

AI-Enabled Online Education and the Digital Divide: Legal and Ethical Issues in Rural Settings

Sana Kumar

Indian Institute of Management Rohtak, Haryana

Email: sanakumar2512@gmail.com

Received: 20 March 2026 Revised: 18 April 2026 Accepted: 24 April 2026 Published: 06 May 2026

Abstract

In recent years, Artificial Intelligence (AI) has emerged as a disruptive technology, significantly transforming online education globally in the post COVID-19 era. While AI-driven platforms have enhanced learning experiences, they have also introduced some serious concerns in online education systems. The issues are more critical in rural areas where access to digital infrastructure remains limited. This paper presents the results of survey conducted in two rural regions of District Sonapat, State Haryana, India. It identifies the challenges faced by rural learners and examines the impact of AI-enabled educational platforms on key stakeholders, including students, teachers, and parents in rural communities. The paper, while recognizing the potential of AI to facilitate inclusive and personalized learning in remote regions, also deliberates upon proposing and adopting a robust legal and ethical framework. A critical analysis of legal issues related to data privacy, algorithmic bias, and the inconsistent implementation of accessibility standards for AI-enabled online learning is presented in the paper. The study proposes an AI-enabled multidimensional framework for online education to address these concerns. The paper concludes with specific recommendations aimed at ensuring that AI in education is both legally accountable and socially inclusive. These recommendations would help in bridging the digital divide and promote equitable access to AI-enabled quality education.

Keywords:

AI-driven online education, digital divide, educational equity, Rural education, Ethical implications, Legal and regulatory frameworks

1. Introduction

COVID-19 drove a shift to online learning and as per the Article 21A of the Constitution of India, education is the fundamental right of every child between the ages of 6 and 14 (Constitution of India, Article 21A, 1950). However, achieving quality education for all has become a major hurdle due to digital disparity primarily because of differences in the rural and urban ecosystem, and technological and socio-economic barriers. Consequently, the impact of AI-powered online learning platforms is not uniform and such issues continue to prevent a larger section of learners from reaping benefits.

In this context, the legal dimension of educational equity is crucial. The Act of Right to Education (RTE) (*Right of Children to Free and Compulsory Education Act, 2009*), the laws concerning protection of data, and the regulations such as the

Digital Personal Data Protection (DPDP) Act, 2023 (*Digital Personal Data Protection Act, 2023.*, 2023), determine the obligations of the Government and private parties for equal learning options. However, the students and teachers in the rural countryside of India face many barriers such as unstable internet connectivity, absence of a digital device, low-tech knowledge, and financial burden.

This study investigates the obstructions to digital access, usage, engagement, and learning outcome through survey data from two rural regions in Haryana. Even though the survey is about online learning in general, this paper discusses how Artificial intelligence (AI)-driven education can resolve these issues while being legal and ethical.

This paper aims to examine the challenges in online learning, as revealed by survey data, with a particular emphasis on accessibility, infrastructure gaps, digital literacy, and student engagement. It

also investigates the impact of AI in education through assessing its ability to enhance personalization, accessibility, and student engagement. Various laws and policies such as data protection, ethics and intellectual property, for AI-enhanced education have also been discussed in the paper while identifying the gaps in enforcement and regulation.

2. Background & Literature Review

The COVID-19 pandemic has significantly accelerated the shift toward online learning environments, revealing persistent inequalities along urban-rural divides and socioeconomic lines. The current educational setup points to the pressing need for examining how these technological advancements impact educational access and equity, particularly in rural areas where resources and infrastructure may lag behind urban counterparts.

AI is reshaping education through personalized learning, automated assessments, and intelligent tutoring systems. Platforms like DIKSHA (DIKSHA, 2017) and SWAYAM (SWAYAM, 2017) in India integrate AI-based recommendations to tailor content to individual learning needs only up to certain extent. Studies have shown that AI-powered interventions improve engagement, learning outcomes, and accessibility (Luckin & Holmes, 2016). However, there is limited accessibility of AI-driven online education to students in rural areas due to technological constraints and affordability issues. Further, Mathrani et al. (Mathrani et al., 2022) and Sundeen et al. (Sundeen & Kisner, 2024) discussed the challenges and implications of digital learning during the COVID-19 pandemic in developing countries.

Yadav et al. (Yadav, 2024), Budidarma (Budidarma, 2022) and Anuprakash (Arunprakash, 2024) discussed that various factors such as low household income, gender disparities, and inadequate infrastructure hinder digital learning adoption, the uneven distribution of digital devices and identified significant gender disparities. The digital divide is aggravated by inadequate internet infrastructure, limiting online learning opportunities for students in remote areas. Arunprakash also identified that a lack of digital skills among

educators hinder the quality of instruction and student engagement. Therefore, Gulzar et al. recommended a mandatory digital literacy training for teachers to enhance their teaching capabilities in digital environments (Gulzar et al., 2024). Parental involvement is also vital for fostering a supportive learning environment. However, lower-income families often struggle to provide necessary resources, further widening the educational gap which was studied by Tang et al. (Tang et al., 2024).

The AI-based online education has led to a number of legal issues such as security and privacy concerns, algorithmic biases and academic integrity issues. It is crucial to address these legal challenges for responsible integration of AI in educational settings (Zhao, 2025). AI permits teachers to concentrate on strategic and creative tasks while enhancing the teaching-learning process. The Right to Education (RTE) Act, 2009 (*Right of Children to Free and Compulsory Education Act, 2009*), in India, guarantees free and compulsory education but is silent on digital accessibility. The law in India that governs the process of digital personal data has been passed in order to protect the rights of individuals and also provide for the processing of personal data for legitimate purposes which is the Digital Personal Data Protection Act (DPDP Act), 2023 (*Digital Personal Data Protection Act, 2023.*, 2023). The Act lays down procedures for the processing of personal data. It also empowers the data principal (or individual) with rights. AI tools used in education require access to large amounts of personal data, raising privacy issues. The collection storage and usage of students' data are regulated under the data protection law applicable in the jurisdiction. However, present frameworks may not adequately address the nuances of AI technologies in an educational context due to nonexistence of specific AI regulations (Chatinakrob, 2024). Concerns around student data security and AI-enabled learning analytics. Abdurohman identified that the integration of AI will faces challenges such as ethics, data privacy, and the digital divide of society (Abdurohman, 2025).

Dokumacı (Dokumacı, 2024) argued that it is imperative to create innovative models that will help people trust AI and balancing innovation with

ethical regulation will safeguard societal interests. The AI-generated contents has given rise to ownership disputes and it is important to answer the questions such as who owns the rights to all that AI generates?, can we patent the algorithms?. These issues have been discussed by Nidhi Sharma (Dr. Nidhi Sharma, 2024). She also argues that educational AI systems depend on collecting and analyzing large amounts of data, giving rise to serious privacy issues. In Europe, the General Data Protection Regulation (GDPR, n.d.) and in the United States, the California Consumer Privacy Act (CCPA, n.d.) are essentially privacy legislation aimed at protecting individuals' rights and address individuals' rights and obligations concerning data (Dr. Nidhi Sharma, 2024). Ensuring compliance with these regulations can be challenging as educational institutions need strong protection plans against the masks and misuse of sensitive information (Kaddouri et al., 2024; Kirin et al., 2024). Schools and developers must navigate the legal intricacies of establishing who owns the right to AI-generated works and how these rights can be protected and enforced (Kipin et al., 2024).

