3. Digital transformation, education, and adult learning in Malaysia

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Malaysia's government has long recognised the value and promise of technology and innovation, having begun in the 1990s to develop a multimedia super corridor (MSC) to be competitive in a globally digitalised economy (Banerjee 1999). While digitalisation refers to the process of restructuring society around digital and communication infrastructures (Brennen and Kreiss 2016), digital transformation involves socio-technological changes that have broader and more profound implications on society and culture, such as the evolution of information dissemination from edited, curated print articles to unregulated, algorithmically recommended TikTok videos.

Despite its incomplete digital transformation, Malaysia emerged as a relatively well-connected country in Southeast Asia. As of 2019, Malaysia was a mobile-first nation, with a 123% mobile broadband penetration rate and a 9% fixed broadband penetration rate. In populated areas, 4G coverage was reportedly at 82% (MCMC 2020), albeit of questionable quality. Basic data plans are generally affordable, and the most popular online activities among internet users are social communications such as texting and social media (Gong 2020).

Efforts to further digitalise Malaysia had begun before the COVID-19 pandemic. A national broadband infrastructure plan had been launched; programmes had been established to incorporate advanced digital technologies into economic sectors such as manufacturing; and various structural institutions, such as the civil service, institutes of higher learning, and legal courts, had begun incorporating digital services, cloud computing, and big data analysis into their workflows. However, the pandemic revealed in Malaysia, as elsewhere, the stark structural

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inequalities present in its digital infrastructure and adoption, a problem that had existed since the days of the MSC (Bunnell 2002). While digital technologies enabled elite segments of society to adapt fairly easily and quickly to life under lockdown, many under-served groups were not as fortunate.

In this chapter we assess the ways in which digital technologies, instead of levelling the playing field, may actually increase socio-economic inequalities, especially with regard to education and adult learning. We consider the segments of society who may be further marginalised in the future, given the changing conditions of learning and work accelerated by COVID-19, and suggest how future research and policy can tackle these challenges.

Previously, the digital divide described a fundamental gap in terms of access to computers and the internet (DiMaggio et al. 2001). As computing power costs decreased and internet infrastructure became widespread, digital inequalities became not just about access but also about meaningful connectivity and use (A4AI 2020; Gong 2020; Hargittai, Piper, and Morris 2018). The question is no longer simply whether everyone can connect to the internet, but also how we are connecting and how we are using our connectivity.

In the wake of the COVID-19 pandemic, Malaysia recognised internet connectivity as a public utility (MOF 2020), paving the way for significant improvements in the development of internet infrastructure. While this may address the access component of the digital divide, it does not guarantee inclusive meaningful connectivity or use. During Malaysia's movement control orders to curb the spread of COVID-19, schools and universities were closed. Despite their best efforts to pivot to online classes, teachers and students faced challenges in terms of both digital access and digital pedagogy. When offices closed, a divide emerged between workers who could work from home and workers who had to be physically present to do their (often essential) jobs. Income has been a good predictor of which side of this divide a worker might fall (Siti Aiysyah 2020).

Income has also been a good predictor of the likelihood of non-essential workers staying employed during the pandemic (Parker, Minkin, and Bennett 2020). The number of unemployed people in Malaysia rose 41% from 521,400 in September 2019 to 737,500 in September 2020 (DOSM 2019; DOSM 2020c). Online education opportunities increased as part of adult learning initiatives to reskill and upskill job

seekers. However, take-up of these programmes remained relatively low (*Malay Mail* 2020).

Widening gaps in education

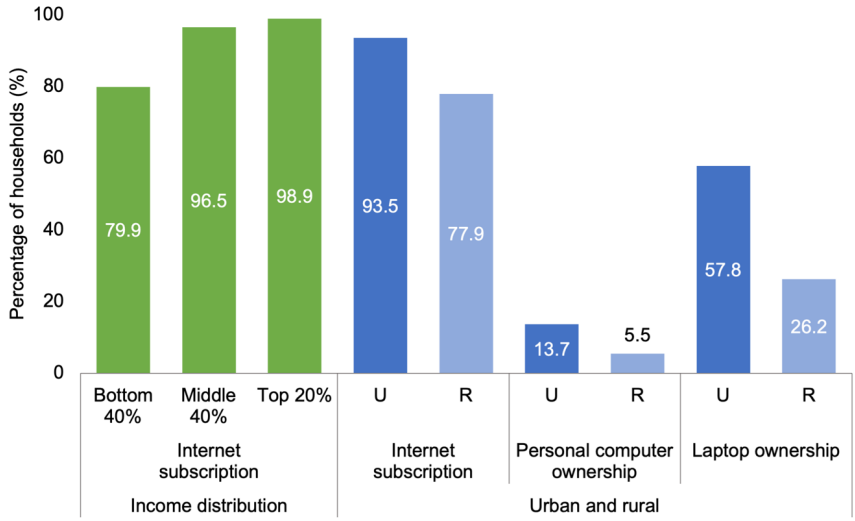
We turn now to a discussion of the role and impact of digital technologies and the digital divide on education and adult learning. Malaysian school students lost at least 17 out of 43 normal schooling weeks in 2020 due to school closures. Learning was disrupted for around 4.9 million pre-school, primary, and secondary school students (MOE 2020) and around 1.3 million higher education students (MOHE 2020). Different and compounding forms of existing inequalities became apparent with distance learning.

