

RESEARCH ARTICLE

Digital learning in techno-utopia? Do-it-yourself education in Kibera, Nairobi

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Abstract

This article argues that, despite techno-utopian narratives of digital self-directed learning (through content freely available on the internet) and its proposed opportunities for upward social mobility, digital learning is and remains a highly contextual practice, rooted in local realities and aspirational trajectories. Through learning with a community-based organization (CBO) that offers tech training to youth from low-income neighbourhoods in Kibera, Nairobi, I argue that digital learning does not replace formal education but rather is strategically incorporated into already existing learning practices. Although Nairobi has been extensively studied as a frontrunner in technology uptake and development in Africa, it is crucial to also look at technology practices and uptake away from elite design and use, to extend and deepen our knowledge of how the digital realm plays out in the lives of the majority of urban residents.

Résumé

Cet article soutient qu'en dépit des discours techno-utopiques d'apprentissage autodirigé facilité par le numérique (avec un contenu disponible gratuitement sur Internet) et des opportunités d'ascension sociale qu'il propose, l'apprentissage numérique est et reste une pratique hautement contextuelle ancrée dans les réalités locales et les trajectoires aspirationnelles. En apprenant avec un organisme communautaire qui offre des formations techniques aux jeunes des quartiers défavorisés de Kibera, à Nairobi, l'auteur soutient que l'apprentissage numérique ne remplace pas l'éducation formelle, mais plutôt qu'il s'intègre de manière stratégique dans des pratiques d'apprentissage déjà existantes. Nairobi a été largement étudiée comme ville championne de l'utilisation et du développement de la technologie en Afrique, mais il est crucial d'examiner également les pratiques technologiques et l'utilisation de la technologie au-delà de sa pertinence et utilisation par les élites, pour mieux comprendre comment la sphère numérique s'inscrit dans la vie de la majorité des résidents urbains.

Resumo

Este artigo argumenta que, apesar das narrativas tecno-utópicas da aprendizagem digital autodirigida (através de conteúdos disponíveis gratuitamente na Internet) e das oportunidades propostas para uma mobilidade social ascendente, a aprendizagem digital é e continua a ser uma prática altamente contextual, enraizada nas realidades locais e em

trajetórias aspiracionais. Através da aprendizagem com uma organização de base comunitária (OBC) que oferece formação tecnológica a jovens de bairros de baixo rendimento em Kibera, Nairobi, defendo que a aprendizagem digital não substitui a educação formal, mas é antes estrategicamente incorporada em práticas de aprendizagem já existentes. Embora Nairobi tenha sido amplamente estudada como pioneira na adoção e desenvolvimento de tecnologias em África, é crucial analisar também as práticas e a adoção de tecnologias fora do âmbito da conceção e utilização de elite, para alargar e aprofundar o nosso conhecimento sobre a forma como o domínio digital se desenrola na vida da maioria dos residentes urbanos.

Introduction¹

'Haven't we all been in that spot,' Naima pitched, with a trembling voice that had lost some of its initial confidence, 'where we were punished for not doing our homework? Yes, in public schools, they offer textbooks, but you will find two, three, or even four people in one desk. And when homework is given, only one person can take the book. The rest will face the consequences of not having that book.' Naima was standing in front of the classroom with two teammates. In her early twenties, she had finished high school, and was now at the last hurdle of the three-month course in coding, design and business skills offered to youth by an (informal) coding school (the School) in Kibera, one of Kenya's largest low-income neighbourhoods. After being taught the basics of several coding languages, a bit of drawing and design, as well as some basic business skills, students are supposed to form teams during the last month of the training and use what they have learned to find a solution to problems they identified in their community. Naima was pitching a solution that she and her team called 'progressive learning', which consisted of a mobile application through which pupils would be able to access textbooks at home. Parents would have to subscribe to the application, and children could then retrieve the content of the books on their parent's phone, allowing them to get their homework done, and avoid punishment the next day.

Although the team had worked on the idea and the app for several weeks and had already received comments during the process, in the actual feedback round it became clear that there were several things the team had failed to take into account. The solution sounded quite simple and straightforward, but what about the licence fees for the textbooks? How would poor parents pay not just for the subscription, but for the data plans as well? And what about parents who needed the household's only smartphone for work themselves? During the question round, more and more issues relating to the material and personal backgrounds of urban life in the slums came to the fore, revealing tensions between the techno-optimistic solution being proposed and the socio-material realities of the neighbourhood where it was going to be used. Although this was only an exercise in an informal introductory course, the techno-optimistic, problem-solving mindset embedded within the course clearly came to the

¹ The article is based on nineteen months of fieldwork in Nairobi, a first period of almost fifteen months in 2019–20 followed up with three visits, one in each subsequent year. I have followed one of the cohorts in the coding school and participated in some of the School's ongoing projects. I also conducted fieldwork in other tech environments in Nairobi. Research was funded by KU Leuven Special Research Fund (BOF), number 3H180662 (CityLabs).

fore, as did the problems associated with it. It stood as an example of a larger local aspiration to ‘fix’ complex societal problems by means of new, digital solutions that would make the world run smoother and more efficiently, but which also often failed to consider the full complexity of local realities.