If not controlled, AI systems can increase current prejudices or give rise to new ones. It is evident from the survey that AI-driven online learning has great potential for tapping educational equity in rural India. However, in order to achieve more effective and inclusive education systems we need to ensure equitable access to technologies and resources, tackle the gaps of digital literacy, and create robust legal and policy frameworks.

3. Methodology

The paper follows both the qualitative and quantitative approaches to address the gaps as identified in the previous section. The quantitative part involves surveying students, teachers and parents in rural areas to identify patterns based on their responses. The qualitative aspect seeks an in-depth investigation into the challenges and benefits of AI in education from various stakeholders.

Using qualitative and quantitative methodology this study tries to provide a comprehensive analysis of several challenges, opportunities and policy implications of the AI-driven learning process in

various rural areas. In doing so, it focuses on infrastructure, digital skills, financial barriers and legal regulation issues.

3.1. Survey Data Analysis

This section presents the survey data source and scope of data. The survey has been designed to assess the experiences, challenges, and perceptions of students, teachers, and parents regarding online learning. The data provides insights into infrastructural barriers, digital literacy levels, engagement patterns, socio-economic constraints, and policy awareness. The method used for collection of data is based on Questionnaire. The details are presented in subsections below.

3.1.1. Data And Methods

The structured preliminary teaching-learning questionnaire was prepared based on a literature review and informal engagement with the parents and teachers. To include the experiences and challenges of all the respondents, three questionnaires were prepared to be filled by the students, teachers and parents respectively. Every participant group was distributed the questionnaires. This was done so that the effects of the move towards online learning could be individually assessed for students, teachers and parents. The questionnaire was pilot tested with four respondents whose responses were taken into consideration for the finalization of the questionnaire. Furthermore, interviews were performed to assist our analysis, find challenges, and discover possible solutions.

3.1.2. Survey Data Source

This study was based on a survey conducted in the rural areas of Patla and Akbarpur Barota in the Sonapat district of Haryana, India. The purpose of this study was to assess the online learning issues faced by students, teachers and parents and the immediate impact of pandemic enforced paradigm shift to online learning. The total number of respondents were 280. This included 146 students of classes 8 to 12. Also included were 32 teachers from the primary and senior secondary departments as well as 102 parents. Among them, there were 174 males and 106 females.

The student survey was undertaken with students ranging from classes 8 to 12, with an age group ranging from 11 years to 20 years with an average age of approx. 15 years. The survey was designed with a sample size of 650 students out of which 146 students responded. This chosen group was likely to have a better knowledge of digital tools and technologies, especially those used for online learning, compared to students at the primary level. Those individuals who had previously engaged in

online education had a greater understanding of its issues and consequences, providing a better and reliable feedback to validate the survey. The survey included responses from 146 respondents. 40(27.4%) belonged to class 12. 38(26%) from class 11, 25(17.1%) belonged to class 10. 18(12.3%) belonged to Class 9 and 25(17.1%) belonged to Class 8. 84(57.5%) students respondents were male and 62(42.5%) students were female.

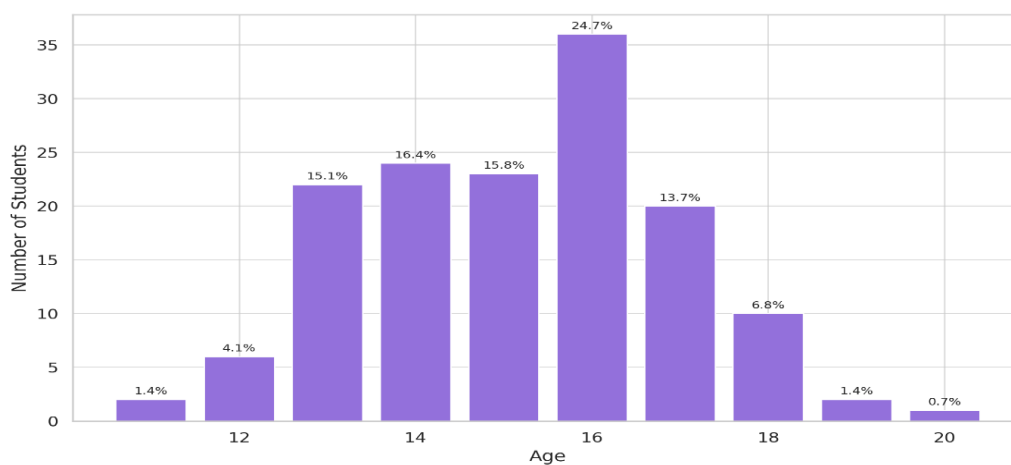


Figure 1: Distribution of Students' Age in the Survey Sample

The age of teachers participating in the survey ranged from 27 to 56 years old, with an average age of 42 years. Out of 32 teacher respondents, 18 (56.3%) were male, while 14 (43.8%) were female and their designations ranged from 11 (34.4%) Primary Teachers (PRT) to 6 (18.8%) Trained Graduate Teachers (TGT) to 15 (44.9%) Post Graduate Teachers (PGT).

102 parents, 72 males (70.6%) and 30 females (29.4%) replied to the given questionnaire. The questionnaire was prepared in both Hindi and English language for better understanding of the respondents.

The survey is mainly focused on the following points:

1. Infrastructure and Access
2. Digital Literacy and Readiness
3. Engagement and Learning Outcomes
4. Socio-Economic Barriers

The in-depth examination of data patterns and critical analysis lead to an assessment of policy implications for AI-driven learning in rural education.

4. DATA ANALYSIS AND INTERPRETATION

4.1 Infrastructure and Access

This section examines the necessary structural supports for online education in rural Haryana, India. It tends to focus on three important points: The availability of digital device (smartphones, laptop, tab etc.) with students and teachers, quality of the internet (speed, stability, cost), disruptions in device usage and attendance disrupted in online classes. Through analysis of these dimensions, the survey aims to focus on the main infrastructure problems students, teachers, and families face that hamper their participation in, as well as the benefit from online learning.

Fig. 2 and fig. 3 show the access to devices and availability of devices respectively. In most families, there are only one or two devices available,

which limits access by several children at the same time. Some families said that they have no devices. Parents indicate that their children do not have access to devices at school even when students report it. This points to shared or limited access

within households. Fig. 4 shows that students primarily rely on mobile data for the internet. Because of unstable connectivity and high data costs, dependency on mobile data means students are not engaged.