The clearest gap was the lack of digital resources for some students, rendering digital learning almost impossible. Even before the pandemic made distance learning the default mode, students lacking the resources necessary to learn remotely were found to trail their peers in cognitive abilities and be more likely to drop out in the long run (Murat and Bonacini 2020). In 2019, only 6–9% of Malaysian school students owned a personal computer and/or a tablet (Hawati and Jarud 2020). Unequal access to digital devices and the internet tended to follow the rural–urban and household income gaps (Figure 3.1), aggravating prevailing inequalities.

Approximately 77% of school students were unable to effectively learn digitally from home owing to limited digital access (Ashraf 2020). This likely lower-bound estimate was based on both fixed and mobile broadband access, though fixed broadband access has been much rarer and arguably more effective for learning. In 2019, Malaysia's average mobile download speed of 11.0 Mbps was far slower than developed countries such as Canada (59.6 Mbps) and South Korea (59.0 Mbps) (Fenwick and Khatri 2020). States with lower median household incomes had lower fixed broadband subscription rates (Gong 2020), which implied a higher percentage of disadvantaged students in poorer states.

Distance learning requires self-discipline and self-initiative. A time use survey found that German students reduced their daily learning time by about half during school closures (Grewenig et al. 2020). The reduction was larger among low-achieving students as their learning time was replaced with less useful activities such as gaming or consuming social media, potentially further deteriorating their educational

Figure 3.1. Internet subscription and personal computer and laptop ownership by household segment, 2019



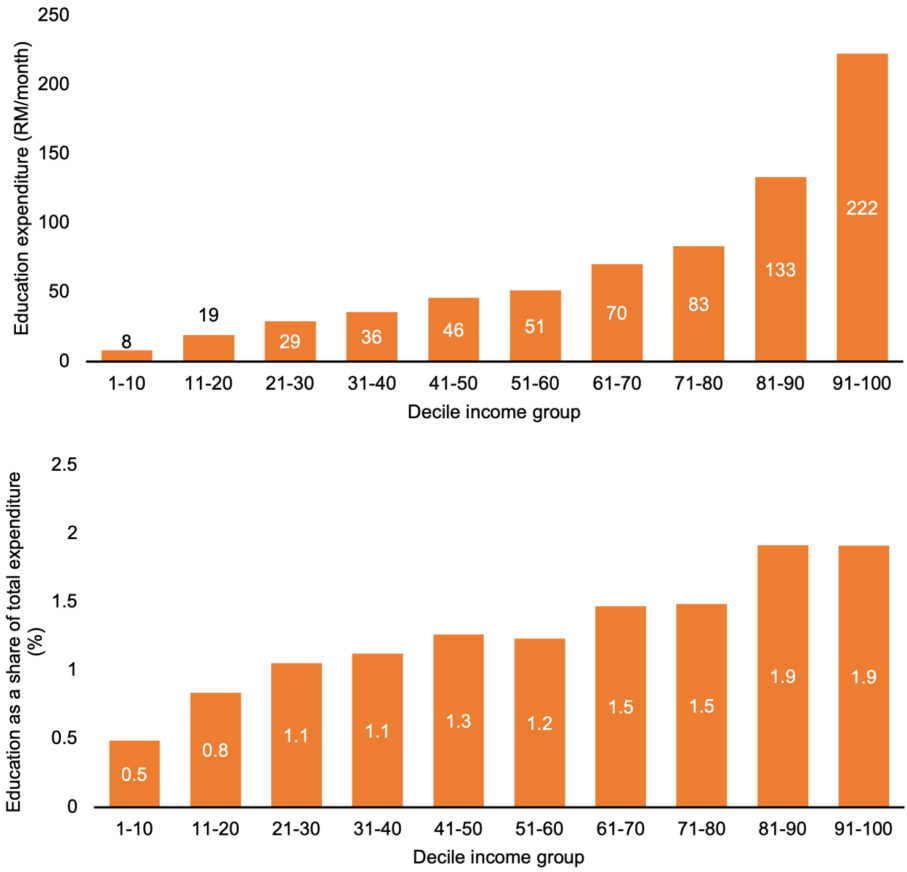
Source: DOSM (2020a).

achievement. This also highlights the discretionary nature of internet use, resulting in different outcomes for users. In 2019, across Malaysia, while 86% of internet users engaged in social networking, only 60% and 56% used the internet to study and read online publications, respectively (Gong 2020).

Researchers discovered that, by April 2020, Google search intensity for online learning resources in the United States had doubled relative to pre-pandemic levels (Bacher-Hicks, Goodman, and Mulhern 2021). However, the demