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# Artificial Intelligence in Education and its Influence on Women Socio-Cultural Empowerment: A Female Teachers' Perspective

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**Abstract:** *The present research focuses on artificial intelligence in education and its influence on women socio-cultural empowerment in Mardan, Nowshera and Sawabi districts of Khyber Pakhtunkhwa. The study main objective was to determine how AI can help teachers in promoting the socio-cultural empowerment of women in the study areas. The study is quantitative in nature, and using Krejcie and Morgan's sample size table, 225 female teachers were selected from the three districts (Mardan, Nowshera, and Sawabi). The Statistical Package for Social Sciences (SPSS) was used to examine the data from 225 junior school teachers (JST), elementary school teachers (EST) and secondary school teachers (SST) who completed standardised questionnaires for this study. The analysed primary data were presented using tables and frequencies. The research data revealed that that artificial intelligence in education has promoted women socio-cultural empowerment in Mardan, Nowshera and Sawabi districts of Khyber Pakhtunkhwa in the real sense. For both the general public and female teachers, it is recommended that training, seminars, and awareness-raising activities be organized regarding the importance of artificial intelligence in education and how it empowers women socially.*

## Introduction

Artificial intelligence (AI) is transforming the educational landscape worldwide by offering personalized learning, intelligent tutoring systems, and data-driven decision-making tools UNESCO (2021). In developing regions, AI has the potential to bridge gender gaps by enhancing educational access and learning outcomes for women, ultimately contributing to their socio-cultural empowerment. Women socio-cultural empowerment includes cultural norm transformation, reducing female drop out in educational institutions, women's rights to property and legal empowerment, supports outdoor participation and digital skill development and preservation of cultural traditions and identity, where AI can offer new opportunities through education (Dignum, 2019).

Education enhances women ability to make informed decisions, increases self-confidence, promotes awareness of rights, and fosters active participation in economic, social, and political life. Women with secondary levels of education are more likely to raise educated children and take part in civic affairs,

which helps future generations. “Educating a woman is empowering a community”. Artificial Intelligence (AI) is reshaping the global educational landscape, offering transformative opportunities to enhance learning outcomes, increase access, and personalize educational experiences, especially in regions where gender disparities persist (UNESCO, 2019).

Artificial intelligence technologies such as intelligent tutoring systems, predictive analytics and personalized learning platforms can help overcome barriers that often hinder girls’ and women’s access to quality education. AI can support the inclusion and success of female in ways traditional methods cannot (Holstein, McLaren, & Aleven, 2019).

Moreover, AI applications in education can promote women empowerment by not only facilitating access to knowledge but also by enhancing their digital literacy, leadership skills, and decision-making abilities (OECD, 2020). This is in line with international commitments like Goal 4 of the Sustainable Development Goals of the United Nations, which emphasises inclusive, and equitable quality education for all, and Goal 5, which calls for attaining gender equality and empowering all women and girls (UNESCO, 2021). AI tutoring systems and automate assessments, which make education more accessible to women in restricted environments (OECD, 2020).

Artificial intelligence (AI) tools that identify at-risk learners through predictive analytics can help reduce female dropout rates, while virtual mentors and chatbots can offer academic and emotional support tailored to girls’ specific challenges (Holstein et al., 2019). AI is a powerful enabler of women social and professional empowerment (UNESCO, 2021). AI-based platforms allow women in remote or conservative communities to access education from home (Goyal & Singh, 2022). “AI can be a game-changer for inclusive education, particularly for marginalized women and girls” (UN Women, 2023).

In the 21st century, innovation and technology are playing a pivotal role in shaping societies, economies, and governance systems. As transformative tools, they hold immense potential to promote gender equality by addressing systemic barriers that women and girls face in education, health, employment, and civic participation (UN Women, 2023). AI involves designing inclusive digital tools, promoting women's participation in science and technology fields, and ensuring that innovations address real gendered needs. When developed and implemented with a gender-sensitive lens, technological solutions can help eliminate educational disparities, enhance women’s safety and mobility, support entrepreneurship, and amplify their voices in civic life (World Bank, 2021).

