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Climate Change, Migration, And School Disengagement in A Globalised World: Governance Challenges, Educational Inequality, And the Role of AI and Traditional Knowledge

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ABSTRACT

Climate change is increasingly reshaping patterns of human mobility, governance capacity, and educational stability across the globe. In many contexts, climate-induced displacement and migration intersect with globalisation-driven inequalities to disrupt schooling trajectories, contributing to declining academic performance and rising rates of school disengagement and dropout. Despite growing recognition of these challenges, existing educational responses remain fragmented, often addressing climate change, migration, governance, and technology as isolated policy domains. This paper critically examines how climate change and migration, within a globalised world, influence school disengagement through governance failures, structural inequality, and limited system responsiveness. Drawing on interdisciplinary literature spanning education, climate studies, migration research, governance, and digital transformation, the paper develops an integrated conceptual analysis that foregrounds the role of education systems as both sites of vulnerability and potential resilience. Particular attention is given to the emerging role of artificial intelligence (AI) in supporting early identification of disengagement risks, adaptive learning pathways, and system-level planning, alongside the often-overlooked contributions of traditional and indigenous knowledge systems in fostering community resilience, belonging, and culturally grounded educational continuity. The analysis highlights tensions between technocratic, data-driven solutions and context-sensitive, human-centred approaches that recognise moral responsibility, cultural knowledge, and social justice. The paper argues that addressing school disengagement in the context of climate-induced mobility requires governance frameworks that integrate technological innovation with equity-oriented policies and epistemic plurality. It concludes by proposing a holistic, values-informed framework for educational governance that aligns AI-enabled interventions with traditional knowledge and inclusive policy design to support educational continuity, learner well-being, and long-term social sustainability in an era of climate uncertainty.

Keywords: Climate change, Migration, School disengagement, Educational inequality, Governance, Artificial intelligence, Traditional knowledge, Globalisation, Academic performance, School dropout.

INTRODUCTION

Climate change has emerged as one of the most profound structural forces reshaping social systems in the twenty-first century, with far-reaching implications for human mobility, governance, and educational continuity. As noted by the Intergovernmental Panel on Climate Change (IPCC, 2023), rising sea levels, extreme weather events, environmental degradation, and livelihood disruptions are increasingly driving both internal and cross-border migration, particularly in climate-vulnerable regions of the Global South. These climate-induced mobility patterns intersect with globalisation-driven economic inequalities, placing unprecedented strain on public institutions, including education systems that were not designed to accommodate sustained displacement and social disruption. Within this context, schools have become critical yet fragile sites where the consequences of climate change, migration, and governance failures converge.

Education systems are increasingly confronted with declining academic performance, irregular attendance, and rising rates of school disengagement and dropout among learners affected by climate-related displacement. According to UNESCO (2022), climate shocks and migration disrupt schooling through multiple pathways, including loss of learning time, weakened family livelihoods, psychosocial stress, language barriers, and discontinuities in curriculum and assessment. These challenges are compounded by globalisation processes that prioritise efficiency, standardisation, and market-

driven reforms, often at the expense of equity, contextual relevance, and learner well-being. As Rizvi and Lingard (2010) argue, global education policies frequently overlook the lived realities of marginalised learners, particularly those experiencing mobility and precarity.

Governance plays a central mediating role in shaping how education systems respond to climate-induced migration and inequality. Effective educational governance requires coordination across climate policy, migration management, social protection, and schooling provision; however, such coherence remains limited in many contexts. As highlighted by Robertson and Dale (2015), global governance frameworks often operate through fragmented policy logics, resulting in reactive rather than anticipatory responses to systemic risks. In climate-affected regions, weak institutional capacity, limited data integration, and short-term policy cycles further constrain the ability of education systems to identify at-risk learners and sustain educational engagement. Consequently, school disengagement is not merely an individual or household-level issue but a structural outcome of governance gaps and policy misalignment.

At the same time, technological advances, particularly in artificial intelligence (AI), are increasingly promoted as solutions to complex educational challenges. Scholars such as Selwyn (2019) and Williamson (2021) note that AI-driven systems offer potential tools for early identification of learning disengagement, personalised learning pathways, and system-level planning through predictive analytics. In contexts affected by migration and climate instability, AI could theoretically support real-time monitoring of attendance patterns, learning loss, and dropout risks. However, the growing reliance on data-driven and algorithmic governance also raises critical concerns regarding equity, bias, surveillance, and the exclusion of culturally embedded knowledge systems. As Eubanks (2018) cautions, technological solutions introduced without attention to social context and power relations may reinforce existing inequalities rather than alleviate them.

