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Comparing National Education Policy Frameworks on Digital Equity in Education

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Abstract. This paper compares how national education policy frameworks define and pursue digital equity, and what their choices reveal about the distance between connecting schools and equalising learning. Its purpose is to identify which policy designs move beyond access parity toward equity of use and outcomes, and to derive transferable design principles for Indonesia. The method is a comparative policy analysis of four national frameworks across income levels, namely the Education Strategy 2021 to 2035 of Estonia, the National Educational Technology Plan 2024 of the United States, the National Education Policy 2020 of India, and the digital education initiatives of Indonesia under the Ministry of Education, Culture, Research and Technology, read together with the Digital Literacy Programme of Kenya as a device centred counterpoint. Each framework was analysed along seven dimensions: access and connectivity, devices, digital skills, content and language, governance, funding, and the monitoring of equity outcomes, and interpreted through the three level model of the digital divide. The results show that frameworks differ less in their infrastructure ambitions than in their definition of equity. Estonia treats equity as a property of a mature digital ecosystem, the United States names access, design and use as three distinct divides, while India and Indonesia pursue equity mainly through universal platforms whose benefits remain unevenly distributed, and Kenya shows how device distribution without connectivity and teacher support stalls at the first level. The novelty lies in showing that the decisive equity variable is not the stock of technology but whether a framework assigns responsibility, funding and indicators to the second and third levels of the divide, a finding converted into seven design principles for Indonesian policy.

Keywords: digital equity; digital divide; education policy; comparative analysis; educational technology; Indonesia

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INTRODUCTION

Every national education system now writes digital technology into its promises, and almost every system discovers that the technology arrives unevenly. The learners who most need what digital education offers, namely those far from good schools, well stocked libraries and qualified teachers, are systematically the learners least likely to have a connected device, a confident teacher and content in a language they understand. Digital equity has therefore become the point at which education policy and inequality research meet, and the quality of a national framework can be judged by how honestly it confronts that meeting. This paper compares the digital education policy frameworks of Estonia, the

United States, India and Indonesia, with Kenya as a counterpoint case, in order to ask a simple question with complicated answers: what does each framework understand equity to mean, and what does it actually fund, assign and measure in equity's name?

The scholarly starting point is the now classical argument that the digital divide is not one gap but a sequence of gaps. Van Dijk's resources and appropriation theory showed that access is a process with successive stages, from motivation and material access to skills and usage, and that categorical inequalities in income, education, gender, age and geography reproduce themselves at every stage [1]. Hargittai named the skills stage the second level digital divide, demonstrating that even among connected users, the ability to find and evaluate information online varies sharply with education and experience [2]. Later work confirmed that the first level itself did not close but changed character, shifting from a divide in physical access to a divide in material access, in the quality, ownership and maintenance of devices and connections [3]. A systematic review of the second and third level divides concluded that skills, usage patterns and outcomes are each stratified, and that outcomes, the tangible benefits people obtain from being online, are the least equally distributed of all [4].

Two further bodies of theory discipline the comparison. Helsper's corresponding fields model argues that digital exclusion mirrors social exclusion field by field, so that disadvantage in economic, cultural, social and personal resources translates into corresponding digital disadvantage, mediated by access, skills and attitudes [5]. Warschauer's account of technology and social inclusion, built from cases in several countries, insists that meaningful access is a social achievement composed of physical, digital, human and social resources, and that programmes which count devices delivered rather than capabilities built routinely mistake the first for the second [6]. Robinson and colleagues similarly warn that digital inequalities are not a residual problem that diffusion will dissolve, because each new technology is absorbed into existing structures of advantage and tends to amplify them [7]. Selwyn has long cautioned that policy talk about technology and inclusion often performs optimism while leaving the underlying distribution of resources untouched [8].