## STATEMENT OF THE PROBLEM

Education can enhance people's real-life experiences, which are essential for achieving goals. Women are respected members of society who can radically alter every aspect of it if given the proper education. Moreover, AI fosters digital literacy, enabling teachers to guide students in responsible and informed technology use. Teacher training programs that include AI components help bridge the digital divide, especially in under-resourced or rural areas where tech adoption is slower. Ultimately, empowering teachers through AI related education promotes innovation, enhances instructional quality, and prepares both educators and learners for a future where artificial intelligence will play a central role in all aspects of life.

## OBJECTIVE

1. To determine how AI can help teachers in promoting the socio-cultural empowerment of women in the study areas.

## RESEARCH QUESTION

1. How does artificial intelligence (AI) in education support the socio-cultural empowerment of women?

## SIGNIFICANCE OF THE STUDY

As artificial intelligence continues to reshape various sectors, the education system must also evolve to keep pace. For teachers, acquiring foundational knowledge and practical skills in AI is no longer optional it is essential. By integrating AI into their pedagogy, educators can better personalize instruction, identify learning gaps, and enhance student engagement. This not only improves academic outcomes but also ensures that teaching remains relevant in a technology driven world. One of the main foundations of society and an important aspect in determining the Sustainable Development Goals (SDGs) is education. This research study should be of interest to curriculum designers, educators, legislators, planners, and researchers from non-governmental organizations (NGOs) across the country.

## LITERATURE REVIEW

### Women Empowerment through AI in Education

Access to quality education is a critical enabler of women empowerment, allowing women to develop skills and participate more fully in social and economic life. AI powered educational platforms such as intelligent tutoring systems and language translators have been instrumental in enhancing access to learning for women who face geographical, social, or cultural barriers (Holstein, McLaren, & Aleven, 2019). These tools enable flexible, self-paced learning and provide a safe, private environment for women to engage with educational content, especially in societies where mobility is restricted or gender norms inhibit girls' participation in school. Fosters digital literacy and access to knowledge, is essential for women empowerment (Goyal & Singh, 2022). Career guidance tools can encourage women to pursue diverse and non-traditional career paths (UN Women, 2023).

### AI role in Cultural Norm Transformation

Cultural norms are shared beliefs, practices, and values that govern acceptable behavior within a society. These norms often shape gender roles, educational access, and decision-making authority, particularly in patriarchal societies (Mackie et al., 2015). In many contexts, traditional norms continue to reinforce gender inequality by limiting women's mobility, access to education, and participation in public life. AI powered media content to promote gender equity (UNESCO, 2021), sentiment analysis to detect and address misogyny in digital spaces, culturally adaptive storytelling empowered female figures from within local traditions (Jentzsch et al., 2019). Cultural transformation is most effective when it involves community-level engagement. Initiatives that include religious leaders, elders, and male allies often see more sustained changes in harmful norms, such as early marriage, gender-based violence, or the restriction of women's mobility (Marcus & Harper, 2014).

### AI helps in Reducing Female Dropout in Educational Institutions

One of the core capabilities of AI is being used to identify students at risk of dropping out and recommend timely interventions. For female learners, who are more likely to leave school due to early marriage, caregiving responsibilities, or socio-economic pressures, AI can be a powerful tool to increase retention and completion rates (World Bank, 2021). Female dropout from educational institutions is a global challenge that undermines gender equality and human capital development. Girls are more likely than boys to drop out of school due to a combination of socio-cultural, economic, and institutional factors, particularly in low- and middle-income countries (UNESCO, 2021).

