Promoting digital inclusion in African cities and regions: Policy frameworks for digital resiliency in education for a better COVID-19 recovery

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List of Abbreviations

Emergency Remote Education   ERE

Digital Remote Education   DRE

Digitally Inclusive Emergency Remote Education   DI-ERE

Information and Communication Technologies   ICTs

Mohammed VI Polytechnic University   UM6P

United Nations Human Settlement Programme   UN-Habitat

1. Executive Summary

The COVID-19 pandemic caused immense disruptions in daily activities across all spheres of our lives. Education was one of such key daily activities that was impacted but needed to be sustained over the period. Consequently, numerous governments through their National Education Ministries instituted Emergency Remote Education (ERE), a rapid response digital education meant to ensure continuity in education. As the mode is digital ERE, this demanded a change in both teaching and learning practices. On the one hand, teachers had to learn and create teaching material for online delivery, and on the other hand, students had to learn to access and learn via digital content.

In a number of African countries, in executing this emergency education, their governments faced the challenges of an existing digital divide where access to connectivity, devices and digital skills inhibited efficient and inclusive teaching and learning.

This research project therefore proposed to promote digital resiliency through a three-pronged approach. Firstly, to assess the digital divide in emergency remote education in Africa using two case studies – Benguerir in Morocco and Nairobi in Kenya. Building on the UN-Habitat digital divide assessment tool, the symptoms (gaps) and causes (roots) of the digital divide were assessed in each of the cities focusing on educational institutions and students from low-income neighbourhoods. Secondly, to explore inspiring practices in digital inclusion across the continent using case studies, and lastly, to develop a policy framework of recommendations.

The assessment has shown the presence of a digital divide in education in both Benguerir and Nairobi relating to material access and capabilities for both teachers and students but in varying proportions based on specific local contexts. Further, it was observed that digital divide concerns were not fully considered in emergency remote education during the pandemic. Limited support through the local education unit was given through the training of teachers to record and share teaching material. Other initiatives of support students and teachers were at the liberty of the schools that could mobilize parents for support. At the level of households, there was an emergence of solidarity initiatives such as sharing of Internet connectivity, learning material and resources.

2. Introduction

2.1.   ITU Connect2Recover Research Competition

In the context of the global COVID-19 pandemic, the International Telecommunication Union (ITU) launched Connect2Recover as an initiative to support countries to recover post-pandemic through reinforcing their digital infrastructure and ecosystems and to remain resilient in times of hazard. Within this initiative, a global research competition, the first of its kind by ITU, was launched inviting teams from across the world to submit proposals on digital resiliency and digital inclusion to build back better with broadband for pandemic recovery. [1] In total, fifteen winning teams were selected from 307 applications across 80 countries[2]. This is one of the winning teams. From April through May 2022, three virtual information sessions[3] were organised for the winning teams to present their progress and meet ITU Member States, Sector members and academia. It also served as a platform to solicit support and enhance collaboration among the research teams.

2.2.   Research Background

In the wake of the ongoing COVID-19 pandemic, governments across the world have relied on the use of digital technologies to deliver much needed public services. Crucially, the education sector has been one of the most impacted by these services as it relies largely on physical contact between educators and learners in designated spaces over some time. Education departments instituted emergency policies consisting of emergency remote learning relying on digital technologies across several countries. Despite the initiative, there have been roadblocks including specifically the issue of existing digital divides that impede the proper functioning of remote learning. This cuts across educators and learners alike and therefore needs to be investigated further in the light of this pandemic in order to learn from the experiences and develop adequate resiliency measures moving forward.

Connecting this issue to global policy concerns, the New Urban Agenda calls for cities to develop national information and communications technology policies and e-government strategies, in order to make information and communications technologies accessible to the public (UN-Habitat, 2017). Additionally, the Sustainable Development Goals (Target 9. c) call for a significant increase in access to information and communications technology globally, as well as the provision of universal and affordable access to the Internet in the least developed countries (LDCs). Likewise, the UN Secretary General's Roadmap for Digital Cooperation[4] released in June 2020 highlights global connectivity, digital public goods and digital inclusion as key pillars to

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[1] https://www.itu.int/en/ITU-D/Pages/connect2recover/research-competition/default.aspx

[2] https://www.itu.int/en/ITU-D/Pages/connect2recover/research-competition/winners/default.aspx

[3] https://www.itu.int/en/ITU-D/Pages/events/connect2recover/infosessions-research-competition-papers-focusing-on-Africa/default.aspx

[4] https://www.un.org/en/pdfs/SG_Roadmap_for_Digital_Cooperation-Press_Release_Final.pdf

achieve 'digital cooperation'. UN-Habitat has developed relevant knowledge and policy guidance on the digital divide, emerging from its Smart Cities flagship programme and work on smart city strategies and policies as well as its work on innovation and digital transformation with close attention to digital rights.

It is therefore important to put in place policy frameworks that foster digital inclusion in education to build more resilient post-COVID-19 societies. These, coupled with an acknowledgement of the necessary leadership, resources and skills or capacity that are required to translate these policies into action as well as provide to guidance to African local governments in making strategic investment choices in digital infrastructure for quality education. In doing so, digital connectivity can be improved for real people in everyday communities, while promoting job creation and improving growth outcomes.

2.3.   Research Scope

The project seeks to assess the digital divide in two African cities, learn from best practices across the continent and then leverage this knowledge to propose a policy framework of recommendations for action. By assessing the digital divide, this study develops a mixed-methods approach to collect quantitative and qualitative data from educationists – teachers and administrators – and students in a low-income neighbourhood. The project then looks at best practices of digital inclusion across the continent in order to finally propose a policy framework for action. The project does not therefore seek to propose solutions for action specific to each city but rather a policy framework for action.

2.4.   Research Objectives/Aim

This project aims to develop a **policy framework** including key recommendations to address the **digital divide in education** in Africa using the cities of Benguerir in Morocco, and Nairobi in Kenya as case studies. In order to achieve this overarching aim, **three** specific objectives are developed and outlined:
1. **Explore** the digital divide and the impact on education in these case study cities
   o Specifically, through this objective, we aim to understand how education including basic, secondary and high education bridged the digital divide from the general perspective to the day-to-day life of communities. The following questions will be investigated:
     ▪ *How did Emergency Remote Education during the COVID-19 pandemic take into account education digital divide in the city?*
     ▪ *How do households with students navigate digital divide challenges to access Emergency Remote Education during the pandemic?*
2. **Identify and showcase** best practices that bridge the educational digital divide during the COVID-19 pandemic across the African continent.
   o Through this objective, we seek to discover and showcase exemplary cases of resilience to the educational digital divide that emerged or were enhanced during the COVID-19 pandemic across the African continent. The following question will be investigated:

- *Which are inspiring cases of bridging the educational digital divide on the continent and what lessons can we learn from them?*
3. **Propose** a policy framework for key recommendations to bridge the educational digital divide on the continent
    - Through this, we seek to engage stakeholders in the development of a policy framework and recommendations for bridging the educational digital divide. The following question will be investigated:
    - *What are the key elements of a policy framework to bridge the educational digital divide and with what recommendations given the lessons learnt?*

Objective1- Explore Digital Divide

Objective 2 - Digital inclusion inspiring practices

Objective 3 - Develop Policy Framework
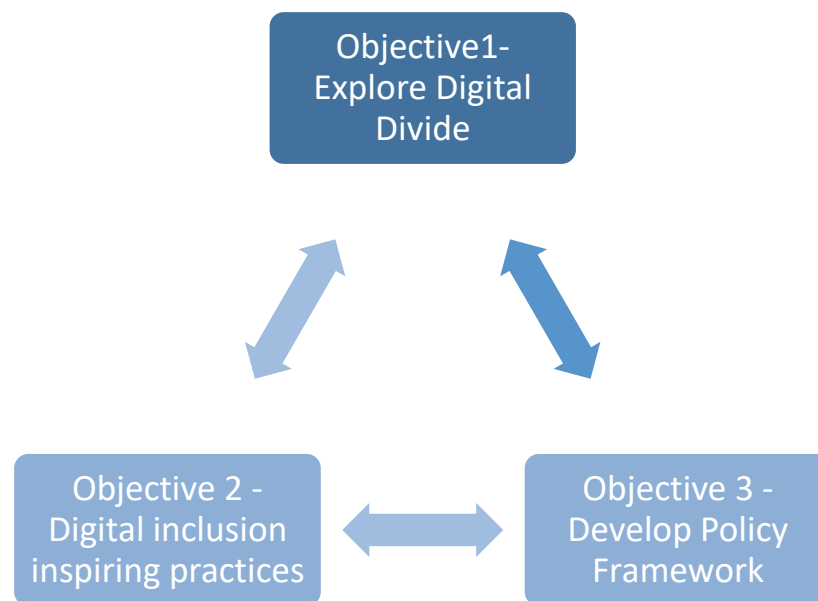
Figure 1: Project components
Source: Authors

3. Literature Review

3.1. COVID-19 and Emergency Remote Education: an overview of case study countries

In the wake of the COVID-19 pandemic since 2020, many nations instituted social distancing protocols in order to curb propagation. Many normal and usual face-to-face activities were required to be conducted via a remote format urgently. Consequently, the shift in education across all levels to this remote format has been variously termed Emergency Remote Education (ERE) or Digital Remote Education (DRE). This is important to differentiate it from digital education in normal conditions where serious planning goes into its development. Researchers (Hodges, Moore, Lockee, Trust, & Bond, 2020, p. 7) have defined it as:

"a temporary shift of instructional delivery to an alternate delivery mode due to crisis circumstances. It involves the use of fully remote teaching solutions for instruction or education that would otherwise be delivered face-to-face or as blended or hybrid courses and that will return to that format once the crisis or emergency has abated"

In the context of Africa, ERE measures were taken to ensure continuity during the pandemic. In Morocco, schools closed in March 2020 and the government instructed education to go remote with a mix of strategies adopted. A national-level digital platform called TelmidTice was established which hosted recorded learning material for students at different levels and courses. To allow for non-Internet users, courses were also given via national television. The Ministry of National Education, Preschool and Sports also prepared printed teaching and learning material for distribution to hard-to-reach areas of the country (CSEFRS, 2021).

Similarly, in Kenya, schools closed in March 2020 and education had to go online. A mix of measures was thus adopted to ensure continuity of teaching and learning. The Ministry of Education broadcasted content through television, radio and YouTube. Partnership with Telkom Kenya and the Civil Aviation Authority (CAA) made it possible to provide 4G coverage via Google Loon to remote areas. Digital copies of textbooks were also made available on the Kenya Education Cloud to students (Kiriti-Ng'ang'a, 2021).

3.2. The Digital Divide

The emergence over the last decades of the Internet and mass communication technologies led to a growing concern on the need to tackle issues of inequalities between those with access to them and those without (van Dijk, 2006). The concept of the digital divide has been used to describe this gap. This has become of crucial importance given the central role that these technologies have taken in our daily lives across the world. UN-Habitat defines it as "the gap between those who have access to and use ICTs including Internet connectivity, Internet-enabled devices and digital literacy skills and those who do not" (UN-Habitat, 2020, p. 15). The divide has been characterised by researchers to take into consideration 4 main levels that build upon each other, as shown in Figure 2 (Dijk, 2006; Van Dijk & Hacker, 2003). The first level

of the divide refers to what has been termed motivational access. This refers to a lack of motivation to use digital technologies. The second level of material access divide refers to a lack of access to gadgets, devices and materials that will permit access to digital technologies and skills. The third level of skills access gap refers to the lack of skills needed to make use of digital technologies. Lastly, the fourth level of usage access gap refers to the lack of capacity to apply these digital technologies to better one's life.

Despite a gradual decline in the gap and improvement in connectivity across the developed regions, it has been observed that it is widening in developing regions. In Africa, despite improved connectivity and a leap to mobile telephony over the last decades, the digital divide persists with an Internet penetration rate of 46.2% compared to a world average of 65.6% (Internet World Stats, 2021).

Three factors explain this digital divide on the continent:

(i) **Socio-economic inequalities**: not being able to afford adequate technology such as a computer or a smartphone or access to the internet, which makes it difficult to access distance education.

(ii) **Weak ICT infrastructure:** According to ITU data in 2021 (ITU, 2022), 82% of the population in Africa is covered by a mobile broadband network, with a coverage gap of 18%. Of those covered, only 33 % of them actually use the Internet, leading to a usage gap of 49% of the population. This is very low as compared to a world average of 63% of Internet users and a coverage of 95%.

(iii) **Spatial inequalities:** different people in different parts of the city have different levels of access to digital technologies and infrastructure in cities. Access to information and communication varies significantly across cities. With such difficulties, urban dwellers and schools face communication and education challenges.
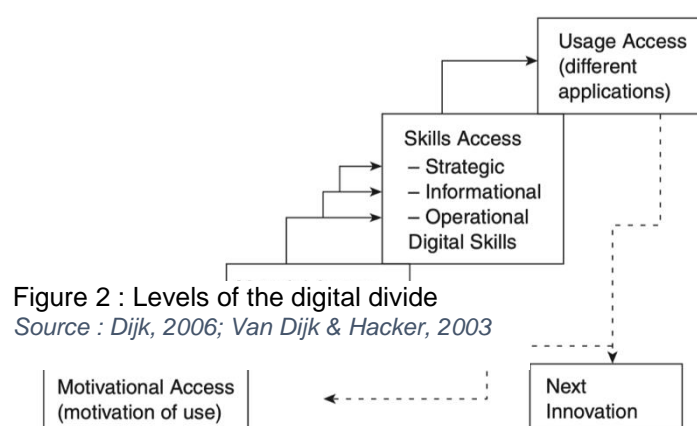
Figure 2 : Levels of the digital divide
Source : Dijk, 2006; Van Dijk & Hacker, 2003

3.3.   Digital Divide and Emergency Remote Education

In the wake of the pandemic, the school closures resulted in the adoption of ERE deployed in diverse forms across several countries. However, on a continent with significant inequalities, ERE revealed the depth of the digital divide. Indeed, during the COVID-19 school closures in sub-Saharan Africa, the vast majority of students did not have access to computers (89% of learners) and the Internet (82% of learners)[5], while about four to five out of ten students in North Africa did not have access to the Internet, either. This situation was more significant for girls, especially in smaller human settlements and in rural areas. Moreover, disparities are observed according to the regions of the continent.

