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FII INSTITUTE
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# REDUCING INEQUALITIES IN EDUCATION THROUGH ARTIFICIAL INTELLIGENCE


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# Executive Summary

## Purpose

This report provides a comparative analysis of the integration of Artificial Intelligence (AI) in education across four champion countries: India, Greece, Brazil, and Kenya. Its primary aim is to examine how AI can address educational inequalities, enhance learning outcomes, and support teacher effectiveness, while identifying policy, infrastructural, and ethical challenges that may hinder equitable adoption. By synthesizing national strategies, pilot initiatives, and innovative projects in these 4 champion countries, the report seeks to inform policymakers, educational leaders, and international partners that are part of the Future Investment Initiative (FII) Institute ecosystem about actionable interventions for fostering inclusive and sustainable AI-enabled education systems worldwide.

## Scope

The analysis covers four countries from four regions (South America, Africa, Europe and South Asia) with diverse educational landscapes, linguistic and cultural contexts, and governance structures:

- **India:** Characterized by a large and linguistically diverse population, India is actively developing AI policies and indigenous large-scale language models (LLMs) while fostering an AI startup ecosystem. AI applications in education range from smart-class platforms to personalized learning tools, but challenges persist in ensuring equitable access across states and rural regions.
- **Greece:** Despite near-universal enrollment, Greece faces persistent inequalities driven by socioeconomic disparities, regional variations, and challenges for minority and immigrant students. National AI initiatives, such as the Blueprint for Greece's AI Transformation and Pharos AI Factory, Underscore the potential of AI to enhance personalized learning, linguistic inclusion, and equitable access to quality education, yet implementation remains uneven and centralized.
- **Brazil:** Public education in Brazil exhibits stark disparities, especially in rural schools, compounded by digital and infrastructural gaps. Government-led initiatives, including the PBIA plan, are recent and lack full implementation, whereas bottom-up interventions like AIED Unplugged demonstrate scalable, low-resource solutions that leverage AI to improve learning outcomes even in low-connectivity environments.
- **Kenya:** Kenya's dual-level governance system poses unique challenges for education policy implementation. While primary, secondary, and university education are managed by the national government, the vocational training centres and early childhood education are managed by the county governments. Kenya is also transitioning into Competency Based Education and Training (CBET) which emphasises competency-based learning, adaptive assessments and digital literacy. There are various initiatives aimed at integrating digital tools and emerging technologies such as AI into the curriculum to support teaching, learning and administration. At a macro-level, these initiatives aim to reduce inequality in educational outcomes by increasing accessibility and democratizing learning. Initiatives to integrate digital tools and AI into education in Kenya include; M-Shule, Kytabu, Angaza Elimu, AI for Kenya Sign Language (AI4KSL) and Eneza Education. While these initiatives, alongside AI-enabled digital literacy curricula, provide promising models for bridging inequality gaps, disparities in infrastructure, teacher capacity, digital literacy and urban-rural access are still formidable inhibitors.

Greece, Kenya, Brazil, and India were selected for this report because together they represent diverse geographic, economic, and developmental contexts—spanning Europe, Africa, Latin America, and Asia—that illustrate both the shared challenges and distinct opportunities in using Artificial Intelligence to reduce educational inequalities. Each country demonstrates a unique combination of policy commitment, innovation, and systemic barriers that is worth analyzing and replicating: Greece's strong digital transformation agenda within an EU framework; Kenya's pioneering mobile-based learning solutions in resource-constrained settings; Brazil's pragmatic, low-connectivity AI models for inclusion; and India's large-scale, multilingual, and federally coordinated AI initiatives. Examining these four cases allows for a comparative understanding of how AI can be successfully adapted to promote equitable education across varying infrastructures, governance systems, and socio-economic conditions.

**The report evaluates these contexts across five dimensions: educational equity, policy and governance, AI integration, ethical considerations, and technological infrastructure.**

## KEY FINDINGS ACROSS GREECE KENYA BRAZIL INDIA

### Educational Inequities Persist Across All Contexts

- **India**: Dropout rates increase with higher education levels, and regional disparities remain pronounced.
- **Greece**: Socioeconomic and regional factors, alongside reliance on private tutoring, exacerbate achievement gaps.
- **Brazil**: Rural schools lack basic infrastructure and digital access, impeding equitable learning opportunities.
- **Kenya**: Urban-rural divides, policy vacuum and digital/AI literacy gaps limit the effectiveness of digital and AI-enabled learning.

### AI Potential is Promising but Unequally Distributed

- Personalized learning tools, adaptive platforms, and AI-assisted assessment can reduce disparities and lighten teacher workloads.
- Initiatives such as **AIED Unplugged** (Brazil), **Pharos AI Factory** (Greece), and **M-Shule** (Kenya) demonstrate context-sensitive approaches to AI in low-resource environments.
- Linguistic and cultural diversity remains a barrier; AI systems often underperform in local languages or fail to incorporate cultural nuances, particularly in India, Kenya, and Greece.

### Policy-Implementation Gaps are Significant

- **India** and **Greece** demonstrate strong policy intent but limited last-mile implementation.
- **Brazil's** top-down AI education plans are not yet operationalized, though bottom-up projects, mainly initiated by public universities, are effective. Some examples are "Intelligent Tutor System to Support Learning of 'Object Orientation Subjects'," by the Federal University of Espírito Santo (UFES), the "Institute of Artificial Intelligence Innovation," by the State University of São Paulo (Unesp) and the "Development & Research group" from the Federal University of Goiás (UFG). Moreover, there are investments from the private sector, such as the "Amazon-Friendly Technology" project, "Letrus" and "Geekie Games," which also strive to narrow the socioeducational gap between the marginalized and non-marginalized students in the country.
- **Kenya's** dual governance structure and transition to a new education system (CBET) complicates education strategy execution, highlighting the need for alignment between national and county-level authorities.

### Ethical and Governance Concerns Require Attention

- Data privacy, student consent, algorithmic bias, and equitable access are critical issues across all four countries.
- Lack of robust digital governance frameworks threatens trust in AI-enabled education systems, especially in Kenya and Greece.

### Infrastructure and Capacity Gaps Limit AI Adoption

- Inadequate internet access, hardware shortages, and limited teacher training hinder the scalability of AI interventions.
- Successful AI adoption relies on solutions that are easy to build and deploy in resource constrained environments as demonstrated in Brazil and Kenya.

## RECOMMENDATIONS FOR GREECE KENYA BRAZIL INDIA

### Policy Development

- Develop clear, actionable AI-in-education strategies that bridge national frameworks with local implementation realities.
- Integrate lessons from successful bottom-up initiatives to ensure scalability and equity.


### Capacity Building

- Provide robust teacher training in AI tools, digital literacy, and ethical AI use.
- Establish continuous professional development (in-service) programs to strengthen teacher confidence and instructional quality.

### Infrastructure Investment

- Prioritize low-cost, context-sensitive technologies to overcome connectivity and hardware gaps.
- Expand digital access in rural and underserved areas to ensure equitable AI deployment.

### Ethical Framework

- Implement guidelines for data privacy, consent, and bias mitigation in AI educational tools.
- Involve diverse stakeholders, including students, parents, and marginalized communities, in the development of AI policies.

### International Collaboration

- Encourage cross-country knowledge sharing, partnerships, and joint AI research to leverage global best practices. The FII Institute and Columbia University, through the worldwide network of partners, are uniquely positioned to organize these knowledge sharing opportunities.
- Support multilingual AI development and culturally sensitive educational tools through international cooperation.

## CONCLUSION

- AI presents a transformative opportunity to enhance learning outcomes, reduce educational inequalities, and support teachers across diverse contexts. However, achieving these benefits requires integrated policy frameworks, targeted capacity building, inclusive technological solutions, and strong ethical governance. By drawing lessons from **India**, **Greece**, **Brazil**, and **Kenya**, this report provides a roadmap for harnessing AI to create equitable, effective, and sustainable education systems worldwide.

# 1. Introduction

Artificial Intelligence (AI) and digital technologies are transforming education worldwide, offering unprecedented opportunities to enhance learning outcomes, personalize instruction, and expand access to knowledge. However, the promise of AI-enabled education is tempered by deep and persistent global inequalities. Many countries, including in the Global North, continue to face challenges such as limited access to qualified teachers, evolving technological infrastructure, and scarce educational materials, which constrain the integration of AI into classrooms. In regions where internet connectivity is unreliable and digital devices are scarce, the benefits of AI remain unevenly distributed, exacerbating existing disparities in learning opportunities.

Moreover, the global education and research landscape is shaped by asymmetries between the Global North and Global South. Institutions in the Global North dominate higher education rankings, research funding, and AI innovation, reinforcing patterns of dependency and contributing to the "brain drain" of talented educators and researchers from low- and middle-income countries. This could risk perpetuating cycles of inequity, where the Global South becomes a consumer rather than a co-creator of educational technologies and research knowledge.

To ensure that AI serves as a force for inclusion rather than exclusion, global collaboration and investment can focus on capacity-building, equitable access to digital infrastructure, and the development of culturally and linguistically relevant AI tools. Addressing these global imbalances—by strengthening local teacher training, diversifying educational resources, and empowering Global South institutions to lead AI research—will be essential to realizing the transformative and equitable potential of AI in education.

Champion countries such as Greece, Kenya, India, and Brazil, while diverse in economic, social, and cultural contexts, face shared challenges in ensuring that AI adoption strengthens rather than exacerbates existing educational disparities.

In **Greece**, national strategies such as the Blueprint for AI Transformation demonstrate strong policy intent, yet implementation remains uneven, particularly in rural and island communities where resource constraints limit the integration of AI into classrooms. Similarly, **Kenya** confronts structural and governance challenges, including multiple digital strategies, limited teacher training, and unequal access to digital infrastructure, which hinder the effective adoption of AI tools, especially in marginalized regions. In **India**, the country's vast linguistic and cultural diversity offers a rich foundation for innovation in AI-powered education. Ongoing national initiatives are expanding access to multilingual and technology-enabled learning platforms. These programs are helping bridge socio-economic divides by promoting connectivity and supporting the creation of educational tools in multiple Indian languages. While challenges remain—only about 55% of the population currently uses the internet, and roughly a third of children are not taught in their preferred language—these barriers are increasingly being addressed through targeted policies and localized innovations. The growing emphasis on inclusive language technologies and the translation of federal AI strategies into state and classroom-level action demonstrate India's commitment to ensuring that digital and AI-driven education becomes more equitable, accessible, and culturally resonant nationwide. India has made substantial progress in expanding educational access and literacy, achieving a national literacy rate of approximately 77% and advancing digital and policy reforms through initiatives like the National Education Policy (NEP) 2020. States such as Kerala lead the way, with literacy rates of 95.3% for population age 7 and above, reflecting effective governance and sustained investment in human capital. Significant disparities still persist across regions and education levels. Dropout rates rise steadily—1.9% at the primary level, 5.2% at upper primary, and 14.2% at secondary—limiting pathways to higher education and a skilled workforce. States such as Uttar Pradesh, with a literacy rate above 78%, continue to face severe educational deprivation due to systemic, socio-economic, and infrastructural challenges. These variations underscore the importance of targeted, equity-focused interventions to bridge regional gaps, strengthen learning outcomes, and ensure that national progress translates into inclusive educational success for all. **Brazil**, despite ambitious national plans for AI integration, continues

to rely on localized, bottom-up initiatives such as AIED Unplugged to overcome persistent infrastructural and digital inequalities. Nonetheless, there are also records of initiatives led by the states' local government, such as Rio Grande do Sul's government, in partnership with IBM. The program uses AI to predict which students are at risk of dropping out of school, analyzing attendance and socioeconomic data to enable preventive and individualized actions.