In this article, I scrutinize how personal aspirations, local educational realities and techno-optimistic promises become closely intertwined, and how young people in Kibera strategically maximize their chances of upward class mobility by instrumentalizing what is available, both in formal and in ‘informal’ learning opportunities. I argue that, for youth in low-income neighbourhoods, formal education is often not a linear nor a continuous path. Instead, educational pathways are frequently halted and interrupted due to a lack of funds to pay school fees, leaving youth frustrated and disappointed. ‘Techno-facilitated forms of learning’ (Mbembe 2021), sometimes locally referred to as ‘YouTube University’ or – in a somewhat broader sense – ‘ghetto university’ (Thieme 2021), whereby young people learn from what is freely available on the internet, have been presented in global tech narratives as alternatives, or solutions, to help young people bypass traditional educational systems in their attempts to attain upward social mobility (Anderson 2012). However, I argue that these techno-utopian discourses about upward social mobility fall short in contexts where precarious day-to-day lived realities of low-income neighbourhoods prevail. I show how, instead of falling for the promises of such utopianism, youth in low-income areas devise a do-it-yourself (DIY) education, consisting of learning in both formal and informal learning environments, in an attempt to maximize their chances to access (formal) education and the job market. In showing how new technologies and the narratives surrounding them find their way into people’s lives, the article adds to a growing body of literature that investigates how digital technologies are incorporated in strategic and agentive efforts to make one’s life better (see also Guma 2020; 2021; Guma *et al.* 2019). In Kibera, an urban area that has been heavily penetrated by non-governmental organizations (NGOs), community-based organizations (CBOs), start-ups, and other private actors, digital interventions do indeed find their way into people’s lives, thereby shaping how they perceive their chances of better futures. New technologies are thus appropriated to fit needs that exist, and in ways that are often ‘intrinsically connected to people’s livelihood strategies’ (Odendaal 2023: 1) and socio-material conditions. Nevertheless, a mere techno-utopian perspective also runs the risk of obscuring the complexity of people’s lifeworlds in low-income areas.

‘Smart’ aspirations in the city that is already there

Nairobi, like many cities on the African continent, has fully embraced the ‘smart city’ aspiration. In the past decade, different governments, both local and national, have pushed a ‘smart city’ agenda, seeking to attract investment and strengthen the economy. The narrative around ‘smartness’ is built on a presumed cleanliness and orderliness that will help cities to advance, or even leapfrog, into the future (Guma and Monstadt 2021). The vocabulary of ‘smartness’ is built on a mixture of business language, which presumes progress (and profits) in exchange for investment, and urban aspirational visions of better and more efficient futures. The Kenyan government has translated these aspirations into various plans, such as the Nairobi Metro 2030 plan, the Vision 2030 plan and the country’s ICT transformation roadmap

to build a pathway to a better future. All of these plans rely on hypothetical technology investments. The much-anticipated construction of Konza Tech City, a purpose-built smart city some sixty kilometres from Nairobi, fits this anticipatory model. Konza Tech City was envisaged as a top-notch tech environment for investors and start-ups, a city detached from Nairobi's day-to-day infrastructural hurdles and problematic social realities, such as its dense traffic and presumed insecurity (see also Van den Broeck 2016). The government of Kenya also secured the arrival of three submarine fibre optic cables, which were up and running by the end of 2010 (Easterling 2014). Although, in the end, Konza Tech City never materialized in the way the government had planned (Anwar and Graham 2022), these infrastructural investments nevertheless helped the local tech ecosystem to thrive. Nairobi rapidly became a regional and even continental forerunner, and global news outlets wrote celebratory stories about the city's enormous potential to leapfrog into the future (Smith 2012; Davies 2014). Visits to the tech ecosystem by distinguished guests such as Facebook's CEO Mark Zuckerberg (Marchant 2018), former US president Barack Obama (Friederici *et al.* 2020) and, more recently, Twitter/X founder and bitcoin enthusiast Jack Dorsey underwrote the growing importance of the Kenyan tech ecosystem. The success of M-Pesa, a mobile money transfer system that gained attention worldwide (Maurer 2012; Kusimba 2021) further underscored Kenya's image as a tech-savvy country.

The attention given to Kenya and its capital as an emerging tech ecosystem attracted many investors and start-ups to Nairobi. And with them developed a certain model of good practice, moulded mostly after the Silicon Valley tech ecosystem, 'the invisible hand of the 21st century' (Arora 2019: 148) that strongly influences tech ecosystems globally (Friederici *et al.* 2020; Avle *et al.* 2017; Carver 2010). This model relies heavily on the idea that technology can and will solve virtually all the world's problems (Morozov 2013). Although characterized as radical 'innovation typified by the adage "move fast and break things" (Taneja 2019)' (Odendaal 2023: 98), the social ramifications of such 'innovation at all cost' (Taneja 2019) are deemed by some to be 'problematic for who it leaves behind' (Odendaal 2023: 98). Furthermore, in Nairobi, an extra layer further complicates the construct, as the tech ecosystem is typified by an expectation of innovations that will generate 'impact', thereby creating a tension for young developers between 'liberating feelings about new work possibilities on the one hand, and on the other, restrictive requirements of international funders and investors who still pursue exoticized imaginations of lives in a generalized Africa' (Coban 2018: 61). The notion of social entrepreneurship, which has gained traction in innovation and development environments in past years, is framed as 'a benevolent capitalism that seeks to "do good, while doing well"' (Wahome 2020: 199). It has created a large market for the testing and implementation of new (digital) technologies, in a train of thought that has been coined techno-optimist (Seyram *et al.* 2020), or, more negatively, solutionist (Morozov 2013), or even techno-dystopian (Haraway 2016), denoting the idea proposed by players within the global tech ecosystem that technological developments can and will be solutions for longstanding societal problems such as poverty or unemployment. The narrative has been severely critiqued in the past couple of years. Business models require 'pitchable' types of solutions, which offer streamlined interventions for well-defined problems. Yet, it has been argued, in such a way, complex problems rooted in complex societal structures

become narrowed down until they are isolated and cut loose from larger contexts. And in many cases the proposed fix is nothing more than a Band-Aid on a broken leg (for techno-fixes in education, see Facer and Selwyn 2021). Kibera, due to its proximity to Nairobi's city centre, and because of travelling images of abject poverty and its depiction as 'the largest slum in Africa', has long been the recipient of countless organizations aiming to 'help'. These have turned Kibera into a testbed of 'do-good innovations', and, in turn keep circulating the image of Kibera as a site of need.