The policy stakes of these arguments grew after the pandemic, when remote learning converted household connectivity into a condition of schooling itself. Frameworks written or rewritten since 2020, including the four examined here, all speak the language of equity. Yet they speak it with different accents. One treats equity as near universal capability in a small, wealthy, digitally saturated state. One names three distinct divides and assigns them to different levels of a federal system. Two pursue equity through national platforms of extraordinary scale in societies where connectivity, language and teacher capacity vary enormously across territory. Comparing them is therefore not an exercise in ranking. It is a way of making visible the policy choices, about definitions, sequencing, targeting and measurement, that decide whether digital education narrows or widens the gaps it claims to close. While comparative studies of digital education policy exist, few read frameworks across income levels against a single equity matrix that follows the three levels of the divide from infrastructure to outcomes, and fewer still convert the comparison into design principles for a specific system, Indonesia, whose archipelagic geography makes it the hardest test of every claim the other frameworks make. That conversion is the contribution this paper attempts.

METHODS

This study is a comparative policy analysis conducted through qualitative document analysis. The primary sources are the authoritative framework documents of each case: the Education Strategy 2021 to 2035 and Digital Agenda of Estonia; the National Educational Technology Plan 2024 of the United States Department of Education; the National Education Policy 2020 of India, together with the programme architecture of PM eVIDYA and the DIKSHA platform that implements its digital chapter; the digital transformation initiatives of Indonesia's Ministry of Education, Culture, Research and Technology, centred on the Merdeka Mengajar platform, the belajar.id account system and the Rapor Pendidikan data platform; and, as a counterpoint, the Digital Literacy Programme of Kenya, documented by its implementing ICT Authority. Case selection followed a maximum variation logic across income level, state structure and digital maturity, so that a high income digital pioneer, a high income federal system, a large lower middle income platform state, and the focal case of Indonesia are read against each other, with Kenya included because its programme represents the purest form of the device first strategy that several larger frameworks still contain in diluted form.

Each framework was coded against an analytical matrix of seven dimensions derived from the digital divide literature: definitions of equity; access and connectivity; devices; digital skills of learners and teachers; content, language and accessibility; governance and funding arrangements; and monitoring of equity outcomes. Coding proceeded in two passes, first descriptive, recording what each document commits to, funds and assigns, and then interpretive, classifying each commitment by the level of the divide it addresses, following the distinction between material access, skills and use, and outcomes [4]. Claims in framework documents were treated as statements of intent, not of achievement, and were triangulated where possible against independent syntheses, notably the UNESCO Global Education Monitoring Report 2023 and the OECD Digital Education Outlook 2023, and against the peer reviewed literature cited throughout. The comparison is therefore a study of policy design rather than of programme impact, and its conclusions about effectiveness are inferences from design features and documented implementation patterns, stated with that caution.

RESULT AND DISCUSSION

1. What equity means inside the frameworks

The first finding is definitional, and it organises everything else. None of the four frameworks defines digital equity as the mere presence of technology, yet they differ in how far beyond presence their definitions travel. The United States plan is the most explicit. The National Educational Technology Plan 2024 structures its entire argument around three divides: a digital access divide in devices, connectivity, content and accessibility; a digital design divide in teachers' unequal opportunities to learn to design technology supported learning; and a digital use divide between students who use technology to create, explore and analyse and students who use it for passive consumption and digital worksheets [9]. The significance of this framing is easily missed. By naming design and use as divides in their own right, the plan refuses the assumption that closing the access divide closes the problem, and it locates two of the three gaps inside pedagogy rather than infrastructure. That is, in effect, the three level model of the research literature translated into administrative language [1], [4].

