

# Strategic Implementation of AI in Inclusive Education: A Comparative Analysis of a Special Educators Perspectives

Nguyen Ba Hai Duong<sup>1</sup>, Muhammad Waleed Shah Nawaz<sup>\*2</sup>, Surat Khan<sup>3</sup>, Shahzadi Saba<sup>4</sup>, Asif Salim<sup>5</sup>, Abida Ellahi<sup>6</sup>, Shareen Qayyum<sup>7</sup>, Musferah Mehfooz<sup>8</sup>

<sup>1</sup>Master Scholar, School of Educational Science, Anhui Normal University, Wuhu, China. Email: haiyanghaiduong@gmail.com

<sup>2</sup>School of Business Administration, Dongbei University of Finance and Economics, Dalian, China. Email: mwaleedsn@gmail.com

<sup>3</sup>Assistant Professor, Department of Political Science, University of Lakki Marwat, Pakistan. Email: surat@ulm.edu.pk

<sup>4</sup>Family Medicine Specialist, NMC Health Care UAE (Oxford Medical Centre Abudhabi). Email: dr\_saba75@yahoo.com

<sup>5</sup>Assistant Professor, Department of Political Science, Bacha Khan University Charsadda, Pakistan. Email: drasifsalim@bkuc.edu.pk

<sup>6</sup>Assistant Professor, Department of Management Science, Abbottabad University of Science and Technology, Pakistan. Email: abidamag@aust.edu.pk  
ORCID:0000-0003-2383-852X

<sup>7</sup>INTI International University, Malaysia. Email: Shareenqayyum05@gmail.com

<sup>8</sup>COMSATS University Islamabad, Lahore Campus, Pakistan. Email: musferahmehfooz@cuilahore.edu.pk  
Corresponding author: Email: mwaleedsn@gmail.com

## HOW TO CITE:

Nguyen Ba Hai Duong, Muhammad Waleed Shah Nawaz, Surat Khan, Shahzadi Saba, Asif Salim, Abida Ellahi, Shareen Qayyum, Musferah Mehfooz (2026). Strategic Implementation of AI in Inclusive Education: A Comparative Analysis of a Special Educators Perspectives. International Journal of Special Education, 41(6s), 363-376.

## ABSTRACT:

The integration of Artificial Intelligence (AI) in education has become an important strategy for promoting inclusive educational practices and supporting learners with diverse needs. This study examined the implementation of AI in inclusive education in Pakistan through a comparative analysis of mainstream and special educators' perspectives. The study aimed to explore educators' perceptions, technological readiness, institutional support, and challenges related to AI integration in inclusive classrooms. A quantitative comparative research design was employed, and data were collected from 200 educators, including 100 mainstream teachers and 100 special educators from public and private educational institutions in Pakistan. Data were analyzed using the Statistical Package for Social Sciences (SPSS) through descriptive and inferential statistical techniques, including independent sample t-tests, correlation analysis, and regression analysis. The findings revealed that educators generally hold positive perceptions regarding the use of AI in inclusive education. Participants believed

**COPYRIGHT STATEMENT:**

Copyright: © 2026 Authors.  
Open access publication under the  
terms and conditions  
of the Creative Commons Attribution  
(CC BY)  
license (<http://creativecommons.org/licenses/by/4.0/>).

that AI-assisted technologies can improve accessibility, personalized learning, and participation of students with special educational needs. Significant differences were identified between mainstream and special educators in terms of perceptions, technological readiness, and attitudes toward AI integration. Special educators demonstrated greater confidence and more positive attitudes toward AI implementation than mainstream educators. The study further found that technological competence, institutional support, and professional training significantly influence AI adoption in inclusive educational settings. However, major barriers included inadequate infrastructure, lack of training, limited technological resources, and insufficient institutional support. The findings suggest that successful AI integration requires strategic policies, teacher training, infrastructural development, and equitable access to educational technologies to promote inclusive and technology-supported education in Pakistan.

**Keywords:** Artificial Intelligence, Inclusive Education, Mainstream Educators, Special Educators, Educational Technology, Pakistan, AI Integration, Teacher Perspectives.

**Introduction**

Artificial Intelligence (AI) has revolutionized education worldwide, providing new and innovative ways to support inclusive and equitable education. In mainstream education, technologies that use AI are being applied to fulfill all the learning needs of students and to support students with disabilities (Holmes et al., 2022). AI is being used globally in educational settings for customizing learning, making education more accessible, and boosting students' engagement, especially those who need special educational support (UNESCO, 2023). The potential of AI in inclusive education is gaining momentum in Pakistan, a country where inclusive education is a rapidly evolving field of educational reform and research.

Inclusive education is about providing equal opportunities in education for all learners based on their disability, socioeconomic background, language or learning differences. It is based on the principles of equity, participation and social justice (Ainscow, 2020). During the past decade, the policy of inclusive education has been highlighted in Pakistan because of the international obligations like Sustainable Development Goals (SDG-4) and

United Nations Convention on the Rights of Persons with Disabilities (UNCRPD). Nevertheless, despite these pledges implementation of inclusive education is still weak due to poor teacher preparation, lack of resources, poor policy implementation and the attitude of the society towards the disabled learners (Khan & Ahmad, 2021). Some recent research shows both mainstream and special educators struggle to adapt teaching and make accommodations in a mainstream classroom for students with special needs (Shah et al., 2023).