These digital divide challenges notwithstanding, the mix of ERE strategies show that governments adopted digital platforms in most cases to ensure continuity and in some cases, provided non-digital alternatives such as printed teaching and learning material to address the challenge.

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[5] https://en.unesco.org/news/startling-digital-divides-distance-learning-emerge

4. Methodology

4.1. Conceptual Framework

Emergency Remote Education as rolled out in the countries in this study relied on the use of digital platforms (existing and created) to connect educators and students who were restricted to their respective homes due to social distancing regulations. The digital platforms served as the space to provide teaching and learning content where teachers uploaded or provided links to existing material to be used in courses. Students used the digital platforms to access these materials and also to connect with colleagues or teachers for assistance.

These connections are explained in the conceptual framework provided below. Educators and students alike had to bridge the digital divide (a mix of the levels explained above) in order to access these platforms and thus for any effective education to be deemed to have taken place.
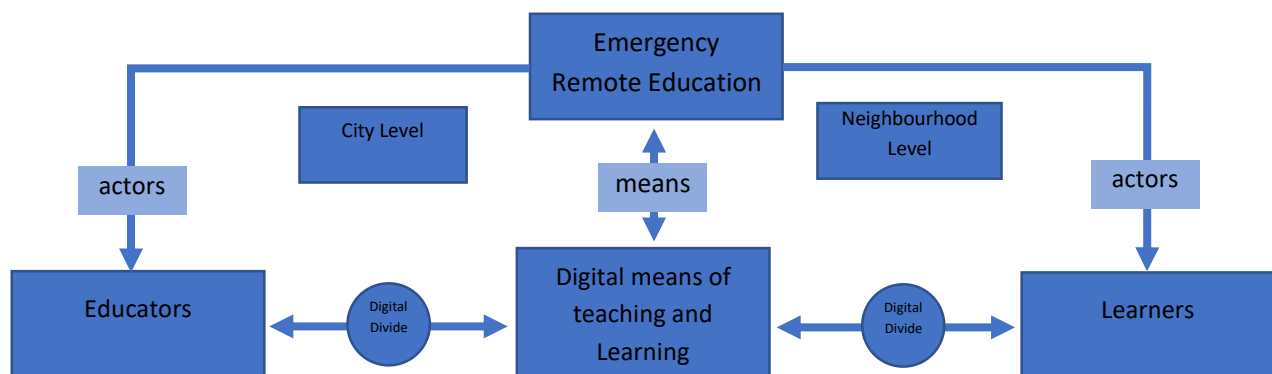
Figure 3: Conceptual Framework
Source: Authors

4.2. Research Design

Previous studies on the educational digital divide in the time of COVID-19 have used qualitative, quantitative and mixed designs (Bond, 2020).

Given the specific objectives outlined above, which point to exploratory and descriptive aspects, a mixed-methods multiple case study design seemed appropriate for this study. Mills et al. (2013) argue that the mixed-methods approach allows for varied data collection techniques that provide for the asking of meaningful questions. Yin (2018) adds that the case study method is preferred when we study recent behaviours of which the researcher cannot manipulate. This mixed-methods approach, which involves insights from students, teachers and schools, also responds to the call to triangulate experiences in future research on education during the pandemic (Bond, 2020).

Objective 1 – Digital Divide Assessment Component

In view of the questions that we sought to answer, we adopted a mixed-methods approach as appropriate for this component. This permitted us to delve deeper into details pertaining to digital divide experienced at each of the cities and collect individual level experiences from students and households. To carry out the assessment, we decided on a two-level approach comprising an assessment at the institutional level of the city and another at the local level of households. This approach permitted us to assess the digital divide from the perspective of educators through schools, local education authorities, public digital and technology administrators, and non-governmental agencies. The other level permitted us to assess the digital divide from the perspective of learners in households in a community.

The assessment in both cases was guided by our adoption of the framework proposed by the UN-Habitat in their work on assessing the digital divide (UN-Habitat, 2020). The framework proposes a tripartite composition of gaps, roots and locus to assess the divide in communities. The gaps component seeks to understand the type of divide experienced by the community in question. In this regard, this references the four levels of the digital divide as espoused by researchers (motivational, material, skills and usage divide). The roots component moves a step further to unearth the causes of the digital divide identified in the gaps. Lastly, the locus pinpoints the locations where the digital divide exists in the community under study.

This methodology was adopted for the two case study cities with stakeholder choice and sampling techniques differing based on context specificities.

Level	Actors	Examples
City - Educators	Education Institutions	Primary, Secondary, Tertiary
	Education administration	City education office
	Public Digital and technology Administrations	City/local government IT unit
	Non-governmental Digital Education entities	Any NGOs involved in digital space
Neighbourhood - Learners	Households	Students and Parents

Table 1: Levels and actors for digital divide assessment
Source: Authors

Objective 2 – Inspiring Practices Component

This component on best practices also used a multiple case study design (See for example, Madon, Reinhard, Roode, & Walsham, 2010; Tomczyk, Sunday Oyelere, Ed., & Ed., 2020). The selection of cases was done via an online call of submissions to teams working within the digital divide/inclusion space. This was published widely via online social media channels to reach a wider audience.

4.3. Sample and Data Description
4.3.1. Benguerir Case Study

As part of data collection for the assessment of the digital divide in education in Benguerir, the two main components of the education system comprising educators and students were considered as our target population. This was necessary to have a holistic understanding of the divide from the perspective of both educators and learners. The population of educators were targeted via schools in the city while that of learners was targeted via a neighbourhood. The following section provides details for the sampling selection as well as a description of the data collected.

4.3.1.1.   Sampling Site and Data Collection Instruments for Educators

Educators constitute one of the key parties in education delivery. Consequently, we decided to involve local education authorities and teachers at various schools (primary and secondary levels) in our data collection. Selection of which schools was purposively done through a list provided by the local education authorities upon official written request to the Regional Directorate of Education. Thus, in total we arrived at a list of 13 schools constituted as shown in the Table 2.

Name of School	Level and Category
Ecole Ibno toFayl	Public Primary School
Ecole Ouahda	Public Primary School
Ecole el Hassan Bouayd	Public Primary School
Mostakbali	Private Primary School
Yassamine	Private Primary School
La Joconde	Private Primary School
Ennahda	Public Middle School
Elfarabi	Public Middle School
Sabil Errachad	Private Middle School
Ahemd Manssor Eddahbi	Private Middle School
Abdelah Ibrahim	Public High School
Rhamna	Public High School
La Résidence	Private High School

Table 2: List of Schools surveyed in Benguerir
Source: Authors

We proceeded to organise a first engagement workshop at the UM6P premises, among others, to introduce the research and also to serve as a focus group discussion on their experiences of the education digital divide. In attendance at this workshop on 18th May 2022, were the heads of each of the above schools plus representatives from the local education authority. Thereafter, individual qualitative face-to-face interviews were scheduled and conducted with at most two teachers (1 headteacher plus one other teacher) at their school premises in June 2022 to provide more details on their experiences of the divide and mitigation strategies adopted. In total 20 heads and teachers participated in the interviews. A key informant interview with the local education authority was also conducted.

The interviews were conducted via a semi-structured list of questions in order to elicit detailed answers using KoboCollect ®. The interview guide was structured into five main parts. The first section touched on demographic details about experience of the interviewee. The second section dwelled on an assessment of the digital divide gaps in terms of material, capability and outcome divides. The third section asked questions on roots of the divide. Section four enquired about the impact of the divide on education during the pandemic, and the last section enquired about mitigation strategies adopted by the interviewees. Each interview lasted 30-45 minutes and was recorded if the interviewee consented.

4.3.2. Sampling Site and Data Collection Instruments for Learners

Students constitute the receiving end of any education system. Collecting data from them was essential in understanding the digital divide from the learners' perspective in the local education system. To effectively target students, we decided on a low-income neighbourhood in Benguerir. The low-income neighbourhood will permit a critical understanding of the divide as experienced by the less privileged in the city. Through our understanding of the geographic and socio-economic situation of Benguerir, we decided on the Chaibat neighbourhood. Chaibat is a neighbourhood situated at the extreme east of Benguerir about 2km from the city centre. The neighbourhood comprises around 200 households made up of single-storey and 2-storey buildings in concrete. Most of these are not fully completed and there is a sense
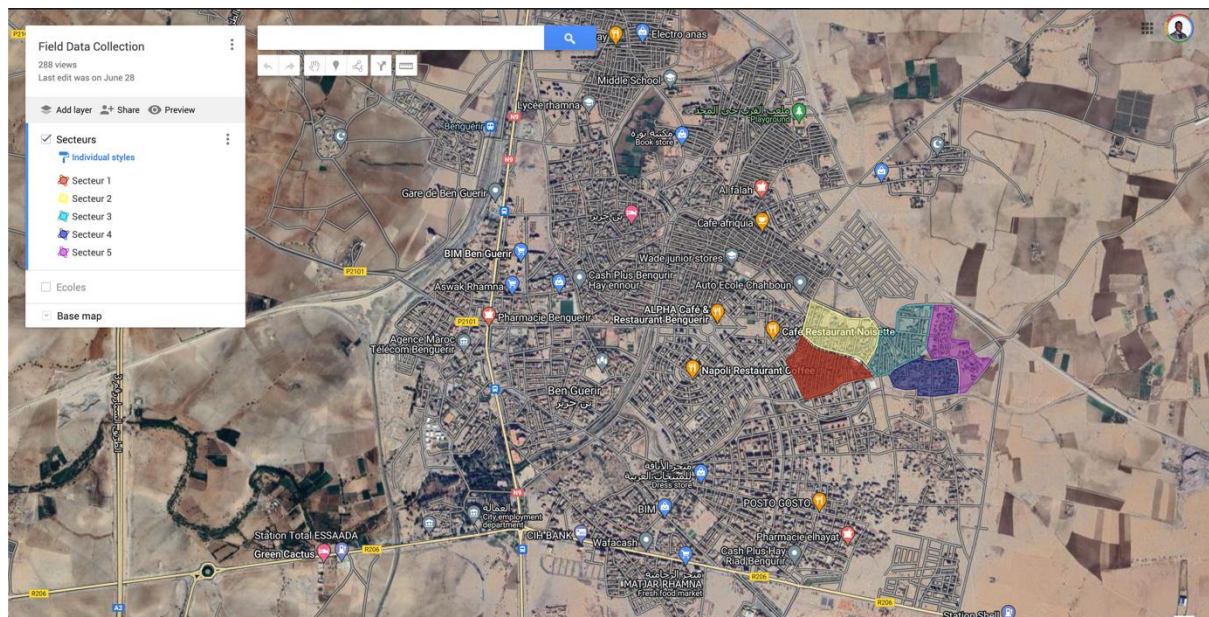
Figure 4: Google map showing Chaibat neighbourhood
Source: Authors via google maps

of ongoing construction. The neighbourhood is connected to the national electricity grid, and the water and telecommunications networks. In total, we targeted 30 households spread across the neighbourhood. To ensure representation, we divided the neighbourhood into 5 sectors and chose at least 6 households from each totalling the required number. The sampling technique was random based on consent from the head of the household. We were thus able to target a population of 161 people comprising 65 students at various levels of education. Figure 6 shows the location of Chaibat and the sector division done by the team. Another criterion for household

choice was the presence of children of school-going age, whether primary, secondary or tertiary. Table 3 summarises the demographic characteristics of the households in our sample.

Code	Household Size	Children in Household of School going Age (Primary, Secondary & Tertiary)	Partook in Emergency Remote Education
Household 1	8	3	No
Household 2	4	2	Yes
Household 3	4	2	Yes
Household 4	5	3	Yes
Household 5	6	2	Yes
Household 6	5	2	Yes
Household 7	4	1	No
Household 8	6	2	Yes
Household 9	9	4	Yes
Household 10	5	2	Yes
Household 11	5	2	Yes
Household 12	5	2	Yes
Household 13	4	2	No
Household 14	7	3	Yes
Household 15	8	3	Yes
Household 16	8	3	No
Household 17	8	2	Yes
Household 18	3	1	No
Household 19	6	3	Yes
Household 20	4	2	Yes
Household 21	5	3	Yes
Household 22	3	1	No
Household 23	5	2	Yes
Household 24	5	1	No
Household 25	4	2	Yes
Household 26	7	3	No
Household 27	3	1	No
Household 28	5	2	Yes
Household 29	6	2	Yes
Household 30	4	2	Yes
Grand Total	161	65	21

Table 3: List of Households survey in Chaibat Neighbourhood
Source: Authors

In terms of the data collection instrument, a questionnaire comprising a mix of close and open-ended questions were deemed suitable as it permits straight-forward and detailed responses, and the questionnaire was designed on KoboCollect®. It was structured into 5 main parts. The first part captured basic demographic data such as household size, number of children of school-going age and disabilities. The aim of the second part was to assess the digital divide so it was subdivided into gaps and roots. The third part was to understand the impact of the observed digital divide on education while the last elicited information on mitigation strategies adopted by households against the digital divide experienced. There were 43 questions asked in the survey. Each interview lasted about 45min-1hour and was recorded, if the interviewee consented.

4.3.3. Nairobi Case Study

Nairobi is divided into 11 administrative sub-counties, namely, Dagoretti, Embakasi, Kamukunji, Kasarani, Kibra, Lang'ata, Makadara, Mathare, Njiru, Starehe and Westlands. The four administrative locations selected for the study are Embakasi and Mukuru Kwa Njenga in Embakasi sub-county and Makadara and Viwandani in Makadara sub-county.