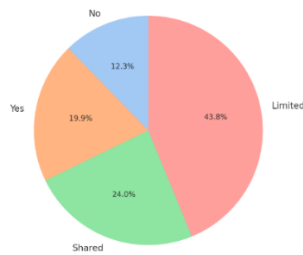


Figure 2: Access to digital devices

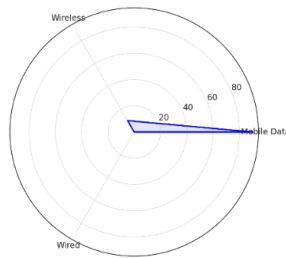


Figure 4: Type of connection available at home

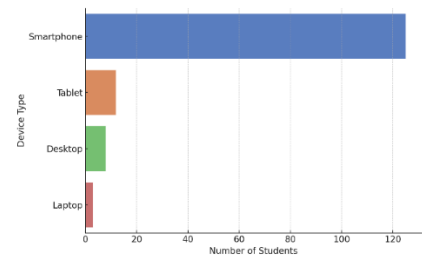


Figure 6: Type of device available

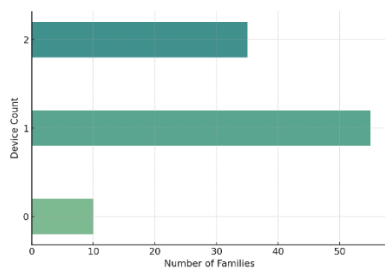


Figure 3: Devices available at home

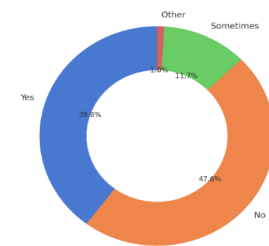


Figure 5: Devices provided by the school

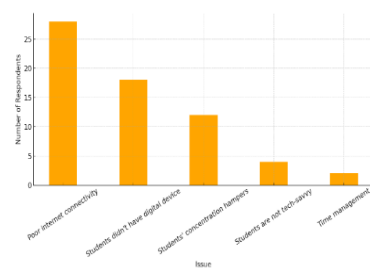


Figure 7: Infrastructure and access challenges

It is also evident from fig. 5 that the institution provides little support to equip the students with the devices necessary for their online learning. As seen in fig. 6 above, mobile phones are the most-used gadget for online learning by students and laptops and tablets are lesser used gadgets. Mobile learning is limited because of small screens, inability to type, and compatibility is a huge issue. Fig. 7 gives a rundown of the challenges faced by the students, parents and teachers for the implementation of online education in a rural setup. Deliberate efforts are required from the authorities and communities to

make up for the digital divide and help everyone get online education.

4.2 Digital Literacy and Readiness

This section explores the awareness of students and teachers regarding digital learning platforms and tools, the extent of teacher training to effectively conduct classes online, and the amount of guidance and technical help provided by parents to students. These aspects help to uncover the strengths and gaps presented in the overall digital readiness of the learning community while providing opportunities for capacity building so that online education is effective and equitable.

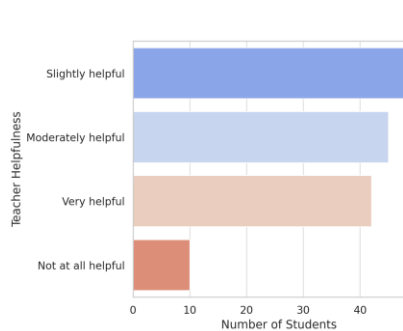


Figure 8: Students' Perception of Teacher Support

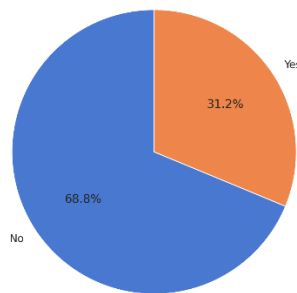


Figure 10: Comfort with Internet Search

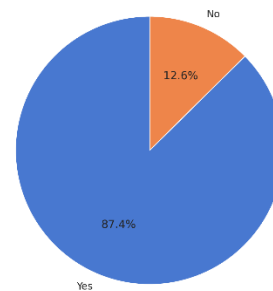


Figure 12: Parents' Ability to Connect to the Internet

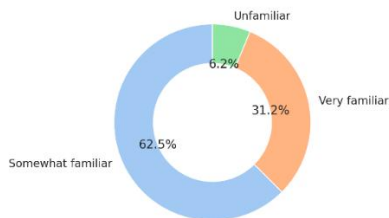


Figure 9: Familiarity with Online Teaching

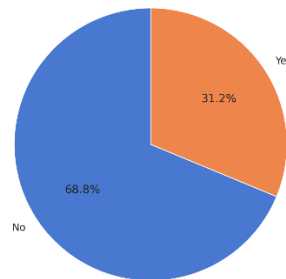


Figure 11: Teachers' Participation in Online Teaching Training

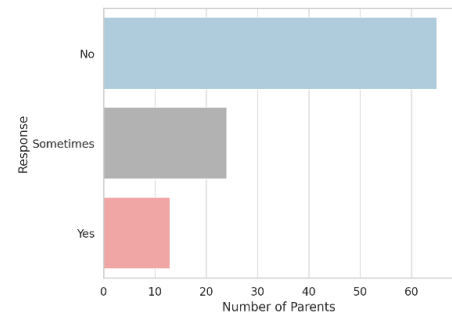


Figure 13: Parental Support for Online Learning

As shown in fig. 8 most of the students find their teacher's support, during online classes, to be moderately to very helpful. Perhaps all this indicates positive engagement, but perhaps there is still room for improvement among students and teachers. Fig. 9 indicates that many teachers use online teaching methods and a few of them are not at all familiar with it. To develop digital teaching skills, there is a need for continuous professional development and enhancement measures. Many of the students are comfortable using the internet to aid their learning as shown in the fig. 10 indicating good digital familiarity. As per fig. 11, only one-third of teachers have received expert training on online teaching which indicates a definite skill enhancement opportunity that is largely unstructured. According to fig. 12 parents can use the devices to connect to the Internet, however, their involvement ranges from very limited to moderately helpful as per Fig. 13.

The survey results indicate the importance of fostering greater parental engagement and digital literacy to create a supportive home environment for students' online learning.

4.3 Engagement and Learning Outcomes

This section highlights aspects of learner engagement and academic skills. As shown in fig. 14 and fig. 15, most of the students (74%) rarely had direct interaction with their teachers, while only 4.8% reported hearing very often, which indicates low engagement level leading to student disconnection. Fig. 16 and fig. 17 show the e-learning platforms and technology perception by teachers respectively. Fig. 18 and fig. 19 show that the feedback from parents and students was predominantly average reflecting a need for improved teacher-student engagement, enhanced digital pedagogy, and stronger infrastructure support.