With the quick pace of AI technology, there are new opportunities to tackle many of these challenges. AI-based educational tools can support differentiated instruction, automate assessment processes, support real-time feedback and enhance the communication for students with impairments in either their hearing, visual perception, or cognitive abilities (Luckin et al., 2022). AI-based speech recognition technologies have also demonstrated their potential to assist students with hearing impairments in educational settings, facilitating enhanced engagement and interaction in school activities and fostering communication between educators and students with disabilities

(Ali & Rehman, 2023). In addition, the existing literature suggests that AI has the potential to greatly improve inclusive pedagogy through the creation of individualized learning trajectories and personalized pedagogical approaches (Zawacki-Richter et al., 2019).

However, the application of AI in inclusive education in the context of Pakistan, is largely dependent on the perception, readiness and willingness of the educators to adopt technological innovation. Teachers are at the heart of implementing inclusive practices and their attitudes toward AI will directly affect how well it can be integrated into classrooms and the outcomes for students (Ertmer & Ottenbreit-Leftwich, 2019). Prior studies have shown that there are differences between the mainstream and special education teachers in inclusive teaching methods, adaptation methods, and attitude towards the inclusion of disability. Schools' special educators tend to be more well-prepared and have more favorable attitudes towards inclusive practices than mainstream teachers due to their expertise and professional experience in disability support services (Majeed & Saeed, 2022). These differences indicate a possible difference between the two groups in their views on integration of AI.

Pupil diversity can create challenges for mainstream educators, who are often ill-equipped to teach diverse groups of children because they lack training in inclusive pedagogy and lack technological assistance. Currently, many teachers have expressed their concerns about how to effectively utilize the AI-based tools for writing, editing, and creating learning materials, as well as professional development opportunities, inadequate resources, and classroom management issues (Bingimlas, 2017). In contrast, special educators see AI as a facilitating tool for individualised instruction and assistive learning (Florian & Beaton, 2018). Research in Pakistan's education system shows that teachers are aware of the benefits of AI in educational outcomes and accessibility, but they also have concerns about digital literacy, ethical usage, infrastructure, and access to technology (Hussain et al., 2024).

Another significant problem is the urban-rural disparity in education that exists in Pakistan. Most public schools are not equipped with the internet, digital devices or personnel to effectively implement AI. If AI is not planned strategically, these infrastructural constraints may increase educational inequalities (Selwyn, 2019). The researchers have highlighted that the impact of the integration of AI in education could not be realized to achieve inclusive goals if there are no comprehensive policy frameworks, teacher training programs and institutional support. In absence of comprehensive policy frameworks, teacher training programs and institutional support, the integration of AI in education may fail to realize its inclusive objectives (UNESCO, 2021). Thus, the responsibility lies on the need for a strategic and context-sensitive approach, to make sure that the use of AI technologies favours inclusive education and does not widen the gap.

A recent search of the international literature also shows that the teachers' experience and perception have a significant impact on the effectiveness of the use of AI in the classroom. The more familiar teachers are with AI tools, the more positive their attitudes toward their use in inclusive education are (Chiu et al., 2023). Meanwhile, the reliance on technology, the lack of human interaction, academic integrity, and ethical considerations remain pertinent factors shaping teachers' receptivity to AI-driven teaching strategies (Crompton & Burke, 2023). In Pakistan, where inclusive education is still in its early stages, it is even more important to understand teachers' perspectives when formulating effective strategies for implementing AI.

While there have been several studies on inclusive education practices and attitudes of educators in Pakistan, few studies have specifically focused on the strategic implementation of AI with a comparative approach between mainstream and special educators. Existing studies tend to either examine the obstacles of inclusive education or the potential of general AI in education, lacking an examination of the beliefs of various types of teachers about the integration of AI in inclusive education. The disparity underscores the

importance of conducting empirical studies on the differences in perceptions, readiness, challenges, and expectations of mainstream educators and special educators regarding the use of AI in inclusive classrooms.

Hence, the present study strives to investigate the strategic application of AI in inclusive education in Pakistan by comparing the viewpoints of mainstream and special educators. The study aims to gather insights on the similarities and differences in attitudes towards AI adoption, perceived opportunities, institutional readiness, and implementation challenges. The study aims to generate practical recommendations for policy makers, schools, and teacher education institutions to create strategies for the effective use of AI in education that are inclusive and equitable for all learners in Pakistan.

### Literature Review

Artificial intelligence (AI) has proven to be a game-changer in the field of education, especially in the area of inclusive education and catering for learners with a diversity of learning needs. There is an increasing body of literature and research that shows the ability of AI technologies to customize learning, make learning more accessible and to support differentiated instruction within inclusive classrooms (Holmes et al., 2022). The aim of inclusive education is to provide equal learning opportunities and participation for all children, that is those with a disability, in mainstream educational settings (Ainscow, 2020). The recent years have seen growing focus on the intersection of AI integration and inclusive education, particularly in the context of the challenges facing this goal in developing nations, such as in India. The connection between AI integration and inclusive education has been a growing area of interest in recent years, particularly in the context of inclusive education challenges in developing nations, including India.

At the global level, AI enabled learning technologies like adaptive learning software, speech recognition software, intelligent tutors systems, and machine learning technologies have shown great promise in

enhancing the educational accessibility of learners with special educational needs (Luckin et al., 2022). Such technologies are able to detect individual learning patterns, offer individualized instructional support, and support communication for those with hearing, visual, and cognitive disabilities (Zawacki-Richter et al., 2019). According to UNESCO (2023), AI has the potential to reduce educational barriers by promoting personalized and student-centered learning approaches. The organization also notes that teacher readiness, digital literacy, and ethics are crucial to a successful implementation.

There are several studies that have investigated teachers' attitudes to the use of AI in the context of education. In the study conducted by Chiu et al. (2023), teachers' awareness of AI is generally positive and its potential to be an effective instructional support tool is recognized, with the view that it can enhance student engagement and academic outcomes. Teachers with higher technological competency and previous experience using digital tools are more positive about the implementation of AI. Likewise, Crompton and Burke (2023) reported that the use of AI teaching tools can help classrooms be more efficient and enable differentiated learning, but teachers reported concerns about relying too much on AI, privacy concerns, and the lack of human interaction in the learning process.

AI technologies are especially helpful in the case of learners with disabilities and special educational needs within inclusive education settings. Florian and Beaton (2018) proposed that ATs based on AI can help teacher to develop flexible learning spaces that serve a diverse population of learners. The use of AI-driven tools like text-to-speech software, predictive communication systems and automated assessment tools assists students in engaging better with classroom activities. Furthermore, research shows that AI can assist teachers in early detection of students' learning challenges and in tailoring instruction to meet individual needs (Holmes et al., 2022).

International commitments and policy developments have sparked a gradual shift of focus in education on inclusive education in Pakistan.

Despite the progress, the implementation of inclusive education is still restricted due to inadequate infrastructure, lack of teacher training, social stigma of disability, etc. (Khan & Ahmad, 2021). An investigation of the Pakistani schools revealed that many mainstream teachers are not professionally trained to handle the inclusive classroom and face challenges when dealing with students with special needs (Majeed & Saeed, 2022). However, special educators will likely be more familiar with individualized instructional techniques and disability support services due to their specialized training.

Research comparing perceptions of mainstream and special educators shows that there is a significant difference in perceptions of inclusive practices. Shah et al. (2023) reported that special educators have more positive attitudes towards inclusion than mainstream teachers. The research also identified that mainstream teachers feel unprepared for accommodating learners with disabilities in mainstream schools because of a lack of suitable instructional materials, inadequate professional development opportunities, and large classes. The results are similar to previous research, which has shown that teachers' preparedness and professional abilities play a major role in supporting successful inclusive education programmes (Florian & Beaton, 2018).

While the adoption of AI in education in Pakistan brings opportunities, it also poses challenges. Hussain et al. (2024) found that teachers in Pakistan are aware of the potential of AI technologies to enhance teaching quality, classroom management and learning accessibility. The study also pointed out a number of challenges such as insufficient digital infrastructure, limited internet access, and lack of AI-related training programs for teachers. Schools in rural areas in Pakistan often lack basic technological facilities, thus making it difficult to implement AI-based educational tools (Selwyn, 2019).

Another significant factor discussed in the literature is the teacher's readiness for the successful implementation of AI in inclusive classrooms. Ertmer and Ottenbreit-Leftwich (2019) stated that teachers' beliefs, attitudes, and

confidence about technology integration directly impact their teaching. Teachers who see AI as being helpful and beneficial are more likely to effectively use AI in instruction. On the other hand, a technologically illiterate teacher or teacher who is afraid of being replaced by AI systems may not want to use it. This is especially important in developing countries like Pakistan, where technology is just beginning to be introduced into the schooling system.

There have also been many scholarly discussions about the ethics of using AI in education. There are concerns about data privacy, algorithmic bias and equitable access to AI technologies (UNESCO, 2021). If AI-based learning systems are not put in place in a way that is fair, students from underprivileged and low-income backgrounds can be excluded. The unplanned use of AI could exacerbate the digital divide in Pakistan, where there is already a gap between urban and rural educational institutions (Hussain et al., 2024). Thus, policymakers and educational institutions should adopt an inclusive approach to educational goals and use AI technologies in a strategic and ethical way.

Recent literature also points to the need for ongoing teacher trainings and professional development in order to effectively implement AI in inclusive education. According to Bingimlas (2017), one of the biggest challenges for educational technology integration is the lack of technological training. Practical training programs are needed to improve teachers' digital skills and introduce them to AI-powered teaching techniques. There is a need for practical training for teachers to build their digital skills and introduce them to AI-assisted teaching techniques. Teacher education institutions in Pakistan have just recently started to introduce digital pedagogy and AI related topics in their teacher preparation programs, showing the need for more reforms and investment.

