unesco
Global Education
Monitoring Report

Paper prepared for the
Global Education Monitoring Report

2021 GEM Report Fellowship

Assessing the Impact of ICT Integration Policy on the Equitable Access to Quality Education in African Contexts: the case of Kenya

EMMANUEL MANYASA

2022

ABSTRACT

Kenya had been implementing a policy of integrating ICT into education for seven years prior to the COVID-19 pandemic. The pandemic forced a moment of reflection on this policy and exposed challenges in realizing its stated objectives with studies revealing a wide digital divide that follows traditional inequity cleavages. This study used both primary and secondary, quantitative and qualitative data to analyse Kenya's ICTs in education policy, highlighting the gaps in its implementation, and the impact of such gaps on the achievement of its stated goals and outcomes.

It arrived at several conclusions. First, the enacted ICTs in education policy has mutated over the years, making effective targeting of interventions and overall measurement of achievement difficult. Second, the implemented policy departs significantly from the enacted policy. Third, the shifts in policy goals and implementation structures have been motivated more by politics rather than lessons from implementation evaluation. Fourth, political discourse influencing may be more important than policy influencing in delivering beneficial changes in education in Kenya. Fifth, the consequence of ineffective implementation is the use of ICTs in education enhancing pre-existing geographic & socio-economic inequities contrary to the expectations.

The study has made four recommendations. First, minimization of policy fluidity by envisioning its changing ecosystem at inception to avoid persistent tweaking. Second, engaging robustly in political discourse influencing in favor of policy stability to enable proper targeting of interventions and measurement of progress. Third, inbuilding policy implementation with affirmative mechanisms to avoid the policies maintaining and/or exacerbating pre-existing disadvantages. Fourth, engaging in political discourse influencing during political transitions to elicit education policy-relevant dialogue between the political class and citizens with respect to changes in education.

This work has been made possible by the generous support of the GEM Report through the GEM Report 2021 fellowship granted to me. I thank the GEM Report team led by the Director Dr. Manos Antoninis for this opportunity. I'm indebted to my mentor, Dr. Priyadarshani Joshi for unrivaled generosity and patience throughout the development of this study report. I thank the other members of the GEM Report fraternity for their generous contributions to this study and my colleagues in the 2021 fellowship cohort for moral support through the process.

TABLE OF CONTENTS

1. Introduction

The onset of the COVID-19 pandemic threw most countries into a spin, exposing a level of systemic dysfunction never imagined before. Specifically, the pandemic exposed wide gaps between what governments promise to do by way of policy, and what they actually do and achieve. In no sector has this been demonstrated more than the education sector, where the pandemic-enforced closure of schools left stakeholders clutching at straws to support learning continuity. Kenya, like many other countries, was caught off-guard occasioning multiple, uncoordinated responses from a multiplicity of actors that proved barely effective in promoting access to learning continuity (Republic of Kenya, 2020a). The interventions, most of which relied on the available information and communications technology (ICT) platforms reached only 22% of the school-going children (Uwezo, 2020).

Prior to the pandemic, Kenya had been grappling with many other challenges in the education sector (JICA, 2012; Kamau, 2014; Republic of Kenya, 2019a). For decades, education reforms in the country have focused on addressing several interrelated concerns in the sector: "…access, retention, equity, quality and relevance, and internal and external efficiencies within the education system." (Republic of Kenya, 2005:3). Kenya has pursued ICT in education policies and strategies as part of the solution to these persistent problems (CESA, 2017; Nyagowa et al., 2012; Republic of Kenya, 2012). Yet pursuit of ICTs in education policies is also driven by the fact that the concept of literacy is evolving in the 21st century just as it did in the 20th century when reading to gain knowledge first became an important marker of literacy. This time it is evolving to include "…the skills and abilities that will enable citizens to function in an increasingly technological world." (ETS, 2007: 14).

Kenya has come a long way implementing programs and projects to integrate ICTs in education as both a solution to the problems bedevilling the sector, and a strategy to achieve the national and global goals of education (Farrell, 2007a; Piper, et al. 2015; Republic of Kenya, 2006b). The country has recorded significant progress from the pre-2005 era when limited access, lack of ICT teachers, gender disparities, high costs of ICT components and limited access to electricity greatly hampered adoption of ICTs in the education sector. In 2006, the level of access to ICTs in the education sector varied by sub-sector, with ratios of 45 university and colleges students to one computer, 120 secondary school students to one computer and 250 primary school pupils to one computer (Republic of Kenya, 2006b). These statistics have since changed (Republic of Kenya, 2020a; USAID, 2020). ICT has moved from being a skill to be imparted to prepare learners for the emerging information-based economy (ETS, 2007; Gündüz, 2010; Republic of Kenya, 2005), to becoming an important building block of "*connectivism*" – which recognizes the fact that learning is a lifelong experience (ETS, 2007; Siemens, 2005).

ICT is now recognized in Kenya and across Africa, as an essential governance, and teaching and learning tool (CESA, 2017; Department of Education (DOE), 2004; Republic of Kenya, 2017), hence drawing investments in its promotion (World Bank, 2011). Investments are further fuelled by the recognition that inadequate ICT integration in education inhibits inclusion of learners with special needs (UNESCO, 2020), and encourages institutions within the sector to operate in silos to the detriment of efficient sector wide governance and management. For instance, the Teachers Service Commission (TSC), Kenya National Examinations Council (KNEC) and the Ministry of Education (MoEd) maintain overlapping school level data with separate school codes for the same school, making it difficult to harmonize the data sets (Republic of Kenya, 2017).

The role of technology generally, in teaching and learning, however, dates back to the invention of the printing machine in 1450. The invention revolutionized education, which had mainly been the responsibility of parents and other family members, with knowledge imparted through apprenticeship (Collins and Halverson, 2009). The traditional model of education was such that learning from someone required physical contact. With population growth and changing lifestyles, this model had become incapable of meeting societies' educational needs. The invention of the printing machine duly altered this model of education. The photocopier, invented in 1959 augmented the gains made by the printing machine enabling faster mass production of learning materials and thus wider circulation. These inventions expanded opportunities for learners to access knowledge generated by people far removed from them in time and space, which in turn heralded the introduction of schooling as is currently known.

Technological advancements have accelerated in recent times, with wide-ranging implications for education both by way of agenda-setting in the sector (CESA, 2017), and direct impact on the actual teaching and learning (Farrell, 2007a; Piper et al. 2015; Siemens, 2005). The ICT explosion in recent years has made learning from far-off people/sources possible in real-time (Collins and Halverson, 2009; Tinmaz and Ozturk, 2019). This has in turn

made harnessing "…the capacity of ICT to improve access, quality and management of education and training systems" one of the East African region's strategic objectives (CESA, 2017:7).

Ideally, the ability to connect to teachers who are far removed from the learner should help learners in historically marginalized regions of the world, and within countries to access the best learning materials and teaching services, and thus improve equity in access to quality learning (Fu, 2013; Republic of Kenya, 2019b). But the ICT revolution has also attached a time value to knowledge, rendering most of it obsolete as fast as new knowledge is generated and shared. This attribute of ICT makes it a threat to equity in education between societies that find themselves on the opposite sides of the technology frontier, and within societies based on historical markers of marginalization and disadvantage (DOE, 2004). Indeed ETS (2007:5) underscores the fact that "…the ability to adopt ICT varies substantially across countries and within communities." For instance, while the Republic of Korea is in the highest level of ICT proficiency – creation (Jeong, 2020), most developing countries like Kenya are still grappling with the ICT integration stage, which according to Tinmaz and Ozturk (2019) is two levels behind the Republic of Korea's level. Gündüz (2010) has demonstrated that the divide can exist within one country, with similar effect of marginalizing those on the periphery of technological progress.

The implication of these rapid changes in the way in which learning happens is that teaching and learning is increasingly tied to access to ICT resources, including ICT proficient teachers. This fact may have informed the Kenya government's decision to prioritize mainstreaming ICTs into the teaching and learning process (Farrell, 2007a; Republic of Kenya, 2006b; Republic of Kenya, 2017). Both MoEd and Ministry of Information and Communications' policies highlight the need to make ICT a platform for improved efficiency in the delivery of education, while simultaneously making the teaching and learning space a hotbed for ICT skills acquisition. Significant government investments that include bilateral and multi-lateral donor contributions have been channelled into the pursuit of this broad objective (Republic of Kenya, 2020a; USAID, 2020; World Bank, 2011).

Kenya is one of the 17 African countries that participated in the New Partnership for Africa's Development (NEPAD) e-School Demonstration (Demo) project. The e-School Demo sought to accrue a body of knowledge, based on real-life experiences of implementing ICTs in schools across the African continent to inform the rollout of the NEPAD e-Schools Initiative (Farrell, 2007a). The Demo was implemented by consortia of international private partners and helped the host countries to appreciate the opportunities and challenges in integrating ICTs in education. Indeed, post the e-School Demo, Kenya has invested significantly in integrating ICTs in education (Nyagowa, et al. 2012).

Pre-pandemic therefore, a lot was thought to be happening along the path of integrating ICTs in education in Kenya. The onset of the COVID-19 pandemic, however, brought to the fore a different picture. The pandemic challenged education sector stakeholders to leverage technology to promote learning continuity across the country. The government, through the Kenya Institute of Curriculum Development (KICD), began running primary and secondary school lessons on radio and TV soon after closing schools in March 2020. It also promoted digital learning by expanding access to and strengthening the Kenya Education Cloud (Republic of Kenya, 2020a). Several civil society organizations (CSOs) and private sector actors on the other hand launched a variety of other interventions. Some schools used text and WhatsApp messages on mobile phones and emails to send assignments to their learners and receive the answers for marking and feedback. Social media platforms, including Facebook were also deployed (Republic of Kenya, 2020a).

These efforts while seeking to ensure learning continuity, only served to highlight a sobering reality check on the gaps between what Adams et al. (2001) define as the rhetorical, the enacted and the implemented policies. In this analysis, rhetorical policy refers to the broad statements of ICTs in education goals found in key addresses of senior government leaders. Enacted policy refers to the authoritative statements, decrees or laws that set standards and direction on ICTs in education. Implemented policy refers to the enacted ICTs in education policies, both original and modified, as they are being translated into actions through systemic, programmatic and project-level changes.

This study focuses on the gap between the enacted and implemented ICTs in education policy and raises the question as to whether the country's ICT in education policy was properly conceived, developed and implemented (UNESCO, 2011). According to UNESCO's strategy for ICT in education presented for discussion at UNESCO High-Level Policy Forum on ICT and Education for All, on 10-11 June, 2013, effective implementation of ICT in education is underpinned by the following five factors:

- Well-developed policies and implementation plans.
- Adequate ICT equipment in terms of student to computer ratio.

- Availability of television sets and radios for education purposes in the school.
- Availability of teachers trained to use ICT.
- Well-established internet and computer infrastructure.

This paper therefore uses the approach proposed by UNESCO (2013) to analyse the implementation of Kenya's ICT in education policy to determine implementation gaps, and the impact of such gaps on the achievement of its stated goals and outcomes.

The remainder of this paper is organized as follows: section 2 presents a review of literature, with three subsections, 2.1 to 2.3 under which historical perspective of ICT in education, ICT integration in education policy and practice, and ICT integration policy in Kenya are reviewed respectively. Section 3 highlights the research questions. Section 4 discusses the data sources. It has two sub-sections 4.1 and 4.2 under which secondary and primary data, and data sources are discussed respectively. Section 5 elucidates the methodology. It has four sub-sections, 5.1 to 5.4 under which data collection methods; study design; data analysis and interpretation; and the analytical framework are discussed respectively. Section 6 presents the findings. Section 7 summarizes the policy relevance, which is followed by conclusions, recommendations and acknowledgements.

2. Literature Review

2.1. The evolution of information communications technology in education

Technological advancements have since times immemorial played a significant role in educational transformation. The invention of paper in 150 AD made it possible for knowledge to be written down and therefore shared between people removed from each other in time and space. The invention of the pencil in 1795, accelerated the pace at which information and knowledge could be written down and either preserved or disseminated for educational purposes. The pencil was followed by the Magic Lantern, which projected images printed on glass plates before the chalkboard was invented in 1890.

del Campo et al. (2012), considers the chalkboard, slide projector, overhead projector, opaque projector, flip chart, white board, television and video, video projector, electric and smart white board, and network resources among the technologies that have brought significant instructional value. The chalkboard allows deleting and overwriting but with no option of going back. The slide projector brought the ability to turn back to the previous slides. The overhead projector enabled painting on the transparency. The opaque projector made it possible to project any material without prior preparation. The flip chart introduced dynamism. The white board added cleanliness to the capabilities and characteristics of the chalkboard. The television and video are close to the learner and can show the physical reality (photos and videos). The video projector added quick switching between multiple media (video, DVD and PC), to the capabilities of the television and video. The electric and smart whiteboard introduced the ability to paint over slide, photo or video. While network resources have capability to show instantly updated information and is more learner-centred and friendly (del Campo, 2012).

Not included in del Campo's list are the radio, which was invented in 1920 and sparked on-air learning; the Skinner Teaching Machine that combined teaching and testing; the photocopier that allowed mass production of teaching materials; and the Scantron system of testing that enabled teachers to grade tests faster and more efficiently. The introduction of the personal computers in 1981, the World Wide Web in 1990 and the subsequent authorization of commercial use of the internet in 1993 by the National Science Foundation opened limitless possibilities for ICTs in education. Social media platforms such as Myspace, Facebook and Twitter, established in 2003, 2004 and 2007 respectively have increasingly become important instructional tools, with a number of groups on these platforms proving important sources of academic and technical support. In Kenya, these platforms as well as WhatsApp were instrumental in enabling teachers to support learning continuity of their learners during the COVID-19 pandemic-enforced school closures (Republic of Kenya, 2020a; Uwezo, 2020).

The recent global economic paradigm shift from mass production and consumption of standardized goods to "…customized creation, sharing and use of new knowledge by a large, diverse, and distributed population…" has direct and significant implications for changes in education policy (UNESCO, 2011:20). Whereas the traditional education model of mass production with hierarchical structures has endured past technologies, the recent, more sophisticated applications are starting to disrupt it. New "ICT capabilities support a model of education in which knowledge creation and learning how to learn are both processes and goals." (UNESCO, 2011:21). Even as the role of ICTs in education expand on the back of new applications, it is important to note that ICTs in

education is a demand-driven phenomenon. The new socio-economic order is demanding new responses from education and ICTs are only helping the education sector to respond appropriately (UNESCO, 2011).

Implied by UNESCO (2011), but also discussed by (Collins and Halverson, 2009) is the fact that the traditional model of education is designed to preserve itself in the midst of all the revolutionary changes driven by technology. This complicates the already challenging task of implementing ICTs in education policy, given that the primary actors – teachers, are steeped in an anti-change tradition. Implementation of ICTs in education policy thus requires transforming teachers' mind-sets. It also requires consideration of the fact that different groups of actors and beneficiaries are at different levels of technology adoption. While some are at the cutting edge (Jeong, 2020), some are many decades behind in access and use of ICTs in education. This difference may not just be between countries, but within countries too.

2.2. ICTs integration in education policy and practice

2.2.1. The role of ICTs in education

The origins of ICT use for teaching and learning can be traced back to the work of Feurzeig, Papert, Bobrow, Grant and Solomon, in 1965 when they came up with the idea of a high-level conversational programming language specifically designed for children (UNESCO, 2012). Adoption of ICTs in education has since followed different paths in different countries and regions. Overall, however, ICTs are increasingly playing a critical role in education. They assist students in accessing digital information efficiently and effectively; drive pedagogical changes in favour of student-centred and self-directed learning; produce a creative learning environment; promote collaborative learning in a distance-learning environment; offer more opportunities to develop critical thinking skills; improve teaching and learning quality; and support teaching by facilitating access to course content (Fu, 2013).

Importantly, integrating "disruptive technologies" in teaching and learning helps to narrow the "…disconnect between students' digital lives outside of school and their experiences in classrooms" (Nowell, 2014: 111). This may help to lay their foundations for lifelong learning, which is a key goal of education (Parvin and Flint, 2015). ICTs help teachers to "…build relationships, extend classroom learning online, tackle the digital divide, and to teach twenty-first century literacies and other life skills." (Nowell, 2014: 119). ICTs play a key role in the training of pre-service teachers by offering multimedia simulations of good teaching practices, delivering individualized training courses, connecting individual teachers to a larger teaching community on a continuous basis, and promoting teacher to teacher collaboration (Ratheeswari, 2018). Indeed, Collins and Halverson (2009) consider ICTs to be at the core of the currently ongoing transformation of education that seeks to customize knowledge for the learners, make learning interactive and give the learners more control of their education.

These benefits make the use of ICTs a key cog in the realization of the promise of education for learners, who must acquire new forms of literacy, including digital literacy or perish (Nowell, 2014). In the light of the clear benefits, and inadequate understanding of the growing importance of existing and emerging ICTs and their relationship to literacy, the Educational Testing Service (ETS) convened an international panel comprising of experts from education, government, non-governmental organizations (NGOs), labour, and the private sector in January 2001 to study the phenomena (ETS, 2007). The panel defined ICT literacy as "…using digital technology, communications tools, and/or networks to access, manage, integrate, evaluate, and create information in order to function in a knowledge society." It also defined a digital divide as "…the absence of equity in the access to and opportunities to learn how to use ICT" (ETS 2007: 2).

Related to the concept of ICT literacy is the concept of 'information literacy'. Developments in technology have helped to crystalize the concept of information literacy and solidified its role in learning (Hinchliffe, 2003). Information literacy is defined by the Final report of the American Library Association Presidential Committee on Information Literacy of 1989 as:

> "*To be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information*" (Hinchliffe, 2003).

Access to and proficiency in the use of ICTs is critical for one to participate and prosper in the new information-based society (GÜNDÜZ, 2010). ICT literacy is also at the core of the envisioned new model of education that ensures a lifelong learning experience (Driscoll, 2000). In an information-based society, ICT literacy is the only

way by which education can effectively contribute to what Amartya Sen considers the ultimate goal of societies' development - human freedom, attained through enhanced capability to be and to function (Sen, 1999).

Yet ICTs are also causing upsets in the education systems around the world and challenging established norms and traditions (Collins and Halverson, 2009). In fact, Collins and Halverson (2009) consider the notion of school to be intrinsically in conflict with use of ICTs in teaching for a variety of reasons: first and foremost, technology seeks to give the learners more control over what they learn, which takes away control from the teachers, who are expectedly, reluctant to give up what the traditional school system offers. Secondly, the notion of the school is one in which learners are required to meet a set of common attainments through which the school and learners are evaluated and their performance documented, while ICTs seek to enhance customization.