The four administrative locations have been selected for the study based on the following considerations:

- The neighbourhoods are characterized by factors that may impede digital inclusion such as socio-economic inequalities, weak ICT infrastructure, and spatial inequalities. Furthermore, they are located in the densely populated eastern part of Nairobi and have the highest populations in the two sub-counties, respectively.
- They provide a good basis for comparative analysis. Embakasi and Makadara house middle-income residential neighbourhoods, while Mukuru Kwa Njenga and Viwandani are characterized by low-income residential neighbourhoods.
- They provide an opportunity for practice, policy uptake and influencing change, especially in the socio-economically disadvantaged areas of Nairobi. These are locations where the federation of slum dwellers in Kenya (*Muungano wa Wanavijiji*) operate. *Muungano wa Wanavijiji* (https://www.muungano.net/) is a social movement that seeks to improve the quality of life of slum dwellers and the urban poor through policy advocacy and dialogue with central and local government, civil society organizations and the private sector. The federation advocates for "inclusive cities" and works with autonomous slum-based groups on issues that affect their settlements with the aim of improving their living conditions and access to basic services.

4.3.3.1. Sampling Sites and Data Collection Instruments for Educators

The study was conducted in eight public and private schools comprising six primary schools and two secondary schools. The schools were selected from the four administrative locations based on their spatial spread and categories. In each of the schools, key informant interviews were conducted with the headteacher and one teacher in-charge of academic affairs. Data collection instruments used in the Benguerir case were adapted for this case as well. Table 4 lists the schools.

Sampled schools		
Name	**Category**	**Location**
1. Thomas Burke Primary School	Private/Religious Organization	Makadara
2. Shepherds Junior Primary School	Private/Individual	Makadara
3. Gatoto Community Primary School	Public/Community	Mukuru Kwa Njenga
4. Kwa Njenga Primary School	Public/Government	Mukuru Kwa Njenga

5. Bright Angels Primary School	Private	Mukuru Kwa Njenga
6. Apostolic Carmel Girls Secondary School	Private/Religious Organization	Makadara
7. Bright Angels Secondary School	Private	Mukuru Kwa Njenga

Table 4: List of Schools surveyed in Nairobi
Source: Authors

4.3.3.2. Sampling Sites and Data Collection Instruments for Learners

As with the case of Benguerir, the study conducted 86 household interviews. These households were randomly selected from the low-income neighbourhoods of Mukuru Kwa Njenga, Mukuru Kwa Reuben and Viwandani, while considering households with school going children during COVID-19 pandemic. The data collection instrument, which was same instrument used in Benguerir, provided semi-structured questions to assess the digital divide, how the divide impacted education and mitigation strategies adopted to address the divide.

4.3.3.3. Data Collection – Inspiring practices in Digital Inclusion Cases

In order to identify and collect inspiring practices on digital inclusion in Africa, the team launched a call for applications in May and published the same across UN-Habitat and UM6P social media platforms. This call was accompanied by a Google form to provide key details of the projects (see appendix 9.2). The form had questions grouped into five main sections. Section one asked questions to identify the practice and the team involved. Section two focused on gaps, section three on roots and section four on location, while the last section focused on the practice details.

4.4. Model and Analysis technique

Drawing from the UN-Habitat model on assessment of the digital divide in education, gaps refer to symptoms of the digital divide while roots refer to the causes of these divides. This model significantly informed our conceptual framework, the research questions, and the subsequent analysis of results.

Specifically, data collected from the interviews of educators were qualitative permitting the team to delve deeper into the gaps and roots of the digital divide. Consequently, thematic content analysis was deemed appropriate linking back to themes that expressed the gaps and roots of the divide. Thematic analysis in qualitative studies consists of firstly familiarizing oneself with the textual data, coding, identifying specific themes and writing up. This was done by identifying specific themes pertaining to gaps and roots of the digital divide from the interviews.

Data collected from students through the households was via a questionnaire survey informed by the model of gaps and roots. Making sense of this data, therefore, was done via descriptive statistical techniques, mostly of measures of central tendency.

Further, for the inspiring practices in digital inclusion, data was collected from a call for submissions that requested teams to provide information on their research, practices, projects, or products. The analysis of the data from this call was done

through an assessment of the gaps that the solution intended to fill, the target population and impact. Table 5 summarises the analysis techniques used.

Objective	Design	Data Collection	Analysis
Digital Divide Assessment	Mixed methods	Household survey and Interviews with educators	Descriptive statistics and narrative analysis
Inspiring Practices in Digital Inclusion	Qualitative	Online forms	Document analysis

Table 5: Summary of analysis techniques
Source: Authors

5. Results

5.1.   Benguerir and Nairobi - Digital Divide Assessment

In this section we present the results of our assessment of the digital divide in Benguerir and Nairobi through our interviews with educators – teachers, and with learners – students in households. The results are presented in these 2 categories below. For each category, the gaps and roots are presented.

5.1.1. Digital Divide Gaps from the perspective of Educators

5.1.1.1.   Material Access Divide 1 - Internet Connectivity

Through the interviews with teachers in Bengeurir, it was noted that they generally had access to Internet connectivity via fixed broadband at home or mobile 4G, only two teachers reported not having a practical means of Internet connection. Of those who had connection, they agreed that it was relatively reliable and stable on most occasions throughout the week but experienced occasional disruptions during the weekend. A few reported occasional challenges which were specific to parts of the city and region – mostly parts of the Riad neighbourhood and the military base at the outskirts. One teacher for instance reported the following:

"I had weak access and low speed. It didn't support conducting a video-conference meeting, it was only valid for WhatsApp and Facebook only."
Another with a stable condition reported that:

"Personally, I could share in all the mentioned modes – audio, video, text - using my own connection. For the others, the use was very limited since we have no Internet connection at the level of the establishment (except for the office of the director and some computer rooms)."
In general, Internet connectivity was a lesser divide to teachers as it was stable and reliable in Benguerir.

The story in Nairobi, however, was different for teachers interviewed. According to three of the headteachers, connectivity issues was a major challenge for their teachers and students in emergency remote education during the lockdown. Seven headteachers noted their students and teachers had usable fixed broadband Internet in their homes. All teachers agreed that they had usable fixed broadband Internet in their homes. Five of the headteachers reported that students and teachers had a means by which to access the Internet conveniently but could not explain how reliable and convenient the connectivity was. On the other hand, five teachers noted that they had a means by which to access the Internet conveniently through Internet fibre connection, home-based WIFI, and had good network coverage. However, three of the headteachers reported that students and teachers did not have a means by which to access the Internet conveniently. The same was reported by three teachers. These students and teachers made use of public Internet locations or had to look for places

with Internet connectivity. The students and teachers were able to use text-based and audio-visual platforms with the kind of Internet connectivity they had access to. This was also confirmed by the teachers. Lastly, three of the headteachers personally experienced Internet connectivity challenges.

5.1.1.2.   Material Access Divide 2 - Access to Devices

In Benguerir, most of the teachers reported that they had personal computers and mobile phones which they relied on for their teaching purposes – their schools did not provide any devices to be used. Headmasters who were interviewed pointed out that the schools could not afford to provide any financial or device support. This assertion of lack of support from schools was reinforced when a headmaster reported:

"Yes, the teachers relied on a sense of personal initiative, unofficially using personal resources to buy devices…"

One headmaster reported when asked if access to devices was a challenge for his teachers:

"*Yes, it was a big challenge, my teachers bought laptops from their own resources to provide the lessons."*

Another headmaster added:

> "Yes*, especially at the beginning of the pandemic period, the lack of devices was a major obstacle…"*

Given all these reports, even though teachers had access to devices, it remained a key divide in their ability to deliver effectively as they relied on their own resources.

In the case of Nairobi, five of the headteachers pointed out that access to devices was a major challenge to the students and teachers in implementing emergency remote education during COVID-19 pandemic lockdown period when schools were closed indefinitely. Five headteachers were aware that the students and teachers had access to devices for teaching and learning, while three of them had no idea. Seven of the teachers confirmed that they had access to devices for teaching and learning. The type of devices that the students and teachers used were, by and large, mobile phones, tablets and laptops. However, the teachers reported that they mainly used mobile phones and laptops. Lastly, two of the headteachers and five of the teachers reported personally experiencing challenges with access to devices.

5.1.1.3.   Digital Capability and Outcome Divide

Generally, in Benguerir, the teachers felt sufficiently confident in their digital skills for teaching. They expressed their capacity to access, create and upload content to existing platforms like YouTube, Facebook, and WhatsApp for communication with their students. They also mentioned the use of the government platform TelmidTICE. One school, for instance, used a proprietary platform called "Tamkine Academy" for middle school teaching. They showed that they were abreast with issues such as privacy and cybersecurity, as some of them have had training previously. This confidence in their skills was further boosted for some of them when the provincial educational department of the Ministry of Education organised training to record teaching material for these selected few.

In Nairobi, seven of the headteachers believed that their students and teachers felt confident in their ability to use a digital device to accomplish their education goals. Seven teachers confirmed that they were confident in their ability to use a digital device. There was consensus that students and teachers may not be aware, conversant, or familiar with online privacy issues. However, five teachers said that they were familiar with online privacy issues. The same applies to cyber security issues, including password management and phishing attempts. Indeed, seven teachers were not aware about cyber security issues. Seven headteachers reported that their teachers were confident in their ability to create and share content for teaching. Nevertheless, four teachers stated that they were not confident or were less familiar with creating and sharing content for teaching. Five headteachers noted that the students and teachers were not capable to access or use online educational platforms. However, five of the teachers said that they were capable to access and use online educational platforms.

5.1.2. Digital Divide Roots from the perspective of Educators

To understand the causes of the gaps identified above, the teachers were further enquired about the possible reasons. These are classified under socio-economic and cultural causes as these were the main themes identified.

5.1.2.1. Socio-Economic and Location-related Causes

In terms of some connectivity issues raised, they identified the location as a cause in places like the military base and parts of the Riad neighbourhood. However, generally, Benguerir was noted to have good Internet coverage. Almost all the teachers agreed that socio-economic reasons specifically related to cost were a key cause of the connectivity and devices gap. For instance, a teacher remarked when asked about the cause of the material digital divide:

"*Sometimes yes, especially in terms of computer equipment, in parallel with social needs.*"

Indeed, without any extra funds from the employers, teachers had to foot the bills to pay for mobile Internet subscriptions and buy devices.

In Nairobi, the students and teachers did not report any locational reasons that contributed to their digital challenges. However, they mentioned lack of access to digital devices, and network and connectivity challenges in most informal settlements. The students and teachers reported affordability issues related to digital devices and Internet connection, and the fact that it is expensive to buy Internet data bundles for most poor families.

5.1.2.2. Socio-cultural Causes

In Benguerir, causes related to cultural practices were identified. For instance, some argued that some of the gaps were caused by existing cultural practices. Firstly, the absence of an existing digital culture especially in education was a hinderance to rapid take-up of ERE. This absence was also related to a fear of all things digital, and hence, an adjustment time was needed to adopt to digital teaching and learning. Some argued that culturally the home was seen as a place of resting, hence there was a time

needed to adjust to distance working - teaching and learning - thus leading to gaps in digital education take up.

For Nairobi, the students and teachers reported no major cultural issues except for the fact that some parents were sceptical that too much Internet use could expose their children to 'bad' sites; referring to explicit sites. Lastly, the students and teachers reported lack of knowledge and that they were not adequately trained to teach and learn online.

5.1.3. Digital Divide Gaps from the perspective of Households
5.1.3.1. Material Access Divide 1 - Internet Connectivity and Online Platforms

In order to assess the gaps in terms of the digital divide in education, households with children of school-going age were surveyed in both cities.

In Benguerir, from the 30 households interviewed, 70% (21 households) reported having students of the household partaking in ERE via digital tools whiles the rest did not (nine households). The means of Internet connectivity of these households varied between fixed broadband and mobile 4G (Figure 7). Some of the households shared broadband with neighbours.

On average, households reported that between 0 to 6 hours a day of Internet connection was dedicated to educational activities translating to about 30 hours maximum per week. The hours of Internet use for education involved attending classes, watching, reading, and listening to online

Figure 5: Common Household internet connection types
Source: Authors

AVERAGE NO. OF HRS/DAY

■ 0 HOURS/DAY ■ 1 HOUR/DAY ▨ 2 HOURS/DAY
■ 3 HOURS/DAY ■ 4 HOURS/DAY ■ 5 HOURS/DAY
▨ 6 HOURS/DAY

Figure 6: Average time of internet use
Source: Authors
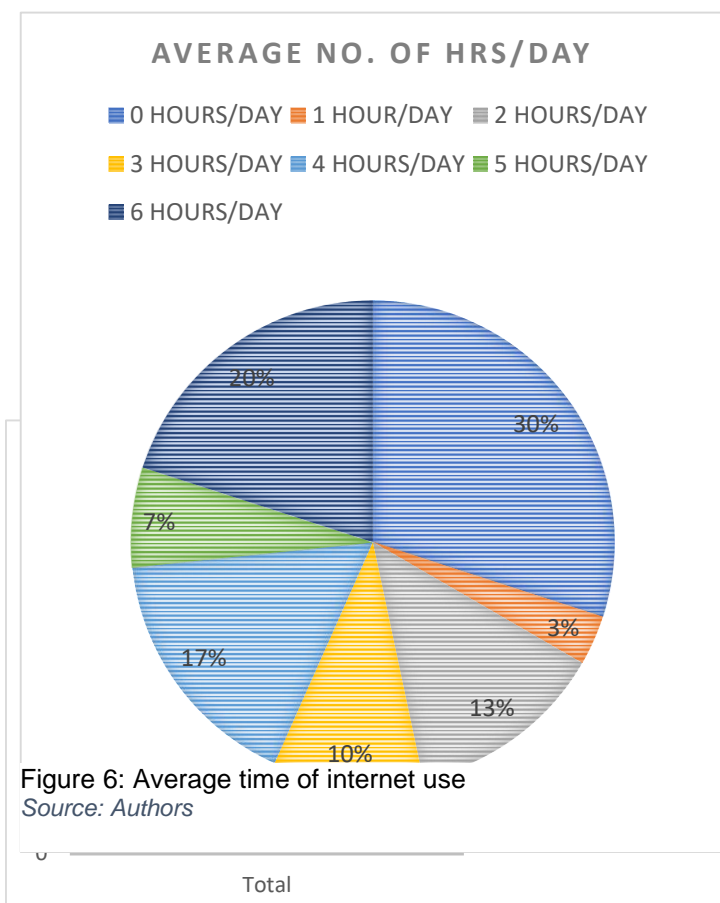
material (Figure 8). Most of the households reported good Internet connection (43%) and a few (9%) reported poor connection on average.