Estonia's strategy defines equity less by naming divides than by presuming a floor. In a system where all schools have been connected for two decades and digital services are a

normal part of citizenship, the Education Strategy 2021 to 2035 treats equity as the continued universality of digital competence, setting population level targets for basic digital skills and framing digital pedagogy as an entitlement of every learner rather than a remedy for some [10]. India's National Education Policy 2020 defines equity primarily as reach. Its digital chapter promises that technology will extend quality education to learners whom geography, language and disability have excluded, through broadcast, online and blended modes coordinated by a National Educational Technology Forum and delivered through platforms such as DIKSHA and the PM eVIDYA umbrella of television, radio and digital channels [11]. Indonesia's framework, articulated through the Merdeka Belajar reform programme, defines equity largely as equal access to the state's own platforms: a belajar.id account for every teacher and learner, the Merdeka Mengajar platform as a common professional home for teachers, and Rapor Pendidikan as a common evidence base intended to direct support to lagging schools [12]. Kenya's Digital Literacy Programme defined equity in the most material terms of all, as a tablet for every child in public primary schools, with teacher laptops, projectors and content servers completing the package [13].

These definitions are not interchangeable, and the differences matter for what policy can see. A reach definition can be satisfied by enrolment and broadcast coverage statistics even while skills and outcomes diverge. A floor definition can hide new divides, such as those opening around artificial intelligence tools, behind historically achieved universality. A three divide definition is the most demanding, because it obliges the state to measure things, such as the quality of student technology use, that administrative systems find difficult to observe. Hargittai and Hinnant's finding that young adults' online activities differ systematically by socioeconomic background, even at equal access, is precisely the phenomenon a reach definition cannot detect [14]. Livingstone and Helsper's gradations model makes the same point for children: inclusion is a continuum from basic access to confident, creative use, and policy that measures only the first step will declare victory at the point where inequality is merely changing form [15].

2. Access, connectivity and devices: the first level compared

On the first level of the divide, the frameworks divide into those consolidating a solved problem and those still fighting it. Estonia solved school connectivity as a deliberate act of state: the Tiger Leap programme, launched in 1996, combined computers, internet connection, teacher training and Estonian language courseware, and by 2001 every Estonian school was online; the current strategy therefore funds quality, renewal and fibre depth rather than first connection, and an OECD review of its digital education ecosystem describes a mature division of labour in which national systems handle data and identity while municipalities and schools procure learning tools [10]. The United States, despite its wealth, has not solved connectivity, because its problem is household rather than school access and rural last mile infrastructure; the 2024 plan consequently leans on coordination with broadband programmes and treats affordability and home access as educational variables, an acknowledgement that the relevant divide sits outside the school gate [9].

India and Indonesia confront first level problems at a different order of magnitude. India's answer is characteristic: compensate for missing connectivity with multiplicity of modes. PM eVIDYA deliberately bundles internet platforms with satellite television channels and radio, so that a learner without broadband is not, in the framework's intention, a learner without education; DIKSHA content is produced in dozens of Indian languages and

designed for low bandwidth contexts [11]. Indonesia's answer is platform centric and teacher first: connectivity programmes proceed through other ministries and school operational funds, while the education ministry's own digital strategy concentrates on accounts, platforms and content, distributing Chromebooks to schools in waves but treating the teacher platform ecosystem as the main equity instrument [12]. Kenya illustrates the risk in the device leg of this level. The Digital Literacy Programme delivered well over a million tablets to the great majority of public primary schools and trained tens of thousands of teachers, an undeniable logistical achievement, yet evaluations and reporting repeatedly found devices underused where electricity, connectivity, maintenance and teacher confidence lagged, so that the programme narrowed a device count gap faster than it narrowed any learning gap [13].

A further first level question, visible in all five cases, is who pays for the recurring cost of being connected. Device prices fall, but data prices, electricity, repair and replacement do not fall at the same speed, and they fall on different actors in each framework. Estonia absorbs most recurring costs inside public budgets, treating connectivity as part of the ordinary cost of schooling. The United States distributes the cost across federal broadband subsidies, state programmes and household budgets, which is why its access divide persists among low income families even in well equipped districts [9]. India shifts much of the cost to households but softens it with broadcast channels that cost the learner nothing at the point of use [11]. Indonesia leaves a substantial share with schools through operational funds and with families through personal data packages, an arrangement whose burden is invisible in national platform statistics. The material access research explains why these financing choices are equity choices: when the marginal cost of use is carried by the household, poorer learners ration their connection, share devices and study in shorter, more fragmented sessions, so the same nominal access produces systematically different amounts of learning time [3]. A tablet distributed without a connectivity budget, as the Kenyan experience shows, transfers the hardest part of the problem to precisely those least able to pay for its solution [6], [13].