Thirdly, the schooling enterprise is founded on the notion of a teacher as the expert from whom learners get knowledge. This expertise is the teacher's main instrument of authority and prestige. Yet digital media introduces a variety of sources of knowledge for the learner, which teachers see as an affront to their position and authority not just among learners, but in the broader society too. According to Gee (2010) cited in Nowell (2014:35), teachers, parents, and administrators appeared fearful that more technology may erode the hierarchical structure of schools, which may cause power struggles among these key actors (Buckingham, 2007).

Fourthly, the school emphasizes knowing content while technology emphasizes knowing how to find the content available in a multiplicity of sources. In the ICT era, knowing where to find information is more important than knowing the content given the fast-changing needs for knowledge. Fifthly, the school emphasizes learning by assimilation while technology places weight on learning by doing. And finally, schooling is designed to teach people everything they might need to know to carry themselves through life, while ICTs support what Postman and Weingartner (1969) call a subversive approach to teaching - the "learn what you need when you need it" approach to learning (Collins and Halverson, 2009).

Ultimately, one of the main aims of ICTs integration in education is to enable the education system to turn learners into what Prensky (2001) calls "digital natives". But to raise digital natives, one must first naturalize "digital immigrants" in the name of teachers and school administrators through training and equipping them appropriately. This argument is supported by Carr (1998) who argues that information illiterate teachers cannot prepare their students to be information literate. Given these realities, the main task for policymakers and implementers in education is to manage the disruptive effects of ICTs in order to optimize both their adoption and benefits in promoting learning (Ertmer and Otternbreit-Leftwich, 2010; ETS, 2007).

2.2.2. Factors influencing adoption of ICTs in education

It is accepted that adoption of ICTs in education generally and in teaching and learning in particular, is an inevitable eventuality given their indispensability to life in the emerging information age (CESA, 2017; ETS, 2007; Farrell et al., 2007). The question to grapple with is why the progress in ICTs adoption does not reflect their general acceptance (Collins and Halverson, 2009; UNESCO, 2011). Fu (2013) delineates a mix of external and internal factors that influence the progression or effectiveness of ICT integration in teaching and learning in schools. The external factors "…include technology availability, accessibility of ICT equipment, time to plan for instruction, technical and administrative support, school curriculum, school climate and culture, faculty teaching load and management routine, and pressure to prepare students for national entrance exams" (Fu, 2013: 117). Equally important is fact that the proponents of using technologies in education promise beyond what technology can actually deliver (Postman, 1995).

The internal factors on the other hand include "…understanding of ICT use; beliefs about ICT; attitudes towards technology integration; perceptions, including intention or motivation to use ICT; self-confidence and knowledge; technology skills; readiness to use ICT; and technology self-efficacy." (Fu, 2013: 118). While distinct, the external and internal factors impact each other in ways that cause their interaction to enhance or inhibit ICT integration in schools. For instance, the culture of the school may impact a teacher's attitude towards ICT integration either positively or negatively, thus making the teacher more or less inclined towards use of ICTs in the classroom.

Effective implementation of ICT in education requires well developed policies and implementation plans (UNESCO, 2011), adequate ICT equipment in terms of student to computer ratio, availability of television sets and radios for education purposes in the school, availability of teachers trained to use ICT and a well-established internet and computer building infrastructure (UNESCO, 2013). Many other barriers, however, stand in the way of the adoption of ICTs in education use (Fu, 2013). These barriers can be grouped into three broad categories based on the perceptions of teachers, students and administrators.

From the teachers' perspective, the barriers include: limited knowledge and experience of using ICTs in teaching (Honan, 2008; Ertmer and Otternbreit-Leftwich, 2010); absence of clear goals for ICT use in schools (Al-Bataineh et al., 2008); pressure to improve scores on national examinations; lack of technical and financial support (Liu and Szabo, 2009); challenges associated with classroom management in contexts of large class sizes (Tezci, 2011); and the school system's overemphasis on teaching technical or operational skills rather than course content (Lim, 2007). From the students' perspective, constraints include: lack of access to ICT devices (Norris and Soloway, 2009); the school system that precludes access to and use of what are considered disruptive ICT devices (Nowell, 2014); and mobility, special needs, and anxiety over standardized test results (Frederick, Schweizer and Lowe, 2006). From the administrators' perspective, the challenges include: absence of a strong analogue foundation (World bank, 2016); cost of acquisition and maintenance of ICT equipment (Norris and Soloway, 2009); lack of appropriate administrative support for the effective use of ICT (Lim, 2007); and examinations oriented administrative mandates that shift the focus away from using ICTs to engage learners in higher-order thinking activities (Goktas, Yildirim and Yildirim, 2009). The three broad constraints together underpin the incoherent understanding of what needs to be done by the three most critical actors to unleash the full potential of ICTs in education.

ICT integration, however, won't have the desired effect unless it is accompanied with implementation of student-centred classroom practices (Fu, 2013). It needs to be combined with diverse teaching methods and approaches, especially constructivist practices, to yield the required learning outcomes. This is only achievable when there is a teaching staff that is ICT literate, well-motivated and sufficiently supported to integrate ICTs in teaching (Honan, 2008; Liu and Szabo, 2009). The teacher motivation and support imperative is in alignment with the assertion by the World development report 2016, that a "digital revolution requires a strong analogue foundation" (World Bank, 2016). Similarly, Pisapia (1994:2) argues that "…technology is used as a vehicle of expression, communication, or analysis as opposed to an activity isolated from the main purpose of the class". This makes the teacher a key driver of ICT integration into the learning process.

Yet teachers are influenced by their own goals and accustomed practice, culture of their community and school, and their own interpretations of the information they receive about new approaches in adopting innovations (Ertmer and Otternbreit-Leftwich, 2010; Pisapia, 1994). Teachers use technology in a variety of ways, ranging from drill and practice, to problem-solving and productivity tools. In making instructional decisions they depend on "…their knowledge of possible uses, availability and ease of use of the technology, and their instructional philosophy." (Pisapia 1994:2). This point is critical for the ICTs in education policy implementers, who must factor in strategies to align the policy expectations with the teachers' interests and circumstances to enhance adoption. Where the circumstances and teachers' interests diverge from the policy's expectations, investments in changing them ought to be made. For instance, Becker (1992) cited in Pisapia (1994) found the presence of a social network of computer-users in schools to drive more teachers into using computers, as compared to schools where such networks were missing. Investment in sufficient infrastructure and skills among significant numbers of teachers in schools is therefore critical in driving ICTs adoption for teaching and learning.

Collins and Halverson (2009) point out several tensions between schooling and use of ICTs that contribute to slow adoption of ICTs. They include: uniform learning embodied in the notion of a mass-production (UNESCO, 2011) of uniform learning that underlies traditional schooling vs. customization; teacher as the unique source of knowledge for the learners vs. diverse knowledge sources; standardized assessment of learning vs. specialization; knowledge accumulation vs. reliance on outside resources; coverage of what learners need for the rest of their lives vs. learning to learn; and learning by acquisition of whatever knowledge exists vs. learning by doing.

ETS (2007) raises three critical questions with significant implications for policy as efforts to promote ICTs in education intensify:

1) Do the corporates involved in the push to incorporate ICTs in various educational applications have interests other than expanding access to education?
2) Is the use of ICTs in education narrowing or broadening the digital divide?
3) Is the expansion in access to ICTs happening at the expense of effective education?

These questions, it may be argued, contribute to the challenges faced by those promoting adoption of ICTs in teaching and learning to the extent that they raise doubts about the true motivation of the push to integrate ICTs in education while also pointing to their possible adverse effects. To answer these questions, and pave way for faster integration of ICTs in education, ETS (2007) recommended three interventions:

1) Conducting large scale assessments and public policy research to inform policy makers, educators, and industry in their effort to broaden people's access to and fluency with new technologies, and guide government investments, education curricula, and philanthropy.
2) Developing specific diagnostic assessments focusing on the measurement of ICT literacy, or on the capacity of individuals to develop it.
3) Developing and implementing an integrated IT curriculum as opposed to single focused, stand-alone curricula to ensure improved ICT literacy.

2.2.3. ICT in education policies and practice

Policies generally play an essential role in facilitating progress towards achievement of the desired transformation of the education systems. Though not sufficient, policies, especially in the initial stages, "…provide a rationale, a set of goals, and a vision of how the education system might look with the introduction of change, and how students, teachers, parents, and the general population might benefit from these changes in schools." (UNESCO, 2011: 30). ICT in education policies are rooted in the socio-economic factors of the country, as illustrated by the notion of a "knowledge ladder" that helps policymakers to envision how educational transformation may progressively happen. The knowledge ladder encompasses four alternative approaches ranging from basic education, to knowledge acquisition, knowledge deepening and finally knowledge creation (UNESCO, 2011).

The knowledge ladder may only be one of the variables in the policymakers' equations when designing their policies. Other considerations come into play, including political and educational interests (UNESCO, 2011). On this basis, different countries have developed different ICT in education policies that have translated into different implementation practices (Chun, 2018; DOE, 2004; Farrell et al., 2007, 2011; Jeong, 2020; UNESCO, 2011). Uruguay for example, has its ICT in education policy based on political, educational and technical considerations in that order (UNESCO, 2011). South Africa has its ICT in education policy founded on the system-wide approach that recognizes the need for policy reforms to happen beyond the education sector to achieve ICTs' educational goals (DOE, 2004).

The Republic of Korea launched its Self-directed, Motivated, Adaptive, Resource-enriched, and Technology-embedded (SMART) Education initiative in 2011. The initiative's main goal was to digitalize educational contents by 2015 to reflect modern changes of the 21st century and to utilize ICT as a primary medium of learning. According to Chun (2018), the initiative featured five major tasks:

1. Expanding and developing digital textbooks including based on smart learning model;
2. Facilitating online classes from afterschool programs to university-level programs and building an online assessment system;
3. Creating a free and safe setting for educational contents through developing legal frameworks, ICT infrastructure and an eco-system for sharing contents;
4. Promoting teacher training of the SMART education; and
5. Establishing the infrastructure of the foundation for cloud educational services in schools as well as a platform to share educational contents.

The SMART Education initiative was a foresighted model grounded in proper understanding of the weaknesses of the Korean education system that it needed to correct before advancing forward (Jeong, 2020). The Initiative sought to correct the historical focus of the Korean education system on cognitive skills at the expense of 'connective' skills that emphasize on character or creative education (Postman and Weingartner, 1969). It also addressed the concerns of teachers, including the fear of exposure to harmful websites and deterioration of physical functions such as eyesight and neck. This paved the way for the Korean government to establish an eco-system that supports students, teachers and parents, and promotes partnerships with local government and the private sector e.g. the SMART education platform (Park et al, 2013; UNESCO, 2019).

The Korean model offers three critical lessons in ICT integration in education: the need to gather visions, goals and strategies of diverse stakeholders to develop a shared agenda for promoting ICT skills for the future generations; allowing schools space to provide more tailored education programmes; and prioritizing teacher development (Jeong, 2020).

South Africa has built its ICT in education policy on four principles: equity; access to infrastructure; capacity building; and norms and standards (DOE, 2004). The policy recognises the fact that "Technology tends to amplify advantage." (DOE, 2004:23) and deliberately embraces the principle of equity in its approach to provide an

alternative basis for supplying access to information and the allocation of resources. It also points out the primacy of access to infrastructure (hardware, software and connectivity) by the end-users (learners, teachers, managers and administrators), without which the desired impact and effectiveness of ICTs would not be realized.

Knowing how critical teachers' competencies in ICTs are to ensuring successful ICT integration in education, the policy prioritizes staff development and support, making ICTs central to the pre-service training of recruits as well as in continuing professional development of practising teachers. It pursues the goal of ensuring that all teachers, managers and administrators in General and Further Education and Training acquire the knowledge, skills and support they need to integrate ICTs in teaching and learning. The policy also establishes standards for professional competency in ICT utilisation that considers five competencies within an outcomes-based paradigm as follows:

- "***entry*** - computer literate, able to use computers and teach learners to use computers;
- ***adoption*** - able to use various technologies, including the computer, to support traditional management, administration, teaching and learning;
- ***adaptation*** - able to use technology to enrich the curriculum and use integrated systems for management and administration;
- ***appropriation*** - able to integrate technology into teaching and learning activities, and use integrated systems for management and administration within a community context; and
- ***innovation*** - prepared to develop entirely new learning environments that use technology as a flexible tool, so that learning becomes collaborative and interactive. Technology is integrated as a flexible tool for whole-school development." (DOE, 2004:25).

To protect users and guarantee durability of the envisaged changes through ICT in education, the South African government created national standards for ICTs in teaching and learning to clarify compliance requirements, responsibilities and implementation mechanisms (DOE, 2004). The standards cover teacher development, content, connectivity, hardware, software and community engagement in the areas of: teacher competencies; educational soundness of electronic content; accessibility and usability; inter-operability of hardware and software, and connectivity to promote durability; scalability and flexibility; rights management; network and information security; and community engagement (DOE, 2004:24).

Rwanda promulgated its national ICT policy in 2000, as a culmination of a national consultative process undertaken in 1999 (Farrell, 2007b). The policy was implemented in four five-year rolling plans referred to as the National Information and Communications Infrastructure (NICI) plans and it is built around 10 pillars one of which is ICT in education. Drawing from the national ICT policy and action plans therein, the Ministry of Education drafted its own ICT policy that zeroed down to four areas of focus: developing an understanding within the system of the value of technology and the need for investment; developing procurement and installation strategies; implementing an EMIS; and developing and managing content and integrating it into the curriculum. After three plans, the NICI process, hailed as a great success, established some basic ICT infrastructure through digitized information for students, teachers and schools, and laid the framework for law/regulation/system (Republic of Rwanda, 2015).

The NICI process provides four key lessons that will continue to guide the success of the SMART Rwanda Master Plan (SRMP). These include:

- "The continued need for high-level political championship for the plan to succeed;
- Resource mobilization to implement the policy and the plan is crucial if a high proportion of the initiatives and projects identified are to succeed;
- Stakeholder participation in the policy and plan development process is crucial for ensuring buy-in and acceptance of the need to pursue an ICT4D agenda; and
- A clear vision, mission, and strategy and a well-scheduled execution plan with a step-by-step approach including specific milestones and expected outputs are crucial." (Republic of Rwanda, 2015:17).

The SRMP, however, departs from the NICI on several fronts including: the execution model; performance management; program and project selection process and management; monitoring and evaluation; and private sector participation. These have been streamlined, restructured and enhanced to ensure improved returns on investment, greater accountability and responsiveness, and determination of a clear linkage between project outcomes and key strategic priorities before any project is implemented. The SRMP is built on seven pillars, one of which is education and three ICT-based enablers (effective ICT governance and management, ICT capacity and

capability and secured and shared infrastructure), and sets out to achieve 10 objectives. Its second objective is to use ICTs in education to enhance teaching and learning (Republic of Rwanda, 2015).

Policies, however, are a necessary but not sufficient condition for educational transformation (UNESCO, 2011). Often, they fail to make an impact due to a variety of reasons. The first reason why policies may fail to achieve impact is that they may be cosmetic (UNESCO, 2011) designed to optimize a political support function (Peltzman et al. 1989), while allowing what Elmore (2004) calls "parallel play" that keeps the interest groups happy without achieving any change. Other reasons why policies may fail include: resistance from teachers if they feel that it is externally imposed on them; if they lack direct connection to classroom practice; if they address extraneous factors with little impact on the desired change in the education system; and they focus on technology to the exclusion of their "…relationship to pedagogy, curriculum, or assessment." (UNESCO, 2011:28).

The school system as set up under the current paradigm consists of a set of frozen, mutually reinforcing components that are difficult to isolate and change one by one. And even when they are changed collectively, there is strong tendency to fall back. An effective policy proposition thus must be one designed to unfreeze these components, change them and then set in motion a process of continuous change of the components along the desired trajectory (UNESCO, 2011).

2.3. The evolution of ICT in education policy in Kenya

Kenya like most other countries has come a long way in its quest to institutionalize ICTs in education. Kenya's approach to ICT integration in education and thus implementation of the ICT in education policy has been one of learning by doing. As more challenges have emerged and politics around education reforms generally and ICT integration in particular changed, so has the country devised ways to push forth the ICTs agenda. Besides the overall framework of vision 2030 and the national ICT strategy for education and training, the country has embraced initiatives by global (UNESCO, 2013), regional (Farrell, 2007b) and national public and private actors to drive the ICT integration agenda.

In the early days, ICT was perceived as a tool to facilitate the country's effective participation in the global knowledge economy (Republic of Kenya, 2005). ICT was understood then, as a driver of national transformation and the education sector as the best platform for infusing ICT skills into the Kenyan population in order to optimize the economic returns (Republic of Kenya, 2005). The education policy on ICT was initially imbedded in three documents namely; e-Government strategy, national ICT policy and Sessional paper No. 1 of 2005.

The e-government strategy emphasized transformation of government services from manual to digital-based operations. The strategy looked at education as a service to be provided to the public, and focused on the use of ICTs to enhance efficiency in: applying for primary and secondary school admission in government schools; checking on the availability of places for admission in the schools; the latest updates on school information; availing school curriculum online; checking examination results, etc. It also sought to operationalize the Education Management Information System (EMIS) to be used to collect and process data to aid improvement of education policy, planning, implementation and monitoring (Republic of Kenya, 2004).

The national ICT policy focused on harnessing the potential of ICTs and related emerging technologies to support universal primary education and human resource development. It emphasized "… integrating ICTs in teaching curriculum at all levels of education; establishing e-educational networks for sharing educational resources and promoting e-learning at all levels; encouraging and supporting ICT training for decision-makers, community and civil society leaders; creating opportunities and providing assistance for the disadvantaged, women and the youth to acquire ICT competencies and skills; and enhancing capacity for research and development in ICT sector." (Republic of Kenya, 2006a:3)

The Sessional paper number 1 of 2005 captures the Ministry of Education's vision of ICT "…as a universal tool for education and training." and underscores the commitment of the government to pursue this vision by equipping "…every educational institution, teacher, learner and the respective community…" with appropriate ICT infrastructure, competencies and policies for usage and progress (Republic of Kenya, 2005:5). This focus appreciates the fact that the integration of ICT in education requires an ICT ecosystem as expressed in the national ICT policy to achieve its objectives (Republic of Kenya, 2019b).

To facilitate faster progress, there was need to consolidate these documents into one to integrate education policy on ICT including the scope, usage, administration and ways to address innovations and attendant Intellectual Property Rights (IPR) (Republic of Kenya, 2006b). As the work of integrating the education policy on ICT got

underway, the scope of expanded. The increasing availability of ICT infrastructure, hardware and software has led to a shift in the perceived role of ICTs in education. ICTs are now seen as a pedagogical and management tool (Republic of Kenya, 2014) and have become one of the key strategies to "Expand access to a gender sensitive and responsive quality education…" (Republic of Kenya, 2015:9).

