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Technological Lag in Pakistan's Education System

Dr.M.Qadeer, Sadaf Naz , Samiya Waseem, Zobia Asghar
University of the Punjab Lahore

Abstract

At its inception, Pakistan's educational system has lagged in terms of technological adaption. The following are the main causes of this: Due to Pakistan's ongoing economic difficulties, less money has been spent on schooling. Although other sectors receive a large amount of the cash, education—particularly technology—receives little attention. Pakistan's education system receives extremely little funding from the public and private sectors. While advanced countries devote a sizeable portion of their GDP to education, Pakistan continues to spend very little, which prevents educational institutions from implementing the latest technology. One of the main problems has been the instability of educational policies. Every government proposes fresh statutes; however, they are not carried out well, which slows down the advancement of educational. Basic amenities like computer laboratories, access to the internet, and digital instructional materials are lacking in many schools and universities. In rural places, this issue is particularly serious.

Since digital is not a major component of their training, most teachers lack knowledge of the latest technologies. As a result, they don't expose pupils to the latest technical developments. Technological educational technology is hesitantly adopted in Pakistan by parents, school officials, and instructors alike. Digital learning or e-learning platforms are not taken seriously, and traditional teaching methods are thought to be more effective. Many educators think that rather than improving the quality of instruction, technology diverts children. The use of technology in education is also slowed down by the preference of parents and educational institutions for traditional classroom setups. The school system has not been modernized; instead, old teaching practices have been maintained. Pakistan has lagged above comparable nations due to its sluggish adoption of educational technology. Corruption and poor administration cause a significant amount of the education budget to be lost, which hinders the adoption of contemporary educational improvements.

Technology adoption is challenging in rural and isolated places since digital instructional technology and internet access are either non-existent or very limited. The main causes of Pakistan's lagging adoption of technology in education are weak regulations, corruption, a lack of government focus, financial problems, a lack of investments, and poor technological

infrastructures. Addressing these problems can assist Pakistan in updating its educational system and aligning it with international norms.

Keywords: Unstable education polices ,Lack of technological infrastructure, Global standard and Pakistan position ,Lack of investment in educational technology

Introduction

Pakistan's educational system faces many obstacles in adapting to the needs of today's society, especially regarding technology. Although Pakistan has made significant progress in increasing literacy over the last few decades, the nation still lags far behind in terms of incorporating technologies into the classroom. This technological backwardness has resulted in Pakistan falling further behind other countries that are making significant advancements in educational technology, in addition to limiting access to modern learning tools. Pakistan's educational potential is severely constrained by its inadequate facilities, inconsistent education regulations, and lack of investment, even though the importance of innovation at education is widely recognized.For the increasingly interconnected globe of right now, education is not merely about imparting material; it's also about giving kids the skills they need to flourish in the digital age. In Pakistan, access to these tools is limited, especially in rural areas, and educational programs have often failed to address the need for technological innovations inclusion in schools and colleges, leaving a system that heavily depends on outdated teaching methods. In contrast, technologies such as digital resources, multimedia tools, and blended learning platforms have revolutionized educational procedures worldwide.

Unstable Education Polices

The erratic and inconsistent nature of educational policies is one of the main obstacles to technical growth in Pakistan's educational system. With every new government enacting reform that frequently reflect political goals rather than the real needs of education, Pakistan's education policy has historically benefited from repeated changes. The integration of contemporary instructional materials and technological innovations in schools and colleges has been hampered by the short-lived initiatives and subpar implementation brought about by this policy instability, claim Khattak and Khan (2020).

Pakistan's educational policy is not consistent or long-term oriented. Every administration presents new goals without expanding on the frameworks that came before, which throws ongoing projects off balance and leaves educational institutions perplexed. For example, the Single National Curriculum (SNC), which was introduced with the intention of unifying the educational system, was criticized for its inclusion and practicality due to its abrupt adoption without enough planning (Ali & Shah, 2021). Furthermore, many government-led technology-based programs, such as Tele School or the Punjab IT Board's digital learning efforts, continue to be disjointed, underfunded, or have a limited lifespan due to the lack of a uniform digital education These discrepancies are

reflected in Pakistan's National Education Policies (NEPs), which were implemented in 1972, 1979, 1992, 1998, 2009, and 2017. Although each strategy promised technical reforms, none of them were able to maintain their goals because of shifting governments and a lack of implementation, according to a UNESCO research from 2022. For instance, the NEP 2009 suggested computer laboratories in public schools and teacher training, underscoring the use of information and communication technology (ICT) in education. However, political unpredictability and a lack of funding significantly hampered the policy's actual implementation (Shami & Hussain, 2020) Policy. Another degree of intricacy is added by Pakistan's decentralized educational system, in which the 18th Amendment gave the provinces considerable authority.

The national education framework lacks consistency and coordination because of the provinces' frequent development of their own plans. Implementing technology improvements is hampered by this fragmentation, particularly when several provincial governments place varying priorities on education. This fragmented strategy is especially harmful to national-scale digital education initiatives, which call for coordinated planning and sustained funding, as Shah and Fatima (2023) point out.

Pakistan can only guarantee the successful incorporation of modern technology in its educational system by establishing education policy and keeping it apart from political meddling. Pakistan's efforts to integrate technology and upgrade its educational system have been hampered by the unpredictability of its educational policy. Reforms are frequently reactive and short-lived, wasting money and having little effect. Pakistan needs to create stable, long-term educational policies that prioritize infrastructure development, teacher preparation, curriculum modernization, and technology innovation if it hopes to prosper and compete globally.

Lack of Technological Infrastructure:

One of the biggest challenges to Pakistan's educational advancement is the absence of technology infrastructure. Although the world is moving toward digital learning and integrating technology into classrooms, many Pakistani educational institutions are still ill-prepared to keep up. This problem is made worse by the technological gap among urban and rural areas, which exposes a system that mostly relies on antiquated instructional strategies and subpar infrastructure. Basic digital infrastructure including computer laboratories, fast internet, multimedia technology, and even reliable electricity are lacking in many public schools, particularly those in rural areas. Only 30% of Pakistani public schools in urban areas have access to operational computer labs, according to research by Ahmed and Qureshi (2021); in rural areas, the figure falls below 10%. Students are denied access to contemporary learning tools like e-books, online tutorials, and virtual classrooms if they lack dependable internet

access and digital devices. This severely restricts their capacity to acquire 21st-century abilities that are increasingly necessary for success in school and the workplace, such as technological literacy, analytical thinking, and technology flexibility.

The low level of governmental and private sector investment in educational technology is one of the main causes of inadequate infrastructure. Only a small percentage of the national budget—roughly 2% of GDP—is devoted to education by the government, and even less of that is used to build out the nation's technological infrastructure. In contrast, via smart investments and public-private partnerships, nations such India, Malaysia, and Turkey have greatly increased their capacity for educational technology.Without such initiatives, Pakistan's educational system stifles innovation and leaves technology integration to sporadic trial projects that frequently lack scalability or long-term support.

Infrastructure deficiencies have also been caused by inadequate policy implementation in addition to financial problems. There is frequently a lack of monitoring, monitoring, and resource allocation, even when policies are created with the goal of fostering digital learning, as is the case with the Digital Pakistan project or provincial IT board efforts. Due to administrative or logistical inefficiencies, this causes initiatives to be abandoned or implemented with delays. Additionally, teachers lack the necessary training to operate the Meager technology that is accessible Even well-equipped classrooms are unproductive in terms of technological learning outcomes because many teachers lack the necessary training on how to incorporate information and communication technology (ICT) tools into their lessons.

The COVID-19 pandemic also highlighted Pakistan's technology infrastructure's serious flaws. While many nations made the switch to internet platforms for remote study, Pakistan found it difficult to give students nationwide with the most basic access. Over 40 million pupils in Pakistan had disruptions in their education during the pandemic because of a shortage of digital devices, internet connection, or broadcast educational materials, according to a UNESCO assessment from 2021. Although the government's efforts, like the introduction of Tele School, were admirable, they were not widely available and frequently excluded students from rural and low-income households.

Furthermore, it is evident that the federal and provincial governments are not working together to integrate ICT. Since education is a decentralized topic in Pakistan, provinces frequently take disparate approaches. As a result, neighbouring provinces like Balochis tan and Sindh continue to fall behind because of underdevelopment and a lack of digital resources, even though Punjab may be making progress by means of its PITB (Punjab Information Technology Board) programs. Because students' access to technology is mostly dependent on their physical location, this discrepancy leads to educational inequity nationwide. The issue of inadequate infrastructure necessitates a

multifaceted strategy. First and foremost, more focused and larger investment is essential. Building ICT infrastructure in schools, particularly in rural regions, must be a top priority for the government, which also needs to make sure that it is regularly maintained and upgraded.

Second, to guarantee that teachers can successfully use technology in the classroom, teacher training programs need to be extended. Third, collaborations with tech firms, non-governmental organizations, and foreign donors can contribute to increasing access to digital resources and material, thereby enhancing inclusivity and adaptability to contemporary demands in education.

One of the biggest obstacles to advancement in modern times is Pakistan's educational system's lack of technology infrastructure. The nation runs the risk of slipping farther behind international educational standards if prompt and concerted action is not taken. To close this technology divide and guarantee that all kids, regardless of background, have equitable access to high-quality education, strategic investment, legislative change, and stakeholder cooperation are crucial.

Global Standards and Pakistan's Position

The implementation of technological devices in education has emerged as a global standard for academic growth and competitiveness in the modern period. Through standardized legislation, digital infrastructure, teacher preparation, and student engagement tactics, nations like Finland, South Korea, Singapore, and Estonia have effectively incorporated technology into their educational systems. These nations spend major percentages of their overall GDP to education and technical development, to make sure students have utilization of digital tools, immersive instructional environments, and immediate evaluation systems. For example, Finland's ICT-integrated curriculum approach and Singapore's Smart Education Program have significantly raised their respective countries' rankings and student achievements. Pakistan, on the other hand, is still far behind the rest of the world in terms of educational technology. Although the importance of digital learning has been acknowledged, national implementation has been dispersed and inadequately funded. Due to a lack of a unified national strategy and restricted access to digital resources, Pakistan scores poorly in terms of educational innovation and digital preparedness, as determined by the World Economic Forum (2021) Global standards also place a strong emphasis on inclusive policy, teacher preparation, and ongoing development in addition to infrastructure. Many public schools lack even the most basic amenities, such computer labs, reliable internet access, and e-learning platforms. Comparing Pakistan to its regional neighbours, Bangladesh and India, who have made significant strides in implementing digital programs at the national level, highlights this disparity. us assessment systems.

Teachers in Pakistan frequently lack digital pedagogy training, and little is done to modify international models to suit local requirements. Due to a lack of financing, awareness, and scalability, programmes like Talee Mabad, Tele School, and the Punjab IT Board initiatives exhibit promise but fall short of reaching a sizable section of the population. A national vision that is in line with international standards is necessary to close this gap, claim Nadeem & Rizvi (2021). This entails boosting funding for education, establishing targets for digital proficiency, and encouraging global cooperation. Pakistan's educational reforms must emphasize technology adaptation as a requirement rather than a luxury if it is to compete on a global scale. The nation's human capital and ability for future innovation will be improved by bridging the digital gap and bringing education into line with international standards.

Lack of Investment in Educational Technology

The persistent underfunding of educational technology is one of the main causes of Pakistan's lagging adoption of new technologies in the classroom. Pakistan continues to devote a remarkably low portion of its national budget to education—less than 2% of its GDP—making it one of the least generous in South Asia, despite the global trend toward technology for learning, smart classrooms, and artificial intelligence in education (UNESCO, 2021). The introduction, upkeep, and spread of technical instruments throughout educational institutions are significantly hampered by this lack of funding.

Every level of the education system exhibits a lack of financial commitment. Basic amenities like computers, projectors, and reliable internet access are frequently absent from public classrooms. Schools in many remote locations do not have electricity, much less access to digital resources. Just 22% of Pakistani public schools have operational computer labs, and even fewer have access to modern gear and software or skilled personnel, as stated by Farooq and Hussain (2020). Although the situation at private schools may be marginally better in urban areas, communities with lower incomes and rural students are excluded from the advantages of contemporary learning settings due to the high expense of accessing digital education.

Furthermore, technology has not always been given priority in Pakistani educational systems as a fundamental element of curriculum delivery. Even though several programs have been started, such Punjab's Smart Schools Program and the prime minister's Digital Pakistan Vision, they are still poorly funded and unevenly carried out. The end effect is a patchwork of digital initiatives that are not nationally accessible, sustainable, or scalable. Many digital education initiatives in Pakistan, as noted by Ahmed and Qureshi (2021), are donor-driven and have a short lifespan; institutionalizing technology inside the education ministry's long-term planning receives minimal consideration.

The underfunding of teacher training is another significant problem. Many educators lack the knowledge and self-assurance necessary to successfully employ digital technologies in the classroom, even in situations when hardware

is available. Consistent professional development is necessary for educational technology, but Pakistan's teacher education programs mostly lack it. Investments in technology do not result in better learning outcomes if they are not accompanied by adequate training. The efficacy of technology in classrooms is further limited by teachers' frequent unfamiliarity with digital pedagogy, online assessment tools, and learning management systems (LMS). Pakistan likewise lags in generating native digital content. Little money is spent on developing interactive modules, e-books, or specific to the topic digital libraries in regional languages.

Pakistani students' cultural and academic requirements are not always met by international technology or foreign learning platforms, which highlights the necessity of funding domestic educational technology. However, such innovation necessitates cooperation and support from academic institutions, the private IT sector, and the government—an approach that is now absent from the national education policy. In contrast, nations like Bangladesh and India have made great strides in incorporating technology into their educational frameworks. For example, with the help of significant funding and public-private partnerships, India's Digital India initiative has installed smart classrooms and digital materials in several states. In contrast, Pakistan still relies on small-scale trial initiatives like Talee Mabad and Tele School, which are creative but lack the number of resources and steady support needed to promote systemic change. Furthermore, corruption and poor management in the educational sector lessen the impact of the meager funding that is allotted. According to studies, inadequate planning and oversight procedures cause a sizable amount of funds allotted for ICT in education to be lost, wasted, or delayed (Shah, 2022). Because of this, educational organizations are unable to improve their current technology or reach a larger audience with their digital services.

Urgent and focused investment is needed to close the technological gap and raise Pakistani education to international norms. This covers investments in digital content production, teacher preparation, accessibility to the internet, and maintenance systems in addition to hardware and infrastructure. Budgetary restrictions, a lack of clear policy direction, insufficient training, and institutional neglect are some of the main causes of Pakistan's low investment in educational technology. The government must make a sustained, well-funded, and well-coordinated commitment to modernizing its educational system through significant technological integration to address these problems. To guarantee the technology for education becomes a long-lasting and significant component of Pakistan's educational landscape, strategic planning, more public funding, and cooperation with private tech companies are necessary.

Political Will and Government Fo‘cus:

Political will and government emphasis are essential to the growth of every country's educational system, especially when it concerns integrating technology. The adoption of technological improvements in education in Pakistan has remained uneven and generally ineffectual, despite the introduction of multiple programs and initiatives over the years, including Vision 2025 and the Digital Pakistan Initiative. Lack of consistent political commitment and ineffective governance systems that do not make education a top priority on the long-term national agenda is two of the main causes of this disparity. Political unpredictability and frequent leadership changes cause educational initiatives to be discontinued or reshaped before they can be completely implemented, as Haider and Qazi (2021) point out.

Although grandiose plans for educational technology are frequently announced by successive administrations, these plans rarely materialize because of short-term political motivations, a lack of financing, and inadequate follow-through. The development of a long-term plan for technology in education is hampered by the absence of political continuity. Furthermore, Pakistan's national budget allocates a comparatively little amount to education—typically less than 2% of GDP—much less than the UNESCO-recommended level of 4-6%. The development of technology is not given priority within this Meager budget. Particularly in impoverished and rural areas, there is a lack of investment in digital tool training for teacher Tele Schoolr laboratories, and internet connectivity. Policymakers find it challenging to track developments or implement evidence-based changes in due to the lack of planned strategies and appropriate evaluation procedures. Additionally, conflicting interests and administrative roadblocks can weaken political will. Administrative inefficiency, a lack of cooperation among departments, and corruption are the main causes of the delays in many government projects. For example, during the COVID-19 pandemic, promising programs like TeleSchool and the Taleemabad app were launched; however, in the post-pandemic period, there has been little political backing for their maintenance and growth.

Moreover, national professional development initiatives hardly ever address digital literacy and technological training for educators. This speaks to a larger issue: politicians themselves frequently don't realize how profoundly technology might improve learning results. Effective, long-lasting change in Pakistan's education system is unlikely to happen unless there is a sincere commitment at the highest levels of leadership. Political leaders must embrace educational technology as a significant national priority rather than merely an election pledge to overcome these obstacles. A more technologically advanced educational system in Pakistan may be possible with sustained bipartisan support, more funding, and open implementation strategies.

Cultural and Religious Aspects:

Public perceptions of education in Pakistan are greatly influenced by religious and cultural beliefs, particularly when it comes to the use of contemporary

technologies in the classroom. The interpretation and application of these concepts frequently differ among locations and societies, even when religion itself encourages the quest of knowledge—as demonstrated by Islamic teachings that encourage the development of Ilm. Educational technology is viewed with suspicion and occasionally as a challenge in comparison to conventional moral and cultural values in some conservative elements of Pakistani society, especially in rural and tribal areas.

Objection to a co-education digital media, access to the internet in schools, and multimedia materials is more common in places where cultural conservatism is dominant, claim Ali and Zafar (2020). As a result, girls' participation in technology and even schools is restricted. In these situations, parents and local authorities frequently favor traditional educational techniques—like textbook-focused instruction and rote memorization—over interactive or digital resources because they believe the latter to be superfluous or culturally inappropriate.

Misunderstandings of religion can contribute to this delay. Their adoption is further discouraged by the fact that the use of smart gadgets and the internet in the classroom is sometimes associated with moral decay or Western influence. The execution of national online education initiatives is hampered by this mentality.

Such conservative resistance is a significant barrier to the successful implementation of tech-based learning programs, especially for female students, according to the results of the Pakistan Institute for Peace Studies (PIPS, 2022). Additionally, numerous faith-based seminaries (Madaris) still teach material that is disconnected from contemporary teaching methods. A sizable section of Pakistan's student body attends these institutions, although they frequently lack computer labs and experience to digital tools. Due to political hesitancy and cultural inertia, modifications to seminary curricula have been attempted, such as integrating science and technology, but the development has been inconsistent and gradual. In order to advance, it is critical to involve parents, community elders, and religious scholars in awareness-raising initiatives that link the use of technology in education with Islamic values of learning, development, and advancement. Technology can be presented as a tool to improve learning in a values-based way rather than as a danger by developing culturally appropriate digital curricula and offering training to educators, including religious educators. Pakistan can only get past the sociocultural obstacles preventing the full incorporation of technological advances in education by implementing inclusive solutions like these.

Local Examples and Case Studies:

Pakistan's efforts to incorporate technology into its educational system have witnessed both significant obstacles and encouraging developments in recent years. A number of efforts have sought to use digital tools to modernize

education; the success of these programs has varied depending on infrastructure, governance, implementation tactics, and policy coherence. The Punjab Information Technology Board (PITB), which has started several initiatives to digitize public education, is one of the more successful instances. Two programs that gave schools access to digital content and online monitoring tools were the School Information System (SIS) and eLearn Punjab. Rafique and Ghani (2021) claim that eLearn Punjab greatly raised pupil participation in urban schools by providing free digital textbooks with interactive content for grades 6–12. However, due to inadequate internet infrastructure and restricted access to digital devices, the campaign failed in rural areas, underscoring the disparity in technological readiness between urban and rural communities.