Across these contexts, four cross-cutting barriers emerge: evolving policy implementation and governance mechanisms, gaps in digital and AI literacy among educators and learners, unequal access to infrastructure, and the ethical challenges posed by data privacy, algorithmic bias, and inclusion. Addressing these challenges requires a coordinated approach that combines robust policy frameworks, investment in human and technical capacity, culturally and linguistically relevant solutions, and international collaboration.

This report presents evidence-based, cross-cutting recommendations for Greece, Kenya, India, and Brazil, with a focus on promoting equitable, effective, and ethical adoption of AI in education. By highlighting actionable strategies in policy development, capacity building, infrastructure investment, ethical frameworks, and international cooperation, the report aims to guide governments, educational institutions, and stakeholders in transforming national intentions into concrete, scalable outcomes that benefit all learners.

## *Educational Inequities Across Four Countries*



### India

India, with a literacy rate of approximately 77%, continues to face significant educational inequities across all levels of schooling—primary, secondary, and higher education. Dropout rates increase progressively with the educational stage: 1.9% at primary school, 5.2% at upper primary, and 14.2% at secondary school. Strong secondary education is critical for access to higher education and the development of an educated workforce, yet many students fail to reach this stage. Educational quality and access vary widely across states. For example, Kerala consistently achieves the highest literacy rates, 95.3% for population age 7 and above, while states such as Uttar Pradesh's literacy rate was 78.2% for the same cohort. States like Uttar Pradesh experience severe educational deprivation due to systemic, socio-economic, and infrastructural challenges. These disparities underscore the need for targeted interventions that address regional inequalities and improve learning outcomes across the country.



### Greece

Greece has achieved notable progress in ensuring near-universal enrollment in primary and secondary education and maintaining one of the lowest early school-leaving rates in the European Union. Recent national strategies—such as the *Blueprint for Greece's AI Transformation* and the *Pharos AI Factory*—further signal a commitment to digital innovation and inclusive learning, including initiatives that strengthen AI literacy and improve access for minority and differently-abled students.

Despite these advancements, persistent opportunities for growth remain along socioeconomic, geographic, and cultural lines. Wealthier families continue to benefit from private tutoring (*frontistiria*), reinforcing a two-tiered education system and widening achievement gaps. Results from PISA 2022 show Greece performing below the OECD average, with only 53% of 15-year-olds achieving basic proficiency in mathematics (OECD: 69%), and large socio-economic performance differences of 76 points in mathematics between the top and bottom quartiles. Rural and island schools face additional constraints—teacher shortages, outdated infrastructure, and limited digital access—while immigrant and minority students experience higher dropout rates and language barriers. The COVID-19 pandemic deepened these inequities, as remote learning proved less accessible to disadvantaged groups.

Efforts to address these disparities include a new Ministry of Education dropout-tracking system to collect more detailed data on early school leaving. The lack of systematic ethnicity or settlement-type breakdowns will likely obscure the scale of exclusion, underscoring the need for stronger monitoring and targeted interventions to ensure that national progress translates into equitable educational outcomes for all learners.

### Brazil

Brazil has made meaningful progress in expanding access to education and integrating digital and AI-based innovations into its learning ecosystem. National policies and emerging initiatives—such as the four-year *Plano Brasileiro de Inteligência Artificial* (PBIA)—reflect a growing governmental commitment to digital transformation in education. Public universities and local innovators are leading the way, with initiatives like AIED Unplugged and Amazon-Friendly Technology demonstrating how AI can be adapted to low-connectivity environments, reaching students in underserved and remote regions. These context-sensitive solutions illustrate Brazil's capacity for creative, inclusive education reform.

In parallel to this meaningful progress, structural opportunities for growth persist. Public rural schools still face severe resource shortages, lacking essentials such as electricity, transportation, computers, and tablets. As of 2025, approximately 20.5 million people in Brazil remain without reliable internet access, constraining opportunities for digital learning and skill development. This digital divide perpetuates unequal educational outcomes and limits the future potential of students in marginalized areas. Bridging these infrastructure gaps and scaling successful local innovations remain critical for ensuring that Brazil's progress in digital education translates into equitable and sustainable learning for all.



### Kenya

Kenya has made substantial progress in expanding access to education and modernizing its system through policy and governance reforms. The 2010 Constitution introduced devolution, creating 47 county governments and bringing education and other public services closer to communities. Although education remains largely under national oversight—with Early Childhood Development and Education (ECDE) and Vocational Training Centers devolved—this dual governance structure has enabled more localized innovation and accountability. Major national investments in school infrastructure and digital technology, alongside the rollout of the Competency-Based Education and Training (CBET) framework, signal a strong commitment to building a more holistic, skills-oriented education system that emphasizes critical thinking and practical learning over rote memorization.

Despite this substantial progress, persistent challenges continue to affect equity and quality. High student–teacher ratios, inadequate teaching materials, and significant disparities between urban and rural schools limit the effectiveness of these reforms. Many rural areas face shortages of qualified teachers and insufficient digital resources, constraining learning outcomes and reinforcing social inequality. Despite policy advances and curricular modernization, inequities in access, quality, and learning outcomes remain widespread—especially among students from marginalized regions and low-income households. Bridging these gaps will require sustained investment, teacher capacity-building, and stronger coordination between national and county-level authorities to ensure that Kenya's educational progress translates into truly inclusive development.

## *Importance of Artificial Intelligence in Education*

AI is rapidly becoming an integral part of education systems worldwide, with countries adopting diverse strategies to harness its potential to improve learning outcomes and address persistent inequalities. In **India**, AI has become increasingly commonplace in both society and policy. The country is actively developing indigenous large language models (LLMs) and small language models (SLMs), while fostering a vibrant AI startup ecosystem. According to Stanford University's AI Index Report, 2024, India ranks seventh globally in aggregate private investments in AI related startups culminating into a total of USD 9.85 billion. This ecosystem is beginning to permeate the education sector, with over 70% of teachers report using AI tools in their classrooms, mainly for lesson planning and administrative tasks, while ~25 EdTech-AI firms are offering smart-class platforms, personalized learning solutions, and AI-driven tools designed to enhance teaching and learning. If effectively democratized, AI has the potential not only to improve student outcomes but also to reduce administrative and instructional burdens on educators, paving the way for a more efficient and equitable education system.

In **Greece**, AI offers a promising avenue for addressing longstanding educational inequalities. The country's education system faces persistent gaps between students who can afford private tutoring and those from disadvantaged backgrounds. AI-powered tools, such as virtual tutors and adaptive learning platforms, can provide individualized feedback aligned with the national curriculum, serving as lower-cost alternatives to supplementary instruction. Initiatives like the *Blueprint for Greece's AI Transformation* and *Pharos AI Factory* aim to support linguistic diversity, immigrant and minority students, and learners with disabilities through Greek-specific translation, text-to-speech, and accessibility tools. By targeting underserved populations and regions with limited teacher availability, particularly rural and island communities, these technologies have the potential to reduce regional disparities. Yet, realizing this potential hinges on equitable implementation, sustained funding, and robust teacher training, including affordable access, robust teacher training, and reliable digital infrastructure; otherwise, AI could inadvertently reinforce existing inequalities.

**Brazil** presents a unique model in which AI is leveraged pragmatically to overcome infrastructural and resource limitations. The *AIED Unplugged* initiative, developed by teachers at the Federal University of Alagoas (UFAL) and partners, provides high-quality, standardized assessment tools to support educators in rural schools, where limited training and resources can compromise educational quality. The project is built around five pillars—conformity, disconnection, proxy use, multi-user solutions, and unskillfulness—to address challenges associated with deploying AI in low-resource settings. Its interface requires minimal internet connectivity, does not demand changes to existing infrastructure, and is user-friendly for teachers with limited digital skills. This approach operationalizes the S.M.A.R.T. (Showing, Manageable, Accessible, Real-time Interactive, Testing) classroom concept, transforming existing resources into accessible, data-supported learning solutions and demonstrating a scalable model for equitable AI integration in real-world contexts.

Across Africa, AI adoption in education is steadily growing, with countries such as Kenya, Nigeria, and South Africa leveraging innovative technologies to enhance access and learning outcomes while addressing teacher shortages. In **Kenya**, the government has released the draft *National Artificial Intelligence Strategy 2025–2030,* which cascades the African Union's AI Strategy at the national level. The strategy envisions positioning the country as a leading AI hub in Africa and integrating AI across key development sectors, including education. Kenya's Competency-Based Education and Training (CBET) emphasizes digital literacy from elementary through junior secondary school, facilitating the use of AI technologies in classrooms. AI-powered platforms such as *M-Shule* and *Eneza Education* are already improving personalized learning experiences in underserved communities, while partnerships with technology companies like Microsoft and Google are strengthening teachers' capacity to implement AI effectively. Together, these country-specific examples illustrate both the transformative potential and the practical challenges of integrating AI into diverse educational contexts. When thoughtfully implemented, AI can serve as a powerful tool to enhance learning, reduce inequities, and support teachers; however, success depends on strategies that account for linguistic, infrastructural, and socioeconomic realities, ensuring equitable access and sustainable impact.

## *Objectives of the Report*

The primary objective of this report is to provide a comparative analysis of the opportunities, challenges, and policy implications associated with the integration of Artificial Intelligence in education across four diverse countries: India, Greece, Brazil, and Kenya. By examining each country's educational context, policy frameworks, digital infrastructure, and innovative practices, the report aims to identify cross-cutting lessons and actionable recommendations that can inform evidence-based decision-making for policymakers, educators, and other stakeholders that are part of the Future Investment Initiative (FII) Institute ecosystem.

Specifically, the report seeks to:

1. **Assess the current state of AI in education**
    - Examine how AI is being deployed across different levels of education, from primary and secondary schools to higher education institutions.
    - Identify the key initiatives, pilot programs, and technological tools being used in each country, highlighting both successes and gaps in implementation.
2. **Analyze educational inequalities and access challenges**
    - Explore how socioeconomic, geographic, and infrastructural disparities influence access to quality education and AI-driven learning tools.
    - Understand the potential of AI to either bridge or exacerbate these disparities, particularly for disadvantaged students and marginalized communities.
3. **Evaluate policy frameworks and governance structures**
    - Review national strategies, regulatory frameworks, and institutional approaches that guide AI adoption in education.
    - Identify barriers to effective policy implementation, including coordination challenges, capacity limitations, and gaps between policy intent and practical outcomes.
4. **Identify best practices and innovative approaches**
    - Highlight successful interventions, both top-down (government-led) and bottom-up (community or university-led), that demonstrate equitable and effective integration of AI in education.
    - Examine adaptive strategies that overcome infrastructural, financial, or digital literacy constraints in low-resource settings.
5. **Develop actionable recommendations**
    - Formulate cross-cutting recommendations for policy development, capacity building, infrastructure investment, ethical frameworks, and international collaboration.
    - Provide guidance for ensuring AI integration in education enhances equity, inclusivity, and learning outcomes while safeguarding privacy and ethical standards.

By achieving these objectives, the report aims to provide a practical, evidence-based roadmap for countries seeking to leverage AI in education, ensuring that technological advancements translate into meaningful improvements in learning opportunities, teacher effectiveness, and educational equity.

# 2. Thematic Analysis of AI Applications in Education

## 2.1 Governance and Educational Policies Related to AI

**GREECE**

Comprehensive strategies, including the Blueprint for AI Transformation (2024) and the Pharos—Hellenic AI Factory, aim to integrate AI across all educational levels. Pilot projects in personalized learning and teach training show promise.