Coming from a background characterised by limited access, absence of skilled ICT teachers, gender disparities, relatively high costs of ICT components and limited access to electricity, the framers of the policy limited their ambition. Kenya opted to pursue six strategic objectives as highlighted below to advance ICT in education agenda as part of the country's vision 2030:

- "To promote public and private sector investments in ICT-in-education sub sector.
- To facilitate annual budgetary provisions for ICT-in-education activities.
- To develop a resource mobilisation strategy for provision of ICT projects and initiatives in education.
- To develop modalities for cost-reduction of ICT products and services.
- To align ICT initiatives in education with Millennium Development Goals (MDGs) under the Word Summit for the Information Society (WSIS) plan of action and New Partnership for Development (NEPAD) e-Schools.
- To encourage cost sharing in which parents and communities contribute in establishing digital infrastructure in schools." (Republic of Kenya, 2006b:13).

To achieve these objectives, the MoEd launched several initiatives to address the identified challenges:

- Establishing a computer supply program to equip students with modern ICT skills by implementing a program targeting "…20,229 public primary schools, 4,000 public secondary schools, 20 PTTCs, 2 diploma colleges, and 10 Model e-learning centres for ACE." (Republic of Kenya, 2010:22);
- The ESP-ICT computer for schools' project, which targeted training over 20,000 teachers on ICT integration in education through a cascade model (Republic of Kenya, 2014);
- The National ICT Innovation and Integration Centre (NI3C) was established to provide support and help-desk services to teachers and schools in ICT integration, testing new innovations and advising senior management about innovative solutions, and hosting the national teachers' portal;
- KICD set out to digitize content for primary and secondary schools and provide alternative channels for dissemination of digital content;
- The MoEd established ICT4E unit and ICT integration Team to provide coordination and harmonization of ICT integration initiatives in education; and
- Initiated the laptops for Class 1 (Republic of Kenya, 2014).

Many of these objectives have been achieved. But they were implemented in an environment fraught with capacity and resources limitations combined with poor coordination among the multiple state and non-state actors. Consequently, many challenges still face the core mission of ICTs in education (Republic of Kenya, 2014; Uwezo, 2020).

2.4. Policy Implementation: challenges and opportunities

Different actors may have divergent perspectives on what constitutes successful policy implementation (Matland, 1995). Proponents of the top-down approach, also known as the rational or systems model emphasize fidelity of the implementation process to the policymakers' intentions. Those of the bottom-up approach emphasize commitment to policy delivery. The bottom-up approach is hinged on the fact that effective policy implementation depends upon complex interaction among the actors in the local sphere, which limits the efficacy of the top-down approach. The top-down approach envisages a policy design that includes an evaluation framework to determine if indeed the policy was delivered and if the implementation achieved the policy goals. These two perspectives can result in very different strategies and outcomes (Brynard, 2007).

Increasingly, however, democratic policy systems support a shift from both approaches to a new centrist one that emphasizes how interactions among different actors influence the policy design and implementation (Calista, 1994). In the framework of evolution and bargaining models, policy implementation is viewed as a bargaining and negotiation process. The centrist approach embodies this understanding of policy implementation - as involving bargaining, negotiating and navigating multiple interests. Policymakers may combine components from all or some of the three approaches, as they deem fit for their purposes of implementing the policy at hand (Mthethwa, 2012).

Bhuyan et al. (2010:5) developed a framework that outlines the following seven dimensions as critical to successful policy implementation the approach adopted notwithstanding:

- "the policy, its formulation, and dissemination;
- social, political, and economic context;
- leadership for policy implementation;
- stakeholder involvement in policy implementation;
- implementation planning and resource mobilisation;
- operations and services; and
- feedback on progress and results."

Viennet and Pont (2017) compressed the seven dimensions into four core drivers of policy implementation:

- *Smart policy design:* a policy that is well justified and offers a logical and feasible solution to the policy problem;
- *Inclusive stakeholder engagement:* The extent and manner in which key stakeholders are recognized and included in the implementation process;
- *A conducive institutional, policy and societal context:* An implementation process that recognizes the influence of the existing policy environment, the educational governance and institutional settings and external context; and
- *A coherent implementation strategy to reach schools:* The strategy outlines concrete measures that bring all the determinants together in a coherent manner to make the policy operational at the school level.

In democratic systems, politics, which Kingdon (1984:109) defines as "…swings in national mood, vagaries of public opinion, election results, changes in administration, shifts in partisan or ideological distributions, and interest group pressure" becomes critical for policy implementation. Political forces exist at multiple levels and change over time. For instance, even the international political context affects the national policy process. "As the political economy changes, some policy contexts also change, in turn affecting which actors are involved, which policy decisions are made, and what processes take place at various levels…" (Mthethwa, 2012: 41).

Education policy implementation in Kenya has particularly been susceptible to political changes. Eshiwani (1990) evaluated educational policies adopted in Kenya since independence using the following criteria: internal efficiency; external efficiency; equity; and qualitative aspects of the policies. The evaluation identified the five factors affecting education policy implementation in Kenya as: economic performance; population growth; unemployment of school leavers exiting from different levels; curriculum relevance; teacher shortage; and language of instruction challenges. While efforts to reform the curriculum have progressed, addressing the curriculum relevance problem, the rest of the challenges still persist (Republic of Kenya, 2019c).

3. Research Questions

The COVID-19 pandemic has forced a moment of reflection on Kenya's ICTs in education policy and exposed challenges in realizing its stated objectives. Some of the challenges such as poor internet and mobile phone connectivity, and absence of electricity in far-flung areas are beyond the scope of the Ministry of Education, yet critical to achievement of the goals of the ICTs in education policy. Fundamentally, however, this crisis may have exposed weaknesses in the targeting of investments in the policy's implementation with respect to how it impacts equitable access to quality learning. This study analysed Kenya's ICTs in education policy, highlighting the gaps in its implementation, and the impact of such gaps on the achievement of its stated goals and outcomes. Specifically, the study sought to answer the following four questions:

1. What gaps exist between the enacted and implemented versions of the policy?
2. What are the gaps between the expected and achieved policy outcomes?
3. What factors explain the gaps in policy implementation and in achieved policy outcomes?
4. How do these gaps impact equity in education in Kenya?

4. Data

This study utilized rich primary and secondary (qualitative and quantitative) data sets drawn from multiple sources. Some of the data sets are triangulated to answer multiple research questions, while others address specific research questions.

4.1. Secondary Data

Secondary data sources include:

1. Relevant policy and strategy documents generated by both the government and non-governmental actors in Kenya and the region (qualitative): The variables of interest from these documents include key themes commonly found in educational technology policies globally; policy implementation structures; alignment of the implementation structures and systems; involvement of critical actors (e.g. broadband companies); and relevance to context and intended beneficiaries' circumstances.
2. Relevant project and program evaluation reports (qualitative and quantitative): The variables of interest from these documents included: the implementation funding gaps (required vs. appropriated and expended funds); documented achievements; and degree of collaborations among listed actors.
3. Kenya National Bureau of Statistics (KNBS) latest household survey report (quantitative): The variables of interest from these documents include macro-level socio-economic characteristics of the Kenyan population and documented status of ICT and other enabling infrastructure in schools.
4. Relevant sector plans and expenditure reports over the policy period (quantitative): The variables of interest from these documents included: the implementation funding gaps (required, appropriated vs. expended funds); documented achievements; expenditure on enabling infrastructure by different but relevant Ministries and state departments.

4.2. Primary Data

Primary data sources included:

1. Interviews of selected opinion, policy and practice leaders in the fields of ICT and education, including actors in the energy and telecommunications sectors that play an enabling role in access to digital learning (qualitative): A total of 5 interviews were carried out. Participants were chosen from the Communications Authority; the ICT Unit in the MoEd; Safaricom Plc.; Parliamentary Budget Office; and Rural Electrification and Renewable Energy Corporation (REREC). The variables of interest from these respondents include capacity & incentives of the relevant actors, existing collaborations & partnerships, perceived gaps in policy and law, and gaps in investment.
2. The Usawa learning assessment data (quantitative). The variables of interest from this data included: type and quantity of ICT facilities in primary and secondary schools; percentage of teachers trained on ICT integration; whether schools deployed ICTs to support learning continuity during school closures; and challenges to ICT integration from the school perspective.

Primary data collection in this period was not without risks. The main risk stemmed from the covid-19 pandemic and its unpredictable waves. Collection of primary data was affected by delays caused by a new wave of covid-19 infections that resulted in a lock-down of some counties. Nonetheless, the process was eventually completed. The study benefitted from the fact that it was more inclined towards secondary data, which allowed some of the research questions to be answered even as the process of primary data collection was ongoing.

5. Methodology

5.1. Data collection methods

The study employed mixed methods research to answer the four study questions. This approach was preferred because it allows use of a variety of data sets, which deepens and widens the insights that can be drawn. Policy changes require robust insights, which is enriched by bringing all the available data from multiple sources to bear in generating the conclusions on the basis of which such insights are drawn.

Qualitative data was collected using two methods: key informant interviews; and document analysis. Key informant interviews were used to collect primary data from selected policy and practice leaders in the fields of ICT, energy, finance and education. Document analysis was used to collect secondary data through review of relevant policy and strategy documents generated by both the government and non-governmental actors in Kenya, relevant sector reports and relevant program and project reports.

Quantitative data was collected using a combination of surveys and document review for primary and secondary data respectively. Surveys were used to collect data about access and distribution of ICT devices and infrastructure,

including trained teachers. Surveys were also used to collect data on access to ICTs for learning continuity purposes by children and support by teachers and schools. Data from 1775 primary schools and 339 secondary schools was collected using an interview schedule and an observation guide. The variables in this data set include the status of teacher training on ICT, availability of computer labs and other digital devices, whether or not the school is implementing any digital learning activities, access to the ICT and other enabling infrastructure, availability of ICT-supported libraries, among others.

Document analysis was used to collect secondary quantitative data about the investments in the policy implementation, the national reach of critical ICT and other enabling infrastructure, household poverty levels and their distribution across counties.

5.2. Study Design

The study followed the concurrent triangulation approach illustrated in figure 5.1 to draw insights that respond to the four questions in section three. Concurrent triangulation was deemed the most appropriate strategy for this study considering the type and sources of the required data, as well as the expected completion time of the study. This approach ensured a shorter period of data collection compared with the alternatives such as sequential triangulation. More importantly, however, it synchronized data collection from multiple sources, with the collection of the primary, quantitative data, which was being collected as part of a bigger, pre-planned national study.

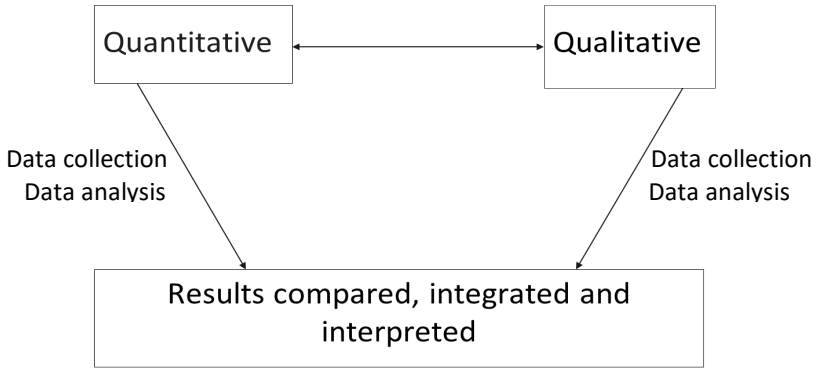

Figure 5.1: A Visual Diagram of the Mixed-Methods Concurrent Triangulation Strategy[1]

As depicted in figure 5.1, qualitative and quantitative data sets, which were further classified into primary and secondary sub-sets, were collected simultaneously. Data collection tools were triangulated to ensure complimentarity of the information sourced. The data were analysed separately before the results being compared, integrated and interpreted.

5.3. Data analysis and interpretation

Data were triangulated, analysed and interpreted to respond to the survey questions as follows:

QUESTION 1: This question was answered by triangulating qualitative data from the policy statement and relevant sector ICT implementation plans and reports with qualitative data from key informant interviews.

QUESTION 2: This question was answered by triangulating quantitative survey data from Usawa learning assessment and secondary data from relevant sector plans and expenditure reports.

QUESTION 3: This question was answered by triangulating quantitative secondary data from relevant sector plans and expenditure reports, quantitative survey data from Usawa learning assessment, and qualitative data from the KI interviews.

QUESTION 4: This question was answered by triangulating quantitative survey data from Usawa learning assessment and secondary data from relevant sector plans and expenditure reports as well as from household survey reports by KNBS.

[1] https://www.researchgate.net/figure/A-Visual-Diagram-of-the-Mixed-Methods-Concurrent-Triangulation-Strategy-The-researchers_fig1_280860447

5.4. Analytical Framework

Figure 5.2 depicts the analytical frame that this study followed. The frame posited that the implemented policy differed from the enacted policy. It assumed a well-designed policy and envisaged a situation where even the best designed policy may suffer gaps in its implementation owing to budget constraints, poorly designed implementation strategies, or exclusion of critical actors. The framework includes the data and processes through which the gaps were identified, and possible remedies suggested to promote ICT integration in education in Kenya and other countries with similar socio-economic characteristics. Policy implementation gaps were assumed to result in under-achievement of the intended policy objectives.

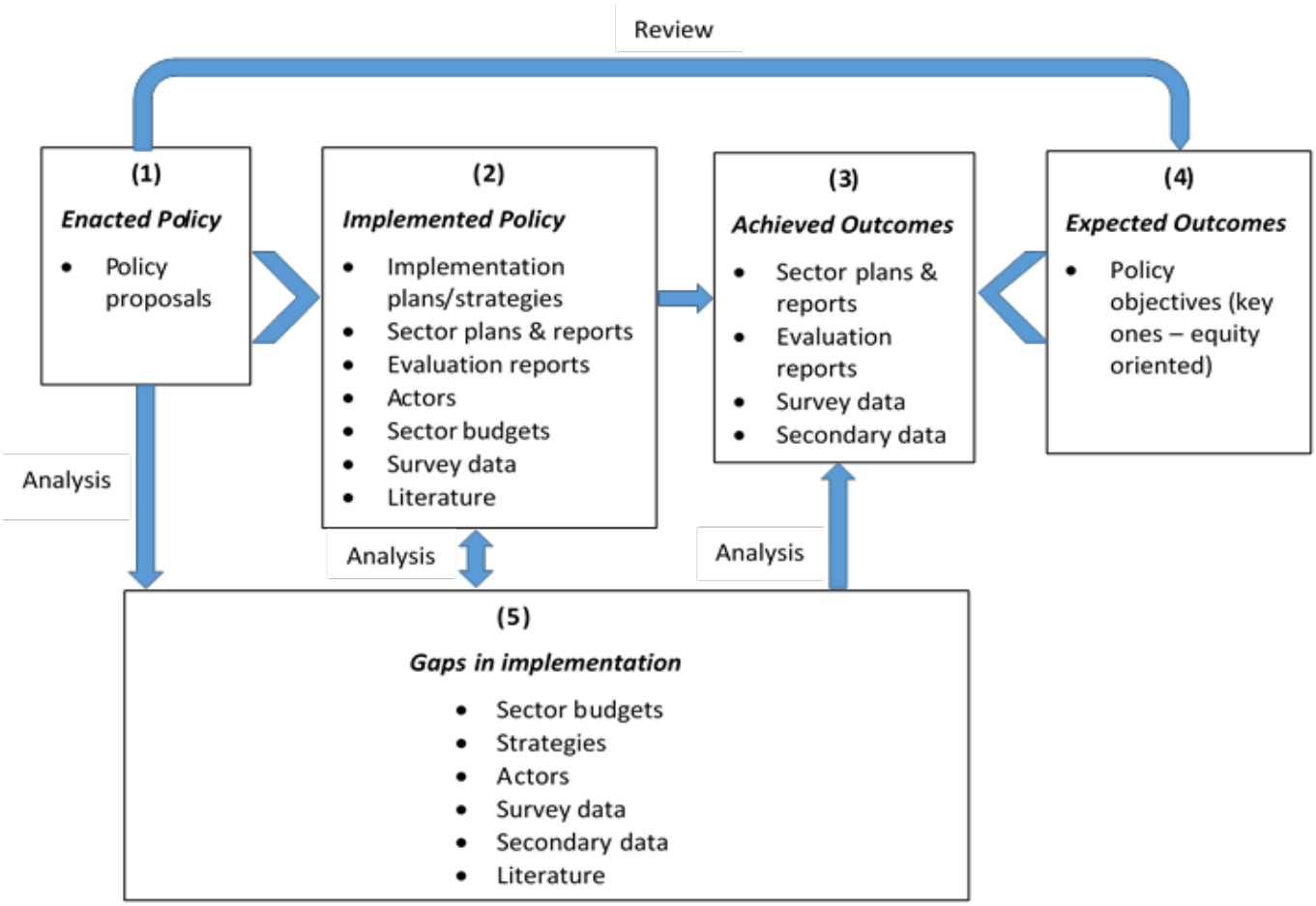

Figure 5.2: Study Analytical Framework

Question one was answered by analysing the gaps between the policy proposals in box (1) and the translated and implemented activities highlighted in box (2). From figure 5.2, the proposed activities are more (greater in value) than the implemented ones as highlighted in the implementation plans/strategies, sector plans and reports, sector budgets, survey data and literature. This leads to the answer to question two: the gaps between achieved and expected outcomes in boxes (3) and (4) respectively. Because the implemented activities are less than the planned, the achieved outcomes are less than the expected outcomes as highlighted in sector reports, survey data and secondary data. The answer to question three is an explanation of the gaps between expected and achieved outcomes. This is obtained by analysing the difference between required and availed resources as indicated in the budgets, strategies, participating actors, survey data, secondary data and literature in box (5). The answers to question four link the gaps in the implementation of the ICTs in education policy to the inequities in the wider education sector and society.

6. Findings

6.1 ICTs in Education Policy: Enacted Vs. Implemented

6.1.1 The Enacted ICT Policy: the original and the modified

Kenya enacted the National ICT strategy for education and training in 2006 (Republic of Kenya, 2006b), which articulates the country's vision for the role of ICTs in education. The strategy, arrived at by consolidating the relevant national aspirations previously expressed in three documents: E-government strategy (Republic of Kenya, 2004); Sessional paper number 1 of 2005 (Republic of Kenya, 2005); and the National information and communication policy (Republic of Kenya, 2006a), still did not constitute a complete ICTs in education policy at its onset. The Kenya government therefore adopted the learning by doing approach to ICTs in education and outlined three immediate tasks to be accomplished as: consolidating the gains already realized under ICTs in education work (Republic of Kenya, 2011); enhancing integration of ICTs in teaching and learning; and prioritizing development of the policy (Republic of Kenya, 2010). The strategy was limited in ambition owing to its formulation in an era of limited technological, technical, human resource and financial resource capacities (Republic of Kenya, 2006b).

