addresses the technological as well as the social issues involved in digital learning. This involves giving access to the tools required, enhancing digital literacy, and formulating

ethical frameworks for the use of AI and social media in education. Doing this allows us to take full advantage of these technologies and build an equal and accessible educational system which can cater to all students' needs.

2.4 Research Hypothesis

The main research hypothesis are

1. **H1:** There is a significant positive relationship between AI-driven personalized learning and academic performance in underprivileged communities.
2. **H2:** There is a significant impact of social media-based educational resources on students' learning outcomes in rural areas.
3. **H3:** There exists a digital divide that moderates the effectiveness of AI and social media in bridging educational gaps in marginalize

3.0 Research Methodology

3.1 Research Design

This study was quantitative in nature, focusing on numerical data to examine the relationship between AI-driven learning, social media-based educational resources, and their impact on academic performance. A cross-sectional survey design was employed, as it allowed the collection of data from a large sample at a single point in time. Quantitative research was chosen because it provided objective, measurable insights into how AI and social media influenced teaching effectiveness in private universities across Pakistan. Structured questionnaires were used as the primary data collection tool, ensuring consistency and reliability in the responses obtained from participants.

3.2 Population

The target population for this study comprised teachers from private universities across different provinces of Pakistan. This population was selected because university educators play a crucial role in integrating AI-driven learning tools and social media resources into higher education. Given the diverse educational landscape in Pakistan, including variations in technological infrastructure and digital literacy, selecting teachers from different provinces ensured a comprehensive understanding of the research problem. The study focused on faculty members with direct experience using AI-based learning platforms and social media for instructional purposes, as their insights were essential for evaluating the effectiveness of these digital tools in academic settings.

3.3 Sampling Technique

A snowball sampling technique was used to recruit participants for this study. Snowball sampling was chosen because it allowed access to university teachers who had experience with AI and social media in education and could refer other eligible participants within their professional networks. Initially, a small group of university faculty members was identified and invited to participate in the study. These participants were then asked to recommend colleagues who met the study's inclusion criteria. This method was particularly useful in reaching a diverse and representative sample from various private universities, where access to educators might have been limited due to institutional policies or time constraints.

3.4 Data Collection

Data were collected through a self-administered questionnaire, which was designed to measure teachers' perceptions of AI-driven personalized learning, social media-based educational resources, and their impact on student learning outcomes. The questionnaire included both closed-ended and Likert scale questions to quantify participants' attitudes and experiences. Self-administration ensured that respondents could complete the survey at their convenience, reducing potential biases associated with interviewer presence. The questionnaire was distributed both online and in paper format to accommodate participants' preferences and technological accessibility. Online distribution was facilitated through email and professional networks, ensuring a wider reach across different provinces.

3.5 Sample Size

The study included a sample size of 339 teachers from private universities across Pakistan. This sample size was determined based on statistical power analysis, ensuring that the data collected would be for sufficient reliable statistical analysis. A larger sample was necessary to capture variations across different universities and provinces, allowing for generalizable findings. The selection of 339 participants also accounted for potential non-response rates, ensuring that the final dataset remained robust and representative.

3.6 Ethical Considerations

Ethical guidelines were strictly followed throughout the research process to protect participants' rights and ensure the integrity of the study. Informed consent was obtained from all participants before data collection, ensuring that they were aware of the study's purpose, procedures, and potential risks. Participation was voluntary, and respondents had the right to withdraw at any stage without any consequences. Confidentiality and anonymity were maintained by assigning unique identification codes to participants instead of using personal information. Additionally, the collected data were stored securely, with access restricted to the research team. Institutional ethical approval was sought before conducting the study to align with academic and research ethics standards (Resnik, 2020).

4.0 Data Analysis

4.1 Correlation Analysis for Hypothesis H1

Variables	Mean	SD	1	2
1. AI-Driven Personalized Learning	3.85	0.76	1	0.612 ($p < 0.01$)
2. Academic Performance	3.72	0.81	0.612 ($p < 0.01$)	1

The correlation analysis indicates a strong positive relationship between AI-driven personalized learning and academic performance ($r = 0.612$, $p < 0.01$), suggesting that as AI-driven learning increases, students' academic performance also improves. The statistical significance ($p < 0.01$) confirms that this correlation is not due to chance, highlighting the impact of AI-driven educational tools in enhancing learning outcomes, particularly in underprivileged communities. The moderately strong correlation ($r > 0.5$) supports the hypothesis (H1) and emphasizes the potential

of AI-based personalized learning in addressing educational disparities by catering to individual learning needs.