**KENYA**


AI solutions focus on improving access and learning outcomes, particularly in rural areas, programs providing adaptive learning, teacher support, and assessment tools are being piloted, though infrastructure limitations, uneven connectivity, and gaps in digital literacy.

**BRAZIL**

Brazilian Artificial Intelligence Plan (PBIA), launched in 2025, marks major progress toward digital transformation. It will eventually meet ongoing initiatives on the field of education, such as "AIED Unplugged," which offers offline solutions that are expanding equitable access to AI-driven learning.

**INDIA**


A multi-layered approach guided by the National Education Policy (2020) and the National Strategy for Artificial Intelligence emphasizes technology integration, personalized learning, and inclusive access, supported by financial allocations and safeguards.

India demonstrates a multi-layered approach, with the National Education Policy (NEP 2020) and the National Strategy for Artificial Intelligence emphasizing technology integration, personalized learning, and inclusive access, supported by targeted financial allocations and regulatory safeguards. Academic initiatives, including IIT Jodhpur's Center for Generative AI and state-level programs like Kerala's AI curriculum, further strengthen national capacity for AI-driven educational transformation.

Greece has developed comprehensive strategies, including the Blueprint for AI Transformation (2024) and the Pharos—Hellenic AI Factory, to integrate AI across all educational levels and support minority, immigrant, and differently-abled students. While pilot projects in personalized learning and teacher training show promise, disparities in resources between public and private schools—especially in rural and island regions—pose challenges for equitable implementation, highlighting the need for sustained investment and capacity-building. Greece's Blueprint for AI Transformation (2024) and the Pharos—Hellenic AI Factory represent concrete policy assets for inclusive digital education. The Blueprint outlines systemic reforms for AI integration across education, while Pharos is building a Greek-language large model and accessibility tools to support minority students, immigrants, and learners with disabilities. These initiatives create an institutional foundation that could be leveraged for equity-focused pilots. A portion of Pharos and Blueprint funding could be earmarked specifically for projects targeting Roma learners, immigrant communities, and schools in remote islands, ensuring that national strategies translate into measurable inclusion outcomes.

Brazil has launched a four-year national AI plan in education (PBIA) beginning in 2024, though implementation remains uneven. Public universities and initiatives such as AIED Unplugged have stepped in to address gaps in access and digital literacy, using innovative approaches that operate offline and leverage teachers as intermediaries, effectively reaching underserved communities.

Kenya has focused on AI solutions that improve access and learning outcomes, particularly in rural areas. Programs leveraging AI to provide adaptive learning, teacher support, and assessment tools are being piloted, though infrastructure limitations, uneven connectivity, and digital literacy gaps remain significant challenges. Early successes illustrate AI's potential to support equitable learning, but scaling these solutions requires continued investment, policy alignment, and teacher capacity-building.

### 2.1.1 India

India's policy ecosystem reflects a deliberate and multi-layered effort to integrate artificial intelligence (AI) into education, balancing innovation with ethical safeguards. The National Education Policy (NEP) 2020 establishes the foundation, emphasizing technology integration across all levels of learning to prepare students for the future of work. By identifying AI, machine learning, big data analysis, and 3-D machining as priority areas, the NEP seeks to align education with global technological shifts while empowering state governments to launch their own AI initiatives in pursuit of India's vision of becoming a developed nation by 2047. This vision is reinforced by the National Strategy for Artificial Intelligence, advanced by NITI Aayog, which champions an "AI for All" approach. The strategy highlights not only the transformative role of AI but also the importance of inclusivity and responsible deployment, ensuring that its benefits extend across sectors and communities. Government commitment is further evident through financial allocations, most notably in the Union Budget 2025–26, which earmarked ₹500 crore for an AI Centre of Excellence in Education. This initiative is expected to foster innovation in personalized learning, adaptive assessments, and AI-enabled content generation, creating a strong institutional anchor for education-specific AI research and application. At the same time, the Digital Personal Data Protection Act (2023) provides the necessary regulatory framework to protect sensitive student information, instilling trust in the use of AI tools. Complementing these efforts, academic institutions have also taken leadership. The Center for Generative AI (Srijan) at IIT Jodhpur, established with AICTE and supported by Meta, is developing open-source AI resources, datasets, and skilling programs such as YuvAI, thereby strengthening national capacity. State-level initiatives add another layer, with Kerala, for example, introducing AI into school curricula. Together, these measures highlight India's holistic approach encompassing policy, finance, regulation, and local innovation, positioning the country as an emerging global leader in AI-driven educational transformation.

### 2.1.2 Greece

Greece has recently developed national strategies that place Artificial Intelligence at the center of its digital and educational transformation. The *Blueprint for Greece's AI Transformation* (2024) outlines a comprehensive vision for integrating AI into all levels of education, from primary through tertiary, emphasizing curriculum reform, teacher training, and the responsible use of AI for equity and inclusion. Complementing this, the *Pharos—Hellenic AI Factory* initiative focuses on building a Greek-specific large language model and inclusive AI services, such as translation and accessibility tools, to support minority students, immigrants, and learners with disabilities. A key challenge lies in the disparity between public and private institutions. Private schools, often better resourced, are quicker to experiment with digital tools and AI-driven learning, while public schools—particularly in rural or island regions—struggle with infrastructure gaps, teacher shortages, and limited digital readiness. This uneven implementation risks reinforcing existing inequalities if not addressed by strong national support mechanisms. In terms of policy success, Greece has taken important first steps in framing AI's role in education, but most initiatives remain at an early stage of implementation. Pilot projects such as AI4EDU (personalized learning platforms for secondary schools) and the Tipping Point's GenAI teacher training program show promise, but broad, systemic adoption across the public sector is still limited. For now, many of the national strategies exist more as frameworks and policy visions than as fully operational reforms, highlighting the need for sustained investment, teacher capacity-building, and equitable infrastructure development to ensure that AI contributes meaningfully to educational equity.

### 2.1.3 Brazil

Brazil's four-year Artificial Intelligence Plan (PBIA), which is an investment plan designed in 2024 and launched in 2025, represents a significant step toward integrating AI across many areas of day-to-day life of Brazilians and achieving sovereignty on AI, including in Education and AI literacy. While implementation is still gaining momentum, the plan will take advantage of existing efforts carried out mostly by public universities and research institutions, which have the aim to achieve active role in advancing practical, inclusive AI solutions. Notably, university-led initiatives will be able to translate the PBIA and other initiatives carried out by the Ministry of Education into action nationwide—creating scalable, context-sensitive models that extend AI benefits to diverse learning environments. Together, these efforts reflect Brazil's growing capacity to transform policy ambition into meaningful educational innovation.

One example coming from the PBIA in its Impact Action 11 proposes an AI-based system to predict and protect students' educational trajectories in order to reduce dropout rates in Brazilian schools and universities by identifying risk and protective factors at each stage. It addresses the serious challenge of school abandonment in basic education—such as 500,000 high school students leaving school annually and about 400,000 children and adolescents aged 6–14 out of school in 2023—as well as roughly 40% annual dropout in federal universities. The goals include mapping risk/protection factors, developing predictive models to identify students at risk of dropout or failure, ensuring these models do not discriminate against specific groups, and training 10,000 public managers per year. Expected impacts are lower dropout rates, more graduates in basic and higher education, and a stronger supply of qualified professionals for the Brazilian labor market, with indicators such as system implementation status, number of trained managers, enrollments in early and later years of fundamental education, and higher education completion. The action involves annual budgetary resources of R$ 500,000 and is carried out by NEES/UFAL, the Ministry of Education (MEC), the Ministry of Science, Technology and Innovation (MCTI), state and municipal education departments, universities, and third-sector and multilateral organizations.

Another example of a prominent initiative that is being utilized by schools around Brazil is AIED Unplugged, which was created as a direct response to Brazil's persistent educational, social and digital inequality, overcoming infrastructural barriers through an approach that requires neither constant connectivity nor new digital skills from its users. Based on pillars such as disconnected operation and the use of teachers as a proxy, the solution was applied on a large scale to enhance the writing skills of elementary school students. Additionally, the "Amazon-Friendly Technology" project, a collaboration between the non-governmental organization World Vision and the technology company Avanade, represents a strategic intervention aimed at empowering young people in riverside communities in the Amazon region. The initiative is based on the premise that the preservation of complex ecosystems, such as the Amazon Rainforest, is intrinsically linked to the engagement and empowerment of local populations. To this end, the project integrates environmental education, digital inclusion, and technological training as central pillars of its methodology. The program is structured around the formation of environmental brigades for children and youth, made up of local children and adolescents. These groups receive specific training to understand and address the region's socio-environmental challenges. The project's implementation is facilitated by a technological infrastructure that includes the use of Artificial Intelligence and satellite connectivity, establishing a digital network that expands access to education and essential services.

### 2.1.4 Kenya

Kenya's AI governance and educational policies are evolving to integrate artificial intelligence into the national development agenda, with the draft Kenya National Artificial Intelligence Strategy 2025–2030 serving as a central framework. The strategy aims to position Kenya as a leading AI hub in Africa, emphasizing education as a key sector for AI-driven innovation. It recommends introducing AI education from primary school, promoting digital literacy, funding AI research, and fostering collaboration with international tech organizations such as Microsoft and Google to build teachers' capacity. A core goal is to use AI as a collaborative tool that enhances teaching while maintaining human agency and prioritizing critical thinking and decision-making skills.

The strategy encourages partnerships with EdTech companies, innovation hubs, and startups to develop tailored AI solutions, fostering a robust AI ecosystem across both public and private education sectors. However, as the strategy was inaugurated in 2025, implementation remains at an early stage. Opportunities exist in developing personalized learning platforms and data-driven decision-making tools to improve access to quality education, particularly in underserved areas. Challenges include a lack of a cohesive national AI policy for education, emerging initiatives, concerns over data privacy, and persistent digital divides that limit access to technology. Effective stakeholder engagement, strategic coordination, and inclusive policy development are essential for AI to meaningfully enhance educational outcomes in Kenya.