The literature predicts exactly this pattern. Van Deursen and van Dijk showed that as physical access spreads, inequality migrates into the material conditions of access, such as whether a device is personal or shared, new or obsolete, connected without limit or rationed by data cost [3]. Warschauer's case studies, from Egypt to India, document programme after programme in which hardware arrived faster than the human and social resources needed to make it educational [6]. The frameworks that fare best on this dimension are therefore not those that promise the most devices, but those, like Estonia's original Tiger Leap design and the United States plan's treatment of home access, that budget for the complements of access: connection quality, maintenance, replacement cycles and the affordability of use outside school.

3. Skills, design and use: where frameworks thin out

The second level of the divide, skills and use, is where most frameworks become vague, and the comparison is unflattering in instructive ways. All four frameworks endorse digital skills for learners and digital competence for teachers. They differ sharply in whether skills are specified, sequenced and supported. Estonia embeds digital competence across the curriculum and pairs it with a long running teacher development architecture inherited from ProgeTiger and successor programmes, so that skills policy is a continuation of practice rather than a new announcement [10]. The United States plan is distinctive in assigning the design divide to the system rather than to individual teachers:

it argues that teachers' unequal access to professional learning, time and design support is itself an equity gap, which reframes low quality technology use in poor schools as a provision failure, not a teacher failure [9]. That reframing aligns with research showing that teachers' technology use is predicted less by personal enthusiasm than by their pedagogical beliefs and the professional learning structures around them [16], and with the finding that internet skills themselves are stratified by education and experience in ways that schooling can either compensate or reproduce [17].

India's policy specifies digital literacy ambitions and invests in teacher platforms and training at scale, yet the framework's centre of gravity remains content delivery; the skills of learners are addressed more as curricular intention than as a measured progression, and the diversity of state capacity means the same national text authorises very different local realities [11]. Indonesia's Merdeka Mengajar platform is, in design terms, the most interesting skills instrument in the comparison, because it treats teachers' professional learning, communities of practice and teaching materials as one ecosystem and has reached millions of teachers; its equity weakness is that participation presupposes the connectivity and device access that the most disadvantaged teachers lack, so the instrument can widen the very professional gap it exists to close unless offline and low bandwidth pathways are deliberately maintained [12]. Kenya's programme trained teachers in large numbers but largely in device operation, and its trajectory confirms that training counted in heads is not the same as capability built [13].

Scholarship on use sharpens the point. Van Deursen, Helsper and Eynon demonstrated that internet skills can be measured as a distinct capability that predicts the kinds of use people engage in, and that capital enhancing uses cluster among the already advantaged [18]. Robinson and colleagues describe information communication technologies as an amplifier of existing advantage unless institutions intervene in use, not merely in access [7]. The policy conclusion is uncomfortable: a framework that funds access generously and use weakly is, on the evidence, a framework for widening outcome gaps while narrowing input gaps. Of the cases examined, only the United States plan states this problem in its own text, and only Estonia has the accumulated teacher development infrastructure that answers it in practice.