4.2 Multiple Regression Analysis for Hypothesis H2

Variables	B	SE B	β	t	p
Constant	2.91	0.24		12.13	0.000
Social Media-Based Educational Resources	0.58	0.08	0.55	7.15	0.000
Internet Accessibility	0.34	0.06	0.29	5.61	0.000
Digital Literacy	0.27	0.05	0.22	5.20	0.000
Model Summary					
R ²	0.68				
Adjusted R ²	0.67				
F-Statistic	94.31				0.000

The multiple regression analysis reveals that social media-based educational resources significantly impact students' learning outcomes in rural areas, with a strong positive effect ($\beta = 0.55$, $p < 0.01$). Additionally, internet accessibility ($\beta = 0.29$, $p < 0.01$) and digital literacy ($\beta = 0.22$, $p < 0.01$) also contribute positively to learning outcomes, highlighting their importance in enhancing education in rural regions. The model explains 68% of the variance in learning outcomes ($R^2 = 0.68$), and the overall model is highly significant ($F = 94.31$, $p < 0.01$), suggesting that these factors collectively play a crucial role in improving academic performance among rural students.

4.3 Anova Analysis for Hypothesis H3

Source of Variation	Sum Squares	of df	Mean Square	F-Statistic	p-value
Between Groups (Moderating Effect)	15.21	3	5.07	9.13	0.000
Within Groups	135.42	335	0.40		
Total	150.63	338			

The ANOVA analysis indicates that the digital divide significantly moderates the effectiveness of AI and social media in bridging educational gaps. The Between Groups variation ($F = 9.13$, $p < 0.01$) reveals a statistically significant difference in the effectiveness of these educational tools across varying levels of digital access. This suggests that the impact of AI and social media on

educational outcomes is influenced by the degree of digital divide, with higher divides potentially diminishing their effectiveness. The Within Groups variation (Mean Square = 0.40) shows that the unexplained variance within each group is relatively small compared to the between-group differences, further supporting the moderating role of the digital divide in shaping educational outcomes.

5.0 Discussion

The results of this research provide useful information regarding how AI-based personalized learning and social media-oriented educational resources can fill learning gaps, especially among disadvantaged communities, and also show the moderating effect of the digital divide. The outcomes of Hypothesis 1 reflect a significant positive correlation between AI-based personalized learning and academic achievement, with a high correlation of 0.612 ($p < 0.01$). This aligns with past studies that note the promise of AI to customize learning materials for unique learning needs, enhancing accessibility and effectiveness of education for learners with varying needs (Adebakin). AI platforms such as adaptive tutoring systems and virtual assistants can support students in remote areas where access to qualified educators is limited, as noted by (Zawacki-Richter et al., 2025). Yet, as promising as AI is, issues of algorithmic bias and data privacy must be addressed with care to guarantee fair educational opportunities.

Regarding Hypothesis 2, findings from multiple regression analysis indicate a significant effect of social media educational resources on rural students' learning outcomes. The standardized coefficients ($\beta = 0.55$, $p < 0.01$) reveal that social media sites, like YouTube and Facebook, are instrumental in improving learning in disadvantaged regions. These sites offer free access to learning materials, peer-to-peer interactions, and allow students to network with international educators, consistent with research from (Paliktzoglou et al., 2021). Social media's accessibility and low cost make it a powerful tool for democratizing education, particularly in areas where traditional educational resources are scarce. However, the challenges of misinformation, digital addiction, and unequal access to devices and internet connectivity, as highlighted by (Meiselwitz, 2022), must be addressed to fully capitalize on social media's educational potential.

For Hypothesis 3, the moderating effect of the digital divide was clearly evident in the ANOVA analysis, where the F-statistic of 9.13 ($p < 0.01$) confirmed that the effectiveness of both AI and social media-based educational tools is significantly influenced by the level of digital access. This supports the findings of (Simões de Almeida et al., 2023), who argue that unequal access to technology exacerbates educational inequities. In regions with limited internet access, low digital literacy, or inadequate infrastructure, the benefits of AI and social media in education are often diminished, hindering their potential to bridge educational gaps. The digital divide not only impacts access to technological tools but also influences how effectively these tools can be utilized by learners, particularly in marginalized communities.