## 2.2 Personalized (Adaptive) Learning

Table 1: Personalized Learning Opportunities by Country

| DIMENSION | GREECE | KENYA | BRAZIL | INDIA |
|---|---|---|---|---|
| **Skills Development** | Tiered curricula supporting technical skills and broader competencies (critical thinking, creativity, ethics). AI4EDU tools provide personalized feedback and adaptive learning. | AI platforms like M-Shule and Eneza Education deliver personalized learning, strengthen foundational skills, promote critical thinking, and expand access to online resources and skill-building programs. | AIED Unplugged ITS uses AI, data analytics, and cognitive models for individualized instruction, tracking student progress and optimizing assessment, leveling the field between rural and urban learners. | AI skill development prioritized by government; $57M allocated for Centers of Excellence, building capacity for AI research and educational applications, enhancing personalized learning. |
| **Adaptive Functionality** | AI4EDU tools (Study Buddy, Teacher Mate) provide tailored feedback and multilingual support, aligning with national curriculum and adapting to individual student needs. | Platforms like M-Shule, Eneza Education, iRead, and Kio Kit deliver adaptive content, interactive learning, and data-driven insights to tailor instruction to individual learning patterns. | AIED Unplugged evaluates handwritten work via computer vision and NLP, providing actionable feedback to both teachers and students, supporting adaptive learning in offline contexts. | Private schools (e.g., Bangalore International School, Delhi Public School) experiment with AI systems that adjust instruction based on individual student progress; access uneven across regions. |
| **Natural Language Processing (NLP)** | Study Buddy and Teacher Mate leverage NLP for personalized feedback and curriculum-aligned support in multiple languages. | Platforms like Eneza Education, iRead, and AI-powered chatbots use NLP to deliver adaptive learning, assess reading, personalize content, and provide language translation support. | AIED Unplugged combines NLP and computer vision to assess assignments, generate feedback, and improve writing skills in low-resource settings. | National Language Translation Mission, IIT Hyderabad speech-to-speech translation for NPTEL, and Bhashini platform expand bilingual access, develop ASR and machine translation tools for multilingual learning. |
| **Virtual Learning Environment** | Pharos—Hellenic AI Factory creates multimodal educational content with Greek-trained language models and generative AI, adaptable to linguistic and cultural needs. | Platforms like M-Shule and Eneza Education deliver virtual learning through mobile apps with adaptive content; chatbots and virtual tutors provide real-time support. | AIED Unplugged operates offline; teachers act as proxies to deliver personalized feedback and instruction without heavy infrastructure or internet reliance. | BYJU's and Khan Academy use AI for pace-based virtual instruction; private school students benefit more due to unequal access in government schools. |
| **Students with Physical Impairments** | Pharos incorporates text-to-speech, speech-to-text, and OCR optimized for Greek, enabling students with disabilities to participate more fully. | AI-powered assistive technologies (speech recognition, text-to-speech, real-time captioning) allow students with limited mobility to interact with learning materials effectively. | AIED Unplugged ITS adapts content, provides individualized feedback, and tracks progress without requiring complex technology, supporting students with mobility challenges. | AI-supported remote learning helps students with impairments access education; platforms analyze performance and interactions to provide targeted support. |

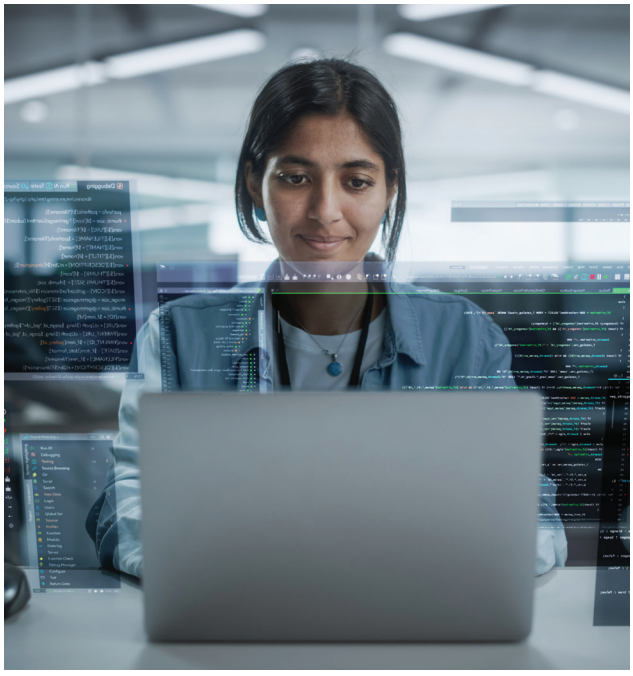
### 2.2.1 Skills Development

In India, AI skill development has emerged as a strong national priority for the Government of India. In the Union Budget, ₹500 Crores (approximately $57 million) was allocated to establish a Center of Excellence (CoE) with a focus on personalized learning through AI. These CoEs are expected to be spearheaded by premier institutions such as AIIMS, IIT Delhi, IIT Ropar, and IIT Kanpur, in collaboration with industry partners and startups. While the centers are not yet fully active, they signal the government's intent to build institutional capacity for AI research and application in education.

In the Greek context, personalized and adaptive learning has become an important theme within recent national strategies for education and digital transformation. The Blueprint for Greece's AI Transformation explicitly recognizes the need to move away from a one-size-fits-all approach, proposing tiered curricula that allow students to engage with computational thinking and artificial intelligence at different levels of depth depending on their skills and interests. This vision places strong emphasis on skills development, not only in technical fields such as programming and data science, but also in broader competencies like critical thinking, creativity, and ethical awareness.

In Brazil's context, through an Intelligent Tutor System (ITS), the abovementioned AIED Unplugged uses AI, data analytics, and cognitive models to provide individualised instruction and feedback to students. They adapt content and instructional methods based on each student's interactions and progress, providing a personalised learning experience. With its key components, the ITS can identify the areas that need improvement on the student's work; decide on instructional strategies, select specific activities, and provide feedback for both the student and the teacher; and track the student's progress as the school year progresses. As a result, studies show that there were no statistically significant differences in writing skills improvement between students from rural and urban areas, demonstrating that the technology "leveled the playing field." The platform also radically optimized the assessment process, reducing the feedback cycle from four months to a maximum of 72 hours and processing over 1.5 million essays, which proves its scalability. Moreover, in the Amazon-Friendly Technology initiative, the methodology combined theoretical instruction with practical activities. Participants participated in environmental workshops and field trips, as well as basic computer courses. A distinctive component of the project was the mentoring program, in which Avanade engineers provided technical support, introducing students to concepts of technology, data science, and Artificial Intelligence. This approach aims not only to impart knowledge but also to develop practical skills for creating sustainable solutions applicable to the local context. Although this initiative shows great promise for the future of AI and Education in Brazil, it must be highlighted that this is just an isolated program, meaning that it is not a nationwide solution to the problem of the digital divide.

Artificial Intelligence is becoming a transformative force in Kenya's education sector, particularly in enhancing skills development for learners. By leveraging AI technologies, platforms like M-Shule and Eneza Education provide personalized learning experiences tailored to individual student performance and learning styles. This customization helps students build foundational skills in subjects like mathematics and language, preparing them for more advanced concepts. Additionally, AI tools foster critical thinking and problem-solving skills through interactive learning environments, engaging students in real-world scenarios that promote analytical skills and creativity.M-Shule is an edtech platform that uses AI and SMS technology to deliver personalized learning content to Kenyan primary schools. Students interact with an AI bot that prompts them with lessons and questions they answer by text. The system analyzes the data in real-time, allowing program teams and supporting organizations to track student performance and provide targeted support where needed. Since inception,



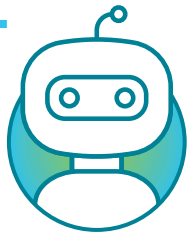
the M-Shule program had reached more than 45,000 users, including 13,000 households from 30 Kenyan Counties by December 2024.

Furthermore, AI expands access to a wide range of educational resources, including online courses and skill-building programs, allowing learners to explore various fields aligned with their career aspirations. This is especially important in a rapidly changing job market that demands adaptability.

### 2.2.2. Adaptive to Varying Levels of Understanding and Learning Styles

In Greece, practical steps toward personalization are beginning to emerge. The AI4EDU project, for example, has developed tools such as Study Buddy for students and Teacher Mate for educators, which provide tailored feedback, multilingual assistance, and adaptive explanations linked directly to the Greek school curriculum. Such applications demonstrate the potential of AI to address varying levels of understanding and learning styles, offering new ways of supporting learners who might otherwise fall behind.

At the school level in India, there is some evidence of AI being deployed to create adaptive learning experiences tailored to individual students' progress. Over **500,000 students** in India use Mindspark across public and private schools. The platform is active in **15 states** in India, offering adaptive content in **10 languages**, through models that reach rural, tribal, and urban fringe areas via NGOs, schools and learning centres. Private schools such as Bangalore International School and Delhi Public School have begun experimenting with AI systems that adjust instruction based on students' speed and assessment outcomes. Such models demonstrate the potential of AI to address varying levels of understanding and learning styles. However, access to these technologies remains uneven, as they are mostly concentrated in private institutions with stronger digital infrastructure.



**Private schools in India have begun experimenting with AI systems that adjust instruction based on students' speed.**

Brazil's initiative, AIED Unplugged, makes it extremely easier for teachers to assess how their students understand the subjects being taught and how to adapt. In practice, the workflow goes as follows: students write essays by hand on standardized sheets of paper with a QR Code. The teacher, acting as a proxy, uses a mobile phone to photograph the essays. The images are processed on the server when there is an internet connection, using Computer Vision to transcribe the handwritten text and Natural Language Processing (NLP) to evaluate it based on a specific rubric. The feedback is then made available on printable dashboards, allowing teachers and students to use it "unplugged." This, consequently, leads to a more personalised experience.

In Kenya, various initiatives are leveraging AI to enhance adaptive learning by catering to different levels of understanding and learning styles. Notable platforms include M-Shule, which personalizes educational content based on individual learning patterns, ensuring students progress at their own pace. Eneza Education provides interactive learning experiences through mobile apps, using AI to assess performance and adapt content to meet diverse learning needs. Other initiatives like iRead focus on improving literacy by adapting reading materials to suit individual proficiency levels, while Kio Kit combines a tablet with educational applications to offer adaptive learning in subjects such as math and science. Additionally, organizations are creating AI tools that analyze student data to identify learning gaps and recommend personalized learning paths, further enhancing engagement and effectiveness in education. Other initiatives include: Soma Book Café that uses AI-driven analysis to curate personalized reading materials for students; Angaza Elimu—a UNICEF-funded eLearning platform that uses AI to provide students with a personalized learning experience; and the Flipped Classroom initiative in Kenya that personalizes learning, providing quality resources, and fostering teacher-student engagement. While challenges such as infrastructure and access remain, the integration of AI offers promising solutions to help reduce educational inequalities and improve learning outcomes for all students. Overall, these initiatives underscore Kenya's commitment to utilizing AI for adaptive learning, aiming to improve educational outcomes, especially in underserved communities. By personalizing

learning experiences, these AI-driven tools foster greater engagement and support the diverse needs of students across the country.

### 2.2.3 Natural Language Processing

India's linguistic diversity makes Natural Language Processing (NLP) essential for scaling AI in education. The **National Language Translation Mission**, led by the Office of the Principal Scientific Adviser, is working to enable bilingual access to teaching and research materials. IIT Hyderabad has piloted a speech-to-speech translation system for NPTEL lectures, supported by the Technology Development for Indian Languages (TDIL) Programme. Other efforts, involving IITs, IIIT Hyderabad, and C-DAC with support from MeitY, are advancing Automatic Speech Recognition (ASR) and machine translation tools. The **Bhashini** platform further crowdsources spoken and written data to enhance public access to multilingual language resources.

In Greece, the tools developed within AI4EDU, particularly *Study Buddy* and *Teacher Mate*, rely heavily on natural language processing to deliver personalized feedback and explanations. By using NLP, these applications can support students and teachers in multiple languages, adjust explanations to individual needs, and ensure alignment with the national curriculum.

AIED Unplugged (Brazil's initiative) uses Natural Language Processing (NLP) in order to evaluate each essay/assignment. It uses Computer Vision to transcribe the handwritten text, NLP to evaluate and grade the homework and, finally, give feedback to both students and teachers, aiming at improving their writing skills.

Kenya's overall adult (15+) literacy rate was 82.9% in 2022, with youth literacy (15–24 years) being higher at 95.7% in the same year. While the overall rate has improved significantly since 2007, significant regional disparities persist, particularly for girls and women in marginalized counties. With more than 60 languages spoken across Kenya, linguistic diversity poses challenges in education. Learners from most parts of rural Kenya can hardly read or write in English. AI-driven NLP tools can bridge this gap by providing translation, contextualized content, and conversational support. One prominent example is Eneza Education, which uses NLP to enhance interactive learning through SMS and mobile applications. By analyzing student responses, the platform provides tailored feedback and adapts content to fit individual learning styles and needs. Another innovative approach involves AI-powered chatbots integrated into various educational platforms. These chatbots utilize NLP to engage students in conversational learning, answering questions and guiding them through materials based on their comprehension levels. Additionally, initiatives like iRead employ NLP to assess reading abilities, offering personalized reading materials and recommendations that enhance literacy. Furthermore, NLP-based language translation tools are being implemented in classrooms, supporting students who speak different languages and making learning more accessible. Organizations are also developing smart learning solutions that analyze student interactions and identify learning gaps, personalizing educational pathways accordingly. Overall, these initiatives highlight Kenya's commitment to using NLP technologies to enhance adaptive learning and improve educational outcomes, particularly in underserved communities.