An important yet often marginalised dimension of this debate is the role of traditional and indigenous knowledge systems in supporting educational resilience and continuity. Traditional knowledge, grounded in community practices, moral values, and intergenerational learning, has long played a vital role in enabling societies to adapt to environmental change and social disruption. Scholars such as Nakashima et al. (2018) and Smith (2021) argue that indigenous knowledge systems offer critical insights into climate adaptation, community cohesion, and ethical responsibility that are frequently absent from formal education policy frameworks. In migration-affected contexts, culturally responsive education that draws on traditional knowledge can strengthen learners' sense of belonging, identity, and motivation, key protective factors against school disengagement.

Despite growing scholarly attention to climate change, migration, and education, existing research often treats these domains in isolation. Studies on climate change and education tend to focus on infrastructure damage and disaster response, while migration research frequently centres on access and enrolment rather than sustained engagement and performance. Similarly, the literature on AI in education has largely prioritised efficiency, scalability, and learning outcomes, with limited engagement with ethical, cultural, and governance dimensions. As noted by Biesta (2015), such instrumental approaches risk narrowing the purpose of education to technical problem-solving, neglecting its broader role in fostering social justice, moral agency, and democratic participation.

This paper responds to these gaps by offering an integrated, interdisciplinary analysis of how climate change and migration contribute to school disengagement in a globalised world, mediated through governance structures, educational inequality, and policy choices. It critically examines the dual role of AI as both a potential enabler of early intervention and a source of new risks, while foregrounding traditional knowledge as a complementary and ethically grounded resource for educational resilience. By bringing these strands together, the paper advances a holistic framework that reconceptualises school disengagement not as a deficit located within learners, but as a systemic outcome shaped by environmental change, mobility, governance capacity, and epistemic priorities.

The central argument advanced in this study is that addressing school disengagement in the context of climate-induced migration requires governance approaches that integrate technological innovation with equity-oriented policies and culturally grounded knowledge systems. Such an approach moves beyond fragmented, technocratic responses toward a human-centred model of educational governance capable of supporting academic continuity, learner well-being, and social sustainability in an era of climate uncertainty and global transformation.

LITERATURE REVIEW

Climate Change, Mobility, and Educational Disruption

The relationship between climate change and education has gained increasing scholarly attention as environmental stressors intensify patterns of displacement and social disruption. The Intergovernmental Panel on Climate Change (IPCC, 2023) identifies climate-induced migration as a growing global phenomenon, particularly affecting low-income and

climate-vulnerable regions where adaptive capacity is limited. Scholars such as McMichael (2020) and Boas et al. (2019) argue that climate-related mobility is rarely a linear or voluntary process; instead, it is shaped by cumulative vulnerabilities, including poverty, governance weaknesses, and limited access to essential services such as education.

Within education research, climate change has been linked to disrupted schooling through infrastructure damage, prolonged school closures, and displacement of learners and teachers (UNESCO, 2022). Studies conducted in climate-affected contexts demonstrate that learners experiencing displacement often face interrupted learning trajectories, reduced instructional time, and heightened psychosocial stress, all of which negatively influence academic performance and school retention (Kousky, 2016; Mendenhall et al., 2021). However, much of this literature remains event-focused, examining education during or immediately after climate disasters, rather than analysing sustained patterns of disengagement associated with long-term mobility and instability.

Migration, Globalisation, and School Disengagement

Migration literature has long examined the educational experiences of mobile populations, particularly refugees, internally displaced persons, and labour migrants. According to Dryden-Peterson (2016), migrant learners often encounter structural barriers such as language differences, curriculum misalignment, discrimination, and limited institutional support, which can undermine engagement and academic success. In globalised education systems, these challenges are intensified by standardised curricula and assessment regimes that privilege sedentary, dominant populations (Rizvi & Lingard, 2010).

School disengagement, conceptualised as a gradual withdrawal from academic, social, and emotional participation in schooling, is increasingly recognised as a precursor to dropout (Finn & Zimmer, 2012). Research indicates that migrant and climate-displaced learners are disproportionately represented among disengaged student populations due to frequent school transitions, loss of social networks, and economic precarity (Taylor & Sidhu, 2012). Yet, as Lewin (2011) observes, dropout is often framed as an individual failure rather than a systemic response to structural inequality, mobility, and governance shortcomings.