According to UNICEF (2020), adolescent girls are often forced to leave school when they reach puberty due to stigma around menstruation or the absence of safe, private toilets. Cultural norms and safety concerns also restrict girls' mobility, making school attendance less feasible especially in rural or conservative settings (Glick, 2008). Parental attitudes and community support strongly influence girls' educational continuity. Engaging parents through awareness programs (AI), school management

committees, and local champions can help shift perceptions and promote girls' right to education (Unterhalter et al., 2014).

### AI role in Women Rights to Property and Legal Empowerment

Women's property rights and legal empowerment are foundational to achieving gender equality and social inclusion. However, in many parts of the world, discriminatory laws, cultural norms, and lack of access to legal systems prevent women from claiming or enforcing their rights to land, housing, and inheritance (OECD, 2021). Emerging technologies, particularly Artificial Intelligence (AI), offer new opportunities to bridge information gaps, improve access to legal services, and strengthen women's ability to claim their rights. Legal AI bots explaining property laws in local languages. AI for document digitization of land and inheritance records and AI-generated legal awareness campaigns targeted at rural women (UN Women, 2022). AI tools, including chat-bots and digital assistants, have been developed to help marginalized populations, especially women, understand complex legal processes and entitlements. For instance, initiatives like "Ask TIA" in South Africa or "HelloTaska" in Indonesia provide legal guidance in local languages using AI-driven conversation. These platforms explain inheritance laws, land titling procedures, and marital property rights, empowering women with accessible legal literacy (IDRC, 2021).

### AI supports outdoor Participation and digital skill development

Artificial intelligence (AI) also supports digital skill development that is critical for participation in the modern workforce. As economies become more digitized, equipping women with AI related competencies increases their employability and entrepreneurship opportunities. Programs integrating AI into women's education can help bridge the gender gap in science, technology, engineering, and mathematics (STEM) fields, which remains significant globally (UNESCO, 2021). According to Bandura's (1997) theory of self-efficacy, real-world experiences and social interaction are crucial for developing confidence and competence. Participation in public forums, education, employment, sports, and volunteerism builds women's psychological resilience and assertiveness (Marcus & Harper, 2014).

In educational settings, outdoor participation in school activities, debates, and leadership roles increases girls' voice and visibility, contributing to their broader sense of social agency and capability utilization (Sen, 1999). Cultural restrictions on female mobility often limit access to empowerment opportunities. In South Asia and parts of the Middle East and Africa, mobility constraints are deeply embedded in gendered expectations of honor and domesticity (Mahmud & Amin, 2006). Safety and navigation apps using AI for real-time alerts (e.g., Safetipin, Safecity), AI curated outdoor activity suggestions aligned with cultural preferences and gamification to motivate outdoor learning and fitness (ITU, 2020).

### AI assists Preservation of Cultural Traditions and Identity

AI archiving tools to digitize and preserve traditional knowledge (e.g., local crafts, songs, oral histories). Natural Language Processing (NLP) for local language learning and content creation and AI assisted cultural education platforms promoting values and heritage through female participation (World Bank, 2021). Despite its potential, AI adoption in education also presents challenges. Gender bias embedded in AI algorithms, lack of access to digital infrastructure, and low digital literacy among women particularly in low-income regions can limit the effectiveness of AI-based interventions (UNESCO, 2021; ITU, 2022). AI can reconstruct faded scripts, fill missing pieces in artwork, and recreate architectural structures using 3D modeling and historical data (Das et al., 2023).

AI is also enabling interactive learning platforms that teach cultural heritage through gamification, virtual reality (VR), and adaptive storytelling. These systems are especially effective for young learners

who may be detached from traditional practices. Personalized AI tutors and culturally relevant chatbots can teach traditional knowledge systems such as indigenous medicine, folklore, and history while adapting to difjjferent learning levels and languages (Kim et al., 2020). AI systems must be trained on diverse and inclusive datasets that accurately reflect cultural nuances and do not impose Western-centric interpretations (Whittaker et al., 2018).

## METHODOLOGY

Research paradigm

Research paradigm of the study area is positivism.