It is important to bring the smart city and the tech ecosystem to the fore when speaking about a low-income neighbourhood such as Kibera, because the aspired smartness of Nairobi acts not just as a background factor but also as an ordering mechanism. It puts forward an imagined urban future that differs quite extensively from many of the characteristics of city life as it unfolds in the day-to-day lives of urban residents. But although it resonates more with urban contexts and aesthetics such as those of Dubai or Singapore than with African urban realities, we cannot put it aside as 'foreign'. This imagery has been embraced and adopted by many local governments. It has become a complex, local-global 'mythical construct' (Odendaal 2023: 4) that looks and sounds compelling and is aspirational in itself (McFarlane 2016), but it also hides 'the true struggles and small appropriations that typify African urbanism' (Odendaal 2023: 4; see also De Boeck and Baloji 2016; Guma 2019). It puts forward a cleanliness and orderliness that recall earlier colonialist desires to make the city 'modern', desires that have now evolved into a drive towards a more networked, more smoothly running, urban environment. It is telling, however, that achieving this 'smart city' idea often requires the construction of new satellite cities (De Boeck 2011; Watson 2014), away from 'the city that is already there' (Bhan 2016: 103), or 'the majority city' (Pieterse 2019) with its 'makeshift lives' (Thieme *et al.* 2017).

It is exactly in the city that is already there that the complexities of new digital technology appropriation push back against techno-utopian beliefs. Therefore, to understand how technologies and technology practices play out, we must turn away from how the elite city looks at technology and towards how the majority city adapts and appropriates (Takhteyev 2012; Nemer 2022) new technology (practices). In line with the discrepancies that have been pointed out in urban studies between the 'ideal' city and its translation into lived realities, a similar scrutiny should be employed in relation to the lived realities of technological products and practices versus their intended design, in order to understand how they find their way into already existing practices and realities.

The School, the setting of the vignette with which this article opened, is one of many organizations that finds itself at the intersection of the tech ecosystem and the majority city. Merging the techno-enthusiasm of global (tech) communities in the early 2010s with the idea that the internet has made virtually all knowledge free to find and use, the School is a prime example of the belief that education about and with technology can help people to get jobs and escape precarious livelihoods. It offers training packages to young people from low-income areas that resonate both with larger, global techno-utopian ideas about lifelong learning and with the idea that technology education can replace – or enable people to leapfrog over – older, ill-suited educational systems that do not prepare youth for new, fast-changing, digital realities (Ames 2019; see also Burch and Miglani 2018 on the Indian context).

In so doing, and in an attempt to adapt to local realities, the School relies heavily on what is freely accessible and downloadable on the internet. It also strongly emphasizes the importance of self-directed learning² in the training it offers. The School is located in one of the more formalized areas of Kibera. As a CBO outside Kenya's formal educational system, it is one of many unofficial vocational training institutions in Nairobi that absorb young people who have failed to access formal tertiary education.

Aspiring education

In Kibera, as in other low-income urban contexts across the continent, being young means trying to build a (better) future for yourself and for those around you. Yet in Kibera it also means navigating a reality of uncertainty, unemployment, poverty and precarity (Farrell 2015). A future in which one can thrive – the vernacular translation of upward class mobility – as it was voiced by one of my conversation partners (see also Archambault 2017; Di Nunzio 2019) is something that is strongly desired. One of the ways through which this future is imagined is (formal) education (see also Stambach 2017); this desire, in turn, is embedded in global ideologies around education. Quality education is often put to the fore as a way out of precarity and is one of the key pillars of the UN Sustainable Development Goals (United Nations n.d.). Globally, children and young people are told that if they do well in school, they are much more likely to 'make it' in life. In Kenya, too, a high standard of education is seen as a way forward (Cooper 2022). It is also one of the pillars of the aforementioned Vision 2030 plan, which aims to transform Kenya into 'a newly-industrializing, middle income country providing a high quality of life to all its citizens in a clean and secure environment'.³

However, for students like Naima and her teammates, being part of this upward social mobility through education, as envisioned by the Vision 2030 plan, is easier said than done. A formal educational path is by no means self-evident for youth in Kenya's low-income neighbourhoods (Ngutuku 2022; see also Ansell *et al.* 2020). Although Mwai Kibaki declared 'free education' when he became president in 2002, parents still face school bills, as they are expected to help pay for school furniture and stationery (Nyaboke *et al.* 2021). Secondary education, which is mostly shaped through a system of boarding schools, is even more expensive.⁴ For parents who are already struggling to make ends meet, such as Naima's, it is in no way self-evident that they should cater to the educational needs of their children. In her dissertation on the coming of age of

² By 'self-directed learning', I mean learning that happens in a context mostly outside formal schooling, or outside a formal curriculum, and which is not guided by teachers. Content and knowledge come mainly through the internet, and learning depends on your own motivation and discipline. There are mostly no deadlines or fixed timeslots.

³ See <<http://www.vision2030.go.ke>>, accessed 10 November 2022. To realize those goals, the Kenyan government ordered a redesign of the national curriculum, with a stronger focus on competency than was the case in the older academic, exam-based curriculum. It was designed with the explicit aim of making students more self-reliant and of getting them to focus more on their talents than on passing national exams.

⁴ In the Kenyan secondary school system, there is also the option to choose a day school. This is less expensive, but still requires fees for – among other things – 'maintenance, physical facilities provision, electricity, water, non-teaching staff emoluments, school uniforms, food stuff etc.' (Kosgei and Keter 2016: 112).

young men in Kibera, Farrell points out what she calls ‘bottlenecks’ at every transition within the formal educational system, pushing out children at each stage, ‘so that students who did attend public university felt like members of an exclusive, elite class’ (Farrell 2015: 88). For most young people in Kibera, attaining tertiary education is a strong aspiration, but difficult to attain and sustain to the end.

Moreover, young people often carry the burden of having to provide for their family from very early on in life, leaving little time or money for their own ambitions. In order to keep the dream of pursuing further education alive, youth often resort to ‘hustling’, as Kenyans commonly call it, adding odd job to odd job to make a (little) money (Thieme *et al.* 2021; see also Di Nunzio 2019 for the Ethiopian context). This gathering of possibilities is never-ending and requires a lot of improvisational skills, and being on the lookout constantly for work or other earning opportunities. Thieme describes hustling as an ‘agentive struggle’, arguing that the concept of hustle ‘rethinks contemporary experiences of urban uncertainty that couple struggle and hope’ (Thieme 2018: 530, 538). The uncertain nature of the hustle invokes both the relentless efforts of young people and the omnipresent possibility of failure. Although hustling is widely used by people across Nairobi to describe various kinds of practice, it is best understood as a fundamentally situated practice, tied up in the very localized ways of being and doing. Low-income neighbourhoods in Nairobi may be quite similar in socio-economic background, but they often differ significantly in cultural terms and should be seen as different ecosystems in their own right. As such, the practice of hustling may vary greatly across different neighbourhoods in Nairobi, but always with the same goal: to use what is available to get ahead in life.

For example, the specific hustling practices that my interlocutors mentioned to me differ from those in Mathare, one of the other large low-income neighbourhoods in Nairobi, where Thieme (2018) was based. Contrary to what unfolds in Mathare, hustling practices in Kibera are very much tied to NGOs, CBOs and other actors, and to the way in which these organizations and actors promote ideas of progress and success. For most young people in Kibera I spoke with, techno-utopian narratives are desirable and attractive, and they very much want to attain the promised progress towards lives that are more stable and liveable.⁵ Yet, in line with what Fontein and Smith (2023) argue, while ‘hustling’ practices may be understood as agentive and creative, we should not ignore the power structures in which this agency plays out. The situatedness of the hustle should be seen as a complex intermingling of available opportunities and the structures that enable, confine or restrict them. Understanding how aspired futures, through the lenses of both education and technology, play out away from elite conceptions helps us to understand how perceived promises of progress are rooted in very local realities.

The day-to-day realities of life in Kibera require constant improvisation; even in the case of relative financial stability, the uncertainty of everyday life is always

⁵ Donovan and Park (2022) note similar observations in their work on mobile lending and debt in Nairobi. They state: ‘For many working people, inclusion in Kenya’s monied economy has always been partial and problematic. Yet, rather than substantive calls for decommodification and redistribution, what many desire is more access to commercial opportunity. It is a demand for membership within the country’s bourgeoisie rather than a call for its reduction or elimination’ (Donovan and Park 2022: 1067; see also James 2021).

apparent. When, for example, the little money earned by young people in infrequent and low-paying jobs is needed to cushion family emergencies or life shocks, such as illness or the death of a family member, dreams of continued education may quickly be shattered. When the money evaporates, the (formal) learning stops. When I mentioned the difficulty of maintaining a linear educational trajectory from school to university or college, one of the young men I often talked to responded: 'In Kenya, for the majority of the students that graduate from high school, there is no linear progression from the start of the educational trajectory to secondary level. That doesn't exist, or maybe it exists for a few, a few.' For Kenya's lower economic classes, 'broken' educational trajectories are the norm rather than the exception, even though the intention of furthering formal education is something that most people strongly aspire to, despite (temporarily) meagre or unavailable financial means.

Interrupted educational trajectories

Most people I met at the School had been able to complete their high school curriculum, already quite an achievement. Yet, when it came to accessing higher education, several mentioned that their chances of attending college or university were hampered by a lack of sustained funding. In the 8-4-4 system,⁶ now being phased out in favour of a more competence-based curriculum (CBC),⁷ a system of national examination was in place, first at the end of primary school (KCPE) and again at the end of secondary school (KCSE). The outcomes of the examinations are of great importance and play a significant role in shaping the future of a student's education. High grades offer the possibility of accessing a government scholarship into tertiary education. Yet, in Kibera, for many young people, even for those with the required grades, getting a degree remains costly. Extra costs, such as transport fees, quickly add up, and for many aspiring students access to university or college often has to be put on hold. Similarly, once one has entered tertiary education, one's trajectory is often disrupted, or 'paused', for lack of means, often without any indication of when such a pause will end. Moreover, a university or college degree is by no means a guarantee of success on the job market, but at least it holds the promise of progress. Therefore, as Honwana remarks, many young people (and their families):

see access to higher levels of education and to secure, long-term employment as the major path toward realizing their dreams. Students from disadvantaged areas and poor social backgrounds have difficulty getting a foothold on the first rungs of this ladder. Although many university graduates also struggle to

⁶ The 8-4-4 system was introduced in 1985 by then president Daniel Torotich Arap Moi. It consisted of an ideal trajectory of eight years of primary, four years of secondary, and four years of university education (Imana 2020).