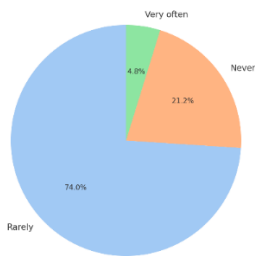


Figure 14: Student communication with tutors in online learning

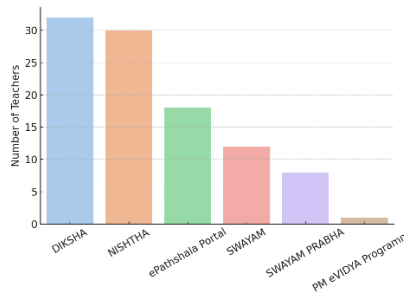


Figure 16: E-learning platforms used by teachers

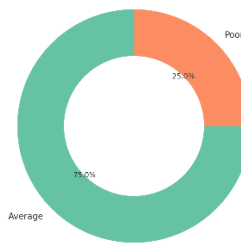


Figure 18: Parent Feedback on Online Learning

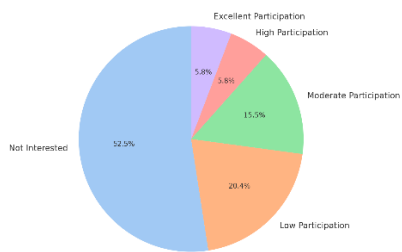


Figure 15: Levels of Student Participation in Online Learning

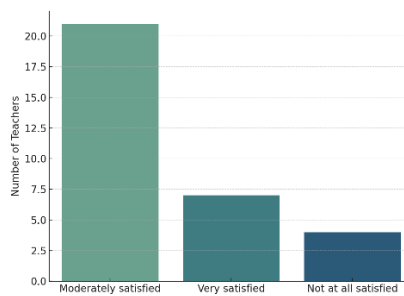


Figure 17: Perception of Technology and Software by Teachers

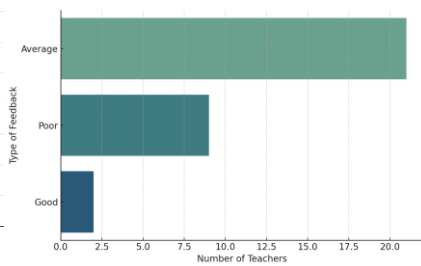


Figure 19: Teacher Feedback in online learning environment from Students

4.4 Socio-Economic Barriers

This section examines the socio-economic barriers that affect access to and participation in online education in rural areas. As shown in Fig. 20 and fig. 21, most parents report low to moderate expenditure on digital learning resources, indicating financial limitations in rural households for investing in devices, data plans, and learning tools. Moreover, parents are not even aware government and bank schemes that offer support for digital learning as shown in fig. 22. It suggests a lack of outreach and dissemination of information in rural areas.

The survey has a balanced representation of male and female students which is shown in fig. 23. Online learning led to behavioral changes in children, the same is reflected in fig. 24. A notable percentage of parents reported behavioral changes in their children due to excess usage of digital devices. It led to increased screen time dependency, distraction, or reduced social interaction. Finally, fig. 25 shows that male students tend to report higher satisfaction levels than females indicating potential gender-based differences in access, confidence, or support for online learning.

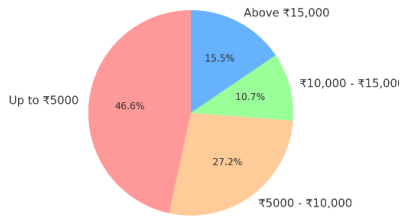


Figure 20: Distribution of Parent-Reported Expenditure on Digital Learning Resources

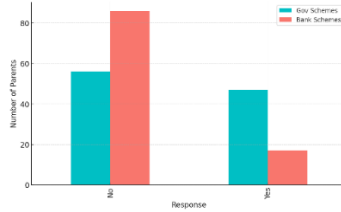


Figure 22: Parent awareness of government and bank schemes for digital learning

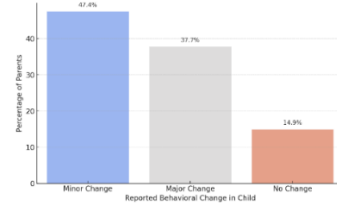


Figure 24: Distribution of Parents Reporting Behavioral Changes in Children Due to Online Learning Devices

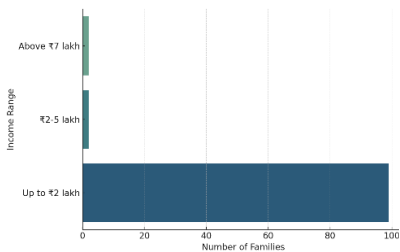


Figure 21: Family income distribution

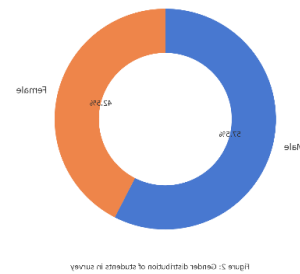


Figure 23: Gender distribution of students in the survey

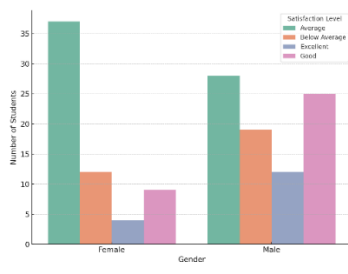


Figure 25: Student Satisfaction with Online Learning: Gender-wise Comparison

The challenges identified in the rural regions of Haryana mirror those faced by students in other developing and underdeveloped countries, where digital education remains constrained by inadequate infrastructure, economic limitations, and socio-cultural barriers. To bridge this gap, a multi-stakeholder approach with legal and ethical considerations is necessary. Additionally, AI-powered solutions can play a transformative role in addressing these challenges.

5. AI-Driven Solutions to Address Digital Learning Challenges in Developing and Underdeveloped Regions

Developed and underdeveloped nations are experiencing obstacles to digitalization education which doesn't allow equal access to quality education. The problems are of technological, socio-economic nature- like low digital infrastructure, lack of funds, low digital literacy, language barriers and gender divide. COVID19 pandemic has urge to take

education online and it exposes these inequalities. Many students in villages and from low-income families still cannot access the internet reliably or own a personal learning device or do not get learning material in their own language. However, efforts have been made to bridge the digital divide.

With the help of Artificial Intelligence, we can overcome these challenges and make education more inclusive. AI adaptive learning platforms, AI automated assessments, AI real-time translation tools and AI intelligent tutoring systems create accessibility. Despite the various types of edtech business solutions and the boom in AI solutions that are available today, experts have suggested that India is not yet ready for AI-led education.

The table below highlights the key pieces of evidence on digital learning challenges in developing and underdeveloped regions, the AI-driven solutions proposed for the same, the expected impacts, and what would be the legal provisions for the same.