Research Design

The current study is quantitative, whereas descriptive design has been applied in the study to accurately and systematically describe the whole situation.

## SAMPLE AND SAMPLING FRAME WORK

The researcher has chosen 225 female teachers from schools: 38 teachers were selected from each junior school, for a total of 114 teachers; 19 teachers were selected from each elementary school, for a total of 57 teachers; and 18 teachers were selected from each secondary school, for a total of 54 teachers through simple random sampling, using Krejcie and Morgan sample size determination table from the three targeted districts (Mardan, sawabi and Nowshera). The researcher took equal sample from each category and district.

## DATA COLLECTION TOOL

Researcher used a structured questionnaire for collection of primary data.

## DATA ANAYSIS

The researcher used the chi-square test to look for associations using uni-variate and bi-variate analysis between dependent (women socio-cultural empowerment) and independent (AI) variables and identify significant associations.

## DATA PRESENTATION AND DISCUSSION

Table No. 1: AI role in Education in Women Socio-cultural Empowerment

| Research Question | Teachers | *SA % | A % | UC % | DA % | SDA % | $X^2$ | **P-value |
|---|---|---|---|---|---|---|---|---|
| a. AI role in cultural norm transformation | JST | 34<br>29.80 | 56<br>49.2 | 20<br>17.5 | 03<br>2.6 | 01<br>0.9 | 92.22 | .000 |
| | EST | 21<br>36.84 | 27<br>47.36 | 07<br>12.28 | 01<br>1.75 | 01<br>1.75 | 50.10 | 0.000 |
| | SST | 16<br>29.6 | 34<br>62.96 | 02<br>3.70 | 01<br>1.85 | 01<br>1.85 | 77.29 | 0.000 |
| b.AI helps in reducing female drop out in educational institutions | JST | 61<br>53.5 | 46<br>40.4 | 05<br>4.4 | 01<br>0.9 | 01<br>0.9 | 143.19 | .000 |
| | EST | 22<br>38.59 | 24<br>42.10 | 06<br>10.52 | 02<br>3.50 | 03<br>5.26 | 40.28 | 0.000 |
| | SST | 25<br>46.29 | 21<br>38.88 | 06<br>11.11 | 01<br>1.85 | 01<br>1.85 | 48.22 | 0.000 |
| c. AI role in women rights to property and legal empowerment | JST | 37<br>32.5 | 59<br>51.8 | 14<br>12.3 | 03<br>2.6 | 01<br>0.9 | 107.75 | .000 |
| | EST | 18<br>31.57 | 29<br>50.87 | 08<br>14.03 | 01<br>1.75 | 01<br>1.75 | 50.98 | 0.000 |
| | SST | 15<br>27.77 | 33<br>61.1 | 04<br>7.40 | 01<br>1.85 | 01<br>1.85 | 69.33 | 0.000 |
| d. AI supports outdoor participation | JST | 42<br>36.8 | 60<br>52.6 | 09<br>7.9 | 01<br>0.9 | 02<br>1.8 | 125.03 | .000 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| and digital skill development | EST | 22<br>38.59 | 25<br>43.85 | 08<br>14.03 | 01<br>1.75 | 01<br>1.75 | 46.07 | 0.000 |
| | SST | 15<br>27.77 | 30<br>55.55 | 07<br>12.96 | 01<br>1.85 | 01<br>1.85 | 54.88 | 0.000 |
| e. AI assists preservation of cultural traditions and identity. | JST | 35<br>30.7 | 58<br>50.9 | 17<br>14.9 | 03<br>2.6 | 01<br>0.9 | 100.38 | .000 |
| | EST | 20<br>35.08 | 30<br>52.63 | 05<br>8.77 | 01<br>1.75 | 01<br>1.75 | 59.40 | 0.000 |
| | SST | 19<br>35.18 | 28<br>51.85 | 05<br>9.25 | 01<br>1.85 | 01<br>1.85 | 54.51 | 0.000 |

Chi-square (X2) table value at 0.05 is 9.49

*Significant *Strongly Agreed (SA), Agreed (A), Uncertain (UC), Disagreed (DA) and strongly disagreed (SDA).