### 2.2.4 Virtual Learning Environment

AI facilitates the creation of virtual classrooms, enabling students to learn from anywhere. This is crucial for students in remote areas who may not have access to physical schools.

In Kenya, several AI initiatives are transforming virtual learning environments within the education sector. Platforms like Eneza Education and M-Shule utilize AI to deliver personalized learning experiences through mobile applications, adapting content based on individual student performance and learning styles. This personalization ensures that learners can progress at their own pace, enhancing engagement and understanding. Another notable initiative is Ubongo. This is an edutainment company that uses AI to create educational content for children, delivered via television and radio in Kenya. The Platform focuses on enhancing problem-solving and critical thinking skills through engaging content and with a reach to millions of children across East Africa, it promotes learning outside traditional classroom through engagement of local communities in content creation, ensuring cultural relevance and acceptance.

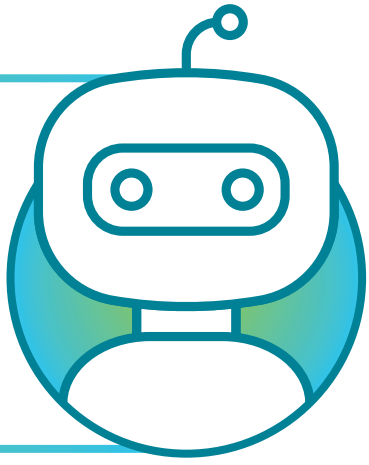
Additionally, AI-powered tools such as chatbots and virtual tutoring systems are being integrated to provide real-time support and interaction, allowing students to ask questions and receive instant feedback. Initiatives like iRead focus on improving literacy by using AI to tailor reading materials to students' proficiency levels, while AI-driven analytics help identify learning gaps and recommend personalized pathways. Overall, these initiatives highlight Kenya's commitment to leveraging AI to create inclusive and effective virtual learning environments, particularly for underserved communities.

In Greece, initiatives such as *Pharos—The Hellenic AI Factory* are pushing the boundaries of virtual learning environments. By developing Greek-trained language models and generative AI tools, Pharos enables the creation of multimodal educational materials that can be adapted to diverse linguistic and cultural needs.

In India, the rise of digital platforms has accelerated AI's role in education. Companies such as BYJU's and Khan Academy are incorporating AI into virtual learning environments to enable personalized, pace-based instruction. During COVID-19, these platforms expanded rapidly, but also exposed inequities: while private school students benefited from AI-enabled virtual classrooms, many government school students lacked digital access. This divide underscores the challenge of ensuring equitable access to AI-driven education across income levels.

AIED Unplugged, one of Brazil's most prominent tools, does not require a steady internet connection to function, given that its purpose is to reduce educational inequalities caused by reliance on technological infrastructure (and to be able to adapt to the existing educational environment). The only situation in which the tool demands internet access is while synchronizing data—such as sending production and receiving diagnostics. Moreover, the solutions are designed to work with the constant sharing of hardware and software, thus eliminating the need for individual logins for each student, making the teacher (in most cases) the "proxy" that will interact with the technology (that will be displayed through a mobile phone) on behalf of the students, requiring skills that most people already have, such as taking photos of the schoolwork.

**In Kenya, AI initiatives are transforming virtual learning environments delivering through mobile apps.**



### 2.2.5 Students with Physical Impairments

The COVID-19 pandemic accelerated the adoption of remote learning technologies, further supported by AI. Virtual classrooms equipped with AI tools allow students with physical impairments to participate in education from home, overcoming traditional barriers. AI algorithms also analyze student interactions and performance, enabling educators to tailor their teaching strategies and provide targeted support.

In Greece, Pharos also includes accessibility features—ranging from text-to-speech and speech-to-text to optical character recognition optimized for the Greek language—that open new opportunities for students with physical or learning impairments to participate more fully in education.

In the Brazilian context, students with physical impairments face significant barriers to education nationwide. Although challenges such as architectural barriers and issues with public transportation are also present in urban centers, these difficulties are often drastically amplified in rural areas, where students with said impairments confront a double barrier to education. The first is the difficulty of mobility, where the lack of accessible public transport and precarious roads can make the daily journey to school an arduous or even impossible task. The second is the lack of adequate infrastructure both at home and at school. Brazil's initiative (AIED Unplugged) has as one of its objectives simplicity while using it and imposing the least amount of barriers to its usage. Therefore, the tool "translates" the data through an Intelligent Tutor System (ITS).To do so, the platform uses AI, data analytics, and cognitive models to provide individualised instruction and feedback to students. They adapt content and instructional methods based on each student's interactions and progress, providing a personalised learning experience. With its key components, the ITS can identify the areas that need improvement on the student's work; decide on instructional strategies, select specific activities, and provide feedback for both the student and the teacher; and track the student's progress as the school year progresses.

In Kenya, AI-powered assistive technologies, including speech recognition software, enable students to interact with learning materials using voice commands. This reduces the need for physical interaction with devices, which is especially beneficial for students with limited mobility.

Additionally, innovative smart learning aids enhance classroom accessibility by converting text to speech and providing real-time captioning, ensuring that students with physical impairments can access the same resources as their peers.

### 2.3 Teacher Support and Professional Development

## AI for Teaching

AI is increasingly used to support teachers by automating administrative tasks, providing insights into student performance, and suggesting targeted interventions, allowing educators to focus more on instruction.

**GREECE**


Platforms like Teacher Mate help automate grading, monitor students, and deliver data-driven guidance, while professional development initiatives strengthen teachers' capacity, particularly in rural areas.

**KENYA**


Government programs train teachers to use AI for administrative tasks, enabling them to dedicate more time to creative teaching.

**BRAZIL**


AI Unplugged platform offers dashboards that analyze student performance and streamline assessments, helping to plan targeted interventions and optimize instructional time.

**INDIA**

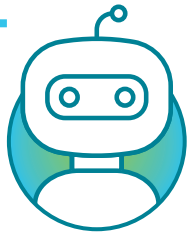
In Kenya, AI tools provide personalized professional development, access to global educational resources, real-time feedback on teaching practices, and

AI tools assisting teachers by automating administrative tasks, providing insights into student performance, and suggesting targeted interventions, to enhance the overall teaching quality and allow teachers to focus more on instruction.

In Greece, AI is increasingly positioned as a tool to support teachers by reducing administrative workloads and enhancing instructional quality. Platforms such as AI4EDU's Teacher Mate allow educators to automate grading, monitor student performance, and receive data-driven insights for targeted interventions, while initiatives like *The Tipping Point's GenAI Education Frontier* provide professional development, particularly in rural areas, to strengthen teachers' capacity to integrate AI meaningfully into their practice. National strategies, including the *Blueprint for Greece's AI Transformation*, highlight the need for systematic teacher training, but many efforts remain at the pilot stage, underscoring the importance of scaling professional development equitably across the public school system.

In India, AI is helping to reduce educational inequities by automating administrative tasks for teachers, allowing them to focus more on instruction. The Delhi government, for example, has initiated a program to train teachers in state-run schools to use AI for non-teaching tasks like creating presentations and managing extracurricular activities. Such initiatives are effective also for teachers to explore more creative forms of learning. In Telangana, an AI-powered facial recognition system is being rolled out across 430 junior colleges, registering over 63,500 students so far, to automate real-time attendance and ease teachers' administrative workload.

**In Brazil, data reveals the potential for AI tools to support teachers, allowing them to focus more on instruction and planning**



In Brazil, data from the AI Unplugged project reveals the potential for AI tools to support teachers through targeted actions that address this integration into the educational world. These tools are designed to automate time-consuming administrative and clerical tasks, such as assessments. The platform provides dashboards with analytics on student performance, allowing educators to identify difficulties and plan targeted interventions. This time optimization allows teachers to focus more on instruction and pedagogical planning, addressing a need expressed by the profession to have more time for these activities.

In Kenya, AI tools and initiatives are significantly enhancing teacher support and professional development in Kenya's education sector. One key aspect is personalized professional development, where AI-driven platforms analyze teachers' performance and needs, providing tailored training programs that focus on specific areas for improvement. This ensures that professional development is relevant and effectively meets the individual requirements of each educator.The Accelerating 21st Century Education (ACE) Project is an initiative that strengthens teacher capacity to use Information and Communication Technologies (ICTs) and AI in their teaching to cultivate essential 21st-century skills in students, such as critical thinking, creativity, problem-solving, and information literacy. Implemented in Kenya through the FHI360 TEPD program, the project aims to equip students for the complexities of the modern world by fostering digital proficiency and other key skills

Additionally, AI tools grant teachers access to a wealth of educational resources, including lesson plans and best practices from around the world. This easy access helps educators stay updated with the latest teaching methodologies, thereby improving their instructional skills. Furthermore, AI systems facilitate real-time feedback on teaching practices through classroom observations and analysis of student performance data, allowing teachers to refine their methods and address challenges promptly. AI also fosters collaborative learning communities through online platforms where educators can share experiences and support one another, particularly in remote or underserved areas. By automating administrative tasks such as grading and attendance tracking, AI tools free up teachers' time to focus on professional development and instructional improvement.

## 2.4 Access to Digital Educational Resources

### AI and Access to Digital Educational Resources

**GREECE**

Pharos initiatives develop Greek-specific AI tools (translation, summarization, accessibility). Key Barriers: Limited Infrastructure (rural/island areas) and Dependence on Private Tutoring highlight structural inequities.

**INDIA**

Digital India & Bhashini initiatives prioritize broadband and multilingual AI content to overcome language barriers and support personalized learning for rural students.

**BRAZIL**

AIED Unplugged offers high-quality, AI-modeled feedback, specifically bridging the digital divide in remote, underserved areas.

**KENYA**

Eneza Education & M-Shule platforms provide AI driven learning solutions to underserved learners, ensuring equitable access in remote regions.

Across these contexts, AI-enabled solutions help bridge educational gaps by adapting to local infrastructure constraints, enhancing engagement, and improving learning outcomes.

AI-powered platforms offer access to high-quality educational materials and resources, even in remote or underserved areas.

Access to digital educational resources in Greece reflects a mix of progress and persistent inequalities. While initiatives such as *Pharos—The Hellenic AI Factory* are developing Greek-specific translation, summarization, and accessibility tools, and national strategies promote open platforms for AI projects and teaching materials, disparities remain between well-resourced urban schools and rural or island communities with limited infrastructure. Persistent dependence on private tutoring highlights structural inequities in digital access and support. Expanding equitable access to digital tools and ensuring their integration into the public education system remain central challenges for Greece's digital transformation agenda.

AI requires robust digital and physical infrastructure such as internet connectivity, smartphone penetration, and often also has language barriers that AI models are unable to work with. However, despite these challenges, digital infrastructure and broadband connectivity is a key priority of "Digital India"—a government initiative to digitize various daily services. There is key potential that would help rural education systems at the last mile thrive with AI. Moreover, with the government's Bhashini initiative mentioned earlier, various disadvantages that rural students and educators often have would be reduced. Once AI systems can offer multimedia content in multiple languages in India, including for those in remote areas, a key barrier will be addressed to ensure that language is not a barrier to accessing quality education. Furthermore, more mature AI models in rural languages, once personalized approach, would improve comprehension and retention, dropout rates, and prepare another generation of students for an AI-driven workforce.