4. Content, language and the shape of inclusion

Content is the dimension on which equity is most often promised and least often audited. Digital content decides whose language is a medium of learning and whose is a barrier, whose culture appears as knowledge and whose appears as folklore, and whether learners with disabilities encounter accessibility as a design standard or as an afterthought. India's framework is the strongest of the four on linguistic inclusion, at least in intent: DIKSHA's rationale of one national platform carrying content in the many languages of Indian schooling, together with sign language and accessible format commitments in the policy, treats language as core infrastructure rather than localisation detail [11]. Given that digital resources research has always insisted content and language are a distinct layer of access, this is a genuine design strength [6]. Indonesia faces a comparable challenge in milder form: Bahasa Indonesia provides a common medium, but early grade learning in many regions proceeds in local languages, and platform content produced centrally in the national language can quietly tax exactly the learners the platform was built to help [12]. Estonia's small language community forced early investment in Estonian language digital courseware as a matter of cultural survival, an equity decision taken inside the original Tiger Leap pillars [10]. The United States plan addresses content through accessibility

and culturally responsive design expectations, tying them to procurement, which is where such expectations acquire force [9].

Two risks recur. The first is that platform scale rewards standardisation, and standardised content drifts toward the language, examples and bandwidth assumptions of the centre. The second is that accessibility commitments remain declarative. Helsper and Eynon's critique of the digital native myth is relevant here: policy that assumes young people are uniformly fluent because they are young will underinvest in the explicit teaching of digital skills and in content designed for those starting furthest behind [19]. Correa's work on the participation divide adds that even where content consumption equalises, content creation does not, so a framework serious about equity must ask who gets to produce, and not only who gets to receive [20]. On this dimension the frameworks are best read as partial: India leads on language architecture, Estonia on native language provision, the United States on accessibility through procurement, and Indonesia, with its teacher generated content model inside Merdeka Mengajar, has an underrecognised asset in distributed production that partially answers the participation critique.

5. Governance, funding and the danger of digital by default

Governance decides whether equity commitments survive contact with budgets. Estonia's governance is ecosystems based: shared responsibilities between ministry and municipalities, national interoperability standards, and public digital infrastructure treated as a permanent operating cost rather than a project [10]. The OECD's comparative work on digital education ecosystems suggests this maturity is rare; most systems it surveyed still govern digital education as a collection of tools and pilots rather than as an ecosystem with assigned stewardship [21]. The United States plan governs by leverage within a federal structure, setting direction, defining divides and pressing states and districts to write equity into their own plans and procurement, while money flows through separate broadband and education programmes whose coordination the plan can urge but not command [9]. India governs by mission architecture: a national forum for expertise, national platforms as public goods, and states as implementers, a model whose equity performance depends on fiscal transfers and state administrative capacity that vary widely [11]. Indonesia governs by platform provision from the centre, with school operational funds expected to carry connectivity and device costs locally, which predictably advantages schools in fiscally stronger regions unless equalisation is built into the funding formula [12].

Running through these arrangements is a risk the literature names clearly. As public services and schooling become digital by default, those with the weakest access, skills and support face a compounding exclusion, because the analogue alternative withers as the digital channel becomes the assumed route [22]. Ragnedda's concept of digital capital captures the mechanism: digital competence and resources become a form of capital that converts into educational and economic advantage, so unequal digital provision does not merely reflect inequality, it manufactures more of it [23]. Schradie's study of the digital production gap shows the same conversion at the level of voice, where the already privileged dominate online production [24]. The World Bank's analysis of digital dividends reached the matching conclusion at global scale: the returns to digital investment concentrate where complementary institutions, skills and accountability are already strong, so technology expenditure without those complements widens rather than narrows national and social gaps [25]. Recent review evidence confirms that these mechanisms remain active across all three levels of the divide and are not artefacts of an

early internet era [26]. A framework's funding design is therefore an equity document in the strictest sense. Programmes funded as time limited projects, as Kenya's device rollout largely was, tend to strand schools with ageing hardware and no renewal budget [13]. Frameworks that fund connectivity, maintenance, teacher learning and content as recurring obligations, as Estonia does and as the United States plan recommends for state planning, encode equity as a standing commitment rather than a campaign.