Table 1: AI-Powered Solutions for Digital Learning Challenges in Developing and Underdeveloped Regions

Challenge Identified	Potential AI Solution	Expected Impact	Legal Dimensions
Lack of high-speed internet and power disruptions in rural areas	AI-driven offline learning platforms with adaptive content	Enables students to access learning materials without internet dependency	Compliance with data protection laws for offline AI storage and access
Limited access to personal digital devices	AI-enabled voice assistants and chatbot tutors accessible via basic mobile phones	Allows students to receive educational support even on low-end devices	Ensuring accessibility rights under the Right to Education (RTE) Act
Financial constraints in affording data plans	AI-based data compression for low-bandwidth content streaming	Reduces internet costs, making online education more affordable	Policies on digital affordability and net neutrality
Low student engagement and motivation	AI-powered gamified learning experiences and adaptive learning platforms	Enhances participation and learning retention through interactive methods	Ethical AI use policies to ensure fair and unbiased recommendations
Digital illiteracy among students and teachers	AI-driven training modules for digital literacy	Improves ability to use online platforms effectively	Aligns with national digital literacy programs
Language barrier in educational content	AI-based real-time translation and voice recognition for regional languages	Expands access to educational resources for non-English speakers	Legal frameworks for AI in education and linguistic rights
Gender disparity in digital learning	AI-powered adaptive learning tools that provide flexible learning schedules	Encourages higher female participation by reducing accessibility gaps	Gender equity provisions in education policies
One-size-fits-all courses that do not cater to individual needs	AI-driven personalized learning with adaptive difficulty levels	Ensures tailored education paths based on student abilities	Data privacy laws in personalized learning recommendations
Lack of assessment tools to track progress	AI-powered automated assessments and analytics	Provides real-time feedback and personalized learning insights	Compliance with student data protection regulations

The table outlines how AI can help solve key challenges in rural digital education. It also indicates the legal and policy framework required for this purpose.

6. Legal and Policy Considerations for AI-Integrated Online Education

The fusion of artificial intelligence, online education and legal frameworks should be anchored to laws, international regulations and ethical standards to ensure protection of data privacy, fairness, accessibility and intellectual property protection. Still, even though these laws do exist, challenges are faced in enforcement, practicality, and

implementation due to the speed at which AI is evolving. This segment looks at the various legal dimensions that exist, the gaps in their failings and possible solutions Internationally.

In order to make education AI-compliant, a wide array of policies need to come to fruition around the world, for example, digital learning policies by governments and institutions in the world must be in accordance with the human rights framework, and similarly, AI principles and accessibility laws. Below is an overview from an international perspective that addresses key legal and policy issues:

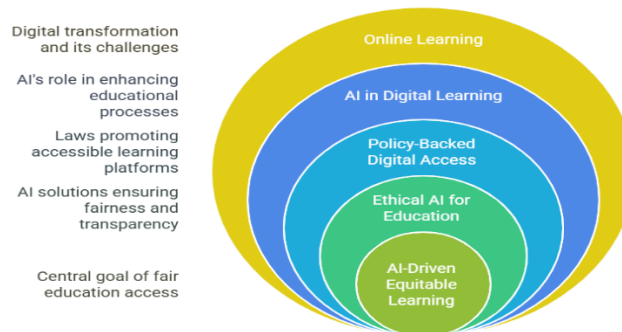


Figure 26: AI-Driven Equitable Learning Framework

6.1 Data Protection and Privacy Laws: Safeguarding Student Data

Legal Frameworks

Several international and national regulations govern the protection of student data in digital education:

- General Data Protection Regulation (GDPR) – European Union** (*General Data Protection Regulation (GDPR)*, 2016): Any organization dealing with personal data of people in the European Union (EU) must comply with the General Data Protection Regulation (GDPR). This includes schools and EdTech providers. The regulations require the processing of data to have a legal basis for either consent, necessity for a contract, or for the public interest, and put a great weight on transparency and fairness. According to the GDPR, students under 16 must require the parental approval for the processing of data by the online service. However, member states have the authority to lower the age threshold to 13. Moreover, GDPR further strengthens the principle of data minimization which ensures only relevant data for educational purposes is obtained or collected. Similarly, students' data cannot be used for a different purpose like marketing unless a new consent is acquired from the parents. Educational institutions must guarantee that students and their guardians have the right to access, rectify and, under certain circumstances, demand the deletion of their data. Under the GDPR, organizations must have strong security measures, notify individuals of data breaches in a timely manner, and conduct Data Protection

Impact Assessments (DPIAs) and appoint Data Protection Officers (DPOs) for high-risk activities, such as learning analytics that utilize AI. Failure to comply has seen a slew of regulatory actions against schools using cloud-based tools due to not having safeguards, showing widespread reach of the law.

- COPPA – United States** (*Children's Online Privacy Protection Act*, 1998): The federal law that deals with data collection from children under 13 on the internet and on educational websites, apps, and services. Under COPPA, it is the responsibility of EdTech operators to get verifiable parental consent to collect, use or disclose any personal data from children. Reliable means to obtain this consent include an authorization form, credit card or other secure online means. As per COPPA, businesses shall include clear and comprehensive privacy notices explaining what data is collected and how it is used. In order to use personal data of children, the law will enforce data minimization so that any data collected would be restricted to that which is necessary for the educational purpose sought. Further, the law prohibits the use of children's data for targeted advertising without explicit parental consent. Finally, parents will have the right to review, modify or delete their child's data at any time. Information needs to be retained only up until the data is useful and deleted from the system. The Federal Trade Commission (FTC) actively enforces COPPA. As a result, EdTech firms that breach COPPA, for example, using student data for advertising, have faced consequences. This

clearly shows the importance of compliance in schools.

- **India's Digital Personal Data Protection (DPDP) Act 2023** (*Digital Personal Data Protection Act, 2023*, 2023): Standards on Safeguarding Student Data on Digital Learning Platforms. The definition of a child is someone who is under the age of 18. This is a higher threshold compared to most jurisdictions. Further, it mandates verifiable parental consent before processing any minor's data. Data fiduciaries, such as schools, EdTech platforms, and those providing related services, must not process children's data if it is against the best interest of the data subject. This includes profiling, behavioral tracking, or serving targeted advertisements. Similar to that, the DPDP Act like GDPR embeds the principles of Purpose Limitation and Data Minimization. This means that only data which is necessary for educational purposes will be collected and used, and this data will not be used for any other purpose without additional consent. The way forward is to adopt a privacy-first approach in digital education.

Challenges in Implementation

As is evident from above that all major technology-driven nations are inclined towards establishing strong legal frameworks, however, following challenges still exist:

- **Age Verification & Consent Management:** Verifying age and getting parental consent, especially in large-scale digital contexts, is logistically complicated and may delay student access.
- **Integrations of Third Parties:** It is difficult to negotiate data-sharing agreements due to involvement of third parties (cloud storage, learning apps) by many schools.
- **Resource Constraints:** Many schools and EdTech startups are not legally, technically and financially fully equipped to implement compliance measures or consent systems.
- **Dynamic Regulatory Landscape:** Technology is evolving very fast so, policies must be constantly updated with the same pace.

- **Balancing Innovation & Privacy:** Using AI to offer customized learning content may violate profiling restrictions set by the GDPR and DPDP Act.

Proposed Solutions

There is a need to follow a multi-faceted approach to address these challenges, outlined as under:

- **Privacy-by-Design:** Schools and edtech platforms must ensure privacy is built in systems from the outset from minimizing data collection, using anonymization to keeping processing local wherever possible.
- **Streamlined Consent & Age Verification:** Create a single consent management system (e.g., parent portals) linked to national ID checks or third-party age estimation tools.
- **Training & Awareness:** Educators, developers, and administrators regularly participate in workshops on privacy laws and compliance best practices.
- **Collaboration with Regulators:** Establish guidelines, sandbox programs and certifications of EdTech tools (e.g. Education Privacy Certified).
- **Data Governance & Security:** To ensure privacy compliance, implement restrictive access controls, encryption, automatic data deletion and vendor assessments.