Kenya's ICT policy is an integral part of the broader national development agenda 2007 – 2030 (Vision 2030), where ICT is listed as one of the enablers of national transformation (Republic of Kenya, 2007). The Vision 2030 is broken down into five-year medium-term implementation plans (MTPs). For the education sector, the later MTPs have been synchronized with national education sector plans. Implementation of the ICTs in education policy, however, also involves the ICT and Energy sectors, hence the analysis covered select items in those two sectors as well. The enacted policy is in two forms: the original and the modified. The original policy is summarised in Appendix 1[2], while its modified version is reflected in the ICTs in education activities as proposed in the MTPs.

The modifications embody the changing ambitions of the government as the ICT ecosystem improves, opening new possibilities of what the policy could accomplish, and thus nudging policymakers to broaden its scope. Indeed, the original policy is itself a major step up in terms of its objectives and budget, compared to what had been proposed by the Kenya Education Sector Support Programme (KESSP). The policy's proposed five-year budget was over KES 18 billion compared KESSP's budget of KES 689.295 million (Republic of Kenya, 2005b). The modified policy is defined in this study as comprising of the original policy plus all those activities, projects and programs proposed for implementation to promote ICTs in education as delineated in the medium-term and annual sector plans.

In the MTP I (2008 – 2012) the government proposed to implement programs aimed at achieving several strategic objectives under the Ministries of Education (MoEd), Ministry of Energy (MoE), and Information and Communication (MoIC). The MoEd sought to promote e-learning and the use of ICTs in education at the cost of KES 1.781 billion. The Ministry of Energy (MoE) proposed to implement one program: the national electrification program to increase access to electricity in rural areas at KES 80 billion. The MoIC proposed to implement four broad ICT programs at the cost of KES 15.11 billion, including:

- The East Africa Marine Cable System (TEAMS) at KES 7 billion;
- National Optic Fibre Network Backhaul Initiative (NOFBI) at KES 5 billion;
- Government Common Core Network (GCCN) - a shared and secure interoperable government-wide ICT architecture at KES 2 billion; and
- Installing Local Area Networks (LANs) in all government ministry headquarters and districts, and linking them to the GCCN at KES 1 billion.

Most of the funding for these programs was to be sourced from private-public partnerships (PPP), which mitigates against the government's control of the projects under implementation. The disproportionate allocation of resources to the MoIC as compared to the MoEd in this initial stage highlights the government's appreciation of the fact that ecosystem building was a pre-requisite to effective use of ICTs in education.

In the MTP II (2013 – 2017), the MoIC was expanded to include technology and renamed Ministry of Information, Communication and Technology (MoICT). The MoICT proposed to implement five broad ICT programs at KES 78 billion including:

- Provision of ICT infrastructure;

[2] Appendix 1 is the enacted policy as at 2006 and therefore forms the basis of all the analysis in this study.

- Cyber security infrastructure;
- Strengthening legal framework in the ICT sector;
- Development and dissemination of digital content; and
- Capacity building and training.

The MoEd proposed to implement one broad ICTs in education program (Integrating ICT in Education) at KES 33.05 billion over the five-year period broken down into the following eight sub-programs/projects:

- Train teachers to enable them to integrate ICTs in teaching and learning processes;
- Establish Education Management Information System (EMIS) centres in all the counties;
- Develop and disseminate digital content;
- Review the policy and institutional framework for ICT integration in education;
- Procure ICT infrastructure for schools;
- Carry out capacity development for ICT integration in education;
- Procure ICT devices for schools; and
- Integrate ICTs in special needs education through provision of equipment to teachers and learners (Republic of Kenya, 2013).

MTP II also saw the introduction of the ambitious digital literacy program (DLP) at the cost of KES 53 billion. The DLP narrowed the policy beneficiaries to the public primary school fraternity (pupils, teachers and managers), and sought to accelerate achievement in four areas:

- Digital content development;
- Provision of digital devices;
- Teachers' ICT integration capacity development; and
- Improvement of ICT infrastructure in the schools, including supply of smart classrooms.

DLP was initially mooted as a MoEd program before its key components, including its coordination, were transferred midstream to the MoICT. It is noteworthy that whereas the 2006 strategy planned to spent approximately KES 18.3 billion at full implementation, by the second MTP, the modified policy had almost doubled the budget at approximately KES 35 billion. Yet many originally proposed activities remained unimplemented, owing to continuous emergence of new programs, projects and activities.

In the MTP III (2018 – 2022), the MoICT, MoEd and MoE planned to implement five, six and one broad ICT in education programs at the total cost of KES 277.038, KES 36.86 and KES 92.551 billion respectively over the five-year period. The MoICT programs include:

- Infrastructure was allocated the largest amount at KES 129.564 billion;
- E-government services at KES 112.8 billion;
- Policy, legal, institutional and regulatory frameworks at KES 18.96 billion;
- National information security at KES 8 billion; and
- Universal access to ICTs at KES 7.714 billion.

The MoEd programs include:

- Digital Learning Program (DLP) in primary schools at KES 18.95 billion;
- ICT integration in secondary education at KES 3.55 billion;
- ICT integration in TVET at KES 6.3 billion;
- Integration of ICT in adult and continuing education at KES 250 million;
- Transition from print to e-Books at KES 1.7 billion; and
- Provision of laptops and assistive devices for learners with special needs at KES 1.98 billion.

The MoE program was the last mile connectivity to connect five million households to electricity through grid and off-grid solutions.

An analysis of the proposals made in the MTPs and the education sector strategic plans reveals a narrow gap between the originally enacted and the modified policy. This underscores a commitment to the original goals of the ICTs in education policy over the years, which may imply that the modifications are inspired by the changing political, economic, social and technical context. The next sub-section discusses the variance between program and project proposals outlined in the three sectors' medium-term and annual plans, and the implemented programs/projects reported in the sectors' medium-term and annual reports.

6.1.2 The proposed for implementation ICT in education policy keeps mutating

The implemented policy is defined in this study as comprising all those activities, projects and programs undertaken to promote ICTs in education as delineated in the relevant (education, energy and ICT) sectors' medium-term and annual reports. This sub-section reviews the three sectors' medium term and annual reports and reveals the fluidity of the policy at implementation as underscored by the finding that the proposed programs, projects and activities still differ from those actually undertaken. For instance, in MTP I, the MoEd proposed to "…establish a computer supply program to schools in order to equip students with modern ICT skills" (Republic of Kenya, 2008:95) and commenced its implementation.

In the same period, the broader government programs in ICTs were focused on building the ICT ecosystem. Leading in this task was the Ministry of Information and Communication (MoIC), which proposed to implement four programs/projects:

- The TEAMS, to provide the country with an affordable high-capacity bandwidth;
- National Terrestrial Fibre Optic Network Project to complement the TEAMS project by ensuring maximum utilisation of capacity and connectivity in all districts in the country;
- GCCN that functions as a shared and secure interoperable government-wide ICT architecture; and
- Installing Local Area Networks (LANs) in all government ministry headquarters and districts, and linking them to the GCCN.

MoIC, however, implemented three out of the four programs, leaving out installation of LANs. MoE proposed and implemented expansion of access to electricity by rural communities.

During MTP II, MoEd proposed to implement eight sub-programs/projects to enhance ICT integration in education. MoEd could not implement some of the sub-programs such as procurement of digital devices because it was transferred to MoICT. Nonetheless, the MoEd only implemented five of the eight proposed programs/projects (Republic of Kenya, 2018). The MoICT on its part proposed to implement five programs/projects aimed at integrating ICTs in education but implemented seven, including two sub-programs of the DLP that were transferred from MoEd. The MoE proposed to implement a countrywide rural electrification program through the Rural Electrification Authority (REA) to connect the main public facilities including primary and secondary schools. Like MoICT, MoE implemented more than it had proposed, taking on an additional sub-program – electrification of public primary schools (a component of the DLP) reassigned to it from MoEd.

During MTP III MoEd proposed to implement six ICTs in education programs broken down into nine sub-programs including:

- Recruitment of DLP -ICT interns;
- Establishment of smart computer classrooms in public primary schools for DLP;
- Capacity building of Field officers and BOM members on DLP Smart classrooms management;
- Innovative ICT solutions in education vetted;
- Provision of ICT equipment and services TVET Institutions;
- Capacity building of ECDE teachers/caregivers on integration of ICT in education;
- Upgrading of NEMIS ICT infrastructure and equipment at the Ministry headquarters, counties, and schools;
- Development of National Educators portal for pedagogical support; and
- Establishment of a national ICT in education help desk.

In the same period, MoICTI proposed and implemented five programs/sub-programs, while MoE proposed and implemented two programs/sub-programs that support ICT integration in education.

Figures 6.1 to 6.3 summarize the number of ICTs in education programs that have been proposed and implemented over the last three medium term planning periods by the three main implementers namely; MoEd, MoE and MoICTI. The figures also highlight the fact that more programs/projects are proposed but fewer are implemented. The rates of actual implementation vary among the Ministries and across the planning periods. During MPT I, a total six programs were proposed but five were implemented with MoICTI making four of the six proposals and implementing three of the five implemented programs. Over the entire period (2008 – 2021), MoICTI has proposed to implement 14 programs and implemented 15 including two which were not in its proposals in the second MTP. Education, the anchor Ministry for this policy, has made 18 proposals and implemented 13 programs including two that were not in its list of proposals during the second MTP. The Ministry of Energy has over the period proposed and implemented the least programs to support ICTs in education.

MTP II recorded equal number of programs implemented with MTP III at 14 each. It must, however, be noted that the projects implemented during MTP II were higher value and more substantively contributed to the ICTs in education policy goals than those implemented in MTP III. Similarly, the energy and ICT sectors have implemented higher value programs/ projects than those implemented by the Ministry of Education.

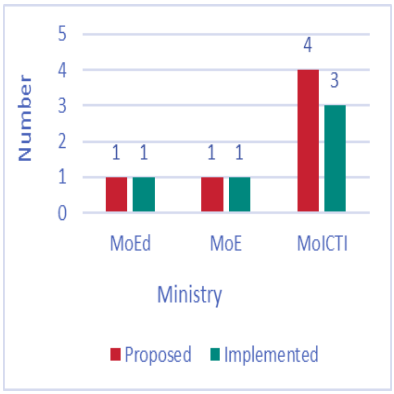

Fig. 6.1: ICTs in education programs implemented in MTP I

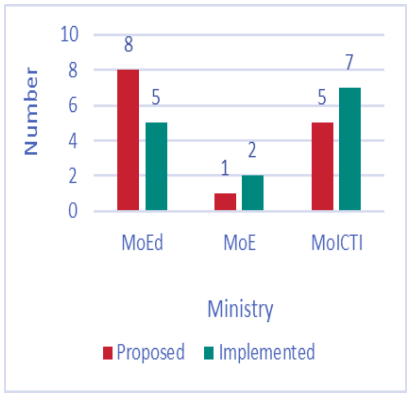

Fig. 6.2: ICTs in education programs implemented in MTP II

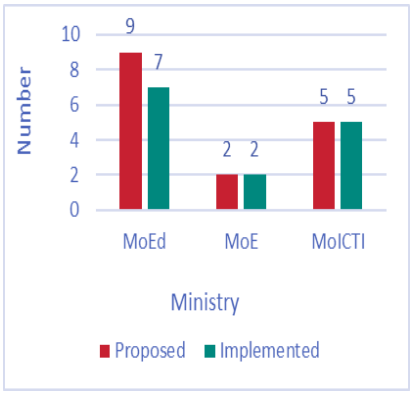

Fig. 6.3: ICTs in education programs implemented in MTP III

It would, for instance, be expected that the ministries of energy and ICT play a bigger role in the implementation of the ICTs in education policy in the initial period by way of ecosystem building and recede as the ministry of education's role expands. Going by the value of the ICTs in education programs and projects being implemented in the third MTP, however, this does not seem to be the case. In fact, the value of the programs/projects under implementation by the MoICTI seem to be growing bigger in comparison to those under the MoEd. This may point to a mutation in the implementation plan as originally envisaged and the attendant challenges that this poses to the functioning of the policy's implementation structures.

The analysis in the next section tracks the implementation of specific programs and projects as outlined in the education, energy and ICT sectors' medium-term and annual plans and reports.

6.2 Key policy milestones missed

The NESP 2013 - 2018 identifies four pillars namely; policy formation, capacity development, digital content development and infrastructure as critical for integration of modern technologies into teaching and learning (Republic of Kenya, 2014). According to UNESCO (2011), effective implementation of ICT in education is predicated upon well developed policies and implementation plans. At the onset of the implementation of Kenya's ICTs in education strategy, however, the country lacked an ICTs in education policy, making policy formation a priority to ensure the success (Republic of Kenya, 2006b). Similarly, it was recognized that effective implementation of ICT integration in education programs requires good knowledge, skills and attitudes of the education managers and teachers, which were missing among these critical actors, thus necessitating investment in capacity-building (Republic of Kenya, 2014).

Equally important but missing or inadequate was ICT infrastructure, comprising of equipment and software required to implement and operate systems and networks for communications services and dissemination of digital content. Digital content is inalienable ingredient of ICT integration in education. It supports curriculum interpretation and implementation. But a huge gap was noted in the availability of digital content in the Kenyan market, compounded by limited technical, human and financial capacity of KICD to vet digital content from other publishers (Republic of Kenya, 2014).

Several programs and projects have been implemented while many more continue to be implemented under each of the four pillars. This analysis follows the four pillars.

This study encountered inadequacy of data on some of the programs and projects implemented under the respective pillars, and therefore uses the available data on select programs as proxies to assess achievement of key milestones for each pillar. The study uses the digital learning program data on electrification of public primary schools as a proxy for complementary infrastructure development, which drives access to ICTs in rural areas. It analyses the four pillars in terms of the investments and outcomes realised between 2006 and 2021 against the original and revised targets and timelines, and finds significant gaps in their achievement. The degree of non-achievement varies from one pillar to another as do the underlying reasons. Failure to achieve a milestone is defined

in two ways: delivery of less than the desired outcome; or late delivery of the desired outcome. This analysis finds delayed achievement of the various outcomes more common than non-achievement.

Figure 6.4 shows the overall achievement levels of the four pillars based on the data from the education sector reports versus their initially envisaged completion timelines. All the pillars have missed key milestones that would enable them to contribute significantly to the achievement of the policy's main goal. Both delayed and under-implementation are interpreted in this study to have the same adverse effects on realization of the overall objective of integrating ICTs in education.

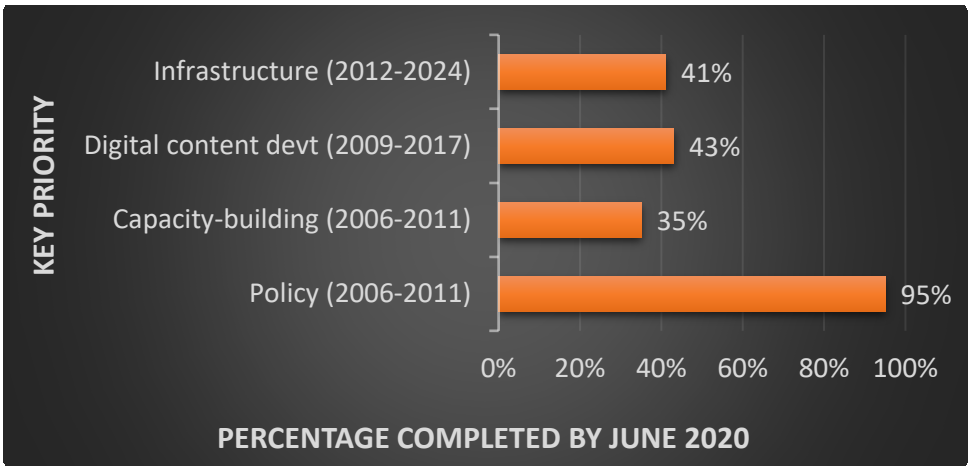

Figure 6.4: Overall achievement levels of the four pillars of ICT in education policy by June 2020

Next is the discussion of the status of each of the four pillars.

6.2.1 Pillar 1: Status of the policy review

Developing the ICTs in education policy was a top priority of the ICT strategy in 2006. The government of Kenya acknowledged from the onset, inadequacies of the legal, policy and regulatory frameworks as one of the challenges to integrating ICTs in education (Republic of Kenya, 2005). Providing a framework for the review of the ICT policy and ICT strategies in the education sector within five years (2006 -2011) thus became a top priority (Republic of Kenya, 2006b). The MTP I, however, did not reflect this urgency. The national education sector plan (NESP) 2013/14 – 2017/18 proposed to review the National ICT Strategy for Education and Training 2006. The review did not happen within the medium-term plan, only commencing in 2018, under the national education sector strategic plan (NESSP) 2018 – 2022. By June 2020, it was 95% complete (Republic of Kenya, 2021).

In the intervening period, however, several complementary policies were developed and legislations enacted. They include the national ICT master plan 2014-2017; the NESSP 2018-2022; the national curriculum policy of 2018; the national ICT policy, 2019 (Republic of Kenya, 2019b); and the policy on integration of ICTs in TVETs. Similarly, several legislations that buttress the use of ICTs in education have also been enacted. These include the Basic Education Act, 2013 (Republic of Kenya, 2013); the Sessional Paper No. 1 of 2019 (Republic of Kenya, 2019a); The Technical Vocational Education and Training (TVET) Act, 2013; the Universities Act, 2012; the KICD Act, 2013; the Computer Misuse and Cybercrimes Act, 2018; and the e-Waste management regulations, 2013.

Pre-existing laws have also been reviewed to enhance the promotion of ICTs in education. For instance, the Kenya Information and Communications Act, 1998 was reviewed in 2011 to enhance equity by creating the Universal Service Fund with a broad mandate "...to support widespread access to, support capacity building and promote innovation in information and communications technology services." (Republic of Kenya, 2011:77). The review empowered the Communications Authority to raise funds by levying a universal service charge on all the licensees under the Act, to support by way of loans, subsidies, and grants, initiatives that promote to access ICT services by the marginalized groups. Indeed, according to one interviewee for this study,

> "*Safaricom Plc., has leveraged the Universal Service Fund to implement 80 projects to expand ICT access in far flung areas in the year 2021 alone, leading to up 90% coverage of the country by 4G technology…To use internet for educational purposes, one requires connection to either fibre (which covers only 70% of the country) or 4G mobile technology.*" – Officer of Safaricom Plc.