The Taleemabad App, created by the Orenda Project, is another noteworthy example. This software targets underprivileged and low-income kids by providing animated video courses that are based on Pakistan's national curriculum. It has been utilized in both official and informal contexts and is renowned for offering high-quality education in an interesting way. The popularity of the software can be attributed to its easy-to-use interface, Urdu-localized content, and smartphone accessibility. In contrast to pupils who only used textbooks, students who used Taleemabad showed better conceptual comprehension in science and mathematics, according to a study by Khan & Mehmood (2022). Another example worth examining is TeleSchool, which was introduced during the COVID-19 pandemic. Students in grades 1–12 received regular lectures from this government-run television network. Despite being timely and helpful in reaching a large audience, the initiative's efficacy was constrained by low awareness in distant communities and a lack of two-way contact. Although TeleSchool enhanced learning continuity during lockdowns, a research by Ahmed & Javed (2021) discovered that it lacked systems for student feedback and assessment, making it a short-term rather than long-term educational change. Additionally, the Federal Directorate of Education's Digital Learning Project in Islamabad experimented with integrating tablets and smart classrooms. In a few chosen model schools, this pilot program revealed improvements in teacher and student motivation. Teacher involvement and student motivation both improved as a result of this pilot program in a few chosen model schools. However, the initiative was criticized for its lack of scalability, inadequate technical support, and poor follow-up, especially in less developed areas.

These instances highlight a prevalent trend in Pakistan's educational technology environment: creative projects are launched, frequently with government or donor backing, but they are unable to grow because of inadequate infrastructure, inconsistent policies, and a lack of teacher training. By incorporating community involvement, maintaining policy stability, and giving teacher development top priority in their edtech models, nations like Bangladesh and India, on the other hand, have demonstrated comparatively greater success (Riaz, 2022). The

Pakistani case studies highlight the potential of educational technology in conjunction with public-private partnerships, government assistance, and locally relevant material. Nevertheless, the effectiveness of these initiatives is diminished in the lack of a unified national strategy and technological policy framework. Bridging the digital divide, particularly in rural regions, and ensuring the sustainability of such efforts through ongoing investments, monitoring, and stakeholder involvement are necessary if technology is to bring about systemic change in education.

Results and Interpretation:

A complex combination of systemic issues and missed opportunities is revealed when Pakistan's educational system is examined in light of technology adaptability. The conclusions derived from academic publications, official documents, and case studies demonstrate that although the value of technological innovation in education is acknowledged, its application is still dispersed, poorly supported, and unevenly administered. One of the most important conclusions is that the incorporation of educational technology has often failed due to a lack of long-term, consistent education policy. Khan (2021) claims that because there is no single digital education plan, each new government launches new projects without considering the results of earlier ones. It is challenging to implement long-lasting reforms because of this lack of continuity, which perplexes educators and administrators.

Another crucial element is inadequate investment. Pakistan devotes only approximately 2% of its GDP to education, without an even lower portion going toward technology infrastructure, despite growing awareness of the advantages of digital learning (UNESCO, 2022). Especially in rural and impoverished areas, this lack of funding hinders the creation of digital infrastructure including computer laboratories, internet services, and teacher training programs.The results also show how inadequate most of the public schools' infrastructure is. According to a survey by Ahmed and Qureshi (2021), most Pakistani schools lack internet connectivity and operational computer labs. It is practically impossible to implement any form of technological learning in some rural districts due to power interruptions and a lack of digital resources. Even the most creative educational initiatives fall short in the absence of fundamental infrastructure. Additionally, there is still a lack of attention paid to teacher preparation.

Most Pakistani educators, particularly those working in public institutions, lack digital pedagogy training. They lack the pedagogical knowledge and technological know-how required to successfully incorporate technology into the classroom. Because of this, teachers are either unable or reluctant to use digital tools, even when they are available. Ali (2020) supported this finding by pointing out that effective ed-tech adoption requires instructors to be digitally

literate. Another factor is the opposition to digital education from cultural and religious perspectives. Technology is seen by many parents and conventional school administrators as a distraction or a danger to moral principles. Because of this mentality, traditional classroom instruction is preferred over cutting-edge digital platforms. In conservative and rural communities, wherever exposure to digital tools is limited and frequently restricted, community-level resistance is especially strong (Shah, 2022).

The investigation also finds successful localized success stories despite these obstacles. Projects like Tele School and the Talee Mabad App have demonstrated how educational content may greatly enhance student learning results when it is accessible, inexpensive, and backed with both public and commercial partners. However, the long-term efficacy of these initiatives is limited because they are still scattered and frequently lack national scale backing and policy coherence. Pakistan lags behind regional neighbours like Bangladesh and India when it comes of ed-tech adaptation and has a low Digital Readiness Index score when compared to international norms. Successful educational technology integration has been achieved by nations with long-term planning, significant financial commitment, and well-coordinated legislative frameworks. This consistency is lacking in Pakistan, as evidenced by both qualitative (teacher satisfaction, curricular relevance) and quantitative (student performance, participation in digital courses) outcomes.