Policymakers can enhance the strength of these measures and make the digital learning environment safer and ethical while supporting responsible AI integration in education.

6.2. AI Ethics and Bias Regulations: Ensuring Fairness and Transparency

Legal Frameworks

Several international regulations and guidelines aim to address ethical concerns and biases in AI-driven education:

- **EU AI Act** (*Artificial Intelligence Act (AI Act)*, 2024): The EU Artificial Intelligence (AI) Act is the first comprehensive legal framework regulating artificial intelligence use across a range of sectors, including education, in the European Union. It has introduced a risk-based classification of AI systems

into 4 categories, i.e., unacceptable risk (e.g. AI for social scoring), high risk (e.g. AI systems used in education), limited risk, and minimal risk. AI used for student assessments, admissions and personalized learning in education is classified as high-risk and must comply with binding regulation measures. Obligation to inform users clearly when they interact with an AI system (students, teachers, parents); ensuring that human oversight is built into AI decisions; and requiring conformity assessment to be conducted before deployment of the AI system. The AI Act also obligates designers and epoch makers to ensure that the AI systems do not create discriminatory outcomes. They particularly protect students from such algorithmic bias on the part of gender, ethnicity, and other socio-economic background. Developers need to put in place effective data governance, guarantee the training data is of high quality and adequately representative, and set up grievance and error redressal mechanisms for the AI-based decisions. This law ensures transparency and fairness in the operations of educational institutions and edtech service providers making them accountable for their AI and algorithmic models.

- **UNESCO AI Ethics Guidelines** (*Recommendation on the Ethics of Artificial Intelligence - UNESCO Digital Library*, n.d.): Supports eliminating AI bias and making education applications of the AI fair. The UNESCO (United Nations Educational, Scientific and Cultural Organization) Recommendation on the Ethics of Artificial Intelligence offers a framework of principles which may help in the ethical deployment (use) of Artificial Intelligence (AI) in a range of contexts, including education. In 2021, 193 member states adopted it as the first universal standard for AI ethics, taking a rights-based approach towards AI governance. According to the UNESCO guidelines, biases and discrimination should be removed from AI systems with regard to fairness in the education sector. The framework requires AI educational tools to be inclusive by design. It should be useful for marginalized groups and persons with disabilities. Rural and linguistic minorities should also find it useful. The guideline urges the incorporation of diverse and representative datasets in order to train models that do not reinforce societal

inequality. UNESCO also emphasizes the need for transparency, explainability and accountability in AI decision making. It asks schools and AI corporations to make it clear how the AI outcome was decided, provide provision for human intervention and to allow complaining. The guidelines suggest that countries can create their own national policies on AI that are aligned with AI ethics and human rights. Further, it aims to encourage countries to work together in a global environment for a fair use of AI in the education sector. The recommendations of UNESCO are non-binding; however, it has normative influence. It can function as a model for countries that use AI with the education system.

Challenges in Implementation

Even though there are regulations in place; There are a few ethical issues regarding the use of AI in education:

- **Algorithmic Bias in AI Systems:** AI technologies that are used in the space of education display differing discriminatory impacts on specific students, especially from disadvantaged communities.
- **Limited Diversity in AI Datasets:** The majority of AI models have been trained on data from dominant languages and urban populations. This means rural students, non-English speakers, and students from economically weaker sections are not included in datasets.
- **Gender Inequities in AI-Driven Education:** AI systems can inadvertently reinforce gender stereotypes, hindering access to subjects or opportunities for female students, thereby perpetuating existing inequalities.
- **Opacity in AI Decision-Making:** Most AI systems work as black boxes which don't explain the reason students, teachers, and parents behind their outputs. So, it becomes difficult to understand any AI-powered decision or to dispute it.
- **Lack of Institutional Capacity:** Many educational institutions do not have the capacity to ensure compliance with ethical standards.

Proposed Solutions

- **Explainability in AI Tools:** The AI systems should provide explanations to the users on the use of AI tools for better understanding and implementation.
- **Promotion of Open-Source AI Tools:** The development and use of open-source AI tools to promote transparency, lessen commercial bias, and enable localization for different education needs should be encouraged.
- **Algorithmic Bias Audits:** It should be ensured that AI tools used in education undergo audits for possible algorithmic biases from time-to-time.
- **Capacity Building:** Tailored training for teachers, administrators, and policymakers should be provided to empower them to deal with AI responsibly in the classroom and the schools as a whole.
- **Global Collaboration for AI Ethics Standards:** Global collaboration should be encouraged to develop harmonized AI ethics guidelines for education across jurisdictions.

These measures would help AI in creating more fair and clear digital learning environments.

6.3. Equity and Accessibility Laws: Bridging the Digital Divide

Legal Frameworks

Various international and national laws focus on promoting equity and accessibility in education:

- **UN Sustainable Development Goal 4 (SDG 4)** (*Goal 4 | Department of Economic and Social Affairs, n.d.*): Aims to provide inclusive and equitable education for all. SDG 4 stresses the need to eradicate disparities in access to education based on sex, disability status, economic status, and location. Integrating technology into education should be as a tool of inclusion, not exclusion. This will definitely highlight digital equity that will ensure that children everywhere will achieve universalization of learning outcomes. Despite its non-binding status, SDG 4 impacts education policy and financing priorities at national levels and international student support policies. Countries are directed through SDG 4 to

develop strategies that support all learners of all ages to access digital technology and media, to enhance their skills and performance.

- **Americans with Disabilities Act (ADA)** (*The Americans with Disabilities Act, n.d.*): Digital learning platforms must be accessible to students with disabilities. According to Title III of the ADA, public-facing services—websites, learning management systems, EdTech applications—must be accessible to the disabled. This involves making interfaces that accommodate a wide range of cognitive and motor abilities, ensuring compatibility with assistive technology like screen readers and providing captions and transcripts for video content. The ADA is also seen as a benchmark for digital accessibility as it supports the Web Content Accessibility Guidelines (WCAG) as a standard. EdTech companies or schools not meeting these requirements can be legally challenged and punished for discrimination. As a result of the ADA, more and more institutions and organizations are offering online distance learning for students and teachers both full time and part time.
- **India's Right to Education (RTE) Act** (*Right of Children to Free and Compulsory Education Act, 2009*): Promote cost-effective means to digital learning for underprivileged students In India, RTE Act 2009 guarantees free and compulsory education to all children from age 6-14. Under this Act, children have a right to access information. The Act enables access to digital resources for efficient learning. Though the RTE Act was enacted before widespread AI adoption, its principles have been extended through policy directions and government programs that make digital inclusion happen. The RTE framework initiates affordability in digital learning materials, exclusion of economically disadvantaged students in technology integration and inclusion in schools is made mandatory. The Act states that the state shall take proactive initiatives to provide quality education, including digital initiatives in rural and underprivileged areas. India does not have a dedicated law regarding digital accessibility in

teaching and learning processes. Nevertheless, the RTE Act reinforces national policies like the Accessible India Campaign and Digital India, which have relevance to materializing parity in digital education.

Challenges in Implementation

In spite of the legal efforts the accessibility still face a significant barrier:

- **Infrastructure Deficits in Rural and Underserved Areas:** Many parts of the world, especially in developing countries, do not have guaranteed access to high-speed internet, reliable electricity or sufficient appropriate hardware so as to not be able to use AI-based learning tools and online education effectively.
- **Financial Barriers for Marginalized Students:** Many students from disadvantage backgrounds are unable to afford AI-powered learning solutions due to their high costs. Solutions such as adaptive platforms, intelligent tutoring systems, and interactive content are particularly costly, exacerbating educational inequalities.
- **Limited Compliance with Accessibility Standards:** Various EdTech platforms do not comply with compliance standards such as WCAG. As a result, these learning tools become difficult or impossible to use by disabled students needing a screen reader, captions or alternative input techniques.
- **Lack of Contextualized Solutions for Diverse Learners:** AI tools are too often designed for the well-connected, urban environments, with little contextualization for rural, multilingual, or culturally diverse populations, which results in exclusion and disengagement.
- **Insufficient Regulatory Oversight:** At present, there are various frameworks like SDG 4 and the ADA, which ensure that there is no non-compliance. However, these regulations are not being enforced strictly as there are many EdTech platforms who are operating without any consequence.

Proposed Solutions

To narrow the digital divide, both policy and technological intervention is recommended.

- **Public-Private Partnerships for Affordable AI Tools:** Governments must work with technology companies and non-profits to develop and subsidize AI-powered learning platforms that low-income students can use for the disabled conventional education tool that we use mainstream.
- **Development of AI-Powered Offline Learning Solutions:** Educational technology providers need to develop AI tools that will work effectively in offline and low-connectivity settings. Accordingly, students in remote areas may be able to secure benefits or personalized learning from such technologies.
- **Mandatory Accessibility Audits for AI-Driven Platforms:** Regulator must require regular accessibility audits for all AI-based EdTech platforms to ensure compliance with global standards like WCAG and national regulations like the ADA, and to cater to students with disabilities.
- **Localized and Inclusive AI Design:** EdTech developers should consider a variety of languages, cultures, and learning needs in the designing AI systems so that the AI-enabled learning platforms can be adaptable to local realities. Besides, it helps to avoid marginalization of non-dominant learners.
- **Strengthening Regulatory Enforcement and Accountability:** Governments should impose clear legal requirements for accessibility and equity obligations in Education Technology (EdTech). Along with penalties and sanctions for non-compliance. Governments should also make monitoring, reporting, and corrective action of non-compliance standard practice.

Tackling these problems can help make education accessible with the help of the artificial intelligence.

6.4. Intellectual Property Rights: AI-Generated Educational Content

Legal Frameworks

Intellectual property (IP) laws play a crucial role in defining ownership rights for AI-generated educational content:

- **Berne Convention (WIPO)** (*Berne Convention for the Protection of Literary and*

Artistic Works, n.d.): It sets global copyright schemes for educational inputs. The World Intellectual Property Organization (WIPO) administers the Berne Convention for the Protection of Literary and Artistic Works. It is the key international treaty governing the copyright protection of educational materials. It provides that a copyright will exist in respect of textbooks, teaching material digital learning material and other original literary or artistic work immediately on their being created and need not be registered. The Berne Convention lays down the principle of national treatment that same protection should be given to the works created in one member country at par with a work created in another member country. The convention is based on human authorship, which makes it difficult to apply it in case of AI-generated content, because no human could be the creator. The gap raises doubts about whether AI-generated educational material like automated assessments and instructional videos attracts copyright protection (and if so, who owns it).

- **EU Copyright Directive** (Directive 2001/29/EC of the European Parliament and of the Council of 22 May 2001 on the Harmonisation of Certain Aspects of Copyright and Related Rights in the Information Society, 2001): Offers guidance on copyright ownership of AI-generated content. The Copyright in the Digital Single Market (DSM) Directive of the European Union (EU) more specifically provides a regional copyright regime for the digital age including AI generated content. It is also known as the EU Copyright Directive. The directive mainly strengthens copyright for humans but has exceptions for text and data mining (TDM) permitting certain activities for building AI that technically does not infringe copyright. However, the instruction does not explicitly clarify the ownership of the output generated purely by artificial intelligence, thus leading to ambiguity in educational contexts. The ambiguous legal framework creates grey scenarios for teachers, institutions and EdTech companies. An instance is the copyright of a set of adaptive learning resources developed by an

AI tool without direct human involvement. In this case, the question as to will own the copyright, the developer of the specific AI, the institution that uses the specific AI, or the teacher who uses it in the classroom remains undecided. When AI-generated content is being shared across borders, the answer to such questions will not be straightforward.

Challenges in Implementation

Existing IP laws face difficulties in regulating AI-generated educational content:

- **Ambiguity in Ownership:** In the present scenarios it is difficult to clearly determine the ownership of the AI generated content. The disputes arise due to uncertainty of ownership such as whether it belongs to the AI's developer, the educator, the institution deploying the AI, or no one at all.
- **Licensing Conflicts and Restrictions on Use:** The ambiguity in ownership further leads to licensing issues and create barriers reusing or sharing the AI-created learning resources.
- **Cross-Jurisdictional Variations:** Different countries interpret copyright laws differently, and the absence of harmonized global standards for AI-generated content results in inconsistencies.
- **Lack of Open-licensing Framework:** Schools with restricted funds, marginalized learners, and educators find it difficult to adapt resources for local contexts in the absence of open licensing frameworks for AI-generated educational content.

Proposed Solutions

Following policy interventions are required for better outreach and clarity in AI-generated educational content,:

- **Capacity Building for Educators:** Regular training programs should organized to empower teachers, administrators, and policymakers so that they may handle AI-related IP issues.
- **AI-Specific IPR:** Policymakers should develop clear legal frameworks that explicitly define the ownership rights of AI-generated educational

content, specifying who holds copyright in different scenarios.

- **Harmonization of International IP Standards:** International organizations such as WIPO and UNESCO should lead efforts to develop harmonized guidelines for AI-generated content in education, reducing cross-border legal conflicts and ensuring consistent protection and access rights globally.
- **Open Licensing Frameworks:** Open-source and open-licensing models should be adopted by the governments, educational bodies, and EdTech platforms. Various bodies should ensure funding for such initiatives.

While multiple legal frameworks govern AI in education, their effectiveness depends on enforcement, adaptation, and international cooperation. To ensure responsible AI integration in digital learning, policymakers must:

- Strengthen enforcement mechanisms to ensure compliance with AI and data protection laws.
- Address AI biases and equity challenges through legal accountability measures.
- Invest in AI-driven infrastructure and policy standardization to promote equitable and inclusive education.

By implementing these strategies, AI can serve as a powerful tool to enhance educational access while upholding legal and ethical standards.