Globalisation further complicates these dynamics by reshaping labour markets and educational priorities. Market-oriented reforms emphasising efficiency, competition, and skills for employability have narrowed the purpose of schooling, often marginalising learners whose circumstances do not align with linear educational pathways (Ball, 2012). As a result, education systems operating within globalised policy frameworks may inadvertently exacerbate disengagement among mobile and climate-affected populations.

Governance, Educational Inequality, and Policy Fragmentation

Governance has emerged as a critical lens for understanding educational inequality in contexts of climate change and migration. Educational governance encompasses policy coordination, institutional capacity, accountability mechanisms, and resource allocation across multiple levels of the state (Dale, 2015). Robertson and Dale (2015) argue that global governance arrangements increasingly influence national education policies, often promoting standardised solutions that lack sensitivity to local vulnerabilities and mobility patterns.

In climate-affected regions, governance challenges are magnified by limited fiscal capacity, weak data systems, and fragmented policy responsibilities across climate, migration, and education sectors (OECD, 2021). Studies show that education policies frequently fail to account for mobile learners, resulting in gaps in enrolment continuity, assessment recognition, and targeted support for at-risk students (UNHCR, 2022). These governance failures contribute to persistent educational inequality, where climate-displaced and migrant learners experience lower academic outcomes and higher dropout rates.

Importantly, governance frameworks often prioritise access and enrolment indicators while neglecting deeper dimensions of engagement, belonging, and well-being (Biesta, 2015). This narrow focus limits the ability of education systems to address the root causes of disengagement in contexts shaped by environmental uncertainty and social mobility.

Artificial Intelligence and Data-Driven Educational Interventions

The growing integration of artificial intelligence (AI) into education governance and practice has generated both optimism and critique. Proponents argue that AI-enabled tools can support early identification of disengagement risks, personalise learning, and improve system-level planning through predictive analytics (Holmes et al., 2019; Williamson, 2021). In theory, such tools could be particularly valuable in contexts characterised by mobility and instability, where traditional monitoring systems struggle to track learner progress.

However, critical scholars caution that AI-driven approaches often reflect technocratic assumptions that overlook social context, power relations, and cultural diversity. Selwyn (2019) and Eubanks (2018) warn that algorithmic decision-making can reproduce existing inequalities when data sets exclude marginalised

populations or embed bias. In climate-affected and migrant contexts, incomplete data, language barriers, and informal learning pathways may further limit the effectiveness and fairness of AI-based interventions.

Moreover, the AI-in-education literature has largely focused on efficiency and learning outcomes, with limited engagement with ethical governance, community participation, and epistemic diversity. This gap raises concerns about the suitability of purely data-driven solutions for addressing complex, socially embedded phenomena such as school disengagement.

Traditional Knowledge, Community Resilience, and Educational Continuity

Traditional and indigenous knowledge systems represent a critical yet underexplored dimension of educational responses to climate change and migration. Traditional knowledge encompasses locally grounded practices, moral values, and ecological understandings developed through long-term interaction with specific environments (Nakashima et al., 2018). Scholars argue that such knowledge systems play a vital role in fostering resilience, social cohesion, and adaptive capacity in the face of environmental change (Whyte, 2017).

In educational contexts, culturally responsive pedagogy that incorporates traditional knowledge has been shown to enhance learner engagement, identity affirmation, and community participation (Smith, 2021; Castagno & Brayboy, 2008). For climate-displaced and migrant learners, connections to cultural knowledge and community narratives can serve as protective factors against disengagement and alienation. However, formal education systems, particularly those shaped by globalised policy agendas, often marginalise traditional knowledge in favour of standardised, Western epistemologies (Andreotti, 2011).

The limited integration of traditional knowledge into education governance and curriculum represents a missed opportunity to address school disengagement through culturally grounded and ethically informed approaches, particularly in climate-vulnerable regions.