⁷ The CBC was announced in 2017 by then president Uhuru Kenyatta. 'The CBC is designed to emphasize the significance of developing skills and knowledge and applying those competencies to real-life situations' (Nyakangi 2022). After several years of piloting, it was rolled out nationwide in 2020 (Gatitu 2022). A lot of protest followed, especially from parents complaining about being burdened by the new curriculum (Nyamai 2022), as well as about a lack of adequately trained teachers (Gatitu 2022). Its future is now under scrutiny by newly elected president Ruto, who has announced that the CBC will be assessed, per UNESCO guidelines, as it has been in place for five years now, and that it will be reviewed after public participation (Nyamai 2022).

find jobs, higher education still holds a mystique; it appears to be a precondition for achievement. (Honwana 2012: 45)

When I spoke about formal educational trajectories with people at the School, the frustration and disappointment of my conversation partners indicated just how important access to formal education was for their desired trajectories. Adam, one of the leading members of the School, hesitantly admitted that he did not hold a formal university or college degree. He spent his childhood in Kibera and managed to make it through primary and high school. But despite high scores in his KCSE exam, he failed to attain a university degree. He told me:

You know, I've been through high school through scholarships, mostly. I was sponsored through high school, and also partially primary school. My mom was very much struggling to pay my school fee. So after high school, when I joined university, I was relying on someone to help me to pay the school fees, because it's very expensive. Even though the government was paying my tuition fee, it was still expensive.⁸

With the help of the government and an organization that had previously helped him to pay his primary and high school fees, he enrolled in a private university with a good reputation. Yet, already during the first days of his tertiary education, he found that extra expenses were needed, and he was forced to unenroll after only three weeks.

So the main reason behind that is, I was unable to keep myself in school because of the financial situation that I was in back then. Even just keeping myself for three weeks, I had to use like 95 per cent of my savings. Because I used to commute each day from here to there. At least 300 shillings a day, I have to include lunch, orientation fees, etc. It was very expensive.⁹

Another of the School's members, a young woman in her early twenties who had joined the apprenticeship programme after completing the training cycle, told me a similar story. She was often present at the School but sometimes seemed distracted from learning and work. Eventually she told me why: she considered herself to be waiting. Although she enjoyed being at the School, Amy was counting down the time until her sister would graduate from college. 'My father doesn't have money to pay two school fees,' she told me in a matter-of-fact way. 'When my sister finishes, I can go.' It remained unclear how realistic her dream was, or whether she would ever be able to attend college at all, but in the meantime she was making the best of this imposed wait, keeping as many options as possible open for the future. Yet her earnings at the School were small and not sufficient to sustain herself, let alone her family.

Both Adam and Amy found their way to the School at a time when formal education was unavailable to them. Their story was – and is – not exceptional. Many of the learners expressed their participation in the School's activities as a way of bridging the gap between high school and college. In other cases, they were

⁸ Interview with Adam, January 2021.

⁹ *Ibid.*

encouraged by peers or acquaintances to enter the School while looking for jobs. The School served as one among multiple other strategies through which young people endeavoured to combine both educational and work options, thereby maximizing their chances to get ahead in life.

The difficulties young people in Kibera encounter in attaining formal education, and the hustle practices and strategies they employ to get by, echo across other parts of Kenya and the continent more broadly (see, for instance, Frye 2012 on Malawi). The agentic attempts of young people to build a future in the context of struggling economies, and in the absence of state institutions able to cushion that struggle, have been documented extensively across Africa (see, for instance, Piot 2016; Landau and Pampalone 2018; Mains 2007; Masquelier 2013).¹⁰

'Data is cheaper at night'

Naima was one of the students who made great progress during her stay at the School. Like many students starting out at the School, Naima had little to no prior knowledge of working with personal computers, and yet here she was, designing an app through MIT's app creator tool. The computers, neatly lined up on desks against the green walls of the classroom, all ran on Linux,¹¹ and students were expected to master the basics of Terminal during the first weeks of their training cycle. They were taught to handle the machines as developers, writing code from the very first days of the training programme. Further along in their training they would learn, among other things, basic Scratch and p5.js, a JavaScript library for 'creative coding, with a focus on making coding accessible and inclusive for artists, designers, educators, beginners'.¹² The course was designed so that students were exposed to a great deal of different content, but always in such a way that they were introduced formally by the trainers to the basics, preparing them to work hands-on on projects or tasks at later stages, when they were expected to search through internet tutorials for possible solutions to problems they might have encountered. In this process, they were allowed to ask for help only once they ran out of other options. This was a very conscious design, made to steer students towards digital self-directed learning, enabling them to use these learning skills after the training as well.

This approach is firmly rooted within wider dynamics of knowledge acquisition. Recently, and across the world, new global digital learning practices, such as learning new skills through Google or YouTube, have become household practices, and they are widely used by young people to 'upskill' (see also Simone and Pieterse 2017; Thieme 2021; Selwyn 2022). Online resources such as Wikipedia and YouTube are often now the first places where people turn to research and learn (Selwyn 2022), especially in tech education, where self-directed learning is a longstanding practice

¹⁰ What is referred to as 'hustling' in Kenya is often known in Francophone African contexts as *la débrouille* (Ayimpan 2014; Waage 2006) or '*débrouillardise*', as reported in Lomé (Santos 2023). The non-linear paths into uncertain futures, and the instability of these trajectories, has also been referred to as *waithood* (Honwana 2012), whereby young men negotiate their personal circumstances, and suffer from an inability to move on in life, due to unemployment. They must actively improvise livelihoods and devise connections in order to set in motion societal change for the better (Mains 2007; Masquelier 2013).

¹¹ Linux is open-source software often used by developers and is free to use.

¹² See <<https://p5js.org/>>, accessed 10 November 2022.