The profound digital divide exacerbates educational inequality in Brazil. Students from rural areas, especially in the North and Northeast regions, face significant barriers to reliable internet and device access, which has historically prevented them from accessing high-quality digital resources. The main differentiator of the AIED unplugged model is its ability to provide access to high-quality educational resources—in this case, personalized AI-generated feedback for remote and underserved areas.

In Kenya, initiatives like Eneza Education leverage SMS technology to provide interactive lessons, quizzes, and tailored content, making quality learning materials accessible to students in remote areas with limited internet connectivity. This approach ensures that all students, regardless of their geographical location or socio-economic status, can benefit from educational resources. Another key initiative, M-Shule, utilizes AI to deliver personalized learning experiences through mobile platforms. By analyzing individual student performance, it provides customized learning materials that match each learner's needs, thereby enhancing engagement and improving educational outcomes. Additionally, various organizations are developing AI-powered smart learning solutions that aggregate and curate digital resources, making it easier for teachers and students to access relevant materials based on their preferences and learning patterns.

## 2.5. Intersection with Future Investment Initiative Institute Pillars

AI-enabled education extends beyond the classroom, intersecting with sustainability, health, and emerging technologies such as AI and robotics, creating opportunities for cross-sectoral impact.

### SUSTAINABILITY AND ENVIRONMENTAL AWARENESS

In the context of sustainability, digital learning platforms reduce the need for physical materials and travel, lowering carbon footprints while promoting environmental literacy through AI-supported curricula on sustainable development goals. Initiatives like AI-enhanced curriculum mapping in Greece and India also allow students to engage with real-world data on climate, energy, and resource management, fostering a generation of learners attuned to sustainable practices.

### HEALTH

AI-enabled education contributes to health literacy and well-being by integrating adaptive learning technologies that can deliver content on health-related topics. In Kenya, platforms like M-Shule and Eneza Education personalize learning experiences while enabling the inclusion of health awareness modules, reaching students in underserved communities. In India, AI tools reduce administrative burdens for teachers, freeing time to incorporate critical health and well-being content into classroom instruction. By tailoring content to individual learning levels and needs, AI supports both cognitive and health education, particularly for students who might otherwise have limited access to reliable health information. A recent survey ("Are You There, AI?") found that 88% of school students in India turn to AI tools when they're stressed or anxious; and 57% use AI for emotional support indicating that students are already using AI for health-oriented needs.

### AI, ROBOTICS AND EMERGING TECHNOLOGIES

The convergence with AI and robotics provides novel pathways for interactive and adaptive learning. Robotics-based teaching aids, AI tutors, and intelligent simulations allow learners to engage with complex STEM concepts through experiential learning, while platforms like India's AI-driven personalized learning tools and Brazil's AIED Unplugged showcase how adaptive technologies can scale across diverse classrooms. These intersections highlight that AI-enabled education is not an isolated innovation; rather, it functions as a catalyst for broader societal transformation, linking educational outcomes with health improvements, sustainable practices, and technological advancement.

### EQUITY AND SOCIAL INCLUSION

AI education initiatives also intersect with broader social objectives, particularly equity and inclusion. In Greece, AI has the potential to bridge gaps caused by socioeconomic disparities, language barriers, and regional inequalities, offering accessible alternatives to private tutoring. Brazil's AIED Unplugged demonstrates how AI can standardize assessment and learning in rural schools, overcoming infrastructural and digital divides. In Kenya, AI tools support students from diverse linguistic and socioeconomic backgrounds, providing tailored feedback and learning paths to reduce disparities in educational outcomes.

### WORKFORCE DEVELOPMENT AND ECONOMIC PARTICIPATION

Finally, AI-enabled education has direct links to workforce development and economic empowerment. By equipping students with digital skills, critical thinking, and problem-solving capabilities, AI tools enhance employability and prepare youth for emerging sectors in technology, data analytics, and AI-driven industries. In India and Greece, personalized AI learning environments support the development of skills aligned with national innovation and digital transformation goals, helping bridge the gap between education and labor market needs.

# 3. Common Challenges Across Countries

Table 2: Common Challenges Across Countries

| DIMENSION | GREECE | KENYA | BRAZIL | INDIA |
|---|---|---|---|---|
| **Infrastructure** | Rural/island schools face outdated facilities, limited devices, and unreliable internet; COVID-19 amplified gaps; Pharos initiative attempts scalable AI solutions. | Inadequate infrastructure in rural schools, limited computers, inconsistent electricity; urban–rural divide restricts AI adoption. | Severe infrastructure gaps in remote regions; lack of electricity, internet, roads, and basic services prevents widespread AI adoption. | Rural schools have lower internet connectivity, fewer ICT labs, smart classrooms, and digital libraries; programs like BharatNet partially mitigate inequities. |
| **Digital Literacy** | Uneven digital competence among students, teachers, and families; national initiatives aim to improve skills but systematic training and equitable access remain necessary. | Many students and teachers lack digital skills, particularly in marginalized areas; limits effective use of AI and perpetuates inequalities. | Limited access to devices and internet; even simplified unplugged solutions require teacher training to be effective. | Low digital literacy, especially in rural areas; socio-economic and geographic disparities hinder AI integration; PMGDISHA seeks to improve competencies. |
| **Cultural/ Linguistic Barriers** | Immigrant and minority students, including Roma communities, face difficulties accessing curriculum materials; Pharos creates Greek-specific translation and accessibility tools but scaling is limited. | Over 40 ethnic groups and 60+ languages; digital resources mostly in English/Kiswahili; limited AI language models reduce engagement; traditional teaching attitudes may resist digital adoption. | Standard Portuguese used with regional disparities; no major AI-language initiatives highlighted in uploaded data. | Hundreds of languages/ dialects; AI systems often support only major languages; Bhashini platform aims to improve coverage but struggles with regional nuances. |
| **Ethical Concerns** | Data privacy, consent, and algorithmic bias are critical; Pharos integrates ethical design principles; teacher training and clear guidelines needed. | Nascent data protection framework; student data may be vulnerable; algorithmic bias risks disadvantaging marginalized students; requires governance and transparency. | Brazil addresses AI ethics in education through laws ensuring fairness, transparency, and accountability, using regulation to align innovation with social justice. | Kenya faces ethical challenges in AI education, including weak data protection enforcement, privacy risks, and algorithmic bias that may worsen inequalities. |
| **Policy & Governance** | Blueprint for AI Transformation outlines ambitious goals; implementation slow and uneven; centralized governance limits local adaptation; pilot initiatives like Pharos and AI4EDU show promise. | Governance challenges due to central–county dynamics; limited cohesive AI-in-education strategy; reforms ongoing but disparities persist. | As the PBIA plan is in its early stages, bottom-up, university-led initiatives such as AIED Unplugged are demonstrating scalable, proven solutions that can be integrated into national policy. | Strong policy intent, e.g., AI Centers of Excellence; implementation hampered by federal-state complexity; public school impact still limited. |

## 3.1 Infrastructure and Access to Hardware/ Compute Limitations:

Infrastructure and access to hardware remain major barriers to equitable AI-driven education across Greece, Kenya, India, and Brazil. In Greece, rural and island schools face outdated facilities, limited devices, and unreliable internet, which deepened learning gaps during the COVID-19 pandemic despite initiatives like Pharos. In Kenya, inadequate physical infrastructure, electricity, and limited access to computers in rural schools restrict the effective use of digital learning tools, widening the urban–rural divide. India shows a pronounced digital divide, with rural schools having far lower internet connectivity, ICT labs, smart classrooms, and digital libraries compared to urban areas; programs like BharatNet and localized innovations provide partial solutions but cannot fully address inequities. In Brazil, infrastructure challenges are most severe in remote regions, where lack of electricity, internet, roads, and basic services prevents widespread adoption of educational technologies, leaving many students and teachers excluded from digital learning opportunities. Across all four countries, infrastructure disparities are a critical obstacle to scaling AI-enabled education inclusively.

In Greece, infrastructure and access to hardware remain significant barriers to equitable digital transformation in education. Many public schools, particularly in rural and island regions, face outdated facilities, unreliable internet connectivity, and limited availability of devices, which constrain the effective use of AI and digital tools. These challenges were especially evident during the COVID-19 pandemic, when unequal access to laptops and stable connections deepened learning gaps. While initiatives like *Pharos—The Hellenic AI Factory* aim to provide cost-effective and scalable AI services, ensuring adequate infrastructure and hardware across all schools remains a pressing challenge for achieving inclusive AI-driven education.Evidence from PISA 2022 indicates that 54% of Greek students attend schools where principals report learning is hindered by teacher shortages. At the same time, Eurostat regional data shows that in regions such as Kentriki Ellada, nearly 17.3% of residents have never used the internet, underscoring digital exclusion in parts of the country. These structural constraints suggest that any AI-enabled interventions in Greece can account for both human resource gaps and regional digital divides. Low-bandwidth, offline, or teacher-proxy AI models could be particularly well-suited for rural and island schools.

In Kenya, infrastructure and access to hardware represent significant barriers to achieving equitable education. Many schools, particularly in rural and underserved areas, lack the necessary facilities and resources to support effective teaching and learning. Inadequate physical infrastructure, such as poorly maintained classrooms and insufficient electricity, hampers the ability to implement modern educational technologies, including digital learning tools. The disparity in access to computers and other hardware further exacerbates educational inequalities. While urban schools may have access to well-equipped computer labs and internet connectivity, rural institutions often struggle with a lack of basic technological resources. This digital divide limits students' exposure to essential skills and knowledge in an increasingly technology-driven world, leaving them at a disadvantage compared to their urban counterparts.

In India, infrastructure and access constraints remain major barriers to AI-enabled education, particularly in rural schools. Only 18.47% of rural schools have internet connectivity compared to 47.29% in urban areas, while ICT labs and smart classrooms are available in just 44.9% of rural schools versus 68.7% of urban schools, reflecting a wide digital divide. These gaps are compounded by unreliable electricity, lack of devices, and inadequate broadband access, with only 7.5% of schools having digital libraries and 32.4% maintaining working computers. National efforts such as the BharatNet program and the National Broadband Mission are attempting to extend connectivity to villages, while localized innovations—like ICT labs in Prayagraj's government schools and a solar-powered digital learning hub in Meghalaya—offer promising models for bridging infrastructure inequities. Despite these initiatives, infrastructure inequality continues to restrict the scalability of AI-driven learning in government schools.

In Brazil, the implementation of educational technology faces the systemic challenge of infrastructure inequality. Although this is a national problem, this precarity is drastically accentuated in rural regions, where the lack of electricity and reliable internet access is still a reality for a significant portion of the population. Schools located in remote areas, such as in the Amazon rainforest or semi-arid regions, suffer from the absence of roads and basic services, making the distribution of resources, including technological ones, a complex logistical obstacle. This lack of basic infrastructure prevents millions of students and teachers from benefiting from digital tools, consolidating a scenario of exclusion. To try and solve this issue, the Amazon-

Friendly Technology fostered the active participation of 253 students from the North region of the country. Of these, 187 were directly involved in environmental workshops and field activities, while 121 received formal computer training, with ongoing support from technical mentors. The implemented technological infrastructure has become a permanent resource for teachers and schools, ensuring the sustainability and expansion of the project's educational impact.