According to the findings, Pakistan has enormous potential for educational technology, but achieving this potential would require resolving long-standing problems like unstable policies, inadequate infrastructure, a lack of funding, inadequate teacher preparation, and cultural resistance. To close this technology divide in education, a national strategy endorsed by state as well as non-state actors and sustained by sustainable investment is essential.

Recommendations:

A number of thorough, long-term, and practical suggestions must be implemented in order to address Pakistan's educational system's technology lag. Increasing government spending on instructional technology is the first and most important step. A sizeable amount of the yearly budget for education should be set aside expressly for internet access, smart classrooms, digital infrastructure, and equipment upkeep. Pakistan has no chance of competing with technologically advanced countries without this. Additionally, the government needs to change its strategy from short-term pilot initiatives to long-range plans of action that include scalability and assessment elements (Ali, 2020). Training teachers needs to be a national priority. No matter how sophisticated the technology is, it won't produce the intended results unless teachers are properly educated to use it. In order to provide instructors with digital abilities, blended learning tactics, and content development methods, regular professional development programs—both online and in-person—should be implemented.

Modern training modules that are suited to Pakistan's needs can be created with assistance from partnerships between universities, teacher training programs, and global edtech companies (Ahmed & Qureshi, 2021). It is necessary to provide a framework for public-private partnerships (PPPs) in order to draw in private sector innovation and investment. Particularly in underprivileged areas, private tech enterprises, telecom providers, and educational digital platforms can support outreach initiatives, software development, and reasonably priced technological solutions. These collaborations may also result in the creation of regionally appropriate digital content in local languages, which is essential for inclusive education (Nadeem & Rizvi, 2021). Corporate expenditure on educational technology can be stimulated by government incentives like tax breaks or subsidies. The inclusion of information and communication technology, or ICT, in the national curriculum is another important suggestion. At the moment, many schools approach technology as a distinct topic. Rather, it ought to be integrated into all courses and grade levels to encourage critical thinking, problem-solving, and digital literacy. This will produce a generation of tech-savvy people who can use technology creatively in addition to being aware of it.

Furthermore, a major priority needs to be making sure that everyone has equal access to technology. Targeted initiatives are needed to close the gap between urban and rural areas in terms of access to digital devices, the internet, and electricity. The digital divide can be closed with the support of programs like developing educational centres in communities with shared digital resources, increasing internet connectivity in remote places, and giving students in rural areas subsidised tablets or laptops (Shah, 2022).Finally, any educational technology project should incorporate monitoring and assessment systems. This entails establishing precise objectives, monitoring advancement, evaluating results, and making necessary modifications on schedule. Supporting data-driven policymaking and providing money for scalable solutions are two other ways that foreign donors and development organizations can contribute. In conclusion, it is feasible to modernize Pakistan's educational system using technology, but doing so calls for a cooperative ecosystem, political will to succeed, strategic investment, and highly qualified people capital. The technological gap in Pakistan would widen if these suggestions are not promptly and practically implemented, placing generations to come back in a world that is becoming increasingly digital.

Conclusion:

The persistent underfunding of educational technology is one of the main causes of Pakistan's lagging adoption of new technologies in the classroom. Pakistan continues to devote a remarkably low portion of its national budget to instruction—less than 2% of its GDP—making it one of the least generous in

South Asia, despite the global trend toward electronic educational resources, intelligent learning environments, and artificial intelligence for educational purposes (UNESCO, 2021). The introduction, upkeep, and spread of technical instruments throughout educational institutions are significantly hampered by this lack of funding. Every level of the education system exhibit a lack of financial commitment. Basic amenities like computers, projectors, and reliable internet access are frequently absent from public classrooms. Schools in many remote locations do not have electricity, much less access to digital resources.