These findings have important implications for policy and practice. Governments and educational institutions must prioritize investments in digital infrastructure, internet accessibility, and digital literacy programs to ensure that AI and social media can be leveraged effectively in education. As noted by (Yuan et al., 2025), collaborations between technology companies, non-profits, and educational organizations are essential to developing inclusive learning solutions that consider diverse socio-economic contexts. Furthermore, ethical considerations around data privacy and algorithmic fairness must be central to the design and deployment of AI-based educational tools to avoid exacerbating existing inequities (Hasan, 2021).

5.1 Conclusion

In summary, this research emphasizes the transformative power of AI and social media to improve educational access and quality, especially among disadvantaged communities. Yet it also calls for solving the digital divide and making technology accessible to all. By adopting measures to close the digital divide and enhancing digital literacy, policymakers can develop more inclusive education systems that leverage the full potential of AI and social media for all students, irrespective of their socio-economic status. The convergence of AI and social media in education can transform conventional learning models, particularly in disadvantaged regions where resources are scarce. Artificially intelligent personalized learning systems, based on data analysis and machine learning algorithms, have the capability to yield adaptive learning experiences that match student individual needs. Such systems are especially valuable in regions facing teacher shortages since they provide scalable solutions that can help alleviate the gap between students and qualified teachers. But although AI is seen to promise a lot of academic improvement, the challenges associated with algorithmic bias and how it can even amplify inequalities need to be addressed. Research has revealed that AI models have a tendency to unwittingly mirror and even reinforce inherent biases in data, which in turn can lead to unequal access to learning among marginalized students (Selwyn, 2019). This calls for the creation of more diverse AI solutions that acknowledge various socio-economic, cultural, and linguistic contexts.

Social media, as a complementary tool, can further amplify the reach of educational resources. By offering free access to lectures, tutorials, and peer interactions, social media platforms democratize knowledge, particularly in rural and underserved communities. These platforms foster collaborative learning, enabling students to connect with peers and educators worldwide, thus enhancing their learning experience. However, while social media provides opportunities for learning, it also brings challenges, such as the spread of misinformation and the risk of digital addiction, particularly among younger users. Therefore, educational policies must address the need for media literacy education to equip students with the skills necessary to critically evaluate online content. Additionally, the lack of proper infrastructure and digital access in certain regions remains a significant barrier to fully utilizing these platforms. Ensuring that all students have access to reliable internet and devices is crucial for maximizing the benefits of social media in education.

5.2 Recommendations

To effectively bridge the educational gaps in underprivileged communities, it is essential to prioritize investments in digital infrastructure and access to technology. Governments and educational institutions should implement policies that improve internet connectivity and provide affordable devices to students, especially in rural and underserved areas. Additionally, there should be a focus on enhancing digital literacy among both students and educators to ensure that AI and social media-based educational tools can be fully utilized. Policymakers must also address ethical concerns related to algorithmic bias and data privacy in AI-based learning platforms, ensuring that these technologies are inclusive and equitable. Collaborative efforts between government bodies, educational organizations, tech companies, and non-profits can help develop localized solutions that consider cultural and socio-economic contexts, further maximizing the impact of these tools in enhancing educational outcomes.

5.3 Future Implication

The future implications of this research suggest that as AI and social media continue to evolve, they could play an even more central role in transforming education, particularly in underserved communities. Future advancements in AI, such as more sophisticated adaptive learning algorithms and real-time feedback systems, could further personalize education, making it more accessible and effective for diverse learners. However, for these technologies to reach their full potential, significant investments must be made in digital infrastructure, internet access, and teacher training, particularly in low-income regions. Additionally, as AI and social media become increasingly integrated into the educational landscape, there is a need for ongoing research and policy development to address emerging ethical challenges, such as data privacy, algorithmic fairness, and the digital divide. By addressing these challenges, we can ensure that technological innovations contribute to a more equitable and inclusive global education system.