## 3.2 Digital Literacy

Digital literacy is a major barrier to equitable education across Kenya, Brazil, Greece, and India. In Kenya, many students and teachers, particularly in rural or marginalized communities, lack the skills to effectively use digital platforms, limiting the benefits of available technology and perpetuating educational inequalities. In Brazil, limited access to devices and the internet hinders the development of digital skills, and even simplified "unplugged" solutions like AIED Unplugged require teacher training to be used effectively. Greece faces uneven digital competence among students, teachers, and families, especially in rural areas, with many skills limited to basic use rather than critical engagement; national initiatives aim to address these gaps but equitable access and systematic training remain necessary. In India, digital literacy is low, particularly in rural regions, with wide socio-economic and geographic disparities; limited skills among teachers and students hinder AI and digital tool integration, and national programs like PMGDISHA seek to improve competencies, yet access and training continue to be critical challenges. Across all four countries, insufficient digital literacy restricts effective use of technology and reinforces existing educational inequities.

Digital literacy is a significant challenge in addressing educational inequalities in Kenya. As the education sector increasingly integrates technology into learning, the ability of students and teachers to effectively use digital tools becomes crucial. Many learners, particularly in rural and marginalized communities, lack the necessary skills to navigate digital platforms, which hinders their ability to benefit from online resources and learning opportunities. Moreover, educators often face similar challenges, as many are not adequately trained in digital technologies. This gap in skills means that even when technology is available, it may not be utilized effectively in the classroom. The disparity in digital literacy contributes to a cycle of inequality, where students without access to technology or the skills to use it fall further behind their peers.

Similarly, digital literacy becomes a distant goal for Brazil, placing the country at a disadvantage when compared to other nations. The lack of continuous access to devices and the internet prevents students and teachers from developing the necessary digital skills for the 21st century. The AIED Unplugged model was consciously designed to overcome this barrier (the very need to create "unplugged" solutions highlights the country's delay), requiring only skills that most teachers already possess, such as taking a photo with a cell phone. That being said, even with simple tools, teachers express the need for training to feel secure and empowered to use the technology effectively in the classroom.

Digital literacy is a central challenge for Greece, as significant gaps persist among students, teachers, and families. While younger generations are active users of social media and digital platforms, their skills often remain limited to basic use rather than critical or productive engagement. Teachers also face uneven levels of digital competence, particularly in rural and under-resourced schools, which hinders the integration of AI and digital tools into everyday teaching. National strategies such as the Blueprint for Greece's AI Transformation and initiatives like The Tipping Point's GenAI Education Frontier aim to strengthen digital and AI literacy across the education system, but systematic training and equitable access remain necessary to ensure that digital literacy becomes a universal foundation rather than a privilege tied to socioeconomic background.

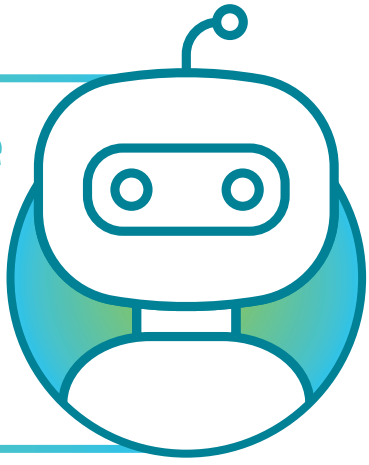
Digital literacy continues to be a critical challenge in India, limiting the effective adoption of AI and digital tools in education. While younger students may be familiar with social media or basic smartphone use, their skills often do not extend to productive or critical engagement with digital platforms. Teachers, especially in rural and government schools, face uneven levels of digital competence, which restricts the integration of technology into everyday teaching. Studies highlight that only 18.1% of individuals in rural areas and 39.6% in urban areas have basic computer literacy, underscoring wide socio-economic and geographic disparities. Moreover, the Azim Premji Foundation found that nearly 60% of children struggled to access online learning during COVID-19, reflecting both infrastructure gaps and limited digital capability. National programs such as PMGDISHA aim to strengthen digital skills, but systematic training and equitable access remain essential to making digital literacy a universal foundation rather than a privilege.

### 3.3 Cultural and Linguistic Barriers

Cultural and linguistic diversity presents major challenges to equitable education in Kenya, Greece, and India, particularly in the context of AI and digital learning. In Kenya, with over 40 ethnic groups and 60+ languages, most digital resources are in English or Kiswahili, leaving students who speak other languages underserved. Limited language models and western-centric AI datasets hinder accurate translations and contextual understanding, reducing engagement and trust. Cultural attitudes favoring traditional teaching methods can also resist digital adoption. In Greece, immigrant and minority students, including Roma communities, face difficulties accessing curriculum materials in Standard Modern Greek. Initiatives like Pharos aim to create Greek-specific translation and accessibility tools, but scaling remains a challenge. In India, linguistic diversity spans hundreds of languages and dialects, yet AI systems often support only major languages. Efforts such as the Bhashini platform attempt to bridge this gap, but even advanced language models struggle with regional nuances, limiting the cultural accuracy and inclusivity of AI-enabled education. Across all three countries, culturally relevant content and multilingual learning platforms are essential to overcome these barriers and ensure equitable access to digital education.

Cultural and linguistic barriers pose significant challenges to addressing educational inequalities in Kenya, particularly in the digital era. With over 40 ethnic groups and multiple languages spoken across the country, the education system often struggles to accommodate diverse cultural contexts and linguistic needs. Many digital learning resources are primarily available in English or Kiswahili, which can alienate students who are more comfortable in their native languages. There is a lack of language models that clearly reflect the existing language diversity of Kenya's over 60 languages. And since most AI language models are dependent on western languages data sets, it makes it difficult to get accurate translations that are contextual. This leads to frustration and mistrust of the educational systems. This language gap can hinder comprehension and engagement, limiting the effectiveness of digital educational tools for a substantial portion of the student population. Additionally, cultural perceptions about education and technology can influence students' and parents' willingness to embrace digital learning. In some communities, traditional methods of teaching and learning are favored, leading to resistance against new technologies. This reluctance can prevent the adoption of digital resources that could enhance learning opportunities. To overcome these barriers, it is essential to develop culturally relevant educational content and promote multilingual learning platforms that reflect Kenya's linguistic diversity.

**In Greece, minority students face difficulties accessing curriculum materials. Initiatives like Pharos aim to create accessible tools.**



Cultural and linguistic barriers also remain a notable challenge in Greece's education system, particularly for immigrant and minority students, including Roma communities, who often face difficulties accessing curriculum materials in Standard Modern Greek. Specifically, according to the Report of the General Secretariat for Social Solidarity and Combating Poverty (2025), Roma communities in Greece show particularly low levels of educational inclusion and attainment. Approximately 14% report being illiterate, while 27% attended some primary school classes without completing the level. Only 10% complete primary education, 13% are enrolled in general upper secondary school, and 17% of children do not attend school regularly, indicating high dropout rates and the intergenerational reproduction of educational inequalities. Despite these challenges, the report highlights positive trends of re-engagement through Second Chance Schools and individual cases of access to upper and tertiary education, demonstrating both the potential for improvement and the importance of targeted educational and social integration policies.

In the Roma community, contextualized learning resources are limited, and language support programs are unevenly implemented across schools. Initiatives like *Pharos—The Hellenic AI Factory* directly address these gaps by developing Greek-specific translation, summarization, and accessibility tools designed to support linguistic diversity and cultural inclusivity. While promising, such projects are still in early stages, and scaling them effectively will be essential to ensure that all learners, regardless of cultural or linguistic background, can engage meaningfully with educational content.

India's immense linguistic diversity translating into hundreds (some estimates cite over 780) of languages and dialects poses a major challenge to equitable AI adoption in education and public services. While AI systems often focus on a handful of major languages, this leaves speakers of regional or minority tongues severely underserved. Efforts like the government's **Bhashini platform**, designed to power translation and communication across Indian languages using AI models, show promise, but scaling across India's multilingual landscape remains difficult. Even large language models (LLMs) trained for India tend to underperform on cultural nuances and localized knowledge, meaning they can misunderstand or inaccurately represent regional traditions and vernacular uses. Taken together, linguistic plurality and cultural complexity continue to inhibit AI systems' ability to serve India's diverse populations accurately and empathetically.

## 3.4 Ethical Concerns

Ethical concerns around AI in education are increasingly recognized in Greece, particularly regarding data sharing, student privacy, and the risk of bias in large language models. While national strategies such as the Blueprint for Greece's AI Transformation stress the importance of responsible AI use, implementation frameworks remain underdeveloped, especially in schools with limited digital governance structures. Projects like *Pharos—The Hellenic AI Factory* incorporate ethical design principles, emphasizing transparency, inclusivity, and compliance with European data protection standards, yet challenges persist in ensuring that sensitive student data is safeguarded and that AI systems trained on non-diverse datasets do not reinforce cultural or linguistic biases. Establishing clear guidelines and teacher training on ethical AI use will be critical to building trust and equity in Greece's digital education ecosystem.

In India, ethical considerations around AI in education are becoming increasingly relevant as large-scale digital initiatives expand. While national frameworks such as AI for All and NDEAR emphasize inclusion and data security, implementation varies widely across states. The absence of a dedicated data protection law and the uneven quality of digital infrastructure raise concerns about privacy, consent, and data misuse. Moreover, AI systems often rely on datasets skewed toward English and urban users, potentially reinforcing linguistic and socio-economic disparities. The *Digital Personal Data Protection Act* (2023) marks progress but lacks sector-specific safeguards for minors and educational data. Moreover, **algorithmic opacity**—where learning analytics tools or adaptive systems operate without clear disclosure—limits accountability and informed consent. **Bias in datasets** further risks reinforcing structural inequalities, as most AI models are trained on English-language or urban data, marginalizing learners from regional, rural, and low-income backgrounds

Ethical concerns present significant challenges in addressing educational inequalities in Kenya, especially in the digital era. As educational technologies become more prevalent, issues related to data privacy, consent, and the potential for bias in AI-driven tools emerge. Though Kenya has a data protection act, its implementation is still in its infancy and its efficacy has not been fully tested. This means that it is not yet possible to determine how effectively the personal data of learners is protected and secured against misuse. Many digital platforms collect personal data from students, raising

questions about how this information is used and protected. In a context where many families may not fully understand these implications, the risk of misuse or exploitation of data becomes a critical concern. Additionally, there is the potential for bias in algorithms used in educational technologies, which can perpetuate existing inequalities. For example, if AI tools are trained on data that reflects societal biases, they may inadvertently disadvantage certain groups of students. This can lead to unequal access to resources and support, further entrenching educational disparities. To address these ethical challenges, it is crucial for policymakers and educators to establish clear guidelines on data usage, ensure transparency in AI applications, and actively involve diverse stakeholders in the development of educational technologies.

The introduction of Artificial Intelligence (AI) into Brazil's education system presents a critical inflection point, offering the profound potential to mitigate severe historical educational inequality through personalized learning. However, this promise is directly counterbalanced by the risk that unregulated algorithms could become powerful new vectors of exclusion, deepening existing social fractures. To manage this dual reality, Brazil is establishing a robust legal and ethical governance structure. This structure includes the pending Bill 2.338/2023, which will classify AI systems by risk, prohibit harmful uses, and mandate transparency, aligning Brazil with international best practices. Crucially, the existing General Data Protection Law (LGPD, Law No. 13.709/2018) serves as an indispensable foundation for algorithmic social justice. It is designed to ensure that technological innovation actively reduces, rather than perpetuates, disparities. This commitment is further solidified by the increased authority granted to the Brazilian Data Protection Agency (ANPD) and the creation of the Digital Child and Adolescent Statute, establishing a comprehensive regulatory ecosystem that views governance not as a barrier, but as the essential guide for ethical innovation.