Existing platforms such as Facebook, YouTube and WhatsApp were the most common platforms accessible and used by students to access educational material. Students from 16 households reported not using any other platforms. They added that their teachers used WhatsApp to communicate with them and sent links to videos and other material hosted on
YouTube and Facebook. As these are existing platforms, most students (48%) agreed that they were fairly comfortable in using them and were satisfied with how they worked.

Some students also reported using the proprietary government Application TelmidTICE® to access material.

n Nairobi, the respondents were asked if their school going children (students) had access to online classes during COVID-19 lockdown (Figure 9). More than half (60.5%) of the households reported that the students had access to online classes, while 39.5% of the households with students did not have access to online classes. For the households in which students had access to online classes (n=52), the main type of access was through Internet connection at home (84.6%) as opposed to use of public Internet. The use of public Internet was largely through a public facility. Such students had to travel an average of 2.5 kilometres, with a minimum of 1 and a maximum of 8 kilometres, to access the public Internet facility. On the other hand, for the households in which students used Internet at home (n=44), the large majority (93%) of them relied on mobile data.
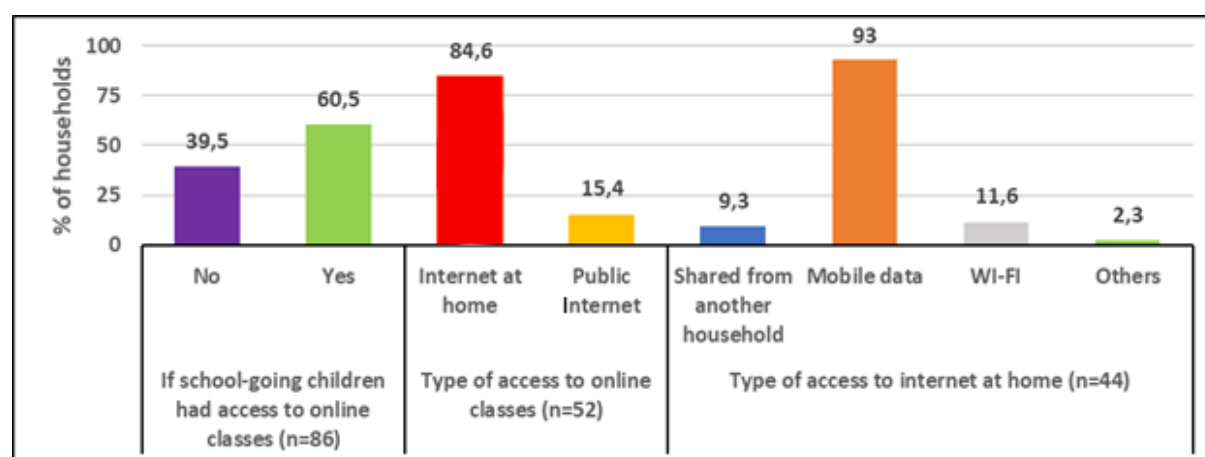
Figure 7: Access to online classes and internet connectivity
Source: Authors

During the COVID-19 lockdown period, most of the students spent between 1-2 hours on the Internet per day for educational purposes (Figure 10). This is largely because of the costs of buying Internet bundles. However, there are households where students spent more than 3 hours a day, partly because of the many offers that existed from Internet service providers, and partly from those who had access to a mobile phone

or a laptop throughout the day. The mean hours spent on the Internet per day is 3.6 hours with a minimum of 1 and maximum of 10 hours. Majority of the respondents were of the opinion that the quality of the Internet connection was good (40.9%). However, 31.8% were of the opinion that the quality of Internet connection was either fair or poor.
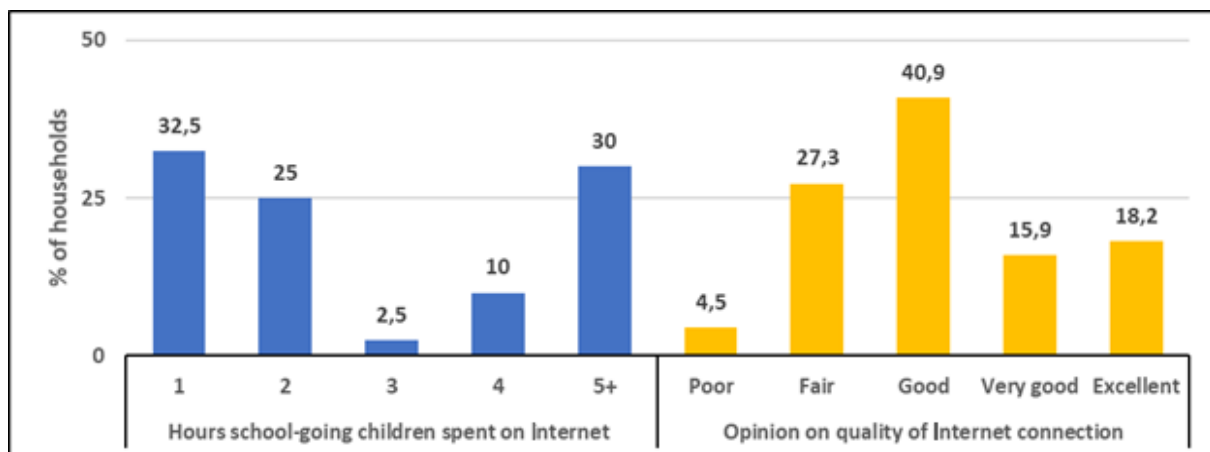
Figure 8: Average time of Internet use and Quality of connection

Source: Authors

34 households (39.5%) with school going children reported that the students had no access to online classes. This was largely attributed to lack of devices to connect to the Internet (71%) and lack of access to Internet (50%) (Table 5). In another 32% of the households, the students did not have platforms provided for online classes. The reasons for lack of devices and lack of access to Internet was attributed to lack of electricity, extra expenses involved in buying Internet data bundles, lack of a smartphone, lack of money to purchase an extra smartphone for the children, and poor network connectivity.

> *"During COVID-19 pandemic period, most families struggled to bring food on table rather than focusing on buying phones and Internet bundles for their children to learn. In fact, most of the people in this area lost their jobs or income generating activities during that period and life was difficult and cost of living was high."*

Reasons of no access to online classes for school going children		
	Frequency	**Percentage**
No access to Internet	17	50
No platforms provided for online classes	11	32.4
No devices to connect to the Internet	24	70.6

Others	1	2.9

Table 6: Reasons for no access to online classes for students
Source: Authors

5.1.3.2. Material Access Divide 2 - Access to Devices

In terms of access to devices as a gap, the households interviewed in Benguerir showed that there was wide access to devices. These devices were mostly laptops, mobile phones and tablets. Mobile phones were the most common device used in ERE in households (72%) while some households had a combination of 2 to 3 devices. Of these households, 24% had at least 2 devices connected to the Internet, and 1% had only 1 connected device. Students, especially those in primary and middle schools used devices belonging to their parents. Some households reported having a common device for all the children for ERE purposes.
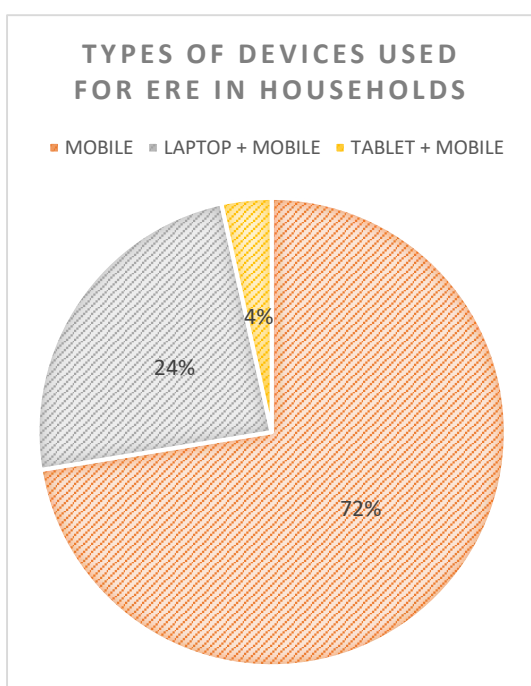
In Nairobi, the respondents were asked about the various types of devices that the

Figure 10: Types of Devices used
Source: Authors
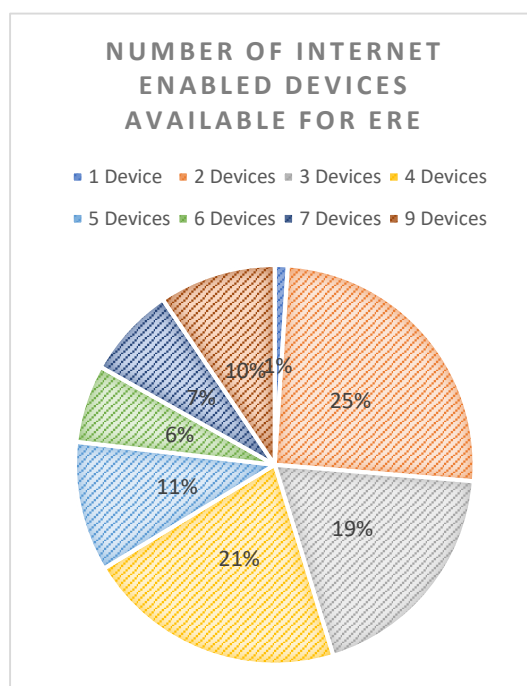
Figure 9: Number of Internet connected devices
Source: Authors

school going children in the household used to access Internet conveniently and reliably. Figure 13 shows that mobile phone is the dominant device that is used in 83.1% of the households. The use of Desktop PC, laptop and tablet is not very common. 13 households (15.1%) did not have any Internet-enabled devices, while most households had only one (38.4%) device or two (26.7%) devices at their disposal.
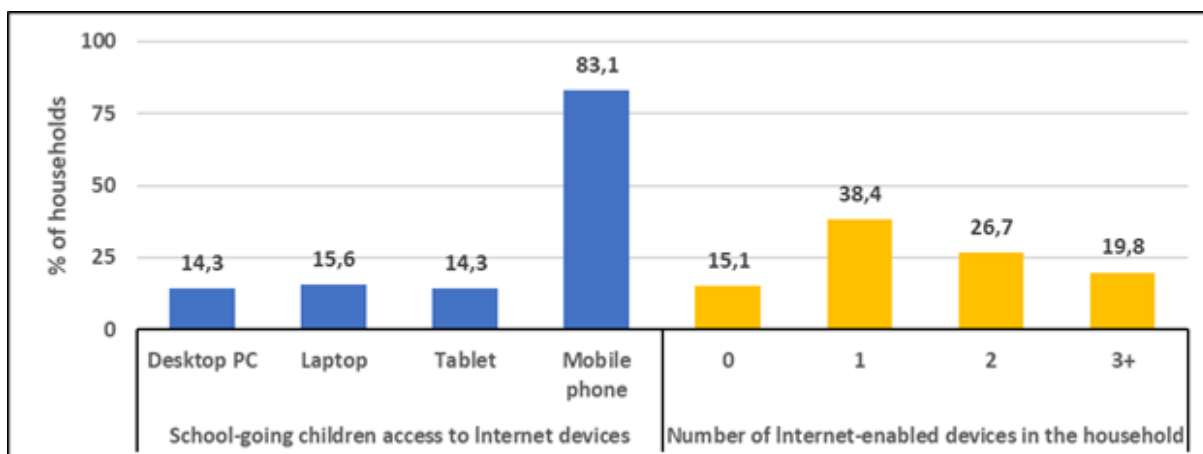
Figure 11: Access to Internet devices
Source: Authors

5.1.3.3. Digital Capability and Outcome Divide

Digital capabilities as a divide refer to the inability of people to use digital tools efficiently and confidently for their benefit mostly because of material access divide. Students were questioned as to their confidence in terms of skills and device use.

Beginning with Benguerir, many students reported being somewhat confident (20%), some were fully confident, while others did not feel at all confident in using the Internet. To go a step further, they were asked about their competence in using digital devices. 7% reported being fully confident, 33% being fairly confident, 23% being somewhat confident, 23% being slightly confident, and lastly 13% being not at all confident in their abilities.

For issues related to online safety, students in 13 households reported not being familiar at all, six said they were moderately familiar, another six households were somewhat familiar, and five households were slightly familiar. Of those who responded being familiar, one parent stated:

"Students in this household are aware of privacy issues and the management of their personal data." Another added that:

"My children are fairly aware of the management and protection of their personal data."

On cybersecurity issues, students from 13 households reported being Moderately familiar, 11 households responded that they are Not at all familiar, two households being slightly familiar and four households being somewhat familiar.

Another dimension of digital capabilities relates to content creation and sharing. This would usually involve recording of video, audio and writing content for online education platforms. Most (37%) of the students were moderately confident in their abilities, 23% were not confident at all, while 3% were extremely confident. Lastly, to benefit from digital skills, one needs to be able to use them for the purposes of further studies and employment. Students demonstrated a lack of confidence in this regard. Of those interviewed, students in 11 households felt they were not at all confident in applying for studies using online forms, students in nine households were moderately confident, students in three households were slightly confident, students in six households were somewhat confident and students in one household extremely confident.