The recorded progress in legal and other policy reviews are helpful, but limited by the delayed completion of the ICT in education and training policy. The convergence of views among the experts interviewed is that non-completion of the policy remains a major hurdle in the efforts to achieve the overall goal of integrating ICTs in education in Kenya. The absence of the policy leaves private sector actors seeking to contribute to the national goal of integrating ICTs in teaching and learning confused. According to an officer at Safaricom Plc., the largest mobile telephone service provider in Kenya, the company has partnered with education content providers to develop an SMS-based platform called *Shupavu291* on which learners from grade 4 to form 4 are able to access learning and revision content free of charge by sending an SMS to the platform. This is designed to benefit most children from households that cannot afford smartphones. Through its corporate social responsibility activities, the company has also run a campaign dubbed *47 in 1* that has built one fully furnished computer lab in one school in each of the 47 counties. Yet one interviewee of this study feels that the company, and indeed other private sector actors could do more if the policy was more supportive.

> *"Lack of policy clarity on digital learning and the role of the private sector, including an incentive structure is limiting the extent to which companies like Safaricom can go to support government efforts. For instance, when the company gives discounted or free internet access to a school, shouldn't it be exempted from tax on the service so provided?"* – Officer of Safaricom Plc.

His views on the lack of clear policy are shared by another interviewee of this study who argues that:

> *"The absence of the policy with clear coordination structures has contributed to slow progress towards ICT integration in education arising from difficulties in effective monitoring and evaluation of the programs and projects implemented by the multiple agencies towards this goal."* – Officer of ICT Unit, MoEd.

6.2.2 Pillar 2: Status of digital content development

Digital content development is one of the main pillars of Kenya's ICT in education policy. Its importance was enhanced by the implementation of the DLP and reinforced by the onset of the COVID-19 pandemic that required countries to leverage digital platforms to support learning continuity. KICD has the responsibility of implementing the program as mandated by the KICD Act 2013. Prior to 2013, the mandate was with KICD's predecessor – Kenya Institute of Education (KIE). KICD has over the years endeavoured to integrate ICTs in the curriculum as well as develop digital content. But a huge gap persists in the availability of digital content locally. Most actors have laid emphasis on digitizing science content at the expense of other areas of learning (Republic of Kenya, 2014). KICD's technical, human and financial capacity to vet digital content from other publishers is still limited. Analysis of the sector plans and reports over the years doesn't show improvement in prioritising capacity-building at KICD to enhance its ability to perform this critical task.

The challenges in digitising the curriculum have been compounded by the recent curriculum switch to the CBC, which means that most of the content that had been developed (up to class 3 in MTP III – much lower than the aspired for class 7 by the end of MTP II), is now obsolete. The gap in digital content development remains wide, making it the weakest pillar in the ICTs in education policy. And yet, the trend in funding digital content development work is not encouraging. The current MTEF (2022/23 – 2024/25) shows that funding for "E-Learning (Curation of Digital Content for CBC & dissemination through Kenya Education Cloud)" declined from KES 150 million in F/Y 2018/19 to KES 85 million in F/Y 2019/20 to zero in F/Y 2020/21 (Republic of Kenya, 2021:69). The program is not mentioned among the priority areas in the sector in subsequent years to 2024/25. Similarly, there is reference to development of digital content for the learners with special needs, specifically those with visual impairment in the sector proposals in MTP II and MTP III, but there is no record on what has so far been done in delivering the content.

Challenges with digital content are not just in development, but in dissemination too. For instance, "In FY 2019/20, KES 800M was allocated for establishment of smart classrooms across the country to support the digital learning program. However, the funds were not availed due to lack of exchequer." (Republic of Kenya, 2021:19). Indeed, Usawa Agenda (2020) found that only 22% of Kenya's school-going children could access learning continuity interventions through digital platforms as shown in figure 6.5 below. Even then, the access was inequitable in favour of learners attending private schools, which points to the negative equity implications of the failed implementation of this crucial policy.

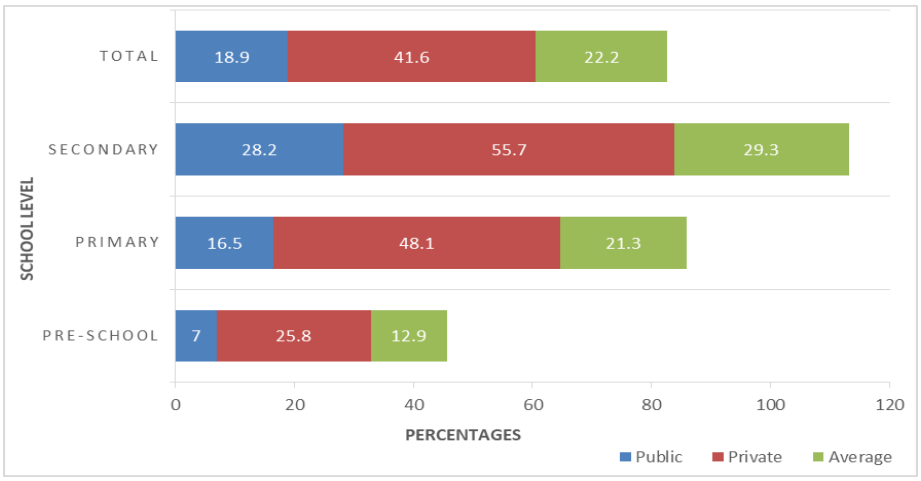

Fig. 6.5: Access to digital learning during the extended school closures in 2020.

Source: Usawa Agenda remote learning survey report

6.2.3 Pillar 3: Status of infrastructure development

Successful integration of ICTs in education requires a well-developed ICT ecosystem (Farrell, 2007). In the policy under review, building the ICT ecosystem focuses on ensuring access and equity; technical support and maintenance; research and development; harnessing emerging technologies; monitoring and evaluation; and partnerships and resource mobilization. Due to data limitations, this analysis focuses on the equity and access, harnessing emerging technologies, and technical support and maintenance. The responsibility of delivering these three components is shared among three ministries of Education, ICT and Energy. The main programs and projects implemented and used as proxies in this analysis are distributed as follows:

Ministry of Education: Establishment of County NEMIS centres to provide ICT infrastructure for effective data management and efficient delivery of services to the public (NEMIS_CC); Establishment of smart computer classrooms in primary schools (SCCs); Building of computer labs in public primary schools to support DLP; and Construction of a digital centre at the Kenya Institute of Curriculum Development to enhance teaching and research (DRC).

Ministry of Energy: electrifying public institutions that support education in rural areas (EPI); electrification of all public primary schools (EPPS) to enhance the success of the DLP; and implementation of the Kenya off-grid solar project to electrify schools and public facilities that are far removed from the national grid (KOGSP).

Ministry of ICT, Innovation and Youth Affairs: establishment of smart computer classrooms in public primary schools.

Analysis of these programs reveals wide implementation gaps as shown in figure 6.6.

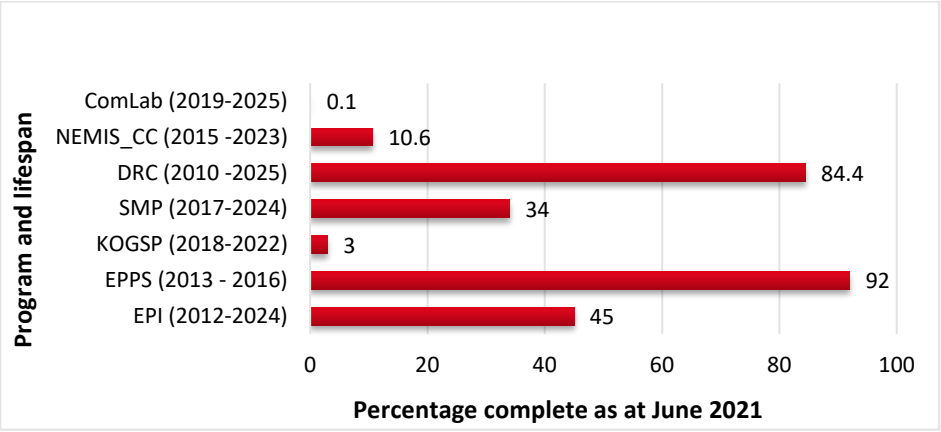

Figure 6.6: The rate of achievement of the main programs in infrastructure development

Electrification of public primary schools to support the DLP (DLP_electricity) has been implemented by the Ministry of Energy (MoE) since 2013. It was at 92% level of completion as at June 2021, having overshot its initial delivery timeline of June 2016. Also implemented by the MoE is electrification of public facilities (EPI), which has been

ongoing since 2012 with a completion date of 2024, and the solar maintenance program for the schools and facilities that are connected to solar power (SMP). The implementation for both had only reached 45% and 34% respectively, as at June 2021.

The construction of an education resource centre (KICD R. Centre) meant to serve as the national nerve centre for the development, management and dissemination of digital content for schools commenced in 2010 and was due for completion in 2020. The timeframe has been extended by the MoEd to 2025 after failure to meet the initial timeline. Its completion status was at 84.4% as at June 2021. The institution of the NEMIS at the county level (NEMIS_CC), which has been underway since 2015 and is due to conclude in 2023, had only reached 10.6% as at June 2021. The delivery of smart classrooms in public primary schools has failed to take off. None of the 10,300 smart classrooms targeted had been delivered by June 2021.

Construction of computer labs in all public primary schools by the MoEd from 2019 and due to conclude in 2025, had only achieved 0.1% of the target by June 2021 (Republic of Kenya, 2021). This is a major set back given the pivotal role these labs in the operationalization of the Kenya education cloud and dissemination of digital content – both critical to the success of the DLP.

Importantly, however, this analysis reveals the fact that the wide implementation gaps are not randomly distributed across programs. There is a pattern of non-achievement by programs targeting the marginalized groups in the country, most outstanding being the Kenya off-grid solar project. This project was designed to help communities that are far removed from the national grid, who incidentally face multiple other barriers to accessing ICT services. Its dismal implementation rate of only 3% thus marginalizes the intended beneficiaries further.

6.2.4 Pillar 4: Status of ICT capacity development

The work of capacity development for the use of ICTs in education in Kenya is distributed in three different ministries. According to the sector plans and reports from these ministries, ICT capacity development has three components: ICT infrastructure development to make the education sector ICT-ready; skilling of the relevant personnel for ICT-based pedagogy and management of education; and availing ICT facilities and enabling infrastructure. Ministry of Education is responsible for integration of ICTs in education; training (capacity building); and education management information systems (EMIS); Ministry of Energy is responsible for electrifying schools to enable the use of ICTs; and Ministry of ICT, Innovation and Youth Affairs is responsible for ICT infrastructure development and availing ICT devices and equipment. Each of the ministries has, and continues to implement projects and programs in line with their mandates. Their work is complementary, albeit often, uncoordinated according to some of the experts interviewed for this study.

The MoEd is implementing several programs and projects. The main ones being:

- The ICT integration in secondary schools aimed at integrating ICT in the learning process, school management, digital curriculum and promoting e-learning in public secondary schools (ICTI_SS);
- Skilling of teachers on ICT integration in teaching and learning; and
- Recruitment of ICT interns to enable IT-based management of schools and teachers, in support of ICT integration in education (ICT-Interns).

The MoICTI is implementing the following:

- The component of the DLP in primary schools aimed at supplying 1.2 million learner digital devices together with projectors and teacher digital devices (DLP_Devices); and
- Recruitment and deployment of ICT interns to support use of ICTs in teaching activities in schools (DLP-Interns).

The programs for ICT capacity development implemented by these ministries have varied commencement and completion dates, and have recorded varied degrees of progress as indicated in figure 6.7.

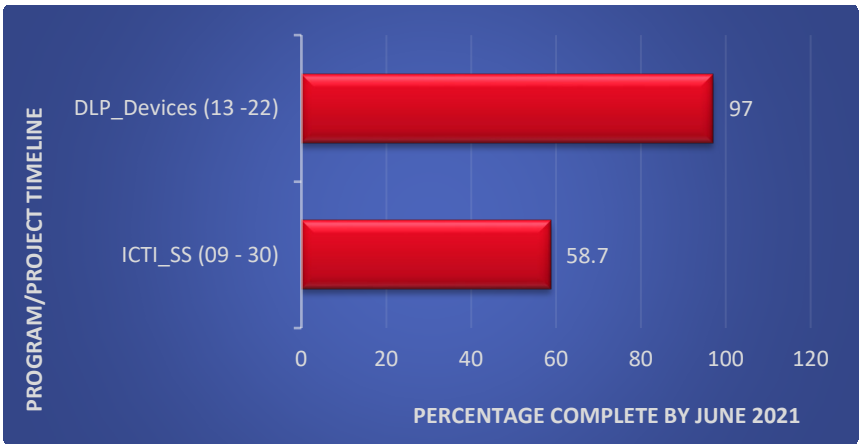

Figure 6.7: Achievement of key milestones in ICT capacity building

The program on integration of ICT in secondary schools (ICTI_SS) has been under implementation since 2009. It was initially due for completion in July 2023 at the cost of KES 5 billion. Its completion date and overall cost have since been reviewed to July 2030 at KES 26.2 billion. The current status of achievement of 58.7% falls below the expected level if the program is to meet the target outcome within the targeted timeframe.

The supply of digital devices to primary schools to support the DLP (DLP_Devices) has been implemented by the MoICTI since 2013 and is due to conclude in 2022. It had reached 97% of its target numbers by June 2021. It is noteworthy that in the year 2017/18, the number of devices delivered to primary schools was 3.8 times of the annual target. A total of 956,735 were delivered to primary schools against a target of 250,000 devices.

While the DLP components implemented by MoICTI have progressed significantly, those implemented by MoEd have mostly failed. Similarly, the recruitment of ICT interns to provide technical support to schools has floundered on account of complex recruitment processes, confusion on where it is domiciled (MoEd or MoICTI) and lack of funding. Thus, none of the 4,000 targeted interns had been recruited by June 2021.

The work to integrate ICTs in education management as part of the broader ICTs in education strategy begun in the year 2008/09, with installation of an updated EMIS data capture system in 79 districts, and training of officers in-charge of district EMIS on the system. The EMIS, and later NEMIS programs have generally been implemented with greater success across the years compared to the other programs under the broader capacity building milestone. This has, however, slowed in recent times as implementation has moved to the devolved units where geographical disparities remain high.

Teachers' ICT integration capacity development is a major component of both the ICT integration in secondary schools and the DLP implemented by the MoEd and its affiliated Teachers Service Commission (TSC). TSC targeted to train 180,000 primary school teachers on ICT integration between the 2014/15 and 2017/18 fiscal years. Given that there are 220,744 primary school teachers under TSC as per the latest Economic Survey report (2022), this would amount to a training rate of 81.5%. The Usawa Agenda 2021 findings as indicated in figure 6.8 below, however, show a sharp contrast, with only 19.4% of primary school teachers having been trained (Uwezo, 2021). The failed effort in teacher capacity building is inimical to the stated aspirations of this policy given the pivotal role of teachers in ICT integration in education (Mathipa and Mukhari, 2014; Republic of Kenya, 2014; World Bank, 2016; UNESCO, 2011).

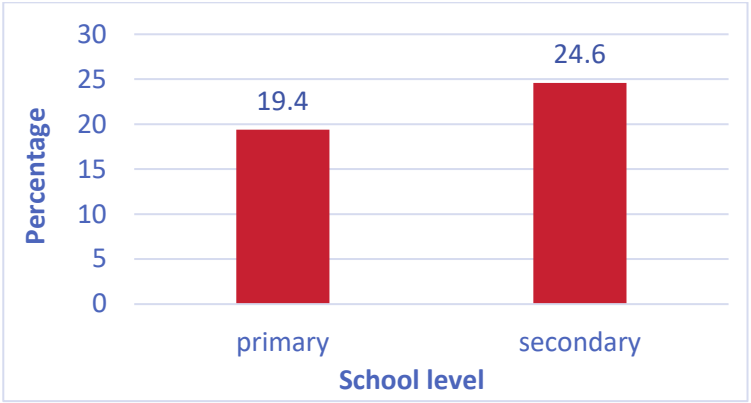

Fig. 6.8: Percentage of teachers trained by MoEd on ICT integration

6.3 Key outcome targets missed

MTP I was used in many ways to lay the ground for the ICTs in education policy implementation. This may explain the limited progress recorded during this period on the key pillars of the policy. MTP II recorded the highest percentage of achievement of ICTs in education targets compared to MTP I and MTP III, but still has gaps between the planned and achieved outcomes. It is therefore used in this analysis to illustrate the gaps in the implementation outcomes of the ICTs in education policy in Kenya.

MTP II set out to ensure that "…all learning institutions have access to; and efficiently utilize personal computers/laptops at the ratio of 1:15 by 2015." (Republic of Kenya, 2013:18). A June 2021 study by Usawa Agenda (Usawa, 2022), covering 1775 primary and 339 public secondary schools across 45 of the 47 counties in Kenya found that the learner to computer ratio is way above the targeted ratio. The findings show that nationally, the average pupil/computer ratio in primary schools stand at 43:1. The distribution is, however, not uniform across counties. Turkana County, for instance, has a pupil/computer ratio of 111:1 while Tharaka Nithi County has a ratio of 15:1, being the only county that has attained the national target for year 2015.

For secondary schools, the national average learner/computer ratio is 52:1. This varies widely among the different categories of public secondary schools as shown in figure 6.9. The national schools (highest ranked and most equipped), have a learner/computer ratio of 43:1, extra-county schools have a ratio of 45:1, county schools have a ratio of 64:1, while sub-county schools have a ratio of 128:1. This disparity is worth of note. It undermines the equity commitment of the policy under implementation. Sub-county schools form the majority of secondary schools in the country, they generally are found in the countryside and they educate children from less-privileged households. When the incomplete implementation of the policy means that these children don't benefit from fair access to computers at school, it compounds the negative effects of a myriad other disadvantages that learners in the sub-county schools have to content with.

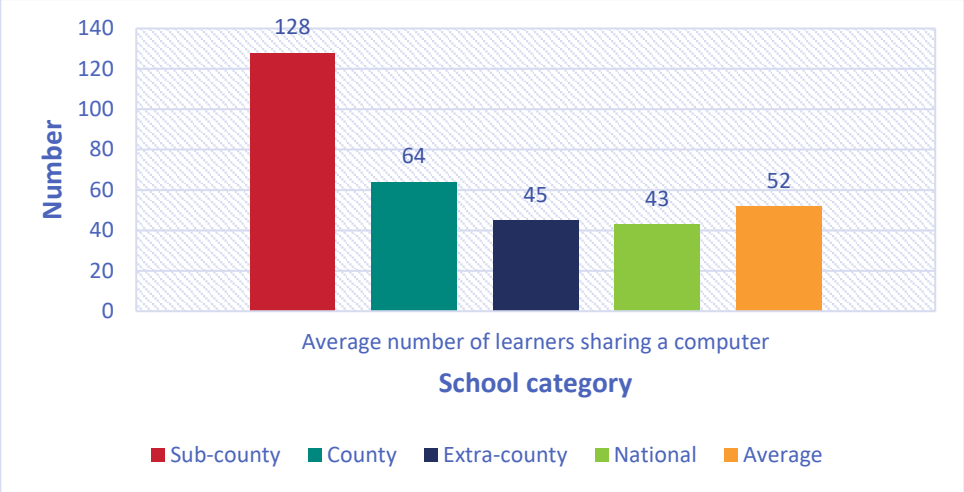

Fig. 6.9: Average number of learners sharing a computer by the category of the secondary school

The findings in figure 6.9 also speak to the failure of the ICT integration in secondary schools' program. After almost ten years of implementation of a program whose goal is, among others, to provide ICT infrastructure to the schools, the skewed learner/computer ratios against the sub-county schools points to an equity-blind approach to the implementation of this program.