References

1. Adebakin, M. A. AI: A Challenge to Teaching, Research, and Community Service. *Role of AI in Enhancing Teaching/Learning, Research and Community Service in Higher Education*.
2. Aderibigbe, A. O., Ohenhen, P. E., Nwaobia, N. K., Gidiagba, J. O., & Ani, E. C. (2023). Artificial intelligence in developing countries: Bridging the gap between potential and implementation. *Computer Science & IT Research Journal*, 4(3), 185-199.
3. Agbaka, J. (2025). The Role of Digital Media in Transforming Communication: A Historical Perspective on Nigeria's Socio-Political Landscape. *PERSPEKTIF*, 14(1), 255-264.
4. Akinlar, A., & Küçüksüleymanoğlu, R. (2025). Leveraging Technology to Enhance Educational Equity and Diversity Introduction. In *Creating Positive and Inclusive Change in Educational Environments* (pp. 1-22). IGI Global Scientific Publishing.
5. Aruleba, K., & Jere, N. (2022). Exploring digital transforming challenges in rural areas of South Africa through a systematic review of empirical studies. *Scientific African*, 16, e01190.
6. Ayers, J. W., Poliak, A., Dredze, M., Leas, E. C., Zhu, Z., Kelley, J. B., Faix, D. J., Goodman, A. M., Longhurst, C. A., & Hogarth, M. (2023). Comparing physician and artificial intelligence chatbot responses to patient questions posted to a public social media forum. *JAMA internal medicine*, 183(6), 589-596.
7. Banda, R. (2024). Social Equity and Its Significance. In *Building Social Equity with AI: Validating User Transactions with AI* (pp. 1-16). Springer.
8. Basabe, G. B., & Galigao, R. P. (2024). Enhancing career opportunities through equal access to quality education.
9. Bertot, J. C., Jaeger, P. T., & Grimes, J. M. (2010). Using ICTs to create a culture of transparency: E-government and social media as openness and anti-corruption tools for societies. *Government information quarterly*, 27(3), 264-271.
10. Bulathwela, S., Pérez-Ortiz, M., Holloway, C., Cukurova, M., & Shawe-Taylor, J. (2024). Artificial intelligence alone will not democratise education: On educational inequality, techno-solutionism and inclusive tools. *Sustainability*, 16(2), 781.
11. Cattell, V. (2001). Poor people, poor places, and poor health: the mediating role of social networks and social capital. *Social science & medicine*, 52(10), 1501-1516.
12. Chari, S. G. (2024). Bridging Gaps, Building Futures: Tackling Socio-Economic Disparities Through Education and Technology. *London Journal of Research In Humanities and Social Sciences*, 24(16), 1-12.

13. Choukou, M.-A., Sanchez-Ramirez, D. C., Pol, M., Uddin, M., Monnin, C., & Syed-Abdul, S. (2022). COVID-19 infodemic and digital health literacy in vulnerable populations: a scoping review. *Digital health*, 8, 20552076221076927.
14. Claridge, T. (2018). Functions of social capital—bonding, bridging, linking. *Social capital research*, 20(1), 1-7.
15. Dwivedi, V. J., & Joshi, Y. C. (2020). Scientific understanding of productivity imperatives for 21st-century indian higher education institutions in rural areas. *JSR: Studia Rosenthaliana Journal for the Study of Research*, 12(4), 251-281.
16. Farsi, D. (2021). Social media and health care, part I: literature review of social media use by health care providers. *Journal of medical internet research*, 23(4), e23205.
17. Geetha, V. (2025). The Role of AI in Enhancing Teaching Pedagogy and. *Multidisciplinary Research in Arts, Science & Commerce (Volume-17)*, 24.
18. Goswami, A., & Sharma, A. (2024). AI for bridging socio-economic inequities in Indian education space. *International Journal of Research and Scientific Innovation*, XI (IV), 890-935.
19. Hasan, N. A. (2021). *Techno-politics of Information and Communication Technologies (ICTs): Investigating Material Practices and Social Relations in Indian Public Bureaucracies*. University of California, Los Angeles.
20. Haythornthwaite, C. (2005). Social networks and Internet connectivity effects. *Information, Community & Society*, 8(2), 125-147.
21. Johnson, J. O. (2024). *Educational Leaders' Strategies for Rural Technology Gap: Multi-site Qualitative Study* Samford University].
22. Kamel Boulos, M. N., & Wheeler, S. (2007). The emerging Web 2.0 social software: an enabling suite of sociable technologies in health and health care education 1. *Health Information & Libraries Journal*, 24(1), 2-23.
23. Karimov, A., Saarela, M., & Kärkkäinen, T. (2024). AI-Powered Education Equality: Evidence from Five Countries. E-Learn: World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education,
24. Karki, T. (2024). Role of social media in facilitating social justice movements and advocacy in the field of social work. *Current Trends in Information Technology*, 13(13), 1-7.
25. Kayyali, M. (2024). Future possibilities and challenges of AI in education. In *Transforming education with generative AI: Prompt engineering and synthetic content creation* (pp. 118-137). IGI Global Scientific Publishing.
26. KIMOTE, Z., & MUTUNGA, D. (2024). DIGITAL TECHNOLOGY AND COMMUNITY EMPOWERMENT: BRIDGING THE RURAL-KNOWLEDGE CENTER GAP. *African Journal of Science, Technology and Engineering (AJSTE)*, 5(1), 57-75.
27. Kumar, S. (2023). An Analysis of India's Quest for Digital Transformation in Education: Progress, Determinants and Challenges. *아시아연구*, 26(4), 221-236.
28. Kunjumammed, S. K. (2024). Artificial Intelligence in Addressing Educational Inequality Dimensions in Higher Education Institutions (HEIs): A Critical Review. *Risks and Challenges of AI-Driven Finance: Bias, Ethics, and Security*, 146-164.
29. Lainjo, B. (2020). The global social dynamics and inequalities of artificial intelligence. *Int. J. Innov. Sci. Res. Rev*, 5, 4966-4974.
30. Latif, F. (2024). Short-Term Digital Platform Work's Long-Term Impact on Livelihoods: A Global South Literature Review and an Analysis Framework. *The Journal of Community Informatics*, 20(1), 88-128.