8. Conclusions

The paper presents the results of the survey conducted in the schools in rural Haryana to study significant barriers related to access, engagement, and the effectiveness of digital education, which were made worse by the covid-19 pandemic. As the study indicates, AI can be a powerful tool for closing gaps if it is designed and used the right way AI-powered education systems could personalize learning journeys, customize content for language and cultural differences, and provide timely intervention for students at risk of not making the grade, however, strong legal and ethical frameworks should be in place to ensure transparency, inclusivity, data privacy, and human control. The

paper further discusses AI-driven solutions to address digital learning challenges in developing and underdeveloped regions. Another contribution of the paper is proposing the AI-Driven equitable learning framework which requires the multi-stakeholder initiative with supportive and appropriate policy intervention by the government. The research highlights that the inclusive and capacity building approach for education policy integration of AI can help formulate a more equitable and digital learning system where no one is left behind.

References

1. Abdurohman, N. R. (2025). Artificial Intelligent In Higher Education: Opportunities and Challenges. *Eurasian Science Review An International Peer-Reviewed Multidisciplinary Journal*, 2(Special Issue), 1683–1695. <https://doi.org/10.63034/esr-334>
2. *Artificial Intelligence Act (AI Act)*. (2024). [Regulation Proposal]. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0206>
3. Arunprakash, A. (2024). Investigating Digital Education: A Study on Fostering Accessibility and Equity in Learning Environments. *Kristu Jayanti Journal of Humanities and Social Sciences (KJHSS)*, 4, 20–29. <https://doi.org/10.59176/kjhss.v4i0.2413>
4. *Berne Convention for the Protection of Literary and Artistic Works*. (n.d.). Retrieved May 28, 2025, from <https://www.wipo.int/treaties/en/ip/berne/>
5. Budidarma, A. (2022). Online Learning in disadvantaged areas. A Literature review. *Jurnal Office*, 8(1), 157. <https://doi.org/10.26858/jo.v8i1.35601>
6. CCPA. <https://oag.ca.gov/privacy/ccpa#:~:text=The%20CCPA%20requires%20business%20privacy,the%20Right%20to%20Non%2DDiscrimination.>
7. Chatinakrob, T. (2024). Interplay of International Law and Cyberspace: State Sovereignty Violation, Extraterritorial Effects, and the Paradigm of Cyber Sovereignty. *Chinese Journal of International Law*, 23(1), 25–72.
8. *Children's Online Privacy Protection Act* (No. 15 U.S.C. §§ 6501–6506). (1998). <https://www.govinfo.gov/app/details/USCODE-2011-title15/USCODE-2011-title15-chap91>

9. Constitution of India, Article 21A (1950). <https://legislative.gov.in/constitution-of-india>
10. *Digital Personal Data Protection Act, 2023*. (2023). <https://www.meity.gov.in/dpdp-act-2023>
11. *DIKSHA*. (2017). [Computer software]. <https://www.digitalindia.gov.in/initiative/diksha/>
12. Directive 2001/29/EC of the European Parliament and of the Council of 22 May 2001 on the Harmonisation of Certain Aspects of Copyright and Related Rights in the Information Society, EP, CONSIL, 167 OJ L (2001). <http://data.europa.eu/eli/dir/2001/29/oj/eng>
13. Dokumacı, M. (2024). Legal Frameworks for AI Regulations. *Human Computer Interaction*, 8(1), 133. <https://doi.org/10.62802/ytst2927>
14. Dr. Nidhi Sharma. (2024). ARTIFICIAL INTELLIGENCE: LEGAL IMPLICATIONS AND CHALLENGES. *Knowledgeable Research: A Multidisciplinary Journal*, 2(11), 13–32. <https://doi.org/10.57067/220k4298>
15. GDPR. <https://gdpr-info.eu/>
16. *General Data Protection Regulation (GDPR)*. (2016). <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32016R0679>
17. *Goal 4 | Department of Economic and Social Affairs*. (n.d.). Retrieved May 28, 2025, from <https://sdgs.un.org/goals/goal4>
18. Gulzar, A. A., Mehmood, Z., & Ahmad, I. (2024). Impact of the Digital Divide on Learning Outcomes of Students in Higher Education Institutes. *Human Nature Journal of Social Sciences*, 5(2), 152–159. <https://doi.org/10.71016/hnjss/7jn1nt52>
19. Kaddouri, M., Mhamdi, K., Chniete, I., Marhraoui, M., Khaldi, M., & Jmad, S. (2024). Adopting AI in Education: Technical Challenges and Ethical Constraints. In M. Sanmugam, B. I. Edwards, N. M. Mohd Barkhaya, & Z. Khlaif (Eds.), *Advances in Educational Technologies and Instructional Design* (pp. 25–72). IGI Global. <https://doi.org/10.4018/979-8-3693-7255-5.ch002>
20. Kirin, R., Khomenko, V., & Pashchenko, O. (2024). PROSPECTS OF LEGAL REGULATION OF EDUCATIONAL AI RELATIONS. In O. Kostenko & Y. Yekhanurov (Eds.), *DIGITAL TRANSFORMATION IN UKRAINE: AI, METAVERSE, AND SOCIETY 5.0* (pp. 124–129). SciFormat Publishing Inc. <https://doi.org/10.69635/978-1-0690482-1-9-ch13>
21. Mathrani, A., Sarvesh, T., & Umer, R. (2022). Digital divide framework: Online learning in developing countries during the COVID-19 lockdown. *Globalisation, Societies and Education*, 20(5), 625–640. <https://doi.org/10.1080/14767724.2021.1981253>
22. *Recommendation on the Ethics of Artificial Intelligence—UNESCO Digital Library*. (n.d.). Retrieved May 28, 2025, from <https://unesdoc.unesco.org/ark:/48223/pf0000380455>
23. *Right of Children to Free and Compulsory Education Act*. (2009).
24. Sundeen, T., & Kisner, L. (2024). Rural Online Learning During COVID 19: What We Learned and What has Changed. *Theory & Practice in Rural Education*, 14(1), 1–29. <https://doi.org/10.3776/tpre.2024.v14n1p1-29>
25. *SWAYAM*. (2017). [Computer software]. <https://swayam.gov.in/>
26. Tang, Q., Kamarudin, S., Rahman, S. N. A., & Zhang, X. (2024). Bridging Gaps in Online Learning: A Systematic Literature Review on the Digital Divide. *Journal of Education and Learning*, 14(1), 161. <https://doi.org/10.5539/jel.v14n1p161>
27. *The Americans with Disabilities Act*. (n.d.). ADA.Gov. Retrieved May 28, 2025, from <https://www.ada.gov/>
28. Yadav, L. (2024). Bridging the Gap: Unveiling the Gendered Digital Divide in Haryana State, India. *South Asian Journal of Social Studies and Economics*, 21(12), 312–320. <https://doi.org/10.9734/sajsse/2024/v21i12939>
29. Zhao, C. (2025). AI-assisted assessment in higher education: A systematic review. *Journal of Educational Technology and Innovation*, 6(4). <https://doi.org/10.61414/jeti.v6i4.209>