Table 6.1 underscores the fact that the implementation of the ICT integration in secondary schools' program is both off the mark in achieving the overall objective (only 33.3% of the secondary schools have an operational computer lab for instance), and flawed from an equity perspective. The table highlights a clear bias in access to ICT infrastructure and services in favour of the national and extra-county secondary schools at the expense of sub-county secondary schools in particular. The national schools are elite schools that are highly privileged, endowed with both human and financial resources, and generally located in big towns and cities. These factors augment each other in bestowing advantage in accessing quality education. Sub-county schools in contrast, are under-privileged, less endowed with both human and financial resources, attended generally by children from under-privileged households, and generally domiciled in villages and small towns. These factors similarly, augment each other to bestow disadvantage in accessing quality education.

Table 6.1: Access to ICT facilities and services in secondary schools by category

ICT Resource access	Sub-county	County	Extra-county	National	Average
The average number of learners sharing a computer	128	64	45	43	52
The proportion of schools with a computer laboratory	25.5%	57%	91.9%	97.3%	33.2%
Percentage of teachers trained in using ICT in teaching and learning	24.1%	30.7%	34.4%	31.1%	30.9%
Percentage of schools offering computer lessons to learners	20.2%	53.5%	87.2%	95.9%	28.2%
Percentage of schools offering computer lessons to learners	5.3%	18.6%	38.4%	31.5%	8.7%
Percentage of schools utilizing KICD audio-visual learning materials	52.1%	54.7%	58.1%	64.4%	52.9%
Percentage of schools utilizing the radio lessons on the national broadcaster – KBC	5.3%	5.8%	12.8%	8.2%	5.7%
Percentage of schools that possess functional official email address	80.9%	90.7%	98.8%	100%	83.1%
Percentage of schools that possess functional official telephone line	45.7%	61.6%	75.6%	93.2%	49.6%

Figure 6.10 shows access to ICT services among primary schools is still heavily influenced by the location of the school. Schools in rural areas are less likely to have a functional official email address compared to their urban counterparts. Of the surveyed schools, 52.7% of rural primary schools had a functional official email address compared to 64.8% of the urban primary schools.

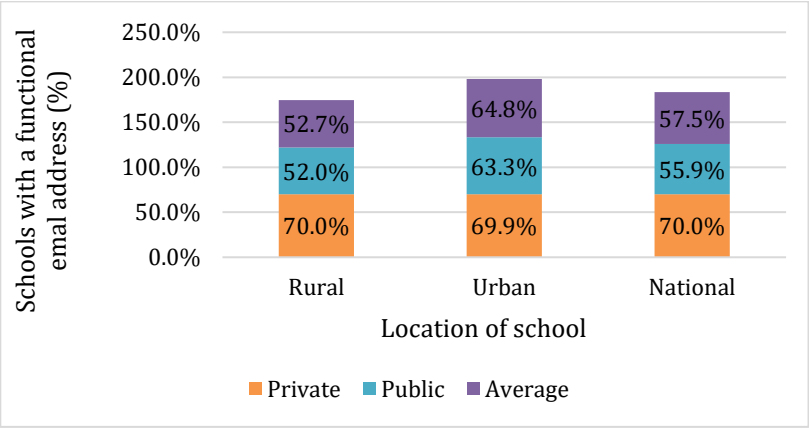

Fig. 6.10: Primary schools with a functional official email address by school type and location

6.4 Factors underpinning the gaps in ICTs in education policy implementation in Kenya

6.4.1 Low prioritization of ICT programs in education

As mentioned earlier in this paper, both the Ministry of Education and the Ministry of ICTI have evolved over the years. The MoEd was initially one, then split into two and merged again with a broader mandate. The MoICTI has expanded thrice in the life of this ICTs in education policy. From being Ministry of Information and Communication, to Ministry of Information, Communication and Technology to now Ministry of Information, Communication, Technology, Innovation and Youth Affairs. Each of these expansions comes with less than proportionate increase in budgetary allocation thus tightening the intra-ministry competition for the allocated funds. As a consequence, the MoEd has found itself pushing ICTs in education down in its priority investment ranking (Republic of Kenya, 2014; Republic of Kenya, 2021).

In the MTEF (2018-2020), for instance, the MoEd has listed priorities as: Primary Education, Secondary Education, Quality assurance and standards, Technical Vocational and Education Training, Youth training and Development,

University Education, Research Science Innovation and Management, Teacher Resource Management, Governance and Standards, and General Administration Planning and Support Services. An analysis of this and other education sector medium term and annual plans, reports and budgets reveals that ICT has fluctuated over time on the sector's priority list. In MTP I, ICTs in education was neither mentioned as a priority program for the sector nor sub-program in any of its sub-sectors (Republic of Kenya, 2008). In the MTP II, integration of ICT into teaching and learning was basic education sub-sector investment priority number 3 out of 6 (Republic of Kenya, 2014), then dropped to priority number last in the MTP III. Indeed, in the Medium-Term Expenditure Framework (MTEF) 2016/17 to 2018/19, ICT was not listed among the top 10 education sector priority programs (Republic of Kenya, 2016).

The latest MTEF period of 2022/23 – 2024/25, with 13 priority programs, has only two of them (primary education and youth training and development) listing ICT in their priority sub-programs. Primary education has ICT integration in teaching and learning as priority number 8 out of 8, while the youth training and development has ICT integration in youth polytechnics as priority number 4 out of 4 (Republic of Kenya, 2021). Under primary education sub-sector, ICT is ranked behind: Free primary education; Special needs education; Alternative provision of basic education; Early child development and education; Primary teachers training and in-servicing; Alternative basic adult & continuing education; and school health, nutrition, and meals. Under the youth training and development sub-sector, ICT is ranked behind the revitalization of youth polytechnics; curriculum development; and quality assurance and standards.

This low prioritization of ICT programs and projects in the MoEd's annual & medium-term sector plans contradicts the stated policy of the government on ICTs. It is noteworthy, that the greatest achievements in implementing the ICTs in education policy were recorded in the MTP II planning period, when ICT was highly ranked. The low prioritization of ICT programs in education is further compounded by low prioritization of education in MoICTI's annual & medium-term sector plans (the national ICT policy, hardly mentions education). The marginalization of education in MoICTI can only get worse as newly added departments compete for the interest of MoICTI leaders and the scarce program implementation capacity.

Low prioritization is further manifested in the fact that in some of the sector reports, there is no mention of the key pillars outlined as priorities in the ICT strategy and sectoral medium-term plans. Indeed, in the first MTEF (2008 - 2012) there was no allocation of funds to ICT in education programs.

6.4.2 Inadequate/irregular funding of the proposed programs and projects

Low ranking of programs means two things in an environment of financial constraints: the programs receive limited allocation of funds; and in the event of budget rationalization, their allocations are the most probable to be slashed or withdrawn altogether. With the MoEd being the beneficiary of the largest percentage of the national budget, its under-prioritized programs are always at the risk of not being funded or the allocated funds being recalled in the event of any fiscal stress that occasions institution of austerity measures. This has been the case for the financial years 2018/19 – 2020/21. With ICT programs ranked at the bottom of the sector priorities, most of their activities have either received minimal funding, or had their funds reallocated in supplementary budgets. "In FY 2019/20, KES 800 million was allocated for establishment of smart classrooms across the country to support the DLP. However, the funds were not availed due to lack of exchequer. In FY 2020/21, KES 300 million was allocated under the economic stimulus package for the recruitment of 1,000 ICT interns to support ICT integration in teaching and learning in primary schools." (Republic of Kenya, 2021:19). That too did not happen owing to budget cuts. In the same year, the sector targeted developing a policy on ICT integration in Vocational Training Centres (VTCs) but no funds were allocated (Republic of Kenya, 2021).

The low and fluctuating ranking of ICT programs in the education sector affects both funding of the programs and projects, and the capacity to absorb funds when they are made available. Implementing units/departments that are starved of resources downgrade or fail to build up their relevant capacities, which in turn inhibits their ability to absorb the intermittently allocated funds. Figures 6.11 and 6.12 illustrate this fact and underscore the critical role of under-funding in undermining the successful implementation of a policy such as this beyond the limited ability to procure the requisite goods and services. The two figures also demonstrate a pattern of more under-funding of MoEd programs (fig. 6.11) than MoE programs (fig. 6.12). The figures further reveal heightened funding of ICTs in education programs generally in the runup to the 2017 General Elections, after which the financing cooled off. The same picture of more funding for ICTs in education programs in the runup to the 2017 General Elections is discernible in fig. 6.13. While the general trajectory of annual funding for ICT integration in secondary schools' program shows a steady decline from F/Y 2014/15, there is a spike in F/Y 2016/17, after which the decline

accelerates despite critical annual targets being missed. This lends credence to the role of the often less discussed, politics, and electoral politics in particular, in policy implementation.

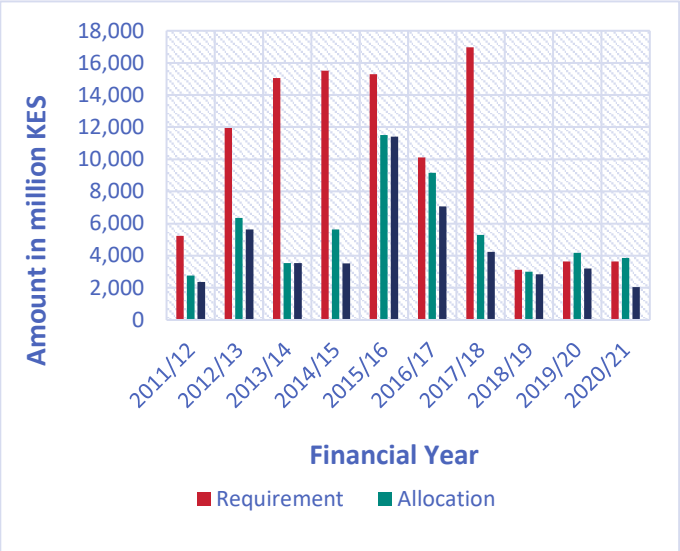

Fig. 6.11: Budget requirements, allocation & absorption by ICT Infrastructure connectivity 2011/12-2020/21

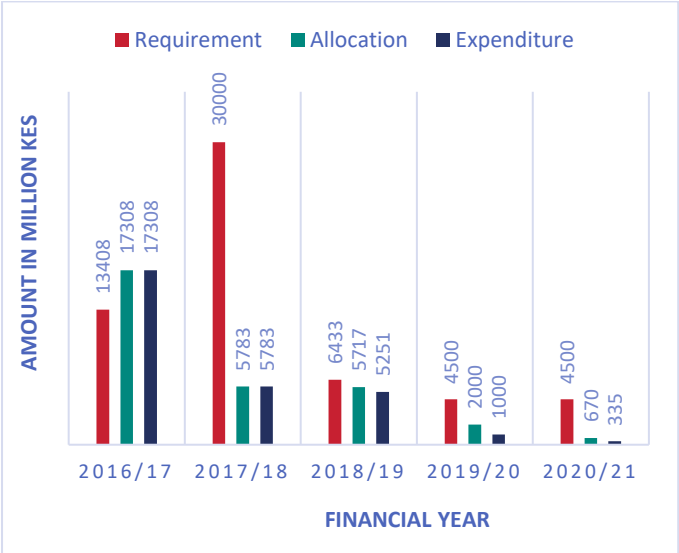

Fig. 6.12: Budget requirement, allocation & absorption by Electrification of primary schools' 2016/17-2020/21

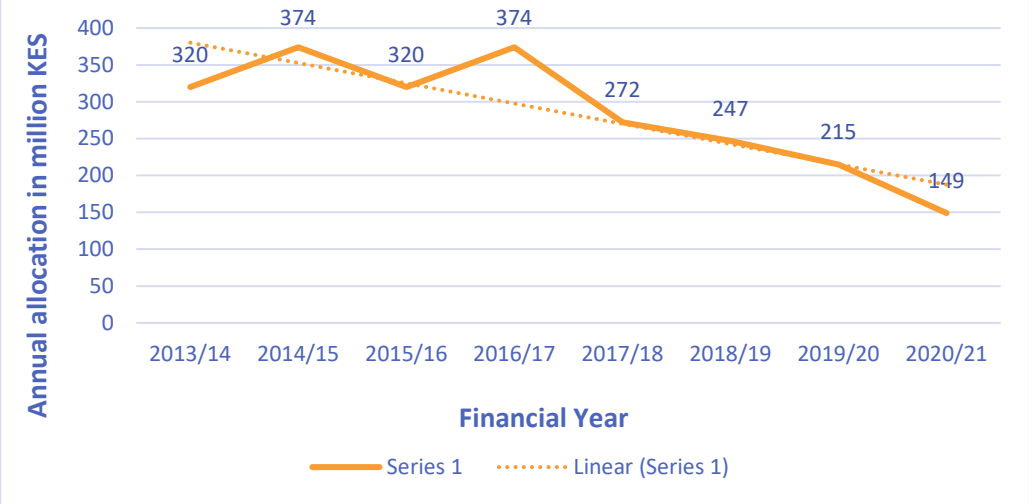

Figure 6.13: Annual budgetary allocation for ICT integration in secondary schools, 2013/14 - 2020/21

The continued decline in the annual allocations to the ICT integration in secondary schools' program is confounding. This program aims to provide "…ICT infrastructure and integrate ICT skills in the delivery of interactive learning process, school management, digital curriculum and promote e-learning in public secondary schools." (Republic of Kenya, 2021: 84). By virtue of its purpose, the implementation of this program is the exigency of the time in Kenya's secondary education sub-sector as the country faces the monumental challenge of transitioning to the new system of education. This process requires that secondary schools admit two cohorts of learners in 2023 and in 2024. The sheer numbers involved might overwhelm the sub-sector. This potential catastrophe could be averted by leveraging ICTs to deliver e-learning. This remains the most open window to alleviate the danger, but astoundingly, the program is being under-funded.

Inadequate funding has a direct impact on program implementation and achievement of desired programmatic and sectoral outcomes. During the period (2018/19 to 2020/21), for instance, the education sector set out to implement the following seven projects:

- Build the capacity of 90 ECDE teachers/caregivers on integration of ICTs in education;
- Provide 130 TVET institutions with ICT equipment and services;
- Recruit 1000 digital literacy program (DLP) - ICT interns;

- Establish 10,300 smart computer classrooms in public primary schools;
- Build the capacity of 6,000 field officers and BOM members on DLP smart classrooms management;
- Train 55,000 officers from the Ministry headquarters and agencies, down to the learning institutions, on NEMIS; and
- Install ICT in 85 offices across the country.

Most of the sector's ICT programs/projects were either partially implemented or shelved altogether on account of either inadequate funding or non-release of funds by the exchequer (Republic of Kenya, 2021). Table 6.2 summarizes the impact of underfunding on achievement of program/project outputs and outcomes.

Table 6.2: Impact of limited funding on ICTs in Education programs in the period 2018/19 – 2020/21

Activity	Target (No.)	Achieved	% achieved	Explanation
Capacity building of ECDE teachers/ caregivers on integration of ICT in education	90	83	92	Austerity measures and reduction of budget in the supplementary budget
Providing TVET institutions with ICT equipment and services	130	60	46	Institution of austerity measures
Recruitment of DLP - ICT Interns	1,000	0	0	Budget cuts and complicated recruitment process
Establishment of smart computer classrooms in public primary schools for DLP	10,300	0	0	Budget cuts
Capacity building of field officers and BOM members on DLP smart classrooms management	6,000	0	0	Budget cuts
Training of officers at ministry headquarters, agencies, county, sub-county, and learning institutions on NEMIS	55,000	20,000	36	Inadequate funding
Installing offices with ICT	85	20	24	Inadequate funding

From table 6.2, it is not just the number of programs that remained unfunded that is noticeable, but also the programs themselves. The unfunded programs are generally the high-value ones, yet more critical to the success of the policy in achieving its goals. They are also the programs that would have greater impact on improving equity in access to quality education.

6.4.3 Fragmented policy implementation structures

At the inception of the policy the Ministry of education outlined the policy and institutional frameworks highlighting the main agencies mandated to lead the implementation process. Many of the agencies in the institutional framework have since changed greatly in form and character. The Ministry of Education has undergone two changes that affect its leadership of the implementation process. Between 2008 and 2013, the ministry of education was divided into two - Ministry of Education and Ministry of Higher Education, Science and Technology. This automatically altered the composition of the Ministerial Committee, which was a key ICT in education policy implementing agency. The chairmanship of the Ministerial Committee is by the Principal Secretary (PS). The framework did not anticipate two PSs in the Ministry. Since 2013, the two ministries were merged back into one Ministry of Education, but with several state departments, each headed by a PS. Currently, there are five Principal Secretaries and that complicates the leadership of the Ministerial Committee.

Besides the loosely knit Ministerial Committee, whose secretariat is the ICT Unit, the implementation structure also has a nebulous entity called the Kenya ICT Trust Fund. The ICT Trust was established as a non-governmental organization, but operating under the MoEd to bring in the participation of the public and private corporates, and mandated to mobilize resources for ICT in education initiatives (Republic of Kenya, 2006b). From the interview with an officer in the ICT Unit,

> *"This entity has posed coordination and planning challenges, often leading to misallocation of resources on the basis of what priorities seem to draw in the*

interests of the external players. Mark you, those interests are themselves not clear."
– Officer from the ICT Unit, MoEd

But these are not the only challenges. The institutional framework doesn't factor in the other ministries (energy and MoICTI), which have ended up playing significant roles in the implementation of key ICT integration in education programs. Their roles have particularly been elevated during the implementation of the DLP thereby compounding the coordination challenge. These original gaps in the implementation structures and the continued changes that lead to continuous shifts in mandates between Ministries and departments mid-way, have made tracking of progress difficult. It has also hindered development of capacity to implement by responsible departments due to uncertainty in the tenure of their mandates. In the 2013/14 to 2017/18 medium-term expenditure framework, the MoEd had budgeted for all capacity building activities including infrastructure development and electrification of schools. The mandates for electrification and ICT infrastructure, including supply of ICT devices were shifted to the ministries of energy and ICT, innovation and youth affairs respectively. This fluidity of the implementing structures, causes underdevelopment of capacity to uptake funds when allocated and results in poor ICT budget absorption, which in turn leads to underfunding of its ICT programs.