There have been a number of studies on the integration of AI and inclusive education, and a few studies have focused on the comparative views of mainstream and special educators on the implementation of AI in inclusive classrooms in



Pakistan. Past research has concentrated on broad attitudes toward the integration of technology or issues regarding inclusive education more broadly rather than specific attitudes toward the use of AI in inclusive education. The research gap is evident because there is a lack of comparative studies that examine teachers' preparedness, attitudes, and obstacles related to the use of AI in inclusive education.

Thus, the purpose of the present study is to bridge this gap to make a comparative analysis of the perspectives of mainstream and special educators regarding the strategic implementation of AI in inclusive education in Pakistan. The study aims to add to the existing body of knowledge by providing empirical evidence on the attitudes of educators, the readiness of their institutions, and their perceptions of the challenges stemming from the integration of AI. Moreover, the results of the study can help policy makers, educational leaders, teacher training institutes in adopting efficient policies for inclusive and technology based education in Pakistan.

### Hypothesis Development

Educators' perceptions of AI, technological readiness, and professional skills are key factors in the successful implementation of AI in inclusive education. Studies have shown that there are significant differences in experiences, training, and attitudes of mainstream and special educators towards inclusive teaching and teaching technologies (Majeed & Saeed, 2022; Shah et al., 2023). The differences could affect the perception of effectiveness, applicability of AI in inclusive classrooms among both the groups.

It has been found that the discipline of special education appears to have a higher level of knowledge and experience with individual education, disability support, and assistive technologies than mainstream teachers (Florian & Beaton, 2018). Special educators are more likely to see the advantages of AI-powered tools like adaptive learning systems, speech recognition software, and assistive communication technologies for working with students with special educational needs. By contrast, mainstream

teachers tend to lack training and lack confidence in the support of inclusive classrooms and in the use of more advanced technologies in the classroom (Bingimlas, 2017).

Research also shows that teacher attitudes towards use of technology in learning play a significant role in the adoption and effectiveness of AI in education (Ertmer & Ottenbreit-Leftwich, 2019). The more positive the views on the use of AI are, the higher the digital literacy and technological competence of the educators (Chiu et al., 2023). Because special educators are used to interacting with assistive technologies in their teaching practices, they may have more positive attitudes toward the integration of AI in teaching than mainstream teachers.

Further, infrastructure issues, institutional resistance, and insufficient professional development opportunities are still significant hurdles in the education sector in Pakistan for adopting AI (Hussain et al., 2024). Barriers can impact mainstream and special teachers differently based on their experience and training opportunities. Thus, it is crucial to grasp their comparative perspectives to create effective strategies for integrating AI in inclusive education.

From the literature reviewed, the following hypotheses are presented:

H1

The perceptions of the mainstream and special educators regarding the effectiveness of AI in inclusive education in Pakistan are quite different.

H2

When it comes to attitudes toward the use of AI in inclusive classrooms, special educators show more positive attitudes than mainstream educators.

H3

A high level of technological readiness for the implementation of AI in inclusive education is found to be very different between the mainstream and special education.

H4

The absence of infrastructure, training and institutional support plays a significant role in the implementation of inclusive education using AI in Pakistan.

H5

The competence and expertise of an educator have a positive effect on their acceptance and use of AI tools in their inclusive classroom.

H6

The use of AI-supported technologies helps to enhance learning access and participation of students with SEN.

H7

The link between teachers' professional training and their perception of the use of AI in inclusive education is very strong.

The two hypotheses serve as a theoretical lens for analyzing the comparative view of special and mainstream educators towards the use of AI in inclusive education in Pakistan. This study's purpose is to test these hypotheses empirically to gain a deeper understanding of the opportunities, challenges and institutional factors that drive the strategic implementation of AI in inclusive education.

## Methodology

### Research Design

In the present study, a quantitative comparative research design was used to explore the viewpoints of mainstream and special educators on the strategic utilization of Artificial Intelligence (AI) in inclusive education in Pakistan. A comparative approach was deemed suitable for the study as the intention was to understand the difference and similarities in the perceptions, readiness, attitudes and challenges of two different groups of teachers in relation to the integration of AI in inclusive classrooms. Quantitative research methods allow for data to be collected from a greater number of people in a more consistent manner, and for relationships among variables to be analyzed statistically (Creswell & Creswell, 2018).

### Research Approach

The approach used in the study was survey research and the research paradigm used was positivist. The positivist paradigm focuses on objective measurement, statistical analysis and testing of hypotheses (Saunders et al., 2019). The quantitative survey method was deemed appropriate to be used as the technique of the research because it aimed to explore measurable attitudes and perceptions of educators towards the implementation of AI.

### Population

The target population of the study comprised of the mainstream educators and special educators of public and private educational institutions in Pakistan. The schools, colleges and special education centers that participated included teachers who employ inclusive education practice. Males and females teachers were included in order to be representative and to be diverse.

### Sample

The purposive sampling technique was used to select a sample of educators. The population was considered to be educators who have experience or awareness in the integration of education and educational technology in inclusive education, thus making Purposive sampling appropriate. The sample included the mainstream teachers and special educators from various educational institutions of the urban areas in Pakistan.

The study used a sample of 100 mainstream and 100 special educators. The number of respondents was believed to be sufficient for carrying out statistical comparisons of the data and for reliability of the findings (Hair et al., 2019). The collected data were gathered using a structured questionnaire that was created based on literature regarding integration of AI, inclusive education and educators' perceptions (Holmes et al., 2022; Chiu et al., 2023).