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In Nairobi, only 22.1% and 26.7% of the households reported that their school going children feel completely confident in their ability to use the Internet and digital device, respectively, to accomplish their educational goals (Figure 14). On the other hand, in 38.4% households, the students were either slightly or not confident at all to use Internet compared to 40.7% who were slightly or not confident at all to use digital device. The rest were either fairly or somewhat confident.
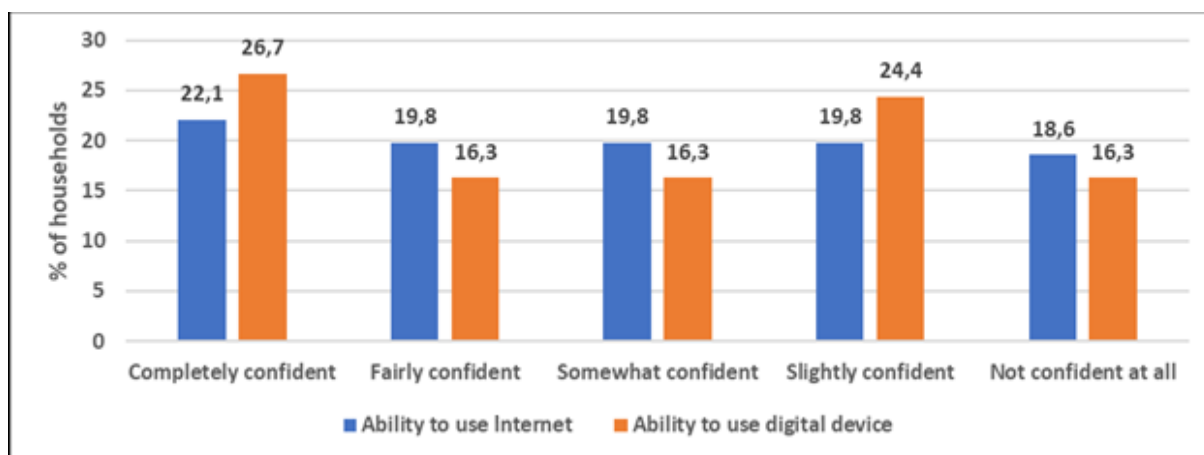
Figure 12:School-going children ability to use Internet and digital device for educational purposes
Source: Authors

The reasons for not being completely confident to use Internet include lack of money to buy a smartphone for use and practice at home, lack of money to buy Internet data bundles for frequent use, lack of adequate knowledge of Internet use and platforms, and that some of the children are too young to use Internet. Some parents asserted:

> *"This online thing was new to most students and therefore they take long [time] to get used to it and understand it. If they are not taught in school or through their friends, it becomes difficult because we are not always at home to assist them where we can. Furthermore, we also do not understand those educational things."*

> *"They know how to use the Internet but not that well. They still need to learn further to use the Internet well. Some of them are even still young and do not know how to use Internet."*

The common platform that students in the household use to access online classes is existing social media platforms like YouTube and WhatsApp (Figure 15). However, 34.5% of the households have students with access to online course platforms. Despite this access, in most of the households, students were not completely comfortable in using the online classes platforms. More than one-third (34.9%) of the households reported that the students were slightly or not comfortable at all in using online classes platforms.
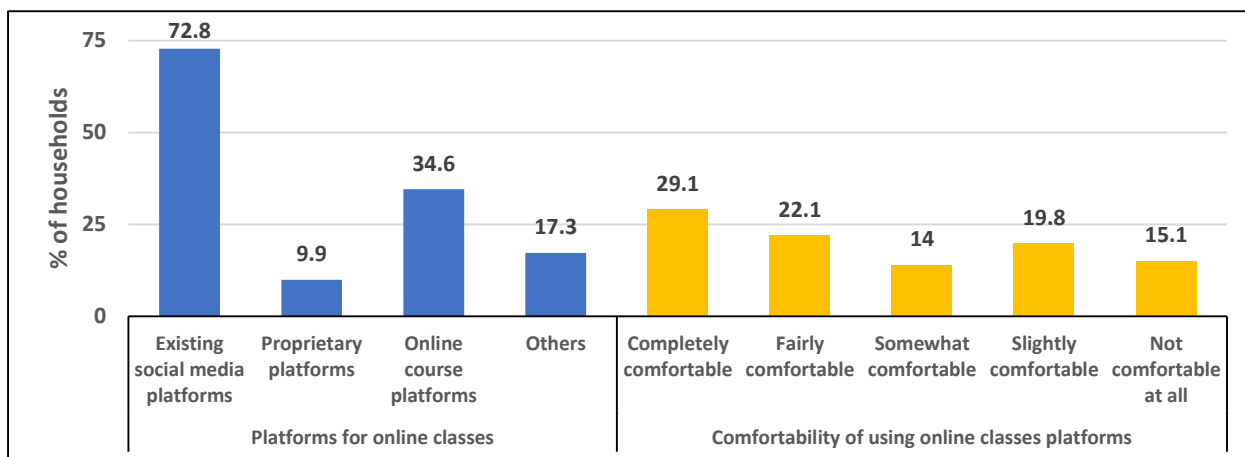
Figure 13: Platforms school-going children use to get online classes
Source: Authors

Suggestions to improve online classes platforms include making them easily accessible and free, adding more academic resources according to syllabus, being more interactive, and not exposing the learner to unwanted information.

> "One disadvantage about this online teaching and learning platforms is that one cannot tell if he or she has not understood. They should be more interactive in nature and target the syllabus."

The respondents were asked if students in the households are familiar with cyber security issues, including password management or phishing attempts. According to Table 7, more than half (52.4%) of the households reported that the school going children were either slightly or not familiar at all with cyber security issues. On the other hand, only 22.1% reported that the students were extremely familiar with cyber security issues.

School-going children familiarity with cyber security issues		
	Frequency	Percentage
Extremely familiar	19	22.1
Moderately familiar	9	10.5
Somewhat familiar	13	15.1
Slightly familiar	12	14.0
Not familiar at all	33	38.4

Table 7: Familiarity with cyber security issues
Source: Authors

Reasons of low familiarity with Internet security issues include lack of knowledge, still too young to comprehend, have never been told, respondents were not aware, and that they only knew about protecting usernames and passwords. However, it was evident that even the respondents were not familiar with cyber security issues. Apparently, only two households reported cases of their school going children being ever harassed on the Internet and social media. These were cases of hacking and pornography.

Figure 8 reveals that school going children were relatively extremely confident in interacting with online platforms compared to those with ability to create and share content online, as well as ability to use social media. On the other hand, higher proportions of households had students who were not confident at all in creating and sharing content online compared to those who were not confident at all in the use of social media and interacting with online platforms. There are relatively high proportions of households with students who are slightly or not confident at all in online content creation and sharing (46.5%), use of social media (45.3%) and ability to interact with online platforms (41.9%).
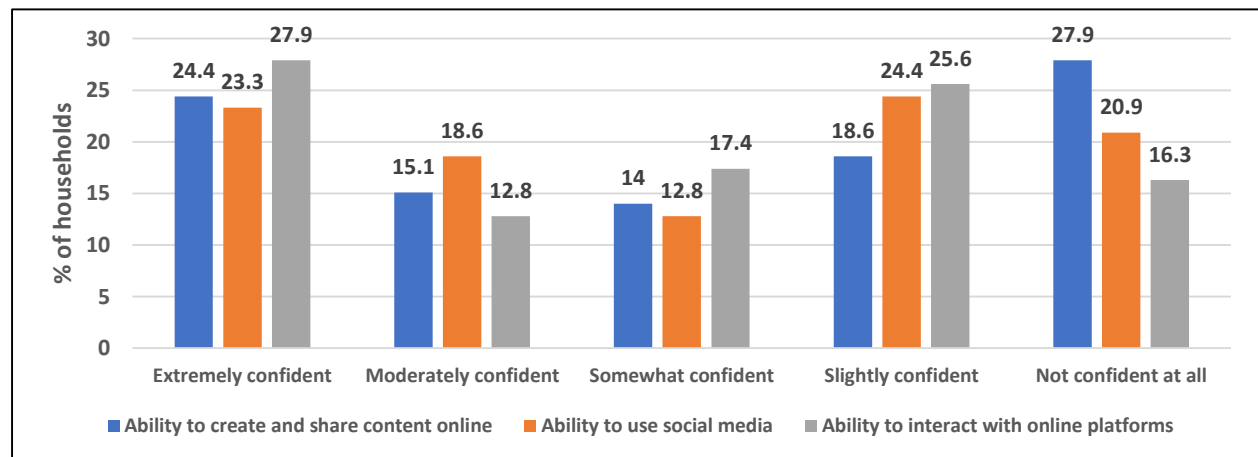
Figure 14:Ability to create and share content, use social media, and interact with online platforms
Source: Authors

Lastly, Table 8 shows that students who always used online educational platforms were in less than one-quarter (23.3%) of the households. On the other hand, the large majority (61.6%) of the households reported that their school going children used online educational platforms either sometimes or rarely or never at all.

Frequency of school-going children using online educational platforms		
	Frequency	**Percentage**
Always	20	23.3
Very often	13	15.1
Sometimes	29	33.7
Rarely	13	15.1
Never	11	12.8

Table 8: Use of online educational platforms
Source: Authors

5.1.4. Digital Divide Roots from the perspective of Households
5.1.4.1. Socio-Economic Causes

From our assessment model, roots refer to the causes of the digital divide gaps identified. We engaged the households to identify these. The socio-economic survey pointed out that households spent between 3 USD (30dh) and 30 USD (300dh)[6] per month on Internet connectivity. The pie chart below summarises the number of households and their monthly spending on Internet connection during the pandemic period. Households pointed out that Internet connection was expensive but that they did not have to sacrifice other needs in order to afford it. When asked if students in the household would spend more time on the Internet learning if it was cheaper, 51% of the households answered in the affirmative. Most of the households (29%) also judged that 10 USD a month was an affordable rate for Internet connection, 8.33% of the households deemed 3 USD as a fair amount while 12.5% of the households agreed to 20 USD as affordable. To buttress the socio-economic conditions as a main cause of the digital divide one parent explained that *"the precarious situation of most nearby households prevents them from having an Internet connection to follow distance learning courses for their children"*.
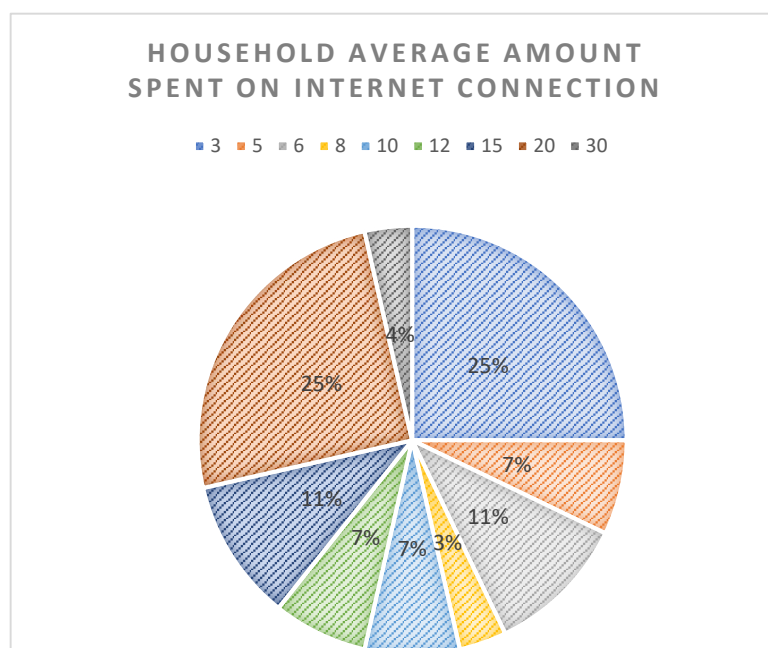
Figure 15: Average amount spent on internet connection
Source: Authors

In Nairobi, households spend a mean of about 12.45USD(1,500 KES)[7] per month on Internet, with a minimum 5 and a maximum of 66.37 (8,000 KES). Even then, more than half (52.3%) of the households use between 5 and 1,000 KES per month on Internet costs. However, 14% of the households use 3,000 KES and above, while 11.6% of the households reported that they did not incur any expenditure on Internet connection. The respondents were further asked how much their ideal household budget for Internet connection was per month. The actual cost spent on Internet connection per month is not quite different from the households' ideal budget. Many

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[6] 1USD = 10dh in 2022
[7] 1USD = 120.53KES in 2022

(68.6%) of the households prefer an ideal monthly expenditure of between 5 and 1,000 KES.

Most (64%) of the respondents were of the opinion that the cost of Internet connection is too expensive for their households. And therefore, 41.9% of the households do not prioritize for Internet access and connection, while another 32.6% of the households do it sometimes or rarely. Many of the respondents noted that they only prioritize the cost of Internet when it is absolutely necessary like when school going children have Internet-based homework, when there is need to use certain Internet-based applications to communicate, or to accomplish essential Internet-based transactions. Otherwise, they explained that Internet is too expensive to prioritize, there is lack of enough money for it, and that basic household needs come first and are important than Internet access. Some respondents stated:

> *"Sometimes what the students need in the Internet is very important, so we cut-off the budget for food to buy bundles. When your child is given an online homework, you have to look for money to buy bundles."*

> *"There is no way I can prioritize to buy Internet bundles over food. Budgeting for basic needs in the house like food, rent and school fees comes first. In any case, we cannot miss buying food for the Internet or it is impossible to buy bundles if there is no food in the house."*

As such, 97.7% of the respondents said that school going children in their households would use more online educational platforms if the Internet was cheaper or free. In addition, 93% of the respondents were of the opinion that digital education can improve the education level of children and give them better chances in life in the future. They explained that technology is changing, and most educational resources can be accesses through the Internet these days, and that it is relatively cheaper for revision and remedial work than to hire a teacher. Furthermore, digital education brings knowledge to everyone, everywhere and anytime; and that it is readily available, easy to access, and exposes the children to a lot of things and knowledge.