More importantly, however, the distribution of mandate to implement a program such as the DLP to different ministries poses more challenges to the overall performance of the project. Using the DLP as an example, the MoICTI received most of the funds it required to supply digital devices to primary schools across the country, reaching up to 97% of its set target by June 2021. Similarly, MoE received enough funds, in time to deliver the electrification of primary schools to support the implementation of DLP. However, the MoEd neither received enough funds in time to train teachers on DLP nor did it receive funds to recruit the DLP interns. The consequence of this, which is attributable to the dispersal of the mandate for the DLP across different ministries, is thousands of electrified schools, with over a million expensive, but disused digital devices wasting away in their stores. The devices are wasting away due to a lack of teacher capacity to deploy them for the intended purpose – aiding teaching and learning.

6.4.4 Politics dwarfing policy

This policy has been under implementation since 2006 so its implementers have experienced one presidential transition. Political transitions, especially at the highest office level matter in policy implementation world over (Viennet and Pont, 2017). It did in Kenya. The inauguration of the Jubilee administration in 2013 brought new priorities with respect to the ICTs in education policy. The most notable being the DLP. "The Digital Literacy project … was to align integration of ICT into teaching and learning for grade one pupils. The components of this flagship project include: infrastructure; content of e-learning; capacity building of the teachers; and the devices." (Republic of Kenya, 2015:45). While the DLP's focus is ICT integration in education, its implementation is coordinated at the MoICTI in the procurement and deployment of devices to the schools while the MoEd manages their utilization (Republic of Kenya, 2020c).

An analysis of the sector budgets and expenditure plans between 2013 and 2017 highlights two facts:

- allocation of funds to ICTs in education increased significantly; and
- most ICT-allocated funds were channelled almost exclusively to implementation of the DLP.

It is important to note that the DLP was a direct extract from the ruling Jubilee party's 2013 election campaign manifesto, which may explain its prioritization at the expense of other programs, including policy development. Indeed, criterion number 3 of the nine used to allocate resources among competing education sector programs is "Linkage of the programme to the *Jubilee administration*[3] flagship projects/interventions" (Republic of Kenya, 2016:187).

Besides the elections, they say the coat takes the shape of the wearer. In Kenya, where the administrative practice is heavily, politically inclined, frequent changes in the top leadership of the Ministry of Education definitely impacts shifts in priorities. Since 2006, the ministry has had 10 Cabinet Secretaries as compared to other ministries, which average at five Cabinet Secretaries. A Cabinet Secretary (Minister, as they were called pre-2013), is responsible for the ministry's policy direction and is also the political figurehead of the ministry. It is also the responsibility of the Cabinet Secretary to negotiate for funding of the programs/projects of the ministry in the cabinet. The instability at the helm of the Ministry of education may explain the shifts in mandate away from the MoEd to competing ministries with respect to ICTs in education policy implementation, as well as the open bias in the allocation of the

[3] Emphasis added to highlight the role of political party manifesto.

resources that favours the other ministries' components of DLP. For instance, while DLP was estimated to cost KES 53 billion, the components of it allocated to MoEd account for less than 20%. Besides, they also constitute the bulk of DLP's sub-projects whose funds were mostly not released by the exchequer in the last MTEF (2018 -2020) leading to non-implementation.

Political considerations have also led to haphazard assignment of responsibilities in the implementation of the policy, in some cases against the existing legal framework. For instance, the KICD Act 2013 gives KICD the sole mandate to develop & regulate development of digital content. This has been disregarded and some of its legal responsibilities given to MoICT. The gerrymandering with the mandates of institutions established through elaborate processes of policymaking has blurred the boundaries of responsibility thereby limiting collaboration and weakening accountability mechanisms among the implementers.

6.5 Implications of the gaps in ICTs in education policy for equity in education in Kenya

The maps in figures 6.14 and 6.15 underscore one critical consequence of the incomplete implementation of the ICTs in education policy which has as one of its major aims, fostering equity in access to quality education and ICT services. The two maps show that the poorer counties have also recorded the lowest percentages of schools connected to electricity. Without electricity, the schools and therefore the learners in those regions are cut out from benefits that accrue from the use of ICT facilities and services available to their counterparts whose schools are connected to electricity.

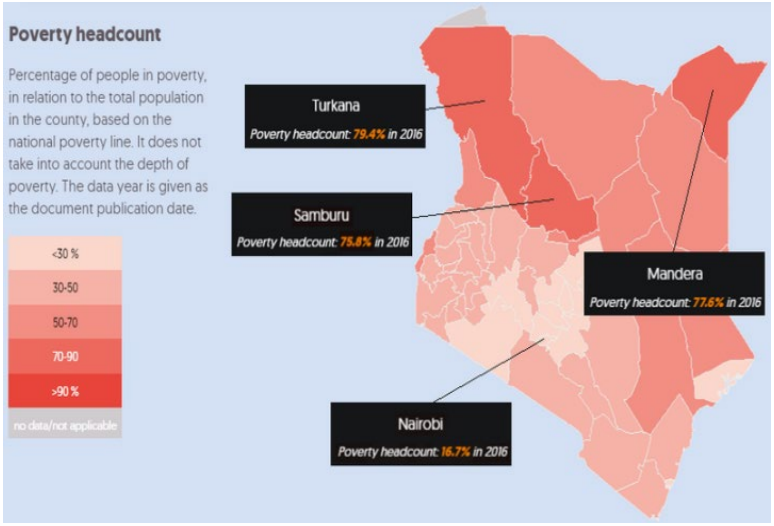

Fig. 6.14: Distribution of poverty levels on Kenya by county
Source: Spotlight on Kenya based on KIHBS, 2015/2016

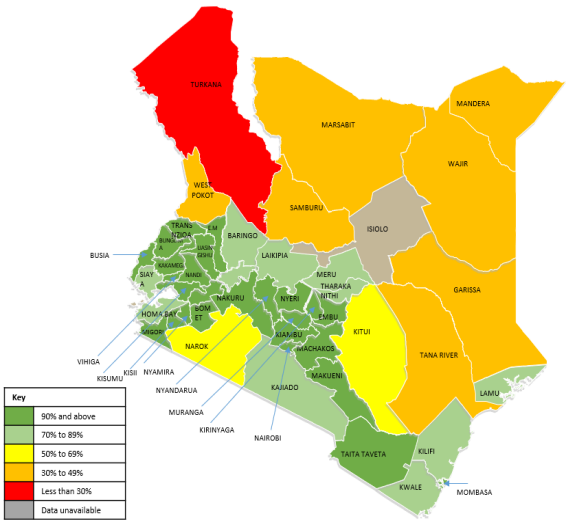

Fig. 6.15: Rate of primary school connectivity to electricity by county
Source: Usawa 2021 learning assessment survey

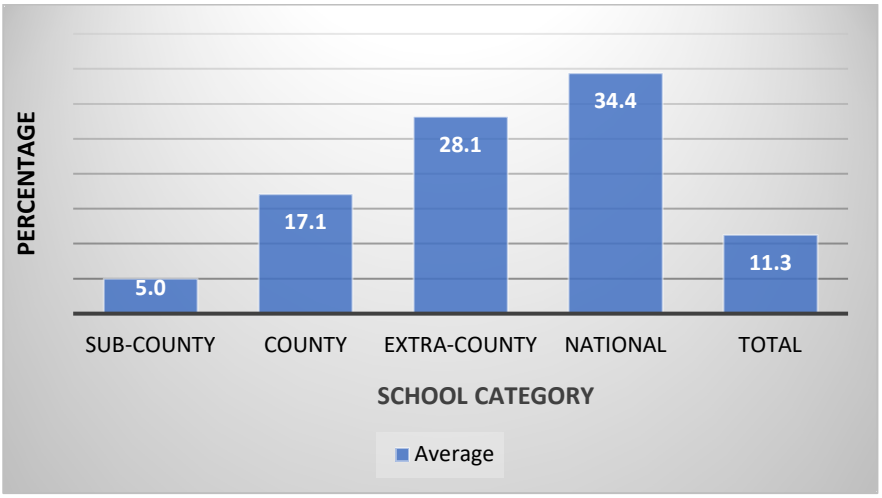

Fig. 6.16: Percentage of schools with a library connected to online resources by category

Figure 6.16 highlights the inequity in access to online library services on the basis of the category of secondary school a child attends.

- 11 in 100 schools nationally have libraries connected to online resources.
- 5 in 100 sub-county schools have libraries connected to online resources.
- 17 in 100 county schools have libraries connected to online resources.
- 28 in 100 extra-county schools have libraries connected to online resources.
- 34 in 100 national schools have libraries connected to online resources.
- Percentage of national schools with a library connected to online resources is more than six times that of sub-county schools and double that of county schools with similar libraries.

This is rooted in access to electricity among other variables and thus compounds the disadvantage of those in historically marginalised areas as shown in the map in figure 6.15.

The failure by the policy to achieve its goals, especially on the integration of ICTs in teaching and learning also meant that only a few learners could be reached remotely when covid-19 forced the government to shut schools. Figure 6.17 shows that only 9.3% of secondary school learners could access remote lessons during the extended school closure period. The figure also manifests inequity in accessing remote lesson based on the category of school one attends with those in national (best-resourced) schools more likely to access compared to those in the sub-county (least-resourced) schools.

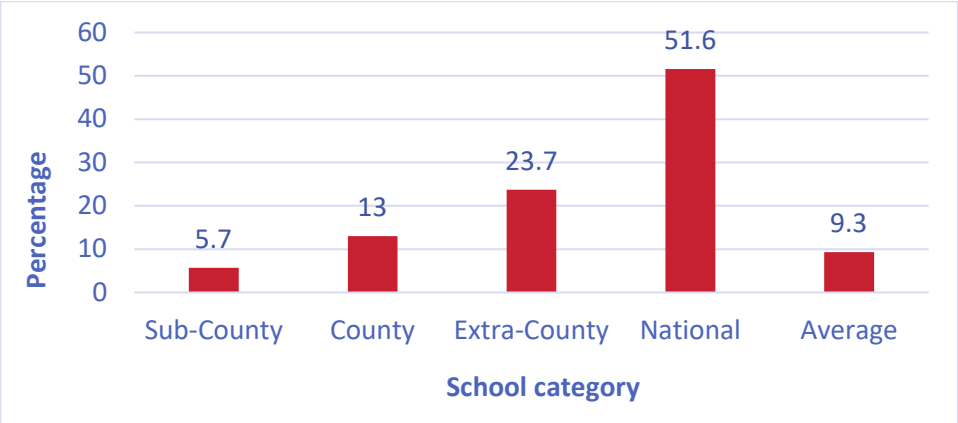

Fig. 6.17: Percentage of secondary school learners who accessed online lessons during the extended closure of schools by category of school attended

Similarly, figure 6.18 shows that only 25% of primary schools were able to support the mostly ICT-based learning continuity measure instituted to prevent learning loss among pupils during the covid-19 enforced schools' closure. It is important to note that despite the high levels of electrification of primary schools and supply of digital devices, the ability of these schools to support online learning continuity was low. This ability is highly correlated with the levels of training of teachers in ICT integration in teaching and learning.

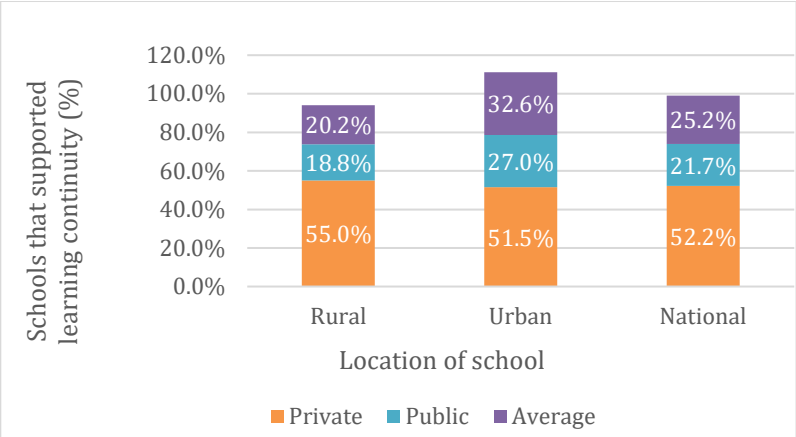

Fig. 6.18: Primary schools that supported learning continuity during school closures by school type and location

7. Policy Relevance

The COVID-19 pandemic has exposed massive digital divide in the Kenyan education sector 15 years into the government's implementation of a policy to promote integration of ICTs in education (Uwezo, 2020). It has also highlighted the potential of the digital divide to supercharge pre-existing inequities in education and widen inequalities in learning outcomes. This has the potential to reverse gains made in the sector and undermine the stated national goals of education (Republic of Kenya, 2019a). It also raises questions on the appropriateness of the strategies employed in implementing the policy, as well as the adequacy and targeting of the investments made in pursuing its objectives. This study sought answers to these and other relevant questions with a view to exposing the gaps between the enacted and implemented versions of the policy; expected and achieved policy outcomes; and the drivers of the observed gaps.

Achievement of the objectives of the ICT integration policy would deliver the promise of education to the children in most marginalized parts of the country and households. It would ameliorate perennial teacher shortages and mitigate the impact of frequent school closures occasioned by man-made and natural calamities that afflict these parts of the country. But the task has fallen behind its schedule by a huge margin. Wide gaps exist between what has been promised in the enacted and amended policy and what has been achieved over the years.

The enacted policy has mutated over the years, making effective targeting of interventions & overall measurement of achievement difficult. The tracking of achievement is made more complex by the shifts in implementing agencies with mandates over some programs moving from one agency to another midstream. Shifts in policy goals and implementation structures have been motivated more by politics rather than lessons from implementation evaluation.

Implemented policy departs significantly from the enacted policy. The consequence of ineffective implementation is ICTs in education utilization enhancing pre-existing geographic & socio-economic inequities, contrary to the stated objectives of the policy. The main drivers underpinning the gaps in implementation and the resultant undesirable effects are: low prioritization of ICT programs in education; under-funding; fragmented and fluid policy implementation structures; and dominance of politics over enacted policy (prioritization of funding for projects is based more on the ruling party manifesto than the written policy).

The findings of this study affirm the fact that policy is a political document. Its formulation must therefore consider the political realities and interests of the country not just in the short-term, but over the entire policy period. Since in a democratic country the politics keep changing, including changes at the highest level of the government over the policy period, to effectively implement a foresighted policy such as the ICTs in education policy, several considerations should be made as delineated in the next section.

RECOMMENDATIONS

In the light of the findings, this study puts forth four recommendations that could help improve the process of policy implementation in Kenya and other similar jurisdictions:

- Minimize policy fluidity by envisioning its changing ecosystem at inception to avoid persistent tweaking.
- Engage robustly in evidence-based political discourse influencing in favor of policy stability to enable proper targeting of interventions and measurement of progress.
- Inbuilt policy implementation with affirmative mechanisms to avoid the policies maintaining and/or exacerbating pre-existing advantage.
- Political discourse influencing may be more important than policy influencing in delivering beneficial changes in education Kenya, especially during political transitions.

ACKNOWLEDGEMENTS

First and foremost, I'm grateful to the Global Education Monitoring (GEM) Report for considering me for their auspicious fellowship, without which this work would not have been possible. In the same breadth, I'm heavily indebted to my mentor, Dr. Priyadarshani Joshi. Besides your heavy responsibility of coordinating the fellowship, which you executed excellently to our overall benefit, you exhibited unrivalled generosity, kindness and patience in supporting me throughout the development of this report. For this, I can't thank you enough. To the GEM Report team: Nicole Bella; Camila Lima De Moraes; Daniel April; Lema Zekrya; Francesca Endrizzi; Yuki Murakami; and Juliana Zapata, led by the Director, Dr. Manos Antoninis, thank you for taking time off your busy schedules to listen to my presentations, read and comment on this report to enhance its quality. To my colleagues, GEMR 2021 fellows: Leena Bhattacharya; Fernanda Gándara; Danqing Yin; Saba Saeed; and Muhammad Afzan Munir, I have learnt a lot from you and hope to continue learning more through future interactions. To my colleague and friend Dr. James Mbugua, who helped me with data analysis and the key informants who accepted my requests for interviews, this study would not have been without your invaluable input. To all the staff of the GEM Report and Usawa Agenda, who aided my successful participation in the 2021 fellowship, but whom I haven't mentioned by name, I appreciate your unique contributions to this study.

REFERENCES

Adams, D., Kee, G. and Lin, L. 2001. "Linking research, policy, and strategic planning to education development in Lao People's Democratic Republic", Comparative Education Review. Vol. 45/2, pp. 220-241, http://dx.doi.org/10.1086/447662.

Becker, G. S. 1964. Human capital: A theoretical and empirical analysis, with special reference to education. New York: NBER.

Bhuyan, A., Jorgensen, A. and Sharma, S. 2010. Taking the Pulse of Policy: The Policy Implementation Assessment Tool. Washington, DC: Futures Group, Health Policy Initiative, Task Order 1.

Brynard, P.A. 2007. Multiplicity in Public Policy Implementation. African Journal of Public Affairs, 1(1):34-40.

Calista, D. 1994. Policy Implementation. In Nagel, S. (ed.) Encyclopedia of policy studies, pp.117-155. New York: Marcel Dekker.

CESA. 2017. Continental Education Strategy for Africa 2016-2025. CESA Journal. 1 (July 2017). 16-25.

Collins, A. and Halverson, R. 2009. Rethinking education in the age of technology: The digital revolution and schooling in America. Technology, Education-Connections, (Tec) Series. New York: Teachers college press.

Creswell, J. W. 2012. Educational research: Planning, conducting, and evaluating quantitative and qualitative research (4th Ed.). Boston, MA: Pearson Education, Inc.

del Campo, J.M., Negro, V. and Núñez, M. 2012. The history of technology in education. A comparative study and forecast. Procedia - Social and Behavioural Sciences. 69. 1086 – 1092.

Department of Education. 2004. White Paper on e-Education: Transforming Learning and Teaching through Information and Communication Technologies (ICTs). Johannesburg: Government Printers.

Educational Testing Service (ETS). 2007. Digital Transformation: A Framework for ICT Literacy. https://www.ets.org/Media/Research/pdf/ICTREPORT.pdf Retrieved on 31/07/2021.

Ertmer, P. A. and Otternbreit-Leftwich, A. T. 2010. Teacher technology change: How knowledge, confidence, beliefs, and culture intersect. Journal of Research on Technology in Education. 42. 255-284.

Eshiwani. G. S. 1990. Implementing Educational Policies in Kenya. World Bank Discussion Papers No. 85. Africa Technical Department Series. Washington DC: World Bank.

Etta, F.E. and Elder, L. (Eds.). 2005. At the Crossroads: ICT Policy Making in East Africa. IDRC. www.idrc.ca/openebooks/219-8/ Retrieved on 27/07/2021.