Table 1: Pathways Linking Climate Change, Migration, and School Disengagement

Structural Driver	Key Dynamics	Educational Implications	Representative Literature
Climate change	Extreme weather, sea-level rise, livelihood loss	School closures, infrastructure damage, interrupted learning	IPCC (2023); UNESCO (2022)
Climate-induced migration	Internal displacement, cross-border mobility, cyclical migration	Disrupted enrolment, curriculum discontinuity, language barriers	McMichael (2020); Dryden-Peterson (2016)
Socio-economic precarity	Loss of income, food insecurity, child labour risks	Reduced attendance, poor academic performance	Kousky (2016); Lewin (2011)
Psychosocial stress	Trauma, loss of community, uncertainty	Declining engagement, behavioural withdrawal	Mendenhall et al. (2021)
Globalised education models	Standardisation, performance-driven reforms	Exclusion of mobile learners, rising dropout	Rizvi & Lingard (2010); Ball (2012)

Literature Gaps

Despite the growing body of research across climate change, migration, education, and technology, several critical gaps remain evident.

First, the literature lacks integrated analyses that explicitly link climate change, migration, governance, and school disengagement within a single conceptual framework. Existing studies tend to address these issues in isolation, limiting understanding of how environmental, social, and institutional factors interact to shape educational outcomes.

Second, while school dropout and disengagement are widely studied, there is insufficient focus on disengagement as a systemic governance outcome rather than an individual learner deficit. Few studies examine how policy fragmentation, institutional rigidity, and globalised reform agendas contribute to sustained disengagement among climate-affected and mobile learners.

Third, research on AI in education remains largely technocratic, with limited critical engagement with ethical governance, equity, and cultural context. There is a notable gap in studies examining how AI tools operate, or fail to operate, in environments characterised by mobility, incomplete data, and social vulnerability.

Fourth, traditional and indigenous knowledge systems are significantly underrepresented in scholarship on climate change, migration, and educational policy. Where they are acknowledged, they are often treated as supplementary rather than integral to educational resilience and engagement strategies.

Finally, there is a lack of holistic, values-informed frameworks that align AI-enabled interventions with traditional knowledge, equity-oriented governance, and learner well-being. This gap limits the capacity of education systems to respond effectively to climate-induced instability and global transformation.

Positioning of the Present Study

By addressing these gaps, the present paper contributes an interdisciplinary, human-centred framework that reconceptualises school disengagement as a product of climate change, migration, governance, and epistemic priorities. It advances scholarly debate by integrating AI and traditional knowledge within an equity-driven governance lens, offering timely insights for education policy and practice in a globalised, climate-uncertain world.

DISCUSSION AND ANALYSIS

Climate Change, Migration, and the Structural Production of School Disengagement

The analysis of the literature indicates that school disengagement in the context of climate change and migration is best understood as a structurally produced phenomenon rather than an outcome of individual learner failure. As the IPCC (2023) emphasises, climate change increasingly generates conditions of prolonged uncertainty, displacement, and livelihood disruption, which directly and indirectly affect children's capacity to remain engaged in formal education. Migration, whether forced, temporary, or cyclical, interrupts schooling trajectories, destabilises social networks, and undermines continuity in curriculum and assessment, all of which are strongly associated with declining academic performance and increased dropout risk (McMichael, 2020; UNESCO, 2022).

This analysis reinforces the argument advanced by Finn and Zimmer (2012) that disengagement is a gradual, cumulative process shaped by institutional responsiveness and contextual stability. In climate-affected contexts, disengagement often emerges not from a lack of motivation but from repeated encounters with misaligned education systems that fail to accommodate mobility, trauma, and economic precarity. Globalisation further amplifies these effects by promoting standardised schooling models that assume stable learners and linear progression, thereby marginalising those whose lives are shaped by climate-induced movement (Rizvi & Lingard, 2010).

Governance Failures and Educational Inequality in a Globalised Context

Governance emerges as a central explanatory factor linking climate change, migration, and educational inequality. The literature suggests that education systems often operate within fragmented policy environments, where climate adaptation, migration management, and education planning are governed by separate institutional silos (OECD, 2021). Robertson and Dale (2015) argue that such fragmentation limits anticipatory governance and results in reactive, short-term interventions that prioritise access metrics over sustained engagement and learning quality.

This governance disconnect disproportionately affects climate-displaced and migrant learners, who frequently fall outside conventional policy categories and data systems. As Lewin (2011) notes, dropout statistics often obscure the structural conditions that push learners out of schooling, including poverty, mobility, and institutional inflexibility. The analysis indicates that governance frameworks influenced by globalisation tend to prioritise efficiency, accountability, and performance indicators, which may unintentionally intensify disengagement by neglecting contextual vulnerability and learner well-being (Ball, 2012).