### AI role in cultural norm transformation

Table No. 1 (a) shows data regarding AI role in cultural norm transformation. In this regard, the question was asked from the 114 junior school teachers. As a result to that statement, 29.8% of the teacher preferred strongly agreed, 49.2% preferred agreed, 17.5% preferred for Uncertain, 2.6% preferred disagreed, and 0.9% preferred strongly disagreed. Chi-square test was calculated 92.22. Similarly 57 elementary school teachers were asked the same statement. As a result to that statement, 36.84 % preferred strongly agreed, 47.36% preferred agreed, 12.28% preferred Uncertain, 1.75% preferred disagreed and strongly disagreed respectively. Chi-square was calculated 50.10. Moreover, 54 secondary school teachers were asked for the statement. As a result, 29.6 % preferred strongly agreed, 62.96% preferred agreed, 3.70% preferred Uncertain, 1.85% preferred disagreed, and strongly disagreed. Chi-square test was calculated 77.29. Table value was observed 9.49 at 0.05. Results showed that calculated values are greater than the table value. It showed that AI has role in cultural norm transformation. These results support the earlier findings of (UNESCO, 2021; Jentzsch et al., 2019 and Marcus & Harper, 2014).

### AI helps in reducing female dropout in educational institutions

Table No. 1 (b) depicts that junior school teachers (114) were asked that AI helps in reducing female dropout in educational institutions. As a result to that statement, 53.5% chosen strongly agreed, 40.4% chosen agreed, 4.4% chosen Uncertain, 9% chosen disagreed and strongly disagreed respectively. Chi-square test was calculated 143.19. These results support the earlier findings of (World Bank, 2021). Similarly, 57 elementary school teachers were asked same statement. As a result to that statement, 38.59% chosen strongly agreed, 42.10% opted for agreed, 10.52% chosen Uncertain, 3.50% chosen disagreed', and 5.26% chosen strongly disagreed. Chi-square test was calculated 40.28. Moreover, 54 secondary school teachers were asked for the statement. As a result, 46.29 % chosen strongly greed, 38.88% chosen agreed, 11.11% chosen Uncertain, 1.85% chosen disagreed and strongly disagreed respectively. Chi-square test was calculated 48.22. These results support the earlier findings of (Unterhalter et al., 2014 and UNICEF, 2020).

### AI role in women rights to property and legal empowerment

Table No. 1 (c) demonstrates that 114 junior school teachers were asked, that AI role in women rights to property and legal empowerment. As a result to that statement, 32.5% selected strongly agreed, 51.8% selected agreed, 12.3% selected Uncertain, 2.6% selected disagreed', and 0.9% selected strongly disagreed. Chi-square test was calculated 107.7. These results support the earlier findings of (UN Women, 2022). Similarly, 57 elementary school teachers were asked the same statement. As a result to that statement, 31.57% selected strongly agreed, 50.87% selected agreed, 14.03% selected Uncertain, 1.75% selected disagreed and strongly disagreed. Chi-square (X2) was calculated 50.98. Moreover, 54 secondary school teachers were asked for the statement. As a result to that statement, 27.77 % selected strongly greed, 61.1% selected agreed, 7.40% selected Uncertain, 1.85% selected disagreed, and strongly disagreed respectively. Chi-square test was calculated 69.33. Table value was observed 9.49 at

0.05. Results showed that calculated values are greater than the table value. These results support the earlier findings of (IDRC, 2021and OECD, 2021).