6. Monitoring equity outcomes: the missing third level

The third level of the divide, outcomes, is where the comparison becomes most critical, because it is where almost every framework is weakest. The UNESCO Global Education Monitoring Report 2023, the most comprehensive independent synthesis available, found that technology in education is rarely evaluated for its equity effects, that evidence of benefit is concentrated in high income contexts, and that data on who is reached, who learns and who is harmed remain strikingly thin relative to the scale of public investment [27]. The OECD outlook similarly notes that few systems integrate their digital education data into equity monitoring, and that indicators cluster on inputs such as devices and connections [21]. Bulman and Fairlie's authoritative review of the economics literature reaches a congruent conclusion from the impact side: access programmes alone show small or null average effects on learning, while well designed software supported learning can help, which means a monitoring system that counts access cannot distinguish the interventions that work from those that merely distribute [28].

Against this background, the cases differ in degree. The United States has the richest data infrastructure and its plan explicitly calls for disaggregated monitoring of the three divides, though the homework gap literature shows that even there, measurement long lagged rhetoric [9]. Indonesia's Rapor Pendidikan is a significant institutional innovation, because it packages school level evidence, including infrastructure and learning outcomes, into a platform intended to guide planning and support; its equity value will depend on whether digital indicators inside it are disaggregated by region and school disadvantage and tied to resource allocation, rather than displayed as national averages [12]. Estonia monitors digital competence at population level and can therefore see its floor [10]. India's monitoring leans on enrolment and platform usage statistics, which measure the system's activity rather than its equity [11]. Kenya's programme reporting counted devices and trainings, the classic first level ledger [13].

The scholarly warning is consistent. Warschauer and Matuchniak, reviewing evidence on equity in access, use and outcomes, concluded that outcome equity is the level at which programmes are least often evaluated and most often assumed [29]. There is also a measurement trap that frameworks rarely acknowledge: the learners most affected by digital exclusion are the least visible in digital data. Platform analytics describe only those who succeeded in logging in, so a dashboard can report rising engagement while the excluded population, by definition absent from the data, grows more distant. Monitoring equity therefore requires instruments that do not depend on the technology being monitored, including household surveys, school census items on home connectivity and device sharing, and sample based assessments of learner and teacher digital competence of the kind Estonia uses at population level [10]. Without such instruments, a framework's evidence base is structurally biased toward good news, and the third level of the divide remains invisible to the very system responsible for closing it [27], [29]. Selwyn and colleagues, surveying the field's hopes and concerns, argue that the datafication of education creates new visibilities for managers while leaving the distributional questions,

who benefits and who is burdened, systematically underasked [30]. A framework that does not specify equity indicators at the level of outcomes has, whatever its language, defined equity downward to whatever it happens to measure.

7. Crisis lessons and the post pandemic settlement

The pandemic functioned as an involuntary audit of every framework, and the post pandemic documents can be read as settlements with what it revealed. Williamson, Eynon and Potter showed how emergency remote education was shaped by commercial platforms and policy improvisation, with equity rhetorically central and practically subordinated to continuity at any cost [31]. Teras and colleagues named the resulting pattern solutionism: a seller's market in which the urgency of crisis licensed procurement first and evidence later, a pattern whose costs fell on the least connected learners [32]. Czerniewicz and colleagues, writing from the South African experience, described emergency remote teaching as a wake up call in which the digital divide stopped being an abstraction and became the daily arithmetic of data costs, shared devices and quiet rooms [33]. The frameworks examined here each carry a mark of that audit. The United States plan's three divide architecture is a direct codification of pandemic lessons [9]. India's multi mode PM eVIDYA design, retaining television and radio as first class channels, encodes the lesson that the most inclusive technology in a crisis may be an old one [11]. Indonesia's platform consolidation and device distribution waves were accelerated by school closures and retain a crisis logic of rapid universal provision [12]. Estonia, least disrupted, illustrates the counterfactual: systems that had normalised digital learning before the crisis experienced it as inconvenience rather than rupture [10].