Importantly, governance failures are not limited to resource constraints; they also reflect epistemic choices about what forms of knowledge and evidence are valued. Policies grounded primarily in quantitative performance data may fail to capture the lived experiences of mobile learners, thereby reinforcing exclusionary practices.

Table 2: Governance, AI, and Traditional Knowledge: Contrasting Approaches to Addressing School Disengagement

Dimension	Technocratic / Fragmented Approaches	Human-Centred / Integrated Approaches
Governance focus	Sectoral silos (education, climate, migration treated separately)	Cross-sectoral, anticipatory governance

Use of AI	Predictive analytics focused on efficiency and monitoring	Ethical, contextualised AI supporting early intervention
Data logic	Standardised, incomplete, mobility-blind datasets	Flexible data systems recognising mobility
Role of traditional knowledge	Marginal or symbolic inclusion	Central to resilience, identity, and engagement
View of disengagement	Individual deficit or behavioural issue	Structural and systemic outcome
Equity orientation	Limited, outcome-focused	Justice-oriented, wellbeing-centred

AI as a Double-Edged Tool in Addressing Disengagement

Artificial intelligence occupies an increasingly prominent role in contemporary education reform discourse, particularly in relation to monitoring, prediction, and personalisation. Scholars such as Holmes et al. (2019) and Williamson (2021) suggest that AI-driven analytics can enhance early identification of disengagement risks and support targeted interventions. In theory, these tools offer promise in climate- and migration-affected contexts, where traditional monitoring mechanisms struggle to track learner trajectories across time and space.

However, the analysis underscores that AI is not a neutral solution. As Selwyn (2019) and Eubanks (2018) caution, data-driven systems are shaped by the assumptions, values, and power relations embedded in their design. In contexts characterised by displacement and informal learning pathways, data gaps and algorithmic bias may result in the misidentification or exclusion of vulnerable learners. Rather than mitigating inequality, AI may inadvertently reproduce it if deployed without robust governance, ethical oversight, and contextual sensitivity.

This tension highlights the need to reconceptualise AI not as a substitute for governance capacity, but as a supplementary tool embedded within human-centred, equity-oriented policy frameworks. AI's effectiveness in addressing school disengagement depends less on technological sophistication and more on the quality of governance structures that guide its use.

The Marginalisation, and Potential, of Traditional Knowledge

A critical insight emerging from the analysis is the systematic marginalisation of traditional and indigenous knowledge within formal education systems, particularly those shaped by globalised policy agendas. Nakashima et al. (2018) and Whyte (2017) emphasise that traditional knowledge systems have long supported environmental adaptation, community cohesion, and ethical responsibility, capacities that are highly relevant in contexts of climate change and migration.

From an educational perspective, culturally grounded knowledge can strengthen learners' sense of identity, belonging, and purpose, which are key protective factors against disengagement (Smith, 2021). For displaced learners, the integration of traditional knowledge into curricula and school practices can provide continuity amid disruption, reinforcing the social and moral dimensions of learning that are often overlooked in technocratic reform models.

The analysis suggests that the exclusion of traditional knowledge is not merely an oversight but reflects deeper epistemic hierarchies within global education governance. As Andreotti (2011) argues, dominant education models frequently privilege Western, market-oriented knowledge systems, thereby limiting the capacity of schools to respond meaningfully to local realities. Reintegrating traditional knowledge is therefore both an equity issue and a governance challenge.

Reframing School Disengagement as a Governance and Justice Issue

Taken together, the findings support a reframing of school disengagement as a governance and social justice issue situated at the intersection of climate change, migration, and globalisation. Rather than attributing disengagement to learner deficits, the analysis aligns with Biesta's (2015) argument that education must be understood as a moral and political project, not merely a technical one.

Effective responses to disengagement require governance frameworks that:

- Recognise climate-induced mobility as a structural condition rather than an exception,
- Integrate education policy with climate adaptation and migration planning,
- Use AI ethically and contextually to support, not replace, human judgment, and
- Value traditional knowledge as a legitimate and necessary component of educational resilience.

Such an approach challenges dominant efficiency-driven reform paradigms and calls for a shift toward human-centred, values-informed educational governance.