(Lange 2014). In Kibera, too, digital self-learning has become a new strategy in the repertoire of the hustle, in a further translation of young people's aspirations for the future and their frustration with the present. The digital offers pathways and routes into worlds that were previously inaccessible to them, such as programming or design. Yet, accessing digital content to be able to learn often presents a serious (financial) challenge in low-income areas, risking, once again, exacerbating existing inequalities, instead of overcoming them.

The notion of the 'digital divide' (Mutsvairo 2016; Mutsvairo and Ragnedda 2019), including both the required digital literacy and the material requirements to access 'YouTube University', remains unresolved and hampers the promise that techno-optimistic narratives propose. Exact numbers are hard to obtain, but the 2019 Kenyan government census included, for the first time, questions about the use and ownership of digital devices, and the results were listed per county.¹³ According to the census, 61,651 'conventional households' were counted in Kibera, of which 18 per cent reported the ownership of a 'desktop computer/laptop/tablet', and 31 per cent reported having internet access. Also, 44.5 per cent of people (above three years old) reported using the internet, and 25 per cent reported using a desktop/laptop/tablet. Ownership of a mobile phone (both smartphones and 'dumb' phones) was reported at 65.9 per cent (Kenya National Bureau of Statistics 2019: 431). In comparison, in Mathare county, ownership of a desktop machine, laptop or tablet was reported to be at 7 per cent (*ibid.*: 468). Of course, the home is not the only place where young people have access to the internet or digital devices; some have access to machines and the internet through their school or church youth group. In the home context, access to personal computers or the internet remains quite restricted. This was confirmed during the first day of the training, when, in an attempt to assess people's basic digital literacy skills, a trainer asked how many people were used to working with a computer. Very few hands went up.

Apart from lack of access to personal computers, and thus having few possibilities to acquire digital literacy skills, other infrastructural and financial barriers also exist. Access to electricity is complicated and can come at a high cost (Guma 2020). Electricity and internet outages are frequent and data bundles are expensive (Kibere 2016). Free online courses, which are abundant on the internet, such as through Codecademy or Sololearn, offer possibilities to learn coding languages, but free versions often come without support from a tutor (this feature often requires upgrading to a paid version, members told me) and without a certificate of completion. And although large tech companies such as Google have announced that they value skills more than degrees (Eadicicco 2020), in Nairobi, certificates and networks are still important to find jobs. Although such courses are meant to help people learn, everyday realities in low-income areas such as Kibera continue to raise barriers between dreams and aspirations. To counter some of these barriers, the School also served as an 'open space', and students who participated in past training were welcome to come and work on projects at the weekend. It offered an alternative

¹³ Although, in the case of Kibera, the county borders are not fully overlapping with Kibera as a neighbourhood, and also include parts of Woodley and Jamuhuri as well as the neighbourhood in which Kenyatta National Hospital is located, the data nevertheless gave an indication of ownership and use of digital devices in the area.

to working from home at odd hours during the night, when ‘data is cheaper’, as one of the members confided to me.

Temporalities of learning and earning

Learning at night was just one strategy to maximize learning and earning strategies employed by the young people I came to know in Kibera. Time management, in terms of both carefully dividing time between learning and earning, and financial optimization of resources such as electricity or data bundles, is key in making learning a valued part of the complex lived realities of the hustle. For young people in Kibera, indeed, time itself is quite expensive, as learning takes time away from earning. In Kibera, digital learning is not a separate sphere; rather, it is intertwined with earning, and the learning is almost always geared towards either a longer aspirational trajectory towards upward social mobility, or immediate ‘upskilling’ in an attempt to enhance one’s options on the job market. Nairobi’s status as a tech hub in the wider region means that there are options for young people with knowledge and skills in coding, design or other tech-related fields. Building up a portfolio, however, takes time, and engaging in reputation-building practices takes time away from doing the jobs necessary to pay the rent and put food on the table.

Michelle, a young woman who had been able to find a job in a nearby company offering STEM education to primary school children, proudly told me that she had been admitted onto a remote university course on coding, organized by a US university. She really had a talent for programming and got good grades at first, but then she had to ‘pause’ the course because of her daytime job, her teaching gigs at the School and the work for her own coding organization, all of which, in combination with the care of her young son as a single mother, simply became too much. The fact that ‘they don’t have Kenyan time’ at the US university course didn’t help either, as she had to stay up late to follow classes, something that proved incompatible with the rest of her (paying) jobs to which she had to give priority over non-paid learning. She, too, was hoping to resume the classes one day in order to upskill further as a way of building towards better-paid jobs.

Another of the School’s members showed me some work he had done as a videographer while trying to save up money to return to college. After having completed several courses in a media college in Nairobi, he too had to drop out because he could not afford to pay the fees for the next semester. In the meantime, he was trying to earn some money by doing small videography gigs and other odd jobs. The work he showed was of a high standard, and I asked him whether he was being paid for this work. ‘Mostly not,’ he admitted. He tried to turn the videography work into a business, but getting work often meant working for free, and although he stressed that it was also a way of building his portfolio, it still spoke of a struggle and a constant negotiation between working towards a dream and putting food on the table. Moreover, for his videography work he had to rely heavily on the School as well, as he needed its camera to execute the gigs he secured. He told me that on several occasions he had to reschedule or cancel jobs because the camera was not available. I asked him whether he thought he would ever be able to afford his own camera. ‘Probably not,’ he thought. But, he added, after he had to leave college due to financial problems, he traded his smartphone for a computer, so that he could continue to practise his

editing skills. He made do with a ‘dumb’ phone until he could afford a new smartphone. Perhaps, he suggested, he might be able to make a similar trade to secure a camera one day. In the meantime, he was trying to make the best out of his time until he could go back to college, by attending a film class organized at the School and by assisting in making promotional videos for the School – but also by getting up at four in the morning to help his mother prepare the chapatis she was selling in the neighbourhood. He was constantly looking for ways to further improve his skills while helping his family get by.