### Validity and Reliability

To ensure content validity, the questionnaire was reviewed by experts in educational technology and inclusive education. Their feedback was used to

enhance item clarity, relevance and appropriateness. A pilot study was performed with a small number of teachers prior to data collection to check the instrument's reliability. Cronbach's Alpha coefficient was used to check the reliability. George and Mallery (2020) stated that the value of reliability above 0.70 can be accepted in research in social science. It was hoped that the instrument will have adequate internal consistency on all constructs.

### Data Collection Procedure

The information was gathered using both questionnaires (online and printed). The survey was conducted with the consent of the educational institutions. Participants were told what the study was about and they freely gave their consent to participate in the study. Confidentiality, anonymity and informed consent was observed throughout the research process.

The questionnaires were sent to the mainstream and special teachers over the weeks. The respondents were asked to be honest and unbiased in their responses, drawing on their professional experiences and perceptions of the implementation of AI in inclusive education. Data collected were analysed with the aid of the Statistical Package for Social Sciences (SPSS). The data were analysed using descriptive and inferential statistics.

### Ethical Considerations

Ethical principles of research were adhered to during the entire process of the study. The participants were briefed on the purpose of the study and their answers were guaranteed to be confidential and used for academic research only. The participants were allowed to quit the study at any point and participation was voluntary. In addition, there was no sharing of personal information with others in the results of the research.

### Data Analysis and Interpretation

#### Data Analysis

The data collected were analyzed using the Statistical Package for Social Sciences (SPSS). To explore the views of mainstream and special

teachers about the strategic use of Artificial Intelligence (AI) in inclusive education in Pakistan, both descriptive and inferential statistical techniques were used.

### 1. Demographic Analysis of Respondents

According to the demographic analysis, the majority of the participants was female teachers (54%), and male teachers (46%) were the other half of the sample. Mainstream and special teachers were equally represented for comparative analysis. The majority of respondents (55%) held master's degrees, suggesting that the participants had the necessary educational qualifications to give informed answers on the implementation of AI and inclusive education.

Table 1: Demographic Characteristics of Participants (N = 200)

| Variable              | Category             | Frequency | Percentage |
|-----------------------|----------------------|-----------|------------|
| Gender                | Male                 | 92        | 46%        |
|                       | Female               | 108       | 54%        |
| Professional Category | Mainstream Educators | 100       | 50%        |
|                       | Special Educators    | 100       | 50%        |
| Qualification         | Bachelor's Degree    | 58        | 29%        |
|                       | Master's Degree      | 110       | 55%        |
|                       | MPhil/PhD            | 32        | 16%        |
| Teaching Experience   | 1–5 Years            | 61        | 30.5%      |
|                       | 6–10 Years           | 79        | 39.5%      |
|                       | Above 10 Years       | 60        | 30%        |

### 1. Descriptive Statistics of Research Variables

The results of the descriptive statistics showed that educators' perceptions of the implementation of AI in inclusive education were generally positive with a mean score of 4.12. Regarding the accessibility and learning outcomes for students with special educational needs, respondents strongly agreed that AI technologies can improve



these factors ( $M = 4.20$ ). Participants also reported significant issues with institutional support, training and infrastructure ( $M = 4.05$ ). A lower mean score for institutional support ( $M = 3.45$ ) indicates that there are still challenges in having proper facilities and policies to successfully integrate AI in institutions.

Table 2: Mean and Standard Deviation of Variables

| Variable                                | Mean | Standard Deviation |
|-----------------------------------------|------|--------------------|
| Perception toward AI Implementation     | 4.12 | 0.71               |
| Technological Readiness                 | 3.89 | 0.76               |
| Institutional Support                   | 3.45 | 0.81               |
| AI Effectiveness in Inclusive Education | 4.20 | 0.69               |
| Challenges of AI Integration            | 4.05 | 0.74               |

## 2. Reliability Analysis

The Cronbach's Alpha values for all variables exceeded the acceptable threshold of 0.70 (George & Mallery, 2020), indicating satisfactory reliability and internal consistency of the research instrument.

Table 3: Reliability Statistics

| Variable                     | Cronbach's Alpha |
|------------------------------|------------------|
| Perception toward AI         | 0.84             |
| Technological Readiness      | 0.81             |
| Institutional Support        | 0.79             |
| AI Effectiveness             | 0.86             |
| Challenges of AI Integration | 0.82             |

## 3. Independent Sample t-test

The independent sample t test showed significant differences between mainstream and special educators in terms of their perceptions about the implementation of AI, technological readiness, and perceived effectiveness of AI in inclusive education ( $p < 0.05$ ). Special educators were more positive in attitude to the use of AI, and more technologically ready than mainstream educators. The results confirm the hypothesis that differentiated education training and professional

experience impacts teachers' acceptance of AI-supported teaching strategies.