4.6 Toward an Integrated Analytical Framework

The discussion culminates in the need for an integrated

framework that links environmental change, mobility, governance capacity, technological intervention, and epistemic inclusion. This framework positions school disengagement as an emergent outcome of interacting systems rather than isolated variables. By aligning AI-enabled tools with traditional knowledge and equity-focused governance, education systems can move toward more sustainable and inclusive responses to climate-induced instability.

This analytical synthesis sets the foundation for the concluding section, which outlines practical and policy-oriented pathways for addressing school disengagement in an era of climate uncertainty and global transformation.

Table 3: Educational and Social Outcomes of Integrated Responses to Climate-Induced School Disengagement

Integrated Strategy	Short-Term Outcomes	Long-Term Outcomes
Climate–education policy alignment	Reduced learning disruption	System resilience
Ethical AI-enabled monitoring	Early identification of disengagement	Reduced dropout rates
Culturally responsive pedagogy	Improved learner engagement	Stronger identity and belonging
Integration of traditional knowledge	Community trust and participation	Intergenerational sustainability
Whole-school wellbeing approaches	Psychosocial stability	Social cohesion and equity

CONCLUSION

This paper set out to critically examine the interconnections between climate change, migration, governance, and school disengagement within an increasingly globalised world, with particular attention to the emerging roles of artificial intelligence (AI) and traditional knowledge systems. Drawing on interdisciplinary scholarship, the analysis demonstrates that school disengagement and dropout cannot be understood as isolated educational failures or individual learner deficits. Rather, they represent systemic outcomes shaped by environmental disruption, mobility, policy fragmentation, and epistemic exclusion.

The discussion highlights that climate change operates as a structural driver of educational instability, reshaping patterns of migration and amplifying existing socio-economic inequalities. Climate-induced displacement disrupts learning continuity, weakens social and institutional support systems, and exposes the limitations of education models premised on stability and linear progression. In globalised education systems, these vulnerabilities are further intensified by market-oriented reforms that prioritise standardisation, efficiency, and performance metrics, often at the expense of equity, well-being, and contextual responsiveness.

Governance emerges as a critical mediating factor in determining whether education systems exacerbate or mitigate disengagement. Fragmented policy approaches that treat climate adaptation, migration management, and education planning as separate domains have proven inadequate in addressing the complex realities faced by mobile and climate-affected learners. The analysis underscores that governance failures are not solely a matter of resource scarcity but also reflect narrow conceptions of evidence, accountability, and educational purpose. When engagement, belonging, and cultural continuity are sidelined, schooling becomes increasingly misaligned with learners lived realities.

The paper also reveals the ambivalent role of AI in addressing school disengagement. While AI-enabled tools hold potential for early identification of risk, personalised learning support, and system-level planning, their effectiveness is contingent on ethical governance, data integrity, and contextual sensitivity. Without these safeguards, AI risks reproducing existing inequalities and reinforcing technocratic approaches that overlook social and cultural dimensions of learning. Importantly, the analysis demonstrates that technological solutions alone cannot compensate for governance gaps or epistemic exclusion.

In contrast, traditional and indigenous knowledge systems emerge as a vital yet underutilised resource for educational resilience. Rooted in place-based practices, moral values, and intergenerational learning, traditional knowledge offers pathways for fostering belonging, ethical responsibility, and community cohesion, qualities essential for sustaining engagement in contexts of climate-induced disruption. The marginalisation of such knowledge within formal education systems reflects broader power asymmetries in global education governance and limits the capacity of schools to respond meaningfully to climate change and migration.

Taken together, the findings support a re-conceptualisation of school disengagement as a governance and justice issue situated at the intersection of

environmental change, mobility, and epistemic priorities. Addressing disengagement in an era of climate uncertainty requires a shift away from fragmented, technocratic responses toward integrated, human-centred educational governance that aligns AI-enabled innovation with equity, cultural relevance, and moral purpose.