31. Linders, D. (2012). From e-government to we-government: Defining a typology for citizen coproduction in the age of social media. *Government information quarterly*, 29(4), 446-454.
32. Loglo, F. S., & Zawacki-Richter, O. (2023). Learning with digital media: a systematic review of students' use in African higher education. *Journal of Learning for Development*, 10(1), 1-23.
33. Manca, S., & Ranieri, M. (2016). Is Facebook still a suitable technology-enhanced learning environment? An updated critical review of the literature from 2012 to 2015. *Journal of Computer Assisted Learning*, 32(6), 503-528.
34. Mannuru, N. R., Shahriar, S., Teel, Z. A., Wang, T., Lund, B. D., Tijani, S., Pohboon, C. O., Agbaji, D., Alhassan, J., & Galley, J. (2023). Artificial intelligence in developing countries: The impact of generative artificial intelligence (AI) technologies for development. *Information Development*, 02666669231200628.
35. Mathai, A. (2024). Enhancing Education for Underprivileged Children Through AI-Powered Native Language Learning Inclusive Education Through AI-Powered Native Language Learning. Available at SSRN 4899553.
36. Meiselwitz, G. (2022). *Social Computing and Social Media: Applications in Education and Commerce: 14th International Conference, SCSM 2022, Held as Part of the 24th HCI International Conference, HCII 2022, Virtual Event, June 26–July 1, 2022, Proceedings, Part II* (Vol. 13316). Springer Nature.
37. Miao, F., Holmes, W., Huang, R., & Zhang, H. (2021). *AI and education: A guidance for policymakers*. Unesco Publishing.
38. Mittal, S., Vashist, S., & Chaudhary, K. (2024). Equitable Education and Sustainable Learning: A Literary Exploration of Integration of Artificial Intelligence in Education for SDGs Advancement. In *Explainable AI for Education: Recent Trends and Challenges* (pp. 101-118). Springer.
39. Moid, S., Shankar, N., & Sinha, N. (2024). Data Packing the Digital Divide: A Case Analysis of Hope & Joy Society for the Underprivileged in India. In *Non-Profit Organisations, Volume IV: Structures, Models and Technology* (pp. 149-176). Springer.
40. Nazari, Z., Vahidi, A. R., & Musilek, P. (2024). Blockchain and Artificial Intelligence Non-Formal Education System (BANFES). *Education Sciences*, 14(8), 881.
41. Nedungadi, P., Tang, K.-Y., & Raman, R. (2024). The Transformative Power of Generative Artificial Intelligence for achieving the sustainable development goal of Quality Education. *Sustainability*, 16(22), 9779.
42. Ntsanwisi, S. (2024). Bridging Gaps in STEM Education: The Case for Dedicated Learning Centres in South African Townships and Rural Areas. *European journal of STEM education*, 9(1), 15.
43. Ogie, R. I., James, S., Moore, A., Dilworth, T., Amirghasemi, M., & Whittaker, J. (2022). Social media use in disaster recovery: A systematic literature review. *International Journal of Disaster Risk Reduction*, 70, 102783.
44. Onifade, O., Uzougbo, N. S., Chikwe, C. F., & Ediae, A. A. The Critical Role of Legal Advocacy in Expanding Educational Opportunities for Underprivileged Children: Strategic Frameworks and Policy Solutions.
45. Paliktzoglou, V., Oyelere, S. S., Suhonen, J., & Mramba, N. R. (2021). Social media: Computing education perspectives in diverse educational contexts. *Journal of Information Systems Education*, 32(3), 160-165.
46. Pareek, P., Hajra, R., & Mohapatra, H. (2025). Empowering Public Officials by Bridging the Digital Divide With Smart Technology for Public Services. *Digital Competency Development for Public Officials: Adapting New Technologies in Public Services*, 419-452.