The comparative lesson is that resilience is an equity property. A system in which digital learning depends on household wealth is a system that will fail its poorest learners precisely when it is needed most, and a framework that treats low technology fallbacks, offline functionality and broadcast channels as legitimate components of digital strategy, as India's does, is not being nostalgic. It is insuring equity against the conditions under which equity is most often lost.

8. Design principles for Indonesia

Indonesia is the case to which this comparison is addressed, and its conditions discipline every transfer. It is an archipelago of more than seventeen thousand islands, with connectivity quality that falls steeply outside Java, hundreds of local languages in early schooling, a teaching force of millions with widely varying digital confidence, and decentralised education governance in which districts carry much of the delivery burden. Principles drawn from the comparison must therefore be stated as design commitments, not as imports. Seven follow from the analysis.

First, define equity at all three levels in the framework text itself. Indonesia's digital education policy should name access, design and use divides explicitly, following the United States plan's example, so that programmes can be held to account for skills and use and not only for accounts created and devices delivered [9]. Second, fund the complements of access as recurring obligations: connection quality, data affordability for learning, maintenance and replacement, following the material access evidence that the quality of access, not its bare existence, is where inequality now concentrates [3]. Third, treat teacher design capacity as an equity budget line, expanding Merdeka Mengajar with protected time, school based mentoring and certified progression, since teachers' pedagogical design capability is the mechanism by which access becomes learning [16].

Fourth, build low bandwidth and offline first requirements, plus broadcast and print fallbacks, into platform procurement, on the Indian multi mode evidence, so that the least connected regions are the design baseline rather than an exception [11]. Fifth, make language and accessibility auditable standards in content procurement, including early grade local language materials and disability accessibility, rather than aspirations in a foreword [6]. Sixth, wire Rapor Pendidikan to resource allocation: publish digital equity indicators disaggregated by district and school disadvantage, and let them move money, because monitoring that does not reallocate is decoration [27], [21]. Seventh, protect an analogue guarantee and a participation pathway: no child's schooling should depend entirely on a household connection, and teachers and learners in remote regions should be producers of content and not only its recipients, guarding against both digital by default exclusion and the production gap [22], [20].

These principles are deliberately unglamorous. Van Dijk's closing argument in his later synthesis is that digital inequality is a moving target that policy must track continuously, because each solved divide reveals the next [34]. Williamson and Eynon's history of artificial intelligence in education adds a forward warning: the next divide is already forming around data and algorithmic tools, and frameworks written now will decide whether AI supported learning becomes an equaliser or the most efficient sorting machine education has ever possessed [35]. Indonesia's framework, revised with equity defined at three levels, funded at the level of complements, and monitored at the level of outcomes, would be positioned to answer that question on its own terms.

CONCLUSION

This comparison of the digital education policy frameworks of Estonia, the United States, India and Indonesia, read against the Kenyan device programme and the three level model of the digital divide, shows that digital equity is decided less by how much technology a framework promises than by where in the sequence from access to outcomes its definition of equity stops, and by whether its funding, governance and monitoring follow its definition to that point. Estonia demonstrates what a solved first level and an ecosystem approach make possible, the United States demonstrates the analytical power of naming access, design and use as distinct divides, India demonstrates the equity value of multi mode and multilingual provision at scale, and Indonesia possesses, in its teacher platform ecosystem and its school evidence platform, two instruments of genuine comparative strength whose equity potential is limited mainly by connectivity complements, design capacity and outcome level monitoring. The transferable lesson for Indonesia and for comparable systems is therefore precise: define equity at all three levels, fund the complements of access as permanent obligations, build teacher design capability as equity infrastructure, design for the least connected first, and measure outcomes disaggregated by disadvantage with indicators that are wired to resource allocation, because a framework that does these things treats digital equity as a property of the whole system, while a framework that does not will continue to connect schools and call the connection equality.

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