The central challenges to ethical AI implementation in education revolve around algorithmic bias and the preservation of human autonomy. Algorithmic bias is pervasive because AI systems are trained on data that inevitably reflects society's structural divisions—including the socioeconomic and racial disparities found in Brazilian school performance data. This issue is compounded by the digital divide, leading to "data poverty" for marginalized communities, which ironically makes AI models less accurate and fair for those who need support the most. The LGPD provides direct mechanisms to combat these risks: Article 6 prohibits non-discrimination, and Article 20 grants data subjects the crucial right to a review of automated decisions. This means any algorithm systematically guiding students to less complex paths based on socioeconomic data can be challenged as illegal, making transparency and explainability mandatory. Furthermore, maintaining autonomy requires balancing personalized learning with preserving students' independent control over their learning and preventing an over-reliance on automated systems from limiting educators' freedom and creative pedagogical methods.

## 3.5 Policy and Governance

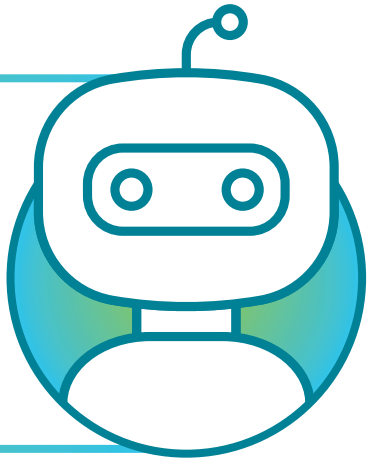
In Greece, education policy on AI reflects an ongoing action–intention gap. National strategies such as the *Blueprint for Greece's AI Transformation* outline ambitious goals for integrating AI and digital tools across all levels of education, yet implementation has been slow and uneven. While initiatives like *Pharos—The Hellenic AI Factory* and AI4EDU show early promise, they remain largely at the pilot stage and have not yet translated into systemic change across public schools. Governance is highly centralized, with limited flexibility at the regional or local level, which can slow adaptation to diverse school contexts, especially in rural and island communities. Bridging this gap will require moving beyond policy frameworks to sustained investment, teacher training, and mechanisms that ensure national strategies are effectively implemented at the classroom level.

India demonstrates strong will and intent in its policy frameworks and signaling to promote AI throughout its sectors. However, AI implementation to the last mile in the education sector faces roadblocks such as devolving power between states and the federal government. Policy implementation and action have thus far only demonstrated a few actionable items such as the establishment of the AI Center of Excellence. Real results in public education in particular are yet to be seen and evaluated. This is the key challenge—translating policy into action in a country with such diverse politics and needs as India.

Brazil's four-year Artificial Intelligence Plan (PBIA), designed in 2024 and launched in 2025, represents a significant step toward integrating AI across many areas of day-to-day life of Brazilians and achieving sovereignty on AI, including in Education and AI literacy. While the national-level initiative is in its foundational stages, successful, bottom-up initiatives led by public universities—which are not necessarily related to the Plan—are being implemented nationwide. A leading example is AIED Unplugged, developed as an innovative response to expand equitable access and bridge Brazil's digital and educational divides through inclusive, offline AI solutions. This model overcomes infrastructural barriers through an approach that requires neither constant connectivity nor new digital skills, using teachers as proxies to enhance the writing skills of elementary students on a large scale. Therefore, the recommendation is for national policy to move beyond theoretical plans and actively incorporate the lessons and proven methodologies from these successful, university-led initiatives. National policies as a whole should be revised to formally integrate and scale the AIED Unplugged model, which has already demonstrated its effectiveness, equity, and scalability in the Brazilian context.

Policy and governance issues significantly challenge efforts to address educational inequalities in Kenya, particularly in the digital era. The lack of a cohesive national strategy for integrating technology into education can lead to emerging initiatives, resulting in inconsistent access to digital resources across different regions. Without clear policies, schools may struggle to implement effective digital learning programs, exacerbating existing disparities between urban and rural areas. Inadequate governance structures in Kenya hinder the effective allocation of resources and funding for technology in education. Corruption and mismanagement may divert essential funds away from infrastructure development and digital literacy initiatives, limiting opportunities for disadvantaged communities. The current stand-off between the National Government and the devolved Governments at the County levels, is a conundrum for seamless and effective implementation of educational strategies. Additionally, the absence of stakeholder engagement in policy formulation can result in solutions that do not address the specific needs of diverse populations.

**India demonstrates strong will and intent to promote AI throughout its sectors. Results are yet to be evaluated.**



# 4. Recommendations

Achieving equitable AI-enabled education in Greece, Kenya, India, and Brazil requires an integrated approach addressing policy, capacity, infrastructure, ethics, and international collaboration. Drawing from existing challenges in these countries—ranging from infrastructure gaps and uneven digital literacy to linguistic diversity and governance barriers—this section provides cross-cutting recommendations that aim to bridge the gap between policy intentions and actionable outcomes.

## 4.1. Policy Development

National policies can move beyond aspirational frameworks to actionable strategies that ensure AI integration in education benefits all learners equitably. Greece's Blueprint for AI Transformation, India's AI Centers of Excellence, Brazil's PBIA plan, and Kenya's emerging digital strategies illustrate strong intent but reveal persistent implementation gaps. To address these, governments can:

- **Develop actionable, context-sensitive strategies:** Policies can translate high-level objectives into practical, measurable goals at the school level. This includes defining timelines, resource allocations, and responsibilities for AI deployment, ensuring strategies are adaptable to diverse school environments, particularly rural and underserved areas.
- **Decentralize governance while maintaining accountability:** Allow regional and local education authorities flexibility to tailor AI implementation to specific contexts while ensuring alignment with national standards. This approach can accelerate adoption in areas where centralized governance slows decision-making.
- **Incorporate evidence-based, bottom-up initiatives:** Successful pilot projects, such as Greece's *Pharos—The Hellenic AI Factory*, Brazil's AIED Unplugged, and Kenya's Eneza platform, can be formally integrated into national policies. Scaling proven models ensures resources are directed toward interventions with demonstrated impact.
- **Engage stakeholders in policy formulation:** Teachers, students, parents, universities, and civil society organizations can participate in policy development to ensure that programs reflect local needs and are socially and culturally relevant.

## 4.2. Capacity Building

Building human and institutional capacity is critical to enable effective AI integration and digital education:

- **Teacher training and professional development:** Educators require systematic training in digital literacy, AI tools, and pedagogical strategies for integrating technology in classrooms. Programs can address both technical skills and pedagogical applications, with localized modules to accommodate diverse cultural and linguistic contexts.
- **Student digital literacy programs:** Curricula can equip learners with the ability to engage critically and productively with digital content and AI tools. Emphasis should be placed on problem-solving, collaboration, and ethical digital citizenship.
- **Community and parental engagement:** Families play a crucial role in reinforcing digital skills. Awareness campaigns and training modules can help parents understand AI tools, data privacy, and online safety, reducing the intergenerational digital divide.
- **Institutional capacity development:** Ministries of education and local authorities should be trained in digital governance, program monitoring, and data-driven decision-making to sustain AI initiatives over time.

## 4.3. Infrastructure Investment

Infrastructure inequalities remain a primary barrier to equitable AI adoption in all four countries, particularly in rural and underserved areas:

- **Expand broadband connectivity and device access:** Governments should prioritize connecting rural schools with reliable internet and ensuring students and teachers have access to computers, tablets, or other digital devices. Solar-powered or low-energy solutions can help overcome challenges in regions with unreliable electricity.
- **Implement low-bandwidth and offline solutions:** Offline-capable educational platforms, such as Brazil's AIED Unplugged model, and modular ICT labs in Greece and India, can extend access in regions with intermittent connectivity.

- **Maintenance and sustainability planning:** Investment should include ongoing support for hardware, software, and network maintenance, ensuring digital tools remain functional and effective over time.
- **Infrastructure equity audits:** Regular assessments can identify regions where gaps persist, guiding targeted interventions and preventing disparities from widening.

## 4. Ethical Framework

Ethical considerations must guide AI integration to protect students' rights and ensure equitable outcomes:

- **Data privacy and protection:** Clear national guidelines can govern the collection, storage, and use of student data, aligned with international best practices, such as GDPR in Europe, while adapted to local contexts in Kenya, India, and Brazil.
- **Bias mitigation in AI systems:** Developers can ensure training datasets reflect linguistic, cultural, and socio-economic diversity to prevent AI tools from reinforcing existing inequalities. Periodic audits and transparency requirements are essential for accountability.
- **Teacher and student empowerment:** Educators and learners will benefit from training to understand ethical implications, consent mechanisms, and responsible AI use, fostering trust and confidence in digital systems.
- **Inclusion and accessibility:** AI-driven educational tools should accommodate learners with disabilities, minority language speakers, and marginalized communities, ensuring no student is excluded due to systemic or technological barriers.

## 5. International Collaboration

Global cooperation can accelerate equitable AI adoption by leveraging expertise, funding, and shared solutions:

- **Cross-country knowledge sharing:** Best practices from pilot programs in one country can inform AI integration in another, such as adapting Brazil's AIED Unplugged or India's Bhashini platform for local contexts.
- **Regional AI centers of excellence:** Establish regional hubs to provide teacher training, technical support, and curriculum development resources, fostering a sustainable ecosystem for AI-enabled learning.
- **Multilateral partnerships:** Engage international organizations, including UNESCO, UNICEF, and the World Bank, to support capacity-building, infrastructure funding, and research on ethical AI use in education.
- **Collaborative research and evaluation:** Encourage multinational studies to assess the effectiveness, equity, and scalability of AI educational interventions, ensuring that policies are guided by robust evidence rather than anecdotal results.

# 5. Conclusion

This report underscores the critical role of Artificial Intelligence (AI) in shaping equitable and high-quality education across Kenya, Brazil, India, and Greece. While each country faces distinct challenges—from infrastructural gaps and digital literacy disparities to cultural, linguistic, and policy implementation barriers—AI emerges as a common enabler with transformative potential. The evidence suggests that when thoughtfully integrated, AI can enhance personalized learning, support teachers, and reduce longstanding educational inequities, particularly in underserved and rural communities.

However, the deployment of AI in education cannot succeed in isolation. Structural challenges such as inadequate infrastructure, uneven teacher capacity, emerging governance, and socio-cultural barriers require concurrent attention. Moreover, ethical considerations around data privacy, algorithmic bias, and inclusive design must be central to any AI strategy to avoid reinforcing existing inequalities. The experiences of initiatives such as AIED Unplugged in Brazil, Pharos AI Factory in Greece, and AI-powered platforms in Kenya illustrate that context-sensitive, accessible, and scalable approaches are essential to ensure meaningful impact.

The report highlights the need for coherent policies, robust capacity-building programs, sustained investment in infrastructure, ethical governance frameworks, and international collaboration to fully realize AI's potential in education. By adopting these cross-cutting strategies, the four countries can move beyond emerging pilot programs and theoretical policy commitments toward systemic transformation. In doing so, AI can become a powerful tool for democratizing access to quality education, bridging digital and socio-economic divides, and equipping students with the skills needed to thrive in the 21st century.

Ultimately, this report demonstrates that the effective integration of AI in education is not only a technological challenge but a societal imperative—one that requires coordinated action from governments, educators, communities, and global partners to ensure that no learner is left behind.

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This report was made possible by the contribution of a multicountry team spanning Brazil, Greece, India, Kenya and the United States. The Center for Sustainable Development is deeply grateful to all co-authors for their intellectual contributions and sustained engagement throughout the research process.

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