Table 4: Policy Implications for Addressing School Disengagement in the Context of Climate Change, Migration, and Technological Transformation

Policy Domain	Key Challenges Identified	Policy Implications	Strategic Focus
Climate–education governance	Fragmented policies across climate, migration, and education sectors	Develop integrated governance frameworks that align climate adaptation, migration planning, and education policy	Anticipatory, cross-sectoral planning
Migration and learner mobility	Disrupted enrolment, lack of learning continuity	Introduce flexible enrolment systems, recognition of prior learning, and mobile learner tracking	Educational continuity and inclusion
Educational inequality	Disproportionate disengagement among climate-affected learners	Target resources toward vulnerable communities and climate hotspots	Equity-driven resource allocation
Use of AI in education	Bias, exclusion, over-reliance on data	Establish ethical AI governance standards and human oversight mechanisms	Responsible and contextualised AI
Data and monitoring systems	Incomplete, mobility-blind datasets	Design adaptive data systems that capture mobility, engagement, and wellbeing	Early identification and prevention
Curriculum and pedagogy	Lack of cultural relevance	Integrate traditional and indigenous knowledge into curricula and pedagogy	Cultural continuity and relevance
Teacher capacity	Limited preparedness for climate and migration contexts	Provide professional development in trauma-informed, culturally responsive, and AI-aware pedagogy	Teacher empowerment
Student wellbeing	Psychosocial stress and disengagement	Strengthen school-based wellbeing and community support programmes	Holistic learner support
Community engagement	Weak school–community linkages	Institutionalise partnerships with communities, elders, and local organisations	Shared responsibility and trust
Accountability frameworks	Narrow performance indicators	Expand accountability to include engagement,	Broader measures of success

		wellbeing, and retention	

WAY FORWARD

Reorienting Educational Governance for Climate Mobility

Moving forward, education systems must explicitly recognise climate-induced mobility as a defining condition of the twenty-first century rather than a temporary disruption. This requires governance frameworks that integrate education policy with climate adaptation strategies, migration planning, and social protection mechanisms. Ministries of education, climate authorities, and migration agencies should adopt coordinated planning processes that anticipate learner mobility, support continuity of learning across locations, and ensure recognition of prior learning and assessment.

Policy indicators should move beyond enrolment and completion rates to include measures of engagement, well-being, and belonging. Such a shift would enable education systems to identify disengagement earlier and respond more holistically to the needs of climate-affected learners.

Embedding Ethical and Contextualised Use of AI

AI should be positioned as a supportive governance tool rather than a deterministic solution to educational disengagement. Future policy frameworks must establish clear ethical guidelines for the use of AI in education, including safeguards against bias, exclusion, and surveillance. Data systems should be designed to account for mobility, informal learning pathways, and contextual diversity, particularly in climate-vulnerable regions.

Importantly, AI-enabled interventions should complement, rather than replace, human judgment, teacher expertise, and community knowledge. Investments in digital capacity building for educators and policymakers are essential to ensure that AI is used critically, transparently, and responsibly.

Integrating Traditional Knowledge into Educational Policy and Practice

A central pathway forward lies in the meaningful integration of traditional and indigenous knowledge into curricula, pedagogy, and governance structures. Education systems should move beyond symbolic inclusion toward substantive engagement with community knowledge holders, elders, and local institutions. Such integration can enhance cultural relevance, reinforce learner identity, and strengthen community–school partnerships.

Policy frameworks should recognise traditional knowledge as a legitimate form of expertise in climate adaptation and educational resilience. This recognition requires epistemic openness within education governance and a willingness to challenge dominant, universalised models of schooling.

Strengthening Schools as Sites of Social and Emotional Support

Schools in climate- and migration-affected contexts must be reconceptualised as sites of social, emotional, and moral support, not merely academic instruction. Whole-school approaches that address psychosocial well-being, language support, and community engagement are critical for sustaining learner participation. Teacher professional development should include training in trauma-informed pedagogy, culturally responsive teaching, and climate literacy.

Such approaches align with a broader understanding of education as a public good that contributes to social cohesion, resilience, and democratic participation.

Future Research Directions

Future research should prioritise longitudinal and comparative studies that examine how climate change and migration shape educational engagement over time and across contexts. There is a particular need for empirical research that evaluates the effectiveness of integrated governance models combining AI-enabled tools, traditional knowledge, and equity-oriented policies. Participatory and community-based research approaches can further amplify the voices of climate-affected learners and communities, ensuring that policy and practice are grounded in lived experience.

Concluding Remark

In an era marked by climate uncertainty, mobility, and rapid technological change, education systems face a pivotal choice: to reinforce exclusion through fragmented, technocratic responses or to reimagine governance in ways that foreground equity, cultural knowledge, and human dignity. By aligning AI innovation with traditional knowledge and inclusive governance, education systems can move beyond crisis management toward sustainable pathways that support learner engagement, educational continuity, and social justice in a globalised world.

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