**AI supports outdoor participation and digital skill development**

No. 1 (d) reveals that 114 junior school teachers were asked, that AI supports outdoor participation and digital skill development. As a result to that statement, 36.8% elected strongly agreed, 52.6% elected agreed, 7.9% elected Uncertain, 0.9% elected disagreed and 1.8% elected strongly disagreed. Chi-square test was calculated 125.03. Similarly, 57 elementary school teachers were asked the same statement. As a result to that statement, 38.59% elected strongly greed, 43.85% elected agreed, 14.03% elected Uncertain, 1.75% elected disagreed and strongly disagreed respectively. Chi-square test was calculated 46.07. Moreover, 54 secondary school teachers were asked for the statement. As a result to that statement, 27.77 % elected strongly agreed, 55.55% elected agreed', 12.96% elected Uncertain, 1.85% elected disagreed, and strongly disagreed respectively. Chi-square test was calculated 54.88. Table value was observed 9.49 at 0.05. Results showed that calculated values are greater than the table value. These results support the earlier findings of (Sen, 1999; Mahmud & Amin, 2006 and ITU, 2020).

AI assists Preservation of Cultural Traditions and Identity

Table No. 1 (e) illustrates that 114 junior school teachers were asked the above statement. As a result to that statement, 30.7% decided for strongly agreed, 50.9% decided for agreed, 14.9% elected for Uncertain, 2.6% decided disagreed and 0.9% decided for strongly disagreed (Das et al., 2023). Chi-square test was calculated 100.38. Similarly, 57 elementary school teachers were asked the same statement. As a result to that statement, 35.08% decided for strongly agreed, 52.63% decided for agreed, 8.77% decided for Uncertain, 1.75% decided disagreed and strongly disagreed respectively. Chi-square test was calculated 59.40. Moreover, 54 secondary school teachers were asked for the statement. As a result to that statement, 35.18% decided for strongly agreed, 51.85% decided for agreed, 9.25% decided for Uncertain, 1.85% decided disagreed, and strongly disagreed respectively. Chi-square test was calculated 54.51. Table value was observed 9.49 at 0.05. Results showed that calculated values are greater than the table value. These results support the earlier findings of (Whittaker et al., 2018; Vincent et al., 202; UNESCO, 2021and ITU, 2022).

## FINDINGS

Findings of the study showed that; teachers 62.96% responses showed that AI role in cultural norm transformation. 42.10% of teachers responded that AI helps in reducing female dropout in educational institutions. 61.1% of respondents believed AI role in women rights to property and legal empowerment. 55.5% of those surveyed believed that AI supports outdoor participation and digital skill development. The respondents, who made up 52.63%, agreed that AI assists preservation of cultural traditions and identity which has positive influence on women socio-cultural empowerment.

## CONCLUSION

The current study investigated the transformative power of AI in education advancing the socio-cultural empowerment of female's school teachers in Mardan, sawabi and Nowshera districts of KPK. The main objective was to determine how AI can help teachers in promoting the socio-cultural empowerment of women in the study areas. Results of the study showed that teachers were agreed that AI has role in cultural norm transformation; it reduce female dropout in educational institutions, AI guide women rights to property and legal empowerment, supports outdoor participation and digital skill development and preservation of cultural traditions and identity which has positive influence on women social empowerment. Such involvement and active participation of women in social activities are due use of AI in education. AI uses in education which aware people from the importance of female in the society.

## RECOMMENDATIONS

- **Training Programs:** Implement targeted AI training for female educators to build capacity and confidence.
- **Infrastructure Development:** Improve digital infrastructure in rural and underserved areas.

- **Policy Support:** Develop gender-sensitive AI policies to ensure inclusive educational practices.
- **Monitoring and Evaluation:** Establish frameworks to assess the impact of AI tools on women's empowerment regularly.
- Integrate AI tools such as personalized learning platforms, virtual tutors, and adaptive assessments to support girls' academic success.
- Promote digital literacy training for female students and teachers to increase confidence in using AI technologies.

These recommendations aim to help governments, NGOs, educational institutions, and tech developers create an AI ecosystem that supports women socio-cultural empowerment while respecting cultural diversity and local contexts.

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