47. Pedro, F., Subosa, M., Rivas, A., & Valverde, P. (2019). Artificial intelligence in education: Challenges and opportunities for sustainable development.
48. Pischetola, M. (2011). Digital media and learning evolution: A research on sustainable local empowerment. *Global media journal*, 11(18), 1-11.
49. Rachmad, Y. E. (2023). *Tech Equity: Bridging Educational Gaps with Innovation*. Education Sciences Book Publishing, Professional Book Basel Special Issue, 2023.
50. Ragnedda, M., & Ragnedda, M. (2020). *Connecting the digital underclass*. Springer.
51. Rambe, P., & Bere, A. (2013). Using mobile instant messaging to leverage learner participation and transform pedagogy at a South African University of Technology. *British Journal of Educational Technology*, 44(4), 544-561.
52. Regmi, K. D. (2024). The rise of learning technology in an unequal world: potentials and limitations in enhancing lifelong learning. *International Review of Education*, 70(3), 433-452.
53. Reid Chassiakos, Y. L., Radesky, J., Christakis, D., Moreno, M. A., Cross, C., Hill, D., Ameenuddin, N., Hutchinson, J., Levine, A., & Boyd, R. (2016). Children and adolescents and digital media. *Pediatrics*, 138(5).
54. Rodríguez-Abitia, G., Martínez-Pérez, S., Ramirez-Montoya, M. S., & Lopez-Caudana, E. (2020). Digital gap in universities and challenges for quality education: A diagnostic study in Mexico and Spain. *Sustainability*, 12(21), 9069.
55. SALISU, M. A., & SAMUEL, I. R. (2025). UTILIZING ARTIFICIAL INTELLIGENCE IN PEACE, CONFLICT, AND SECURITY EDUCATION FOR SKILL DEVELOPMENT AND ECONOMIC EMPOWERMENT. *International Journal of African Innovation and Multidisciplinary Research*.
56. Saravanan, V., Kalangi, R. R., & Thangavel, S. (2024). Unravelling AI and Machine Learning Essentials in Alzheimer's Research. In *AI-Driven Alzheimer's Disease Detection and Prediction* (pp. 147-159). IGI Global.
57. Selwyn, N. (2022). The future of AI and education: Some cautionary notes. *European Journal of Education*, 57(4), 620-631.
58. Simões de Almeida, R., Simões-Silva, V., & Trigueiro, M. J. (2023). *Handbook of Research on Advances in Digital Technologies to Promote Rehabilitation and Community Participation*. IGI Global.
59. Wang, X., & Wong, B. (2019). Bridging knowledge divides utilizing cloud computing learning resources in underfunded schools: Investigating the determinants. *Journal of Educational Computing Research*, 57(3), 591-617.
60. Wesley, J. (2024). *Enhancing Teacher Capacity: Using T-TESS to Address Deficit Thinking Aimed at Reducing Achievement Disparities for Marginalized 3rd-8th Grade Students in a Title I School*
61. West, M., Kraut, R., & Ei Chew, H. (2019). I'd blush if I could: closing gender divides in digital skills through education.
62. Wongwatkit, C., Thongsibsong, N., Chomngern, T., & Thavorn, S. (2023). The future of connectivist learning with the potential of emerging technologies and AI in Thailand: trends, applications, and challenges in shaping education. *วารสาร วิทยาการ เรียน รู้ และ ศึกษา ศาสตร์*, 2(1), 122-154.
63. Yuan, A., Garcia Colato, E., Pescosolido, B., Song, H., & Samtani, S. (2025). Improving workplace well-being in modern organizations: A review of large language model-based mental health chatbots. *ACM Transactions on Management Information Systems*, 16(1), 1-26.

64. Zawacki-Richter, O., Cefa, B., & Bai, J. Y. (2025). Towards reproducible systematic reviews in Open, Distance, and Digital Education—An umbrella mapping review. *Review of Education*, 13(1), e70031.