Just 22% of Pakistani public schools have operational computing facilities, and even fewer have access to modern gear and software or skilled personnel, as reported by Farooq and Hussain (2020). Although the situation at private schools may be marginally better in urban areas, people with lower incomes and rural students are excluded from the advantages of contemporary learning settings due to the high expense of accessing digital education. Furthermore, technology has not always been given priority in Pakistani educational systems as a fundamental element of curriculum delivery. Even though several programs have been started, such Punjab's Smart Schools Program and the Prime Minister's Digital Pakistan Vision, they are still poorly funded and unevenly carried out.

The end effect is a hodgepodge of digital initiatives that are not nationally accessible, sustainable, or scalable. Most digital education initiatives in Pakistan, as noted by Ahmed and Qureshi (2021), are donor-driven and have a short lifespan; institutionalizing technology inside the education ministry's long-term planning receives minimal consideration. The underfunding of teacher training is another significant problem. Many educators lack the knowledge and self-assurance necessary to successfully employ digital technologies in the classroom, even in situations when hardware is available. Consistent professional development is necessary for educational technology, but Pakistan's teacher education programs mostly lack it. Investments in technology do not result in better learning outcomes if they are not accompanied by adequate training. The efficacy of technology in classrooms is further limited by teachers' frequent unfamiliarity with digital pedagogy, online assessment tools, and learning management systems (LMS). In terms of creating locally relevant digital content, Pakistan likewise trails behind. Little money is spent on developing interactive modules, e-books, or topical digital libraries in regional languages. Pakistani students' cultural and academic requirements are not always met by import technology or foreign learning platforms, which highlights the importance of funding domestic educational technology. However, such innovation necessitates cooperation and support from academic institutions, the private IT sector, and the government—an approach that is now absent from the national education policy. In contrast, nations like Bangladesh and India have made great strides in incorporating technology into their educational frameworks. For example, with the help of significant funding and public-private partnerships, India's Digital India initiative has installed smart schools

and e-content in several states. In contrast, Pakistan still relies on small-scale trial initiatives like Talee Mabad and Tele School, which are creative but without the scale and steady support needed to promote systemic change. Furthermore, corruption and poor management in the educational sector lessen the impact of the Meager funding that is allotted. According to studies, inadequate planning and oversight procedures cause a sizable amount of funds allotted for ICT in education to be lost, wasted, or delayed (Shah, 2022). Because of this, educational organizations are unable to improve their current technology or reach a larger audience with their digital services.

Without making educational technology a top priority for the country's growth, Pakistan runs the risk of lagging farther behind in terms of giving its young people the skills they need for the twenty-first century. In conclusion, Pakistan's inadequate investment in technology for education is a complex issue with roots in institutional neglect, poor policy guidance, limited funding, and insufficient training. The government must make a sustained, well-funded, and well-coordinated commitment to modernizing its educational system through significant technological integration in order to address these problems.

References

Ahmed, A., & Qureshi, N. (2021). *Digital Infrastructure and the State of Public Education in Pakistan*. Journal of Educational Development, 12(1), 29–47.

Ali, M., & Zafar, H. (2020). *Cultural Resistance and Digital Education in Pakistan: A Socio-Religious Perspective*. Journal of Education and Society, 12(3), 144–158.

Farooq, R. A., & Hussain, M. (2020). *Educational Technology and Investment in Public Sector Education: A Case of Pakistan*. Journal of Educational Research and Reviews, 15(2), 45–58.

Khan, M. (2021). *Policy Instability and the Digital Divide: A Study of Pakistan's Education Sector*. Pakistan Journal of Social Sciences, 18(2), 55–71.

Pakistan Institute for Peace Studies (PIPS). (2022). *Education, Extremism, and Cultural Conflict in Pakistan*.

Rafique, A., & Ghani, S. (2021). *The Effectiveness of eLearn Punjab in Digitalizing Education: A Review of Public Sector Initiatives in Punjab*. Pakistan Journal of Educational Technology, 2(1), 45–60.

Khan, A., & Mehmood, N. (2022). *Taleemabad and the Future of Mobile*

Learning in Pakistan: A Case Study. South Asian Journal of Educational Development, 4(2), 18–32.
Rafique, A., & Ghani, S. (2021). *The Effectiveness of eLearn Punjab in Digitalizing Education: A Review of Public Sector Initiatives in Punjab*. Pakistan Journal of Educational Technology, 2(1), 45–60.