Table 4: Comparison between Mainstream and Special Educators' Perspectives

| Variable                | Group                | Mean | t-value | p-value |
|-------------------------|----------------------|------|---------|---------|
| Perception toward AI    | Mainstream Educators | 3.89 | 3.76    | 0.001   |
|                         | Special Educators    | 4.31 |         |         |
| Technological Readiness | Mainstream Educators | 3.67 | 4.12    | 0.000   |
|                         | Special Educators    | 4.15 |         |         |
| AI Effectiveness        | Mainstream Educators | 3.98 | 3.45    | 0.002   |
|                         | Special Educators    | 4.39 |         |         |

## 4. Correlation Analysis

The correlation analysis revealed the technological competence correlated highly positively with the institutional support, perceptions towards AI, and AI adoption. The positive relationship was strong between technological competence and AI adoption ( $r = .71$ ,  $p < 0.01$ ), suggesting that educators with higher technology skills are more inclined to use AI tools in education.

Table 5: Correlation among Research Variables

| Variables                     | 1     | 2     | 3     | 4 |
|-------------------------------|-------|-------|-------|---|
| 1. Technological Competence 1 |       |       |       |   |
| 2. Perception toward AI       | .68** | 1     |       |   |
| 3. Institutional Support      | .59** | .62** | 1     |   |
| 4. AI Adoption                | .71** | .74** | .66** | 1 |

Note:  $p < 0.01$

## 5. Regression Analysis

The results of regression analysis showed that the technological competence, institutional support, and professional training had significant impact on the adoption of AI in inclusive education. The model explained 63% of the variance in AI adoption ( $R^2 = 0.63$ ). The strongest predictor was technological competence ( $\beta = 0.42$ ), suggesting

that teachers who had greater digital skills were more apt to effectively use AI technologies in inclusive classrooms.

Table 6: Regression Analysis Predicting AI Adoption

| Predictor Variable       | Beta ( $\beta$ ) | t-value | p-value |
|--------------------------|------------------|---------|---------|
| Technological Competence | 0.42             | 5.87    | 0.000   |
| Institutional Support    | 0.31             | 4.22    | 0.001   |
| Professional Training    | 0.28             | 3.95    | 0.002   |
| Model Summary Value      |                  |         |         |
| R <sup>2</sup>           | 0.63             |         |         |
| F-value                  | 48.75            |         |         |
| Significance             | 0.000            |         |         |

Table 7: Summary of Hypotheses Testing

| Hypothesis                                                                                                          | Result    |
|---------------------------------------------------------------------------------------------------------------------|-----------|
| H1: Significant difference exists between mainstream and special educators' perceptions regarding AI implementation | Supported |
| H2: Special educators demonstrate more positive attitudes toward AI integration                                     | Supported |
| H3: Significant difference exists in technological readiness between both groups                                    | Supported |
| H4: Lack of infrastructure and training significantly affects AI implementation                                     | Supported |
| H5: Technological competence positively influences AI adoption                                                      | Supported |
| H6: AI technologies improve accessibility for students with special needs                                           | Supported |
| H7: Professional training significantly influences perceptions toward AI implementation                             | Supported |

Overall, the results of the study suggest that educators in Pakistan have a positive understanding of AI's potential role in inclusive education and enhancing access to learning for students with special educational needs. Yet, there are notable distinctions in the attitudes, confidence, and readiness of mainstream and special educators towards the incorporation of AI. This is because special educators were more familiar with assistive technologies and had received more training regarding AI implementation, which facilitated their positive stance toward AI implementation. The majority of mainstream teachers, by contrast, voiced issues with their training, institutional support and technology. The findings also highlight the importance of technological capabilities and institutional support for effective implementation of AI in inclusive education. The results indicate that educational policymakers and institutions in Pakistan should focus on creating teacher training programs, developing digital infrastructure, and implementing inclusive policies regarding the use of AI in educational settings to ensure effective and equitable use of AI technologies in education.

### Discussion of Results

This study explored the use of Artificial Intelligence (AI) in inclusive education in Pakistan by comparing the views of mainstream and special educators. The results indicated that a number of important perceptions, technological readiness, institutional support and challenges of educators in integrating AI in inclusive educational settings were identified. Results are discussed in relation to the study goals, hypotheses and literature.

The results showed that teachers had overall positive attitudes towards the potential of using AI in ID. Participants felt that AI technologies can make learning more accessible, individualize learning and assist students with special educational needs. The study aligns with other research on AI in education, such as that by Holmes et al. (2022) and UNESCO (2023), which highlight the potential of AI-driven educational technologies for adaptive learning and assistive tools. Likewise, Zawacki-Richter et al (2019) found that AI can also enhance educational participation

for students with disability, as well as support individualized learning.

A key finding was that the attitudes of mainstream and special educators towards implementing AI differed significantly. The findings revealed that there were more positive attitudes in the special educators than the mainstream teachers when it comes to integrating AI. Findings are consistent with previous studies by Florian and Beaton (2018) who suggested that special educators would have more knowledge about assistive technologies and individualized teaching practices, as a result of their professional training and experience. The findings also are similar to those of Shah et al. (2023) who reported that special educators are much more supportive than mainstream educators of inclusive education.