Farrell, G. 2007a. Survey of ICT and Education in Africa: Kenya Country Report http://documents1.worldbank.org/curated/en/616481468047703710/pdf/463850BRI0Box31ya010ICTed0Survey111.pdf Retrieved on 13/06/2021.

Farrell, G. 2007b. Survey of ICT and Education in Africa: Rwanda Country Report http://documents1.worldbank.org/curated/en/616481468047703710/pdf/463850BRI0Box31ya010ICTed0Survey111.pdf Retrieved on 23/07/2021.

Fu, J. S. 2013. ICT in Education: A critical literature review and its implications. International Journal of Education and Development using Information and Communication Technology (IJEDICT). 9 (1) 112-125.

Gee, J. P. 2011. Language and learning in the digital age. New York: Routledge.

Goktas, Y., Yildirim, S. and Yildirim, Z. 2009. Main barriers and possible enablers of ICT integration into pre-service teacher education programs. Educational Technology and Society. 12, pp.193-204.

Gündüz, H. B. 2010. Digital divide in Turkish primary schools: Sakarya sample, The Turkish online journal of educational technology. Vol. 9 (1). pp. 43-53.

Hinchliffe, L. J. 2003. Technology and the Concept of Information Literacy for Pre-Service Teachers. Illinois: The Haworth Press.

Honan, E. 2008. Barriers to teachers using digital texts in literacy classrooms. Literacy. 42. 36-43.

Hutchison, A. and Reinking, D. 2011. Teachers' perceptions of integrating information and communication technologies into literacy instruction: a national survey in the United States. Reading Research Quarterly. 46. 312-333.

JICA. 2012. Basic education sector analysis report. Japan International Cooperation Agency (JICA). https://openjicareport.jica.go.jp/pdf/12083176.pdf Retrieved on 23/08/2021.

Jeong, E. 2020. Education Reform for the Future: A Case Study of Korea. International journal of education and development using information and communication technology (IJEDICT). 16 (3) (Special Issue). 66-81.

Kamau, L. M. 2014. The future of ICT in Kenyan schools from a historical perspective: A review of the literature. Journal of education & human development. 3 (1) 105-118.

Kingdon, J.W. 1984. Agendas, Alternatives and Public Policies. Ann Arbor: University of Michigan.

Kirimi, K. J. 2014. Impact of Information Communication Technology on Education-Kenya. Journal of Educational and Social Research. 4 (1). 435.

Manyasa, E. 2015. Schooling without learning: the long-term implications of free primary education for income and welfare inequalities in Kenya, in Aworti, N. and Musahara, H. (Eds.). Implementation of millennium development goals: progresses and challenges in some African countries. Addis Ababa: OSSREA.

Mathipa, E. R. and Mukhari, S. 2014. Teacher Factors Influencing the Use of ICT in Teaching and Learning in South African Urban Schools. Mediterranean Journal of Social Sciences. 5 (23). 1213.

Matland, R. 1995. Synthesizing the implementation literature: The ambiguity-conflict model of policy implementation. Journal of public administration research and theory, 5(2):145-74.

Meyers, D.C., Durlak, J.A. & Wandersman, A. 2012. The Quality Implementation Framework: A Synthesis of Critical Steps in the Implementation Process. Am J Community Psychol 50, 462–480. https://doi.org/10.1007/s10464-012-9522-x. Retrieved on 29/12/2021.

Mthethwa, R. M. 2012. Critical dimensions for policy implementation. African Journal of Public Affairs. Vol. 5 (2).

Ndou, V. 2004. E-governance for developing countries: opportunities and challenges, Electronic journal of on information systems in developing countries. Vol. 18 (1) 1-24.

Norris, C. A. and Soloway, E. 2009. A disruption is coming: A primer for educators on the mobile technology revolution, in Durin, A. (Ed.). Mobile technology for children: Designing for interaction and learning. San Francisco: Morgan Kaufman. pp. 83-98.

Norris, C. A. and Soloway, E. 2011. Learning and schooling in the age of mobilism, http://cecs5580.pbworks.com/w/file/fetch/50304204/Soloway%20Ed%20Tech-Learning%20and%20Schooling%20in%20the%20Age%20of%20Mobilism.pdf (Retrieved on 21.07.2021)

Nowell, S.D. 2014. Using disruptive technologies to make digital connections: stories of media use and digital literacy in secondary classrooms. Educational Media International. 51(2) 109-123.

Nyagowa, H. O., Ocholla, D. N. and Mutula, S. M. 2012. Evaluation of Success of NEPAD's Pilot e-Schools in Kenya: An overview. http://www.lis.uzulu.ac.za/research/2012/Nyagowa%20and%20Ocholla%20and%20Mutula%20SCECSAL%202012,KPUC&UZ&UKZN%203.pdf Retrieved on 25/07/2021.

Parvin, R. H. and Flint, S. S. 2015. "The effectiveness of using technology in English language classrooms in government primary schools in Bangladesh". FIRE: Forum for International Research in Education: 2 (1).

Peltzman, S. Levine, M. E and Noll, R. G. 1989. The economic theory of regulation after a decade of deregulation. Brookings papers on economic activity. Microeconomics. 1989. 1-59.

Piper, B., Jepkemei, E., Kwayumba, D., and Kibukho, K. 2015. Kenya's ICT policy in practice: The effectiveness of tablets and e-readers in improving student outcomes. FIRE: Forum for International Research in Education, 2(1). http://preserve.lehigh.edu/fire/vol2/iss1/2 Retrieved on 14/06/2021.

Pisapia, J. 1994. Teaching with technology: Exemplary teachers. Research brief No. 6. Richmond. VA: Metropolitan Educational Research Consortium.

Postman, N. 1995. The end of education: redefining the value of school. New Yolk: Knopf.

Postman, N. and Weingartner, C. 1969. Teaching as a subversive activity. New Yolk: Dell.

Prensky, M. 2001. "Digital Natives, Digital Immigrants Part 1". On the Horizon. 9 (5) 1 – 6.

Psacharopoulos, G. 1984. The contribution of education to economic growth: international comparisons, in Kendrick, J. W. (Ed.). International comparisons of productivity and causes of the slowdown, American enterprise, Ballinger, 335 – 355.

Purdue Online. The Evolution of Technology in the Classroom. https://online.purdue.edu/blog/education/evolution-technology-classroom (Retrieved on 26.07.2021).

Ratheeswari, K. 2018. Information Communication Technology in Education. Journal of Applied and Advanced Research. 3(Suppl. 1) 45-47.

Republic of Kenya. 2004. E-Government Strategy: The Strategic Framework, Administrative Structure, Training Requirements and Standardization Framework. Nairobi: Government Printer.

Republic of Kenya. 2005a. Sessional Paper No. 1 of 2005: A Policy Framework for Education, Training and Research. Nairobi: Government Printer.

Republic of Kenya. 2005b. Kenya Education Sector Support Programme 2005 - 2010. Nairobi: Government Printer.

Republic of Kenya. 2006a. National Information and Communication Policy. Nairobi: Government Printer.

Republic of Kenya. 2006b. National Information and Communication Technology (ICT) Strategy for Education and Training. Nairobi: Government Printer.

Republic of Kenya. 2007. Vision 2030: A globally competitive and prosperous Kenya. Nairobi: Government Printer.

Republic of Kenya. 2010. Human Resource Development Sector Report 2010: Achieving Economic Growth through targeted, Effective and Efficient Public Spending. Nairobi: Government Printer.

Republic of Kenya. 2011. The Kenya Information and Communications Act, 1998. Revised in 2011. Nairobi: Government Printer.

Republic of Kenya. 2013. Education Sector Report 2014/15-2016/17: Medium Term Expenditure Framework. Nairobi: Government Printer.

Republic of Kenya. 2014. National education sector plan 2013 - 2018. Nairobi: Government Printer.

Republic of Kenya. 2015. Education and Training Sector Gender Policy. Nairobi: Government Printer.

Republic of Kenya. 2016. Education Sector Report 2017/18 – 2019/20: Medium Term Expenditure Framework. Nairobi: Government Printer.

Republic of Kenya. 2017. National education sector strategic plan 2018 – 2022. Nairobi: Government Printer.

Republic of Kenya. 2018. Third Medium Term Plan 2018 – 2022, Transforming Lives: Advancing socio-economic development through the “Big Four”. Nairobi: Government Printer.

Republic of Kenya. 2019a. Sessional Paper No. 1 of 2019: A Policy Framework for Reforming Education and Training for Sustainable Development in Kenya Nairobi: Government Printer.

Republic of Kenya. 2019b. National Information, Communications and Technology (ICT) Policy. Nairobi: Government Printer.

Republic of Kenya. 2020a. Kenya Basic Education COVID-2019 Emergency Response Plan. Nairobi: Government Printer.

Republic of Kenya. 2020b. Basic Education Statistical Booklet, 2019. Nairobi: Government Printer.

Republic of Kenya. 2020c. Education Sector Report: Medium Term Expenditure Framework 2021/22 – 2023/24. Nairobi: Government Printer.

Republic of Kenya. 2021. Education Sector Report: Medium Term Expenditure Framework 2022/23 – 2024/25. Nairobi: Government Printer.

Republic of Rwanda. 2015. Smart Rwanda 2020 Master plan: Towards a knowledge-based society. https://www.minict.gov.rw/fileadmin/user_upload/minict_user_upload/Documents/Policies/SMART_RWANDA_MASTERPLAN.pdf Retrieved on 29/08/2021.

Romer, P. 1990. Endogenous technological change. Journal of Political Economy. 98. 71-102.

Sang, G., Valcke, M., Braak, J., Tondeur, J. and Zhu, C. 2011. Predicting ICT integration into classroom teaching in Chinese primary schools: Exploring the complex interplay of teacher-related variables. Journal of Computer Assisted Learning. 27. 60-172.

Sen, A. 1999. Development as Freedom. New York: Oxford University Press.

Siemens G. (2005), Connectivism: a learning theory for the digital age, http://er.dut.ac.za/bitstream/handle/123456789/69/Siemens_2005_Connectivism_A_learning_theory_for_the_digital_age.pdf?sequence=1&isAllowed=y Retrieved on 19/11/2020

Tezci, E. 2011. Factors that influence preservice teachers' ICT usage in education. European Journal of teacher education. 34. 483-499.

Tinmaz, H. and Ozturk, Y. E. 2019. ICT Integration into Education: a Comparison of South Korea and Turkey. Perspectives on global development and technology. 18 (4) 422 – 456.

UNESCO. 2011. Transforming education: The power of ICT policies. Paris: UNESCO.

UNESCO. 2013. UNESCO Strategy for ICT in Education: Challenges, Priority Areas, and Deliverables. Presented for Discussion at UNESCO High-Level Policy Forum on ICT and Education for All, 10-11 June, 2013. http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/ED/pdf/Session5_UNESCO_ICT_in_Edu_Programme_ED.pdf Retrieved on 25/07/2021.

UNESCO. 2019. "Classroom revolution through SMART education in the Republic of Korea: case study by the UNESCO-Fazheng project on best practices in mobile learning." Paris: UNESCO.

UNESCO. 2020. Global Education Monitoring Report 2020: Inclusion and education: All means all. Paris: UNESCO.

UNICEF. 2019. For Every Child, Every Right: The Convention on the Rights of the Child at a crossroads. New York: United Nations Children's Fund (UNICEF).

United Nations. 2012. The millennium development goals report. New York: United Nations.

USAID. 2020. Kenya Digital Ecosystem Country Assessment (DECA). https://www.usaid.gov/digital-development/DECA/Kenya (Retrieved on 26.07.2021).

Usawa. 2022. Is our secondary school system inequitable by design? Usawa 1st Secondary School Survey Report. Nairobi: Usawa Agenda.

Uwezo. 2020. Are Our Children Learning? The Status of Remote-learning among School-going Children in Kenya during the Covid-19 Crisis. Nairobi: Usawa Agenda.

Uwezo. 2021. Are All Our Children Learning? Uwezo 7th Learning Assessment Report. Nairobi: Usawa Agenda.

Viennet, R. and B. Pont. 2017. Education Policy Implementation: A Literature Review and Proposed Framework. OECD Education Working Paper No. 162.

World Bank. 2011. Implementation Completion and Results Report on a Credit to the Republic of Kenya for an Education Sector Support Project. Washington DC: World Bank.

World Bank. 2018. World Development Report: Learning to realize Education's Promise. Washington DC: World Bank.

APPENDICES

Appendix 1: Summarised ICT in education policy implementation framework

No.	Goals	Main Outputs / Indicators	Timeframe	Lead Agency	Amount (KES "000")
1	ICT in education policy formulation	• *ICT Strategy developed*	*3 Years*	*MoEd, ICT Trust, Donors*	6,325
2	Digital equipment provision	• *18,900 primary schools access multimedia equipment* • *2000 primary schools access ICT equipment* • *3000 secondary schools with adequate ICT equipment* • *1520 secondary schools with solar equipment* • *120 technicians trained* • *1 assembly unit established* • 5 laboratories built by the community • *800 educational institutions and community centres equipped with ICT equipment.*	*5 years*	*MoEd (DHE, DBE, ICT) / ICT Trust*	7,853,100
3	Connectivity & network infrastructure	• *5,800 computer LABs established & networked.* • 5 schools with a program to maintain labs • *84 education offices country-wide connected to Internet.* • 7,500 technicians trained	*5 years*	*MoEd / ICT Trust*	2,725,404
4.	Access & equity	• *200 Nonformal Education centres equipped* • *200 rural and urban-poor education institutions equipped* • *250 remote education institutions connected to Internet.* • *National education portal established* • *500 education institutions piloted with innovative and alternative sources of electricity.* • *special needs education institutions equipped with ICT.* • *50 Open & Distance Education Centres facilitated with ICT Equipment* • *76 ICT resource centres well maintained, secured & equipped for access by public.*	*5 years*	*MoEd, ICT TRUST, CSO, KPLC, KenGen, Solar firms, UNICEF*	1,334,900
5	Establish technical support & maintenance mechanisms	• *National ICT Support Centre established.* • *20 education institutions reached out and utilising the technical support centre services.* • *technical support centres set up & equipped to respond to sector needs & offer ICT emergency support (Helpdesk).* • *5800 trained technicians* • *5800 educational institutions adequately equipped with backup tools*	*5 years*	*MoEd/ ICT Trust*	82,700
6	Harnessing emerging technologies	• *National Centre for Education Technology established* • *2000 Common ICT examinations administered at Primary Schools level.* • *3800 Common ICT examinations administered at secondary Schools level*	*5 years*	*MoEd, ICT Unit, ICT TRUST, KIE (KICD)*	180,050
7	Digital content development	• *5 reviews done in ICT Education curriculum* • *10,000 ICT education syllabuses developed.* • *Digital content materials produced and distributed to education institutions.*	*5 years*	*MoEd, ICT Unit, ICT TRUST, KIE (KICD)*	185,350

8	Integration of ICTs in teaching and learning	• *1 potential model ICT institution identified* • *1 resource person identified to work on ICT integration in education.*	*1 year*	*MoEd, ICT Trust*	6,800
9	Capacity building including training	• 2550 education managers trained on ICTs • *2550 ICT Equipment given to education managers* • *20 ICT integrators trained to support integration at the national and district levels* • *675 Trainers Trained to undertake the ICT Teacher Training* • *3600 Trained Teachers from the program* • *56,000 in-serviced teachers both for Secondary and Primary* • *37,800 primary schools in-serviced teachers on Multimedia content.*	*5 years*	*MoEd, ICT Trust, Universities*	4,782,050
10	Research & development	• 170,000 research materials digitized for access by general public. • 3,800 ICT products deployed to education institutions programs	*5 years*	*MoEd, JICA, NCST, Universities*	130,500
11	Establishment of education management information systems (EMIS)	• 2 Servers and associated software for access of data and information acquired	*2 years*	*MoEd, ICT Trust, World Bank*	11,150
12	Promote and facilitate public and private sector partnerships to mobilize resources to equip education institutions and investment in ICT in education sector.	• 800 educational institutions and community centres equipped with ICT equipment • *Membership in NEPAD e-Schools Technical Team* • *Membership in the National WSIS Technical Team* • 5 sensitization workshops held to encourage community to contribute to ICT in education.	*5 years*	*MoEd, ICT Trust*	932,330
13	Establish a legal framework and regulatory framework	• 1 Accreditation of ICT training body formed • Strategy on ICT training progression developed • standards on privacy and protection of community values developed	*1 year*	*MoEd, KNEC, ICT Trust*	12,085
14	Monitoring & evaluation	• 5 annual monitoring and evaluation reports • 5 annual public briefing sessions	*5 years*	*MoEd, ICT Trust*	14,687
Total					**18,257,431.5**

Appendix 2: Education policy implementation: The framework in action

		Coherent implementation strategy
Smart policy design	• What is the purpose of the policy? • What problem does it aim to respond to? • What is done elsewhere / has been done in the past about this problem? • How is it / has it been done? • What is its vision and goals? • Are the vision / goals shared and coherent? • What is the policy supposed to change to achieve the vision? • Is the underlying theory of change sound?	• Use knowledge that is relevant to both the policy and the local setting • Agree on a small number of simple, ambitious and measurable objectives • Secure the resources and plan for the whole duration of the implementation process. Set up a realistic timeline • Agree on the relevant tools to implement the policy

	• Who are the targets? • Are the policy targets aware of what they are expected to change / do they agree? • How feasible is the policy? • What are the existing vs. required resources?	• Set up a monitoring system to get frequent and reliable data without interfering with the implementation process • Adjust the implementation process based on the data and feedback collected
Inclusive stakeholder engagement	• Who are the key stakeholders affected by the policy? • What are the relationships between key actors? • How would they be made to collaborate? • Who is needed to successfully implement? • Who was instrumental in implementing this type of policy elsewhere / in the past? • Are they capable of fulfilling the task? • If not, how would their capacity be built? • How will implementers be held accountable to the public? • Which actors might interfere with / aid the implementation? • How would they be brought on board?	• Engage key stakeholders and incorporate their vision (if not done during policy design) • Harness their knowledge to make the implementation strategy more practical • Agree on the distribution of tasks and responsibilities • Work with the key actors to build their capacity • Adapt the accountability mechanisms to the local context • Set up simple ways to communicate between actors • Communicate clearly about the policy
Conducive context	• What is the institutional setting in place to support the policy implementation? • Do the mechanisms needed for this policy fit with the existing? • If not, how would they be adjusted? • What trends and likely shocks external to the implementing system could affect the process? • What can aid the implementation and how can it be harnessed? • What can hinder the process and how can it be mitigated? • Are there any other policies that tackle this problem? • How could they interfere with / complement each other?	• Make use of the existing setting before creating new institutions, or create institutions that fit well with the existing (especially for incremental policy changes) • Prepare several scenarios of what could happen and the plausible strategies and resources to face them. • Avoid overlap and inconsistencies between policies • Use the complementarities