His story – and many similar ones – shows the complexity of aspiring to a career in technology – or, in his case, videography. They also illustrate what Morgan Ames *et al.* have called ‘making do’, a term they use to ‘underscore the pragmatic situatedness within the constraints of everyday life, where creativity and innovation rub against precarity and marginalization’ (2018: 2). I argue that learning, too, is highly contextual and takes place at the intersection of what is available and what is possible. In taking the agentive nature and the personal responsibility in collecting meaningful educational resources into account, it can be understood as a DIY education, whereby the learning trajectory is highly personal, but always within the socio-material limits of everyday lived realities, carefully combining what is available both online and offline. It is an agentive endeavour, combining both formal and informal learning opportunities, and a constant building of knowledge and skills through various sources, of which digital self-directed learning is now an addition. Yet, despite what techno-optimistic narratives propose, for most people in Kibera this does not offer a pathway around formal education, nor do most people want that. Formal education still holds a strong attraction for the people I spoke with, and, as such, new digital learning opportunities should be seen as new assets in an already complex mix of learning strategies, always embedded in local, situated aspirational trajectories towards more stable futures.

This way of ‘mixing and matching’ the acquisition of skills, knowledge and earnings comes close to what Schilling, Blokland and Simone (2019: 1339) describe when discussing the precarity of work. They argue that youth’s resources are primarily built through the ‘gathering’ of ‘practices that cross clear-cut, fixed social positions’. Furthermore, as Yamada, Takada and Kessi note in relation to education (and work) in African contexts, ‘the paths chosen by the students are not linear; instead, they are formed of multiple trajectories as the students move between the workplace and school, and back again’ (Yamada *et al.* 2021: 9). In this light, the digital learning practices and tactics deployed and taught at the School are a new step in an already familiar pattern, a new asset to be accumulated and deployed whenever the possibility arises. It demonstrates the constant and ceaseless capacity of being flexible, while also pointing to the complex intersections of formal and informal ways of learning, intersections that profoundly challenge traditional ways of looking at and thinking about education. ‘Informal’ ways of learning and skill accumulation should be taken fully into account when looking at educational trajectories of young people. Furthermore, in looking at learning trajectories, the strict formal–informal dichotomy does not do reality justice. Although young people in Kibera strongly desire to be able to participate in formal tertiary education, they are also involved in multiple other forms of learning, such as digital learning, but also learning from each other (Farrell 2015), learning in religious schools (Newman *et al.* 2020), and learning

through the generational passing down of knowledge. All these forms of learning should be taken into account to understand the full learning trajectories of young people (see also Emeagwali 2020; Dei 2010; Jones 2023). The popular adage of ‘lifelong learning’, so commonly employed in tech environments, is vernacularized into a complex and always ongoing strategy to get ahead in life. Digital learning – and the School – is only one part of that complex mix of different forms of learning and knowledge acquisition. Moreover, in its complexity, this learning trajectory also should be understood as being an integral part of hustling practices, as learning and work are an always together combination in youth’s aspirational trajectories towards more stable futures.

The gig entrepreneur

Yet, while hustling is the most common way to talk about the practices Kenyans employ to get ahead in life, some of my conversation partners preferred the aspirational idiom of entrepreneurship. Thomas, for example, strongly objected to being called a hustler. I asked him why. ‘I just work smart,’ he answered. ‘Hustling is not working smart?’ I challenged him. ‘I feel like hustling is like you are all over the place and you are trying to use like force to get what you want.’ He told me he preferred the term ‘go-getter’, because hustling, to him, also implied the day-to-day scrambling to survive without necessarily seeing the bigger picture. He had a clear plan and was working towards it.

Thomas was not the only one who had a clear goal in mind. Most people I talked to in Kibera aspired to one of two things, or both, when asked about labour market futures. Either people were hoping to land a job with stable wages, any job, or they expressed the desire to become an entrepreneur. More than aspiring to jobs in the tech ecosystem itself, people expressed a strong desire to become their own boss, and they consciously used what they were learning at the School as part of a larger plan to set up a business – or, even better, multiple businesses at once. One young woman utilized her new design skills to set up a print shop, while another dreamed of creating a business in which he would customize sneakers. Another used YouTube to learn about the chicken business he envisioned setting up. Overall, the tech skills were strongly merged with entrepreneurial aspirations.

Entrepreneurship is seen by young people in Kibera as a way around the more formalized labour market, where certificates and connections are of utmost importance to secure a job. Many young people I spoke to had neither a certificate nor connections – or at least not the right kinds – and as a result they tried hard to work around that impediment by aspiring to an entrepreneurial career. Moreover, in Kenya, the notion of entrepreneurship is also embedded in state-led imaginaries about the entrepreneur as a moral figure, whose duty it is to help her- or himself and the Kenyan state to attain a better future (Dolan and Gordon 2019).

Once again, these entrepreneurial ambitions are not neutral, but rooted in larger, but very specific, narratives about progress. As Dolan and Gordon (2019: 313) note: ‘These entrepreneurial ambitions are rooted in a new techno-optimism, a belief that harnessing the power of science and technology will deliver a progressive national future, witnessed in Nairobi’s moniker, “Silicon Savannah”.’ Once again, progression is tied to technology, and ‘Silicon Savannah’ is put forward as an ideal, leapfrogging over the city that is already there, but where entrepreneurship is less about

leapfrogging and more entwined with hustling practices, and where progress is not linear but happens in small steps, with many sidesteps.