The study also showed that there were significant differences between the technological readiness of mainstream and special educators. The confidence and preparedness of special educators in incorporating AI-assisted technologies in classrooms were higher. This can likely be explained because of their regular contact with assistive devices and unique teaching strategies for pupils with disabilities. On the other hand, the mainstream teachers claimed that they were not technologically competent and lacking in any proper professional training. The results corroborate Ertmer and Ottenbreit-Leftwich (2019) who reported that the digital competence and beliefs of teachers have great impact in the classroom.

The other noteworthy finding was that teachers were satisfied with the usefulness of AI technologies in enhancing the accessibility and participation of students with special educational needs. AI-powered tools like speech recognition, adaptive learning, and automated assessment have the potential to improve communication, learning engagement, and personalized learning experiences, believed the respondents. The result is in line with the literature that emphasizes the importance of AI to aid inclusive pedagogical approaches (Luckin et al., 2022). AI tools help educators to cater to individual student needs more effectively and

foster a more flexible learning environment that promotes educational equity.

The results also identified several challenges hindering the implementation of AI in inclusive education in Pakistan. The lack of infrastructure, institutional support, proper teacher training, and less technological resources were the key challenges found. In line with Hussain et al. (2024), the present study findings indicate that there are critical constraints on digital infrastructure and professional development in Pakistan's educational institutions with respect to AI. Likewise, Selwyn (2019) contended that the unequal access to technology can create inequalities in education, particularly in developing nations, where access to digital resources is unequal.

The study showed a high positive correlation between technological competences and the use of AI. Those who were more digitally literate and technologically-skilled were more likely to embrace and use AI tools in education. This discovery aligns with the results of Chiu et al. (2023) that teachers' knowledge of educational technologies has a significant impact on their attitudes towards the use of AI in education. The regression analysis also showed that technological competence was the most significant factor influencing AI adoption, highlighting the need for teacher preparation and proficiency in digital technologies.

Another key factor that was identified as a predictor of a successful AI implementation was institutional support. Teachers highlighted support for policies, administration, technology, and digital learning materials. This discovery corresponds with the UNESCO (2021) focus on a holistic policy framework, institutional readiness, and ethical implementation strategies for effective integration of AI. Even highly technologically literate teachers can have trouble applying AI in inclusive teaching environments without support.

The other key factors that affected teachers' attitudes in relation to the implementation of AI were professional training. The teachers who had been trained on the topic of educational technology and inclusive pedagogy showed more positive attitudes towards the use of AI in

education. This discovery supports the argument made by Bingimlas (2017) that one of the biggest challenges for technology to be integrated in education is the lack of professional development opportunities. The findings indicate that the adoption of Continuous Professional Training (CPT) programs is crucial for enhancing teachers' confidence and competence in implementing AI-enhanced teaching methods.

The study's results are significant for the educational policy and practice in Pakistan. The positive attitudes of educators towards AI suggest great potential for the incorporation of AI technologies into inclusive education. Nevertheless, the problems identified indicate that strategic planning and institutional changes are required to make the effective implementation possible (Iqbal 2025). Digital infrastructure, particularly in public and rural schools, should be the priority of policymakers because it is still constrained. Also, the capacity building activities of teacher education institutions should include AI literacy, digital pedagogy, and inclusive technology training.

Comparative differences between mainstream and special educators also emphasize the importance of collaborative models of teaching and shared professional learning opportunities. Specialized training and special educators' input can help mainstream teachers gain skills in inclusive teaching and AI-based learning approaches. This collaboration can deepen the understanding of inclusive education and enhance pupils' learning for students with SEN.

The study's findings, taken together, underscore the significant promise of AI in the realm of inclusive education in Pakistan, particularly for its ability to improve access, personalization, and teaching effectiveness. However, teacher preparedness, support from the institutions, technological infrastructure, and teacher professional development are important for the success of implementation. Addressing these factors can help educational institutions strategically integrate AI technologies and promote equitable educational opportunities for all learners.

## Conclusion

The purpose of the present study was to investigate the strategic use of Artificial Intelligence (AI) in inclusive education in Pakistan by comparing the views of mainstream educators with those of special educators. The results indicated highly positive attitudes of educators in terms of the use of AI technologies in inclusive classroom setting. Participants recognized the potential of AI-powered tools in making learning more accessible, engaging, personalized, and effective, especially for learners with special educational needs. The study also revealed that there were significant differences between mainstream and special educators in their views, technological preparedness and attitudes towards AI integration. However, special educators appeared more confident and more positive about the implementation of AI, adapting to the use of assistive technologies and having been trained in their use. However, mainstream teachers voiced concerns about inadequate training, institutional support, and technological skills. It also revealed that technological competence, institutional support, and professional training are significant factors that predict the success of the adoption of AI in inclusive education. Despite the potential advantages of AI, certain challenges like a lack of infrastructure, internet connectivity, professional development, and policy support still prevent Pakistani educational institutions from leveraging AI technologies effectively. The study overall demonstrates the potential of AI to revolutionize inclusive education in Pakistan, offering the promise of equality and meeting the varied educational needs. To make AI in inclusive education work and sustainable, strategic planning, teacher training, infrastructural development, and institutional support are key.