An interviewee remarked:

> *"Digital education has improved education to a higher level. It exposes the child and gives knowledge and skills for the future generation. By using this technology, a child can explore more and understand what a teacher may not have explained well in class. Things have changed with time and our children need to embrace these new teaching and learning opportunities to better themselves in future."*

5.1.4.2.   Socio-cultural Causes

Households in Benguerir were also questioned on some cultural practices that may be at the root of the digital divide in the neighbourhood. To understand if there were inherent cultural biases towards digital education that would serve as a cultural root, households were asked if they perceived digital education could improve the education of students in general. Almost half of the households agreed that it could improve the

education of students in the household, while the others were not in agreement. One parent remarked:

"H*aving the Internet facilitates research, access to information quickly instead of wasting days looking for it without result sometimes.*"

Another also added that:

"*It can facilitate access to education when school is unreachable.*"

However, some were of the view that it was less efficient. One parent remarked on his preference for face-to-face teaching saying:

"*I have a preference for teaching in the face-to-face mode because it is more profitable and fruitful."* and another further added that:

"*The digital mode will never reach face-to-face efficiency.*"

One parent mentioned that:

"*We use the Internet for every other thing, but it was uncommon to use it for educational purposes before the COVID-19 pandemic.*"

Another cultural root of the digital divide concerns privacy. Some households with limited devices were reticent in sharing the parents' numbers to education authorities, especially those belonging to spouses.

The respondents in Nairobi were asked if it is common to use Internet for digital education in informal settlements community. There was a mixed reaction on this since 59.3% of the respondents thought that it is common to use Internet for digital education in informal settlements, while 40.7% thought that it is not common. Factors that promote the use of Internet for digital education in informal settlements include access to relatively cheaper smartphones and other digital devices, access to Internet through service providers, relatively higher levels of knowledge and education among the youthful population.

On the other hand, factors that prohibit the use of Internet for digital education in informal settlements community include lack of money, affordability issues, digital illiteracy, lack of network, lack of electricity, and lack of access to smartphones. Furthermore, most (82.6%) of the respondents noted that cultural beliefs do not exist nowadays and that cultural practices have nothing to do with digital education. In addition, digital generation has no cultural beliefs and that those are myths and misconceptions. There was mixed reaction on whether a high level of education is required to get access to online courses. More than half (54.7%) of the respondents agreed that high level of education is required, while 45.3% were of the opinion that a high level of education is not necessary.

5.2. Inspiring Practices

A total of nine practices in digital inclusion were received from teams across the continent. They involved digital solutions aimed at bridging the digital divide for learners across all age groups and classes. The Table 9 summarises the details.

The inspiring practices received were mostly from private, international organisations and private-public partnership initiatives. From a description of their key objectives, the solutions covered a number of digital divide gaps across the 3 levels of material, capability and outcome access. Some of them targeted several of these gaps with target populations and levels of education ranging from primary through tertiary and lifelong learners.

UN-Habitat Learn is a free online platform developed on the Opensource Moodle® system by UN-Habitat that has a global footprint. It seeks to reduce the literacy divide by providing online courses on sustainable urbanisation in several languages. As of April 2022, it had 4300 learners, delivered 1200 certificates, and had 40,000 visits from 191 countries around the world.

TuteeFirst is also a web platform based out of Zimbabwe providing an integrated learning platform for higher education and working professionals. In that regard, the gaps it seeks to fill are related to digital literacy.

Zibuza is an online community that serves as an online professional learning community based out of South Africa. Its target population are mostly teaching/academic staff, students and parents. The gaps it fills are related to location access and demographic divide. In that sense, 20% of its community come from or work in rural areas. 41% of the community come from quintile 1-3 schools (under-resourced). Their virtual laboratory provides free access to 90 interactive simulations to the more than 20,000 schools in South Africa without laboratories. Their virtual library also provides access to more than 3500 books across all ages and in all official languages.

Funlexia is an experimental educational game developed by researchers at the School of Collective Intelligence, UM6P. It is targeted to children with reading disabilities - dyslexia. The platform has been initially established in Arabic with the possibility to translate to French and English.

EduVoD is an artificial intelligence driven platform based out of Kenya and is being scaled across 10 African countries. It targets equal access to digital education across primary and secondary schools.

TelmidTICE is a government platform initiated by the Moroccan Ministry of Education in partnership with OCP Foundation, UM6P, and telecommunication operators, INWI and Maroc Telecom. It shares content for primary and secondary school students. At the height of the pandemic, it reached 8 million users with about 3000 video course materials produced. This initiative was accompanied by a capacity development initiative spearheaded by the partner UM6P that trained teachers across several regions in skills to record their teaching material.

Concordia College Yola developed this programme to provide practical sessions to teachers and students on the use of digital tools in teaching, learning, and scheduling classes on Zoom and Google Classroom. As a means to bridge the capability/outcome digital divide, this initiative ensured that teachers were confident to develop content

for their classes. Students, likewise, developed confidence in their abilities to access online content.

UNU-MERIT/Maastricht University was a research project developed to explore the effect of implementing educational open microcredentials on student motivation, engagement, and completion in open access online courses specifically targeting Ph.D. fellows. The outcomes showed that while open access online courses are appreciated by Ph.D. fellows, the implementation of open microcredentials did not provide an incentive towards completion of online courses for this specific population.

National Program for the Promotion of Science, Technology, Engineering, the Arts and Mathematics (STEAM) Education in Togo (TIDD) is a government programme that aims to train more than 1000 young pupils and students in Togo over two years in STEAM tools. It will also consider gender parity by ensuring 50% of positions are reserved for girls. Since 2020, the programme has trained 300 young people in schools and training centres. The project combines online and offline training ensuring that it is adaptable to a diverse context, taking digital divide issues into consideration. For instance, the offline component is done via the development of Fabrication Laboratories (FabLab) in various communities accompanied by the digital platform.

To summarise, the projects received touched on the significant gaps of material access, capability and outcome divide. For this, they targeted and provided diverse solutions for children and lifelong learners. Although most of these initiatives are private sector led, partnerships with public sector were seen to be essential as in the Moroccan and Togo cases has shown, in order for the initiatives to achieve scale. Table 9 summarises the key elements of the practices showcased.

Name of Practice	Location	Education level	Dimension of the Digital Divide Solution targets
UN-Habitat Learn	Global	Adult Learning	Literacy divide (Awareness and education)
TuteeFirst	Zimbabwe	Secondary/Tertiary	Literacy divide (Awareness and education)
Zibuza	South Africa	Primary, Secondary, Early Childhood Development	Connectivity divide (Intra-urban and urban vs. rural), Demographic divide (Gender, ethnicity, age and disability), Socioeconomic divide (Affordability), Literacy divide (Awareness and education)
Lexia	Morocco	Primary, Secondary	Connectivity divide (Intra-urban and urban vs. rural), Literacy divide (Awareness and education)
EduVOD	Kenya	Primary, Secondary	Connectivity divide (Intra-urban and urban vs. rural), Demographic divide (Gender, ethnicity, age and disability), Infrastructural divide (Infrastructure and access), Cultural divide (Motivation and social acceptability), Socioeconomic divide (Affordability),

			Literacy divide (Awareness and education)
TelmidTICE	Morocco	Primary, Secondary	Infrastructural divide, Capability divide, Literacy divide (Awareness and education)
Concordia College Yola	Nigeria	Secondary	Literacy divide (Awareness and education)
UNU-MERIT/Maastricht University	Sub Saharan Africa	Tertiary/Doctoral education	Infrastructural divide (Infrastructure and access), Cultural divide (Motivation and social acceptability)
TIDD - National Program for the Promotion of STEAM Education in Togo	Togo	Primary, Secondary, Tertiary	Demographic divide (Gender, ethnicity, age and disability), Cultural divide (Motivation and social acceptability), Socioeconomic divide (Affordability), Literacy divide (Awareness and education)

Table 9: Summary of Inspiring Practices in Digital Inclusion
Source: Authors

6. Discussion

6.1. How did Emergency Remote Education during the COVID-19 pandemic take into account education digital divide in the city?

In our assessment of the digital divide in Benguerir and Nairobi, it has been observed that the gaps pertaining to material access and digital capability and outcomes are experienced differentially when looked at from the perspectives of educators and learners in households. For educators in Benguerir, the main gap observed was that of material access. As shown in the data, the teachers expressed concern about the lack of support to access Internet connection affordably as well as relying on their own digital devices. While some schools did provide assistance, the majority of schools did not. Hence, this accentuates the divide. Even though the teachers interviewed had gaps in capabilities and outcomes, it was minimised through their capacity to easily learn and adapt their teaching experience to digital means. Also, the local education unit's intervention to train them in recording teaching material helped in this regard, as well. With educators in Nairobi, the assessment seems to be similar. The teachers reported mostly material access gaps in terms of connectivity and devices with minimal support from their schools or education authorities, thus, leaving them on their own to provide the means to conduct ERE. Similar as with Benguerir, the teachers expressed confidence in their abilities to create content and teach digitally and thus, they have the minimum capabilities and minimal outcome gaps, even though they highlighted the need for further training.

For households in Benguerir, however, our assessment of the digital divide seems to be oriented towards a more pronounced gap in terms of digital capability and outcomes than material access. As seen in the data, almost all households had access to at least a mobile phone and connectivity was relatively stable despite concerns of its cost. Thus, households were generally materially able to access ERE. The challenges they faced were of the order of capabilities and outcome divides, being sufficiently confident in accessing material for learning. They also highlighted capabilities and outcome as key challenges. In the case of Nairobi however, we observed through the data that the divide cut across the material, capability, and outcome gaps. The financial status of most of the households translated into difficulty in affording continuous Internet connectivity and limited devices, which subsequently impacted upon the capabilities and outcomes.

As to whether ERE took into account these digital divide challenges in both Benguerir and Nairobi, we argue that not much was done at the local level and especially for low-income neighbourhoods. In both cases, to mitigate against the material access divide, education authorities and schools were constrained in resources to provide connectivity and devices to teachers and students alike. Only a few were able to assist teachers to deliver their courses as in the case of Benguerir. To mitigate capability and outcome divides, some teachers in selected schools in Bengeurir were provided with

training by the local education unit in recording their material; we did not observe the same in the case of Nairobi. However, in both cases, students did not receive any form of training in online learning. Consequently, ERE in both cities proceeded with digital divide challenges impacting on the quality of education during this period. Teachers interviewed were of the opinion that ERE impacted upon the quality of delivery, the standard and level of qualification of their students which could be attributable partly to the digital divide challenges which needed to be accounted for to ensure a smooth rollout and inclusivity for all.

6.2. How do households with students navigate digital divide challenges to access Emergency Remote Education during the pandemic?

We have observed that learners in both cities were faced with material access as well as capability/outcome digital divide challenges. However, the intensity with which households experienced the digital divide in each city is determined by the gaps identified. For instance, with the case of Benguerir, the capability/outcome access digital divide challenges were more pronounced for them, given that access to devices and connectivity were relatively available. For Nairobi, on the contrary, households experienced material access and capability/outcome access divides almost in equal measure.

 In both cities, households were able to provide devices because they relied more on mobile phones than personal computers or laptops for ERE. In that sense, students used their parents' mobile phones. In some households as in Benguerir, an extra phone was bought specifically for students in the household to share. Where there was only one phone, it came with its own challenges, as it limited the duration when students could be online in cases where two students of the household had classes at the same time. Another strategy some households adopted to reduce costs and procure Internet was to share connectivity with neighbors. The monthly bill was then shared between them.

In terms of navigating capability/outcome divides, households relied on online platforms, and guidance from other parents and teachers to assist students. Students of secondary levels with their own phones also shared material amongst themselves. In Nairobi for instance, some parents who could afford paid for private online classes to ensure effective teaching and learning for their children.

In summary, the mitigation strategies at the level of households were mostly based on solidarity among families and students to share Internet connection, learning material and resources and personal family initiatives as much as they could afford. Online platforms, such as Facebook and WhatsApp, served as avenues for sharing, reflecting the rise in solidarity that emerged with the pandemic. Little support was attained from local government authorities in terms of bridging the digital divide to ease ERE

challenges. Service providers as in the case of Safaricom in Nairobi provided free or reduced costs of Internet bundles for education purposes.

6.3.   Which are the inspiring cases of bridging the educational digital divide on the continent and which lessons can we learn from them?

The nine inspiring practices seen above cut across all levels of education from primary to tertiary and lifelong learning, providing much needed access to teaching and learning material. As digital platforms, in most cases, they are easily accessible and mostly free costs to most people who have an Internet connection. This free access model democratises aids in bridging the digital divide.

In general, these inspiring practices provide interesting lessons worthy of emulation.

From most of the models, there is a specific target group with reference to education level. In that sense, content is curated efficiently to be relevant to learners and teachers. Visitors to these platforms often have the ability to determine the level of education, and thus, the content made available to them.

Another important lesson from these models is the development of partnerships for growth. It is noted that most of these practices partner with schools, private and public organisations in order to reach their target populations, seek funding, and scale operations. Partnerships especially in the education sector are crucial given the public good nature of education and the need to make it accessible to all without hindrance.

Lastly, another lesson from these practices is the integration of some forms of community building, gamification, and fun especially for children to encourage learning. In organising around communities, it builds a support system that drives motivation. The same motivation system emerges when gamification and other fun activities are incorporated in these learning platforms.

In summary, these inspiring practices provide essential lessons of inclusion, targeting and community building around teaching and learning to ensure education reaches large numbers in an efficient manner beyond limits of the digital divide.

6.4.   What are the key elements of a policy framework to bridge the educational digital divide and with what recommendations given the lessons learnt?

In assessing the digital divide in the two case study cities of Benguerir and Nairobi, it has crucially foregrounded the importance of context in determining the particular kind of divide experienced at the local level. For instance, whereas Benguerir had good Internet connection, the divide was more evident in capabilities/outcomes; Nairobi, on the other hand, had equal measure of connectivity and capability divides. Importantly, it is evident then that a one-size-fits-all policy framework is not envisageable and

needs to be adapted to each city. Consequently, the role of local government structures is critical in addressing the digital divide and in developing a plan of action in time of ERE.

This policy framework to bridge the educational digital divide seeks to provide a simple guideline for action to address the digital divide at the local level of neighborhoods and cities.

```
┌─────────────────┐
│ Rapid Digital   │
│ Divide          │
│ Assessment      │
└─────────────────┘
        ↓
┌─────────────────┐
│ Stakeholder     │
│ alliances       │
└─────────────────┘
        ↓
┌─────────────────┐
│ Digitally       │
│ Inclusive       │
│ Emergency Remote│
│ Education Plan  │
└─────────────────┘
```
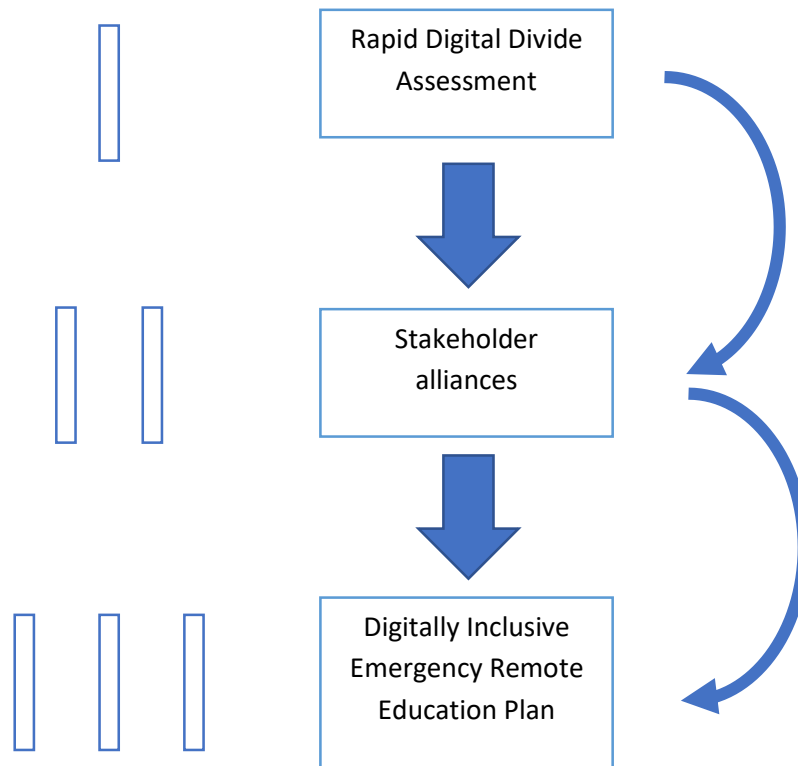
Figure 16: Policy Framework for Digitally Inclusive ERE

Source: Authors

The framework is developed in three main stages. The first stage – Rapid Digital Divide Assessment, promotes an understanding of the digital divide experienced at the local level. It is done by identifying the gaps and roots in order to develop a digital divide profile for the area in question. The local community and government will need to be engaged in this exercise in order to attain an assessment that is reflective of the existing conditions.

The second stage involves building of alliances in preparation for action. The assessment in stage one provides a blueprint of where challenges exist. The second stage permits the identification and bringing together of the stakeholders in order to synergize and draw out plans for tackling the challenges identified. Ideally, key stakeholders including public institutions, local level authorities, inhabitants, private education, and ICT entities will be relevant in this stage.

The last stage consists of developing an action plan that seeks to provide an inclusive response for ERE. The Digitally Inclusive Emergency Remote Education Plan (DI-ERE) will be developed in a participative approach involving all the stakeholders from stage two taking into account the assessment from stage one. Figure 18 provides a diagram of the main processes involved in this policy framework.

Accompanying this framework, the following policy recommendations will assist in developing the digitally inclusive ERE Plan.

Global recommendations
At the global level, digital inclusion could be promoted by considering the following key recommendations.

- Develop a clear strategy and roadmap at the national and local level for digital education (for short, medium and long term)
- Have a people-centred approach
- Prioritize local tools adapted for the context and the infrastructure in place (taking into consideration local language, low connection, low quality of Internet, etc.)
- Establish a digital education unit or department at the local level (county) and in each school
- Establish partnerships with the private sector to accelerate digital education transformation in schools
- Support families on accessing the Internet for education
- Set communication campaigns through SMS, forums, meetings, etc. to promote digital education (like when a national learning platform is available)

Recommendations for national and local governments
This research in two case study cities has led to an understanding of the digital divide at the local level through the gaps and roots. The following recommendations will pave the way for action towards a digitally inclusive educational experience with or without emergencies. The recommendations are proposed following gaps and roots.

Gaps refer to symptoms of the digital divide and the following recommendations are proposed:

Connectivity – to boost connectivity for inclusive digital education
- Make broadband Internet connections available in all schools
- Dedicate a part of the school budget for Internet connectivity
Digital literacy
- Reinforce capacity of teachers and students on data privacy, cybersecurity and other related topics.
- Enhance capacity of teachers and students on the use of digital learning platforms

Roots are the causes of the digital divide and the following recommendations are proposed:

Infrastructure accessibility and availability
- Install free WIFI hotspots in schools
- Set up accessible digital teaching rooms for students
- Set up local labs for the development of online courses
- Set up appropriate infrastructure to connect all schools to the Internet

Socioeconomic conditions
- Support financially low-income households to get access to Internet for education

Demographic experiences, Cultural and Education practices
- Reinforce capacities of teachers and students on the use of online platforms (yearly)
- Promote education campaigns on digital literacy

7. Conclusion

In this project, the team sought to promote digital resiliency in education in Africa through a three-pronged approach that consisted of firstly assessing the digital divide in education, secondly learning from inspiring practices and thirdly, proposing a policy framework of recommendations for action. Specifically, the team settled on two case study cities Benguerir-Morocco and Nairobi-Kenya. In each of these cities, an assessment of the digital divide in education during the pandemic was done drawing from the UN-Habitat model of digital divide assessment that explores gaps and roots.

Drawing from the Benguerir case, the existence of a digital divide in education through connectivity, digital devices and capabilities of students and teachers was observed. Beyond the national government's developed platform, TelmidTICE, limited support was given to teachers and students, and thus, concerns of digital divide were not considered at the local level of the city. Scattered initiatives of solidarity were however observed among families to ensure connectivity and content sharing.

Similarly, the study on Nairobi produced similar results. The digital divide in education through access to connectivity, devices and capabilities of students and skills was observed. Initiatives at the national level did not trickle down to local level especially with low-income neighbourhoods. Thus, the digital divide was not taken into account in the delivery of ERE during the pandemic. Reliance on their own means and solidarity among families were some of the measures adopted to mitigate these challenges to access education.

Considering this, it is necessary to ensure that digital divide assessments are rapidly done to identify gaps and roots in order to inform any form of emergency remote education. This approach will ensure that education continues in a much more efficient and inclusive manner taking into account the needs of all.

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9. Appendices

9.1. Interview Schedules

Educators

<u>Interview Schedule with School authorities (Headmasters)</u>

Name of Interviewer	
Date of interview	
Informed consent signed (yes/no)	
School	

Introduction

Thank you for taking part in this research. We are doing a research project at UM6P and this interview is a part of our work.

If you agree, I would like to record our conversation with my voice recorder. The recording will only be listened to by the research team, and it will be totally anonymous (so we won't share your names and addresses with anyone) We may use quotes from the interview in the written documentation but again these will always be anonymous.

Before we begin, I'd like to ask you to sign this consent form, which states that you understand what is happening and are happy to go ahead with the interview.

Demographic Data (ask the interviewee the following questions)	
Name of Headmaster	
Number of years of Experience	
Experience with using digital tools in education	
General access to ICT in the school	
Use of digital tools in teaching and learning in the school before COVID-19	

Aim: Assess the Digital Divide experienced?
GAPS
Digital Access Divide - Material access
Connectivity

1. In your considered opinion, did you observe connectivity issues as a major challenge your students and teachers faced in Emergency Remote Education (ERE)?
2. Did they have access to usable broadband Internet in their homes?
3. Did they have a means by which to access the Internet conveniently and reliably?
   a. If YES, how reliable and convenient was it?
   b. If No, did they rely on a public service centre such as a public library or travel to a location for Internet connectivity?
4. What kind of education-related activities could your students and teachers perform using the Internet connectivity speed they had access to (text-based, audio-visual, audio etc.)?
5. Did you personally experience any of these challenges?

Access to devices

6. In your considered opinion, was access to devices a major challenge your students and teachers faced in ERE?
7. Do you know if they had access to devices for teaching and learning?
   a. Which kind of devices did they use to access the internet (PC, laptop, tablet, mobile phones, etc)?
   b. How many of such internet-enabled devices did they have access to?
8. Did you personally experience any of these challenges?

Digital Capability and Outcome Divide

9. Did your students and teachers feel confident in their ability to use a digital device to accomplish their education goals?
   a. How familiar are your students and teachers with online privacy issues?
   b. How familiar are your students and teachers with cyber security issues, including password management or phishing attempts?
10. Were your teachers confident in their ability to create and share content for teaching?
11. How capable were your students and teachers to access or use online educational platforms?

ROOTS

12. Did your students and teachers highlight any **location reasons** (e.g. Residence in informal settlement, rural areas, etc) for their digital challenges? Probe for details
13. Did they highlight any **socio-economic reasons** (e.g. Affordability,) for their digital divide challenges? Probe for details
14. Did they highlight any **cultural practices** (e.g. Beliefs, friends and family acceptance, etc.) as reasons for their digital divide challenges? Probe for details
15. Did they highlight any **educational** reasons (e.g. Lack of training, previous use of digital tools, etc) for their digital divide challenges? Probe for details

Aim: Understand the impact on education?

C

16. In your opinion, how did these specific challenges impact students and teachers during the pandemic?

17. How did these specific challenges impact your function as a headteacher during the pandemic?

Aim: understand how the digital divide challenges were addressed by students and teachers

18. In your opinion, how did students and teachers mitigate these digital divide challenges to access education?

19. How did the government's strategies assist you, your students and teachers in addressing these challenges?

20. Which solutions do you think would be helpful for addressing the divide now and in the future?

Interview Schedule with Teachers

Name of Interviewer	
Date of interview	
Informed consent signed (yes/no)	
School	

Introduction

Thank you for taking part in this research. We are doing a research project at UM6P and this interview is a part of our work.

If you agree, I would like to record our conversation with my voice recorder. The recording will only be listened to by the research team, and it will be totally anonymous (so we won't share your names and addresses with anyone) We may use quotes from the interview in the written documentation but again these will always be anonymous.

Before we begin, I'd like to ask you to sign this consent form, which states that you understand what is happening and are happy to go ahead with the interview.

Demographic Data (ask the interviewee the following questions)	
Name of Teacher	
Number of years of Experience	
Level of teaching	

Aim: Assess the Digital Divide experienced?	
GAPS	
Digital Access Divide - Material access	
Connectivity	

1. Did you have access to usable broadband Internet in your home?

2. Did you have a means by which to access the Internet conveniently and reliably?

    a. If YES, how convenient and reliable was it for you and in what ways?

b. If NO, did you rely on a public service centre such as a public library or travel to a location for internet connectivity.

3. What kind of education-related activities could you perform using the Internet connectivity speed you had access to?

Access to devices

4. Did you have access to devices for teaching and learning?

    1. If YES,

    a. What devices did you use to access the Internet?

    b. How many of these internet-enabled devices did you have access to?

Digital Capability and Outcome Divide

5. Did you feel confident in your ability to use a digital device to accomplish your education goals?

6. How familiar are you with online privacy issues?

7. How familiar are you with cyber security issues, including password management or phishing attempts?

8. How confident are you in your ability to create and share content for teaching?

9. How capable are you to access or use online educational platforms?

ROOTS

10. Do you attribute your digital divide challenges to any **location reasons** (e.g. Residence in informal settlement, rural areas, etc)? probe for more details

11. Do you attribute your digital divide challenges to any **socio-economic reasons** (e.g. Affordability,)? probe for more details

12. Do you attribute your digital divide challenges to any existing **cultural practices** in your community (e.g. Beliefs, friends and family acceptance, etc.)? probe for more details

13. Do you attribute your digital divide challenges to any **educational reasons** (e.g. Lack of training, previous use of digital tools, etc)? probe for more details

Aim: Understand the impact on education?

In your opinion, how did these specific challenges impact the Emergency Remote Education during the pandemic?

Aim: understand how the digital divide challenges were addressed by students and teachers

14. How did you mitigate these digital divide challenges?

15. How did the government's strategies assist you to address these challenges?

16. Which solutions do you think would be helpful for addressing the divide now and in the future?

Interview Schedule with Education Administrator

Name of Interviewer	
Date of interview	
Informed consent signed (yes/no)	

Introduction

Thank you for taking part in this research. We are doing a research project at UM6P and this interview is a part of our work.

If you agree, I would like to record our conversation with my voice recorder. The recording will only be listened to by the research team, and it will be totally anonymous (so we won't share your names and addresses with anyone) We may use quotes from the interview in the written documentation but again these will always be anonymous.

Before we begin, I'd like to ask you to sign this consent form, which states that you understand what is happening and are happy to go ahead with the interview.

Demographic Data (ask the interviewee the following questions)	
Name of officer	
Position	

Aim: Assess the Digital Divide experienced?	
GAPS	
Digital Access Divide - Material access	
Connectivity and access to devices	
In your opinion, in general, did the Emergency Remote Education rolled out during the COVID-19 suffer from digital divide challenges in your city?	
Specifically, comment on the following challenges:	
1. Access to usable broadband Internet in homes by teachers and students	
2. Provision of alternate internet services by public services (Public libraries, government agencies, etc)	
3. Connectivity quality and speed	
4. Access to devices for internet connection	
5. Did you personally experience any of these challenges?	
Digital Capability and Outcome Divide	
6. Confidence of teachers and students in their ability to use digital devices for education goals	

7. Familiarity of teachers and students with digital literacy such as privacy and Cyber security issues	
8. Confidence of teachers and students in the creation and sharing of educational content	
9. Access/use of online educational platforms of teachers and students?	

In your opinion, in general, what are the root causes of these digital divide challenges in your city?

10. Geospatial Conditions – e.g. Location of people in informal settlements, rural areas, outskirts	
11. Socioeconomic Conditions - e.g. Affordability, other economic priorities than education, etc	
12. Cultural Practices – e.g. Beliefs, acceptance by friends and family	
13. Education – e.g. Lack of training, previous use of digital tools	

Aim: Understand the impact on education?

14. In your opinion, how did these specific challenges impact the Emergency Remote Education during the pandemic?	

Aim: understand how the digital divide challenges were addressed

15. From your observation, how did students and teachers mitigate these digital divide challenges to access education?	
16. How did your outfit assist education providers to address these challenges?	
17. Which solutions do you think would be helpful for addressing the	

divide now and in the future?	

Households

Questionnaire Survey for Households

Name of Interviewer	
Date of interview	
Informed consent signed (yes/no)	
Informed consent for recording (yes/no)	
Community	

Introduction

Thank you for taking part in this research. We are doing a research project at UM6P, and this interview is a part of our work.

If you agree, then I would like to record our conversation with my voice recorder. The recording will only be listened to by the research team, and it will be totally anonymous (so we won't share your names and addresses with anyone) We may use quotes from the interview in the written documentation but again these will always be anonymous.

Before we begin, I'd like to ask you to sign this consent form, which states that you understand what is happening and are happy to go ahead with the interview.

Demographic Data				
Age				
Gender	Number of Males		Number of Females	
Any known disabilities	Yes		No	
Household Size	0-2	3-5	6-8	9+
Number of children going in Nursery school	0-2	3-5	6-8	9+
Number of children going in primary school	0-2	3-5	6-8	9+
Number of children going in high school	0-2	3-5	6-8	9+
Number of children going in university	0-2	3-5	6-8	9+

Aim: Assess the Digital Divide experienced?	Comments

GAPS				
Digital Access Divide - Material access				
Connectivity				
17. Did the students in the household get online classes during the COVID-19 lockdowns?	Yes		No	
If yes 18. How did students in the household get access to online classes during the OVID-19 lockdowns?	Through internet connection at home	Through public service centre		
If the answer is through internet connection at home 19. How did students in the household have access to Internet in the home?	Shared internet connection from another household	Through mobile data	Through Wi-Fi	Others
20. How long did students in the household use the internet for educational purposes during the COVID-19 lockdowns?	0-30% of their time on internet	31-60% of their time on internet	61-90% of their time on internet	More than 90%
21. How good was the internet connection for students in the household to easily get online classes?	Poor	Fair	Good	Very good	Excellent
If the answer is through public service centre 22. Which types of public service centre?	Public facility (please specify)	Private service provider (please specify)	others (please specify)	
23. How far did students travel to a location to connect to the Internet?	0	1-10 km	11-30 km	More than 30 km
If no 24. Why	No access to internet	No platforms are provided for online classes	No devices to connect to the internet	Others
25. Please elaborate				

I

Access to devices					
26. By which means did students in the household conveniently and reliably access the Internet?	Desktop PC	Mobile Phone	Laptop	Tablet	Feature phone
27. How many Internet-enabled devices do you have in the household?	0	1-3	4-6	7-9	10+
Digital Capability and Outcome Divide					
28. How do students in the household feel confident in their ability to use the Internet to accomplish education goals?	Not confident at all	Sightly confident	Somewhat confident	Fairly confident	Completely confident
29. Could you elaborate					
30. How do students in the household feel confident in their ability to use a digital device to accomplish education goals?	Not confident at all	Slightly confident	Somewhat confident	Fairly confident	Completely confident
31. Which platforms students in the household use to get online classes	Existing social media platforms (YouTube, Facebook, WhatsApp, etc)	Proprietary platforms	MOOCs	Others (specify)	
32. How comfortable are students in the household with those platforms?	Not comfortable at all	Slightly comfortable	Somewhat comfortable	Fairly comfortable	Completely comfortable
33. What improvements do you think could be made on those platforms?					
34. Are students in the household familiar with privacy issues?	Not at all familiar	Slightly familiar	Somewhat familiar	Moderately familiar	Extremely familiar
35. Could you elaborate					
36. Are students in the house familiar with cyber security issues, including	Not at all familiar	Slightly familiar	Somewhat familiar	Moderately familiar	Extremely familiar

password management or phishing attempts?					
37. Have any students in the household been harassed on the internet including social media?	Yes	No			
38. If yes explain					
39. How confident are students in the household in their ability to create and share content online?	Not confident at all	Slightly confident	Somewhat confident	Moderately confident	Extremely confident
40. Do students in the household feel confident in their ability to use social media?	Not confident at all	Slightly confident	Somewhat confident	Moderately confident	Extremely confident
41. Do students in the household feel confident in their ability to fill out online forms for studies or employment?	Not confident at all	Slightly confident	Somewhat confident	Moderately confident	Extremely confident
42. Do students in the household have access to or use online educational platforms?	Always	Very often	Sometimes	Rarely	Never
ROOTS					
Geospatial Conditions					
Socioeconomic Conditions					
43. How much is the house's budget for internet per month?	0-10$	11-50$	51-100$	More than 100$	
44. How expensive do you feel your internet connection is?	Not expensive at all	Slightly expensive	Somewhat expensive	Moderately expensive	Extremely expensive
45. Do you have to prioritize Internet access for other things like groceries or rent?	Almost Always	Often	Sometimes	Seldom	Never
46. Could you elaborate					
47. Would students in the household use more online educational platforms if the	16 out of 30 said yes		No		

internet was cheaper or free?				
48. How much is your ideal budget for internet connection per month?	0-10$	10-50$	50-100$	More than 100$
Cultural Practices				
49. Do you believe digital education could improve the education level of children in the house and give them better chances in life?	Yes		No	
50. Explain How				
51. Is it common in your community to use internet for digital education?	Yes		No	
52. Explain				
53. Do you think some cultural practices in your community limit the access to digital education?	Yes		No	
54. Explain				
Education				
55. Do you think a high level of education is required to get online course?	Yes		No	
Aim: Understand the impact on education?				
56. In your opinion, how did these specific challenges impact the Emergency Remote Education during the pandemic?				
Aim: understand how the digital divide challenges were addressed by students and teachers				
57. How did you mitigate these digital divide challenges?				
58. How did the government's strategies assist you to address these challenges				
59. Which solutions do you think would be helpful				

for addressing the divide now and in the future?			

9.2. Call for Inspiring Practices

PROMOTING DIGITAL INCLUSION IN AFRICAN CITIES AND REGIONS: POLICY FRAMEWORKS FOR DIGITAL RESILIENCY IN EDUCATION FOR A BETTER COVID-19 RECOVERY

Call for inspiring practices

BACKGROUND

This call for application intends to collect inspiring practices promoting digital inclusion in education in Africa, especially during the COVID-19 Lockdowns when many students were not able to go to school.

The purpose is to document good practices and build a compendium of inspiring practices that will support the setting up of a policy framework for educational digital inclusion in African cities. This call is open to research institutions, academia, digital & tech companies, universities, and all types of institutions involved in digital education. This call is part of the research project entitled "Promoting Digital Inclusion in African cities and regions: policy frameworks for digital resiliency in education for a better COVID-19 recovery" conducted by the School of Architecture Planning and Design (SAPD) of Mohamed VI Polytechnic University (UM6P), UN-Habitat and The International Telecommunication Union (ITU). This project aims to develop a policy framework including key recommendations to address the digital divide in education in Africa using the cities of Benguerir - Morocco, Cotonou - Benin and Nairobi - Kenya as case studies.

Application form

APPLICANT	
Representative ►	☐
Title/Position ►	☐
Name of Institution ►	☐
Contact (Email Address) ►	☐
BEST PRACTICE DETAILS	
Title ►	☐
Institution ►	☐
Country ►	☐
Website (if available) ►	☐
CATEGORY OF BEST PRACTICE **(if your application falls into several categories, please pick ONE category that best suits)**	
Teaching & Learning ►	☒
Policy ►	☐
Procedures ►	☐
Communication ►	☐
Governance mechanism ►	☐
Other (Please specify) ►	☐
EDUCATION LEVEL TARGETED	
Primary ►	☐

Secondary ►	☐
Tertiary ►	☐
Other (Please specify) ►	☐

TARGET GROUP(S)	
Teaching/Academic Staff ►	☐
Administrative Staff ►	☐
Students ►	☐
Other (Please specify) ►	☐

DIMENSION(S) OF THE DIGITAL DIVIDE ADDRESSED	
Connectivity divide (Intra-urban and urban vs. rural ►	☐
Demographic divide (Gender, ethnicity, age and disability) ►	☐
Infrastructural divide (Infrastructure and access) ►	☐
Cultural divide (Motivation and social acceptability)►	☐
Socioeconomic divide (Affordability) ►	☐
Literacy divide (Awareness and education) ►	☐

GAPS **(Select the main component of the digital divide in terms of Gaps your solution address)**	
Connectivity (Access to usable broadband internet in the home or a means by which to conveniently and reliably access the internet whether by mobile phone or in a public service center such as a public library.) ►	☐
Digital literacy (Ability to use information and communication technologies to find, evaluate, create and communicate information, requiring both cognitive and technical skills) ►	☐
Access to device (Refers to affordable, sustainable access to internet-enabled devices that meet the needs of the user) ►	☐

LOCATION **(Select the main component of the digital divide in terms of location your solution address)**	
Political boundaries (Can include council districts, innovation zones, tribal divisions or voting districts.) ►	☐
Addresses (Address location) ►	☐

Geo-Coordinate (Geo-coordinates, or latitude/ longitude) ►	☐
Administrative boundaries (Administrative boundaries are non-partisan boundaries set by organizations that administer services such as ZIP codes, prefectures, provinces, or counties.) ►	☐
Geospatial conditions (Limited access to connectivity infrastructure, skills and devices based on the availability of resources and infrastructure in rural areas, informal settlements or areas with unique topography.) ►	☐

ROOTS
(Select the main component of the digital divide in terms of Roots your solution address)

Infrastructure accessibility and availability (The accessibility of internet connectivity infrastructure due to physical location, historic lack of public or private sector investment, or informality.) ►	☐
Socioeconomic conditions (Limited access to connectivity infrastructure, skills and devices based on affordability and need.) ►	☐
Demographic experiences (Limited access to connectivity infrastructure, skills and devices based on gender, ethnicity, disability and age.) ►	☐
Cultural practices (Limited access to connectivity infrastructure, skills and devices based on cultural practices, societal conditioning and perceived need as shaped by the experiences of a community or cultural group.) ►	☐
Education (Limited access to connectivity infrastructure, skills and devices based on education level, awareness, familiarity with the internet and digital literacy levels.) ►	☐

T H E   P R A C T I C E

Practice Description – Short
Provide a one sentence description/summary of the practice ▼

Practice Description-Long (max 150 words)
Summarise the practice. Make sure to address what it is, its key activities/components, what problem/issue/challenge it addresses, what dimension of the digital divide addressed, and what target group it impacts. ▼

Problem Impact (max 100 words)
Indicate initial impact of the solution – what changes resulted in terms of gaps, location or roots and for whom?

Replicability (max 50 words)
Briefly describe if/how this practice can be implemented in another context (other country or education institution) ▼

Email text

CALL FOR INSPIRING PRACTICES ON DIGITAL EDUCATION IN AFRICA CITIES

Are you a researcher or academic institution, university, digital & tech company, or any type of institution involved in digital education in African cities?

Share your inspiring digital inclusion in education projects across the African continent until 30th June 2022.

Selected projects will be showcased and published in a compendium as part of the Connect2Recever research project on digital inclusion in African cities and regions jointly developed by the School of Architecture, Planning and Design (SAPD), Mohammed VI Polytechnic University(UM6P) in partnership with UN-Habitat and the International Telecommunication Union (ITU).

If you have any question, contact hassan.yakubu@um6p.ma or leandry.jieutsankuidje@un.org
Deadline 30th June 2022
Use this link to share your solution https://forms.gle/q6jZH4dc9DThpKKy7

APPEL A PRATIQUES INSPIRANTES SUR L'EDUCATION NUMERIQUE DANS LES VILLES AFRICAINES

Êtes-vous une institution de recherche ou académique, une université, une entreprise numérique et technologique ou tout type d'institution impliquée dans l'éducation numérique dans les villes africaines ?

Partagez vos projets inspirants d'inclusion numérique dans l'éducation à travers le continent africain jusqu'au 30 juin 2022.

Les projets sélectionnés seront présentés et publiés dans un recueil dans le cadre du projet de recherche Connect2Recever sur l'inclusion numérique dans les villes et régions africaines, développé conjointement par School of Architecture, Planning and Design(SAPD), l'Université polytechnique Mohammed VI (UM6P), ONU-Habitat et l'Union internationale des télécommunications (UIT).

Si vous avez des questions, contactez hassan.yakubu@um6p.ma ou leandry.jieutsankuidje@un.org.
Date limite: 30 Juin 2022
Utilisez ce lien pour partager votre solution https://forms.gle/FghvHa3UQUnkod2CA

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