In line with the new opportunities for digital learning that have sprung up in the past decade, the labour market has also seen the rise of new digital opportunities. Digital earning, or what has been coined ‘the global gig economy’,¹⁴ has undeniably reached Nairobi,¹⁵ indeed, one of the new currents within the vastly differentiated economy to which Kibera gives rise is not just digital learning, but also digital earning. Platformed gigs have become technical brokers for jobs that used to be informal, such as the *boda boda* – the motorcycle taxi – sector (Sitas *et al.* 2021; Iazzolino 2023) or food delivery. Increasingly, young people who are interested in tech and ICT are trying to access the more ‘place-less platformed gigs’, whereby jobs such as data entry, but also video editing or writing jobs, are travelling globally between providers and ‘gig doers’. In theory, these jobs may be done anywhere, at any time, by anyone with basic tech skills. Yet, for young people in low-income neighbourhoods, once again, getting access to these jobs is not easy, as the gigs often require technological connections (such as a quick and stable internet) and equipment that are inaccessible or hard to come by for people in Kibera (on access of the poor to digital jobs, see also Anwar and Graham 2022). In Kibera, the easiest way to access the global gig economy is to take a job at one of the companies that serves as an intermediary, thus turning gigs into a ‘stable’ job, instead of a ‘true’ gig. Such companies offer an office, machines and internet with good speed, and they make gig work look more like factory work than entrepreneurship.¹⁶ Yet, once again, these new opportunities are strategically incorporated into more complex imagined trajectories towards a desired future.

When I met Thomas again two years after he told me about his problems in finding a job as a videographer, he had found a viable pathway: he was now interning for a new television channel that was aimed at a young audience. To put food on the table he had also accepted a job with one of the gig-offering companies, for whom he worked the night shift. He was not very happy with the work or the salary, but, for now, he told me, it helped to pay all the bills. He had a clear vision, though, of where he wanted to go from here, and after a few hard years during Covid-19, he indeed seemed to be well on his way to attain the goals he had set for himself.

Conclusion

In this article I have argued that techno-utopian narratives about self-betterment through digital learning fall short in those circumstances and conditions that fail to

¹⁴ The ‘global gig economy’ is an enormous amalgamation of new kinds of digital work, ranging from coding, design and video-editing to tagging images and data entry, but also includes ‘smaller bits’ such as cataloguing text, correcting text, weeding out double entries in an index or content moderation (Gray and Suri 2019).

¹⁵ In devising the smart city narrative and the facilitation of the tech ecosystem, the Kenyan government also hoped to secure a spot in what has been coined ‘the global gig economy’. To do so, it has set up its own vehicle, Ajira Digital Programme, in which people are trained to get access to and perform online work. The government has also put in place ‘a battery of support measures to help Kenyans seeking online labour’ (Melia 2020: 46).

¹⁶ In being turned into factory work, with little protection, such jobs are reminiscent of the longstanding realities of precarious factory work, such as in the garment sector.

meet some of the basic needs of young people. However, the internet does serve as a source for 'upskilling' and finding new pathways towards a more stable livelihood. I have attempted to show how, in Kibera, new learning practices weave themselves into existing practices and strategies. Instead of offering utopian, linear pathways to upward social mobility, online learning resources offer possibilities and pathways to jobs and gigs, but in quite small and incremental steps. The example of Thomas illustrates that even with great effort, capacities and ambitions, digital self-learning is not self-evident. Moreover, digital learning is not detached from local materialities and realities. In other words, it requires and depends on specific material circumstances while it is also geared towards futures that themselves are tightly bound to and shaped by local aspirations and envisioned pathways. Although Thomas did learn quite a bit through the internet, in the end he had to rely on his unsteady access to a camera in order to convert his newly acquired knowledge into a real earning opportunity. He was also strongly dependent on his local connections to find work opportunities. The internet offers a huge source of information, but it is often not as free as proposed, either in itself or because of the cost of electricity, data bundles or devices. 'Free tutorials' demand large amounts of data that require young people to work in the small hours of the night to economize expenses.

In utilizing the new opportunities, many of the already existing rifts between low-income areas and middle- or upper-class inhabitants of Nairobi pop up again. For similar reasons to the way in which traditional (formal) educational systems are difficult to attain for young people from low-income neighbourhoods, the new forms that are presented as opportunities to bypass those 'traditional' educational systems can be equally difficult to access. Daily infrastructural and financial worries hamper not only formal but also informal learning practices. And in exactly the same way that 'traditional' jobs are often more difficult to attain for people in low-income areas, the new jobs in the digital economy once again require material circumstances to which many people in Kibera have no access. Yet, digital learning practices may still offer new possibilities, contribute to better jobs and perhaps even enable upward social mobility, although we must understand such mobility as very volatile in essence, meaning that every step forwards may be reversed at any time. Far from being a techno-utopian solution for solving poverty, digital self-learning inscribes itself in already existing practices, and as such can be leveraged to attain aspirations and goals. Moreover, young people devise a DIY education, whereby they maximize all learning resources available, to maximize their chances on the job market.

As became painfully clear in the opening vignette, techno-optimistic narratives and mindsets are challenged when they meet the local realities of low-income areas. Digital narratives need to be turned into more locally inspired and adapted realities to be truly useful for young people. This reality stretches far beyond the confines of Kibera, and even beyond African low-income areas more widely, but is a reality that touches on (young) people from lower socio-economic areas the world over. In the city that is already there, 'YouTube University' can be a useful asset in a much more complex reality of aspirations and imagined futures of young people in low-income areas, but it is far from a techno-utopian dream for people like Naima and her teammates.

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