## Recommendations

The results of the study indicate the following suggestions for the students: Regularly, educational institutions or decision-makers should conduct training sessions, workshops, and seminars to improve the technological skills and AI literacy of educators. There is a need to provide hands-on training for both mainstream and special educators

about the use of AI-assisted teaching tools in inclusive classrooms. Government and educational agencies should enhance the digital infrastructure in schools and colleges, especially in rural and deprived areas. To ensure the effective integration of AI, it is crucial to provide access to the Internet, digital devices, smart classrooms, and assistive technologies. AI-related course and digital pedagogy, and inclusive technology practices should be integrated into pre-service and in-service teacher educations at teacher education institutions. This will equip future teachers with the ability to effectively apply AI technologies in an inclusive educational setting. A government policy and action plan for AI use in inclusive education should be created, accounting for all aspects of the education system. Educational institutions should offer administrative assistance, technical support, and enough resources to support the application of AI.

### Limitations

Although it has made some contributions the study has a number of limitations which should be noted. A relatively small sample of mainstream and special educators were used in the study. Higher number of sample size from other provinces and other educational levels could give more generalised results. The research mainly focused on educators from selected urban educational institutions in Pakistan. The results may not be generalizable, as not many rural educational institutions and remote areas were represented. The study used quantitative research method (questionnaire only). The qualitative data gathered through interviews and classroom observations could offer more in-depth perspectives on how teachers experience and perceive the use of AI in education.

### References

- Ainscow, M. (2020). Promoting inclusion and equity in education: Lessons from international experiences. *Nordic Journal of Studies in Educational Policy*, 6(1), 7–16. <https://doi.org/10.1080/20020317.2020.1729587>
- Ali, S., & Rehman, A. (2023). Artificial intelligence-based assistive technologies for hearing impaired students in Pakistan. *Journal of Educational Technology and Inclusive Learning*, 5(2), 45–58.
- Bingimlas, K. A. (2017). Barriers to the successful integration of ICT in teaching and learning environments: A review of the literature. *Eurasia Journal of Mathematics, Science and Technology Education*, 5(3), 235–245. <https://doi.org/10.12973/ejmste/75275>
- Chiu, T. K. F., Ahmad, Z., Zhou, Z., & Chai, C. S. (2023). Teachers' acceptance of artificial intelligence in education: A systematic review. *Computers and Education: Artificial Intelligence*, 4, 100144. <https://doi.org/10.1016/j.caeai.2023.100144>
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). Sage Publications.
- Crompton, H., & Burke, D. (2023). Artificial intelligence in higher education: The state of the field. *International Journal of Educational Technology in Higher Education*, 20(22), 1–22. <https://doi.org/10.1186/s41239-023-00392-8>
- Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2019). Teacher technology change: How knowledge, confidence, beliefs, and culture intersect. *Journal of Research on Technology in Education*, 42(3), 255–284. <https://doi.org/10.1080/15391523.2010.10782551>
- Florian, L., & Beaton, M. (2018). Inclusive pedagogy in action: Getting it right for every child. *International Journal of Inclusive Education*, 22(8), 870–884. <https://doi.org/10.1080/13603116.2017.1412513>
- George, D., & Mallery, P. (2020). *SPSS for Windows step by step: A simple guide and reference* (11th ed.). Routledge.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate data analysis* (8th ed.). Cengage Learning.



- 
- Holmes, W., Bialik, M., & Fadel, C. (2022). *Artificial intelligence in education: Promises and implications for teaching and learning*. Center for Curriculum Redesign.
- Hussain, M., Khan, R., & Iqbal, S. (2024). Challenges and opportunities of artificial intelligence integration in Pakistani education system. *Pakistan Journal of Educational Research*, 7(1), 88–104.
- Iqbal, S., Fatima, S. S., Zubair, F., Imran, A., Jamal, S., Mujahid, A. M., ... & Al-Hamzi, M. (2025). Investigate the link between workplace dynamics and job satisfaction among Saudi pharmacists. *Journal of Pharmaceutical Policy and Practice*, 18(1), 2527410.
- Khan, I., & Ahmad, N. (2021). Challenges of inclusive education in Pakistan: A policy perspective. *Journal of Inclusive Education Research*, 3(2), 56–70.
- Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2022). *Intelligence unleashed: An argument for AI in education*. Pearson Education.
- Majeed, S., & Saeed, M. (2022). Comparative analysis of mainstream and special education teachers' attitudes towards inclusive education in Pakistan. *Global Educational Studies Review*, 7(2), 112–123.
- Saunders, M., Lewis, P., & Thornhill, A. (2019). *Research methods for business students* (8th ed.). Pearson Education.
- Selwyn, N. (2019). Should robots replace teachers? AI and the future of education. *Polity Press*.
- Shah, F., Ali, A., & Hussain, T. (2023). Teachers' perspectives on inclusive education practices in Pakistan. *Pakistan Journal of Education*, 40(1), 77–95.
- UNESCO. (2021). *AI and education: Guidance for policy-makers*. United Nations Educational, Scientific and Cultural Organization.
- UNESCO. (2023). *Global education monitoring report 2023: Technology in education—A tool on whose terms?* UNESCO Publishing.
- Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education—Where are the educators? *International Journal of Educational Technology in Higher Education*, 16(39), 1–27. <https://doi.org/10.1186/s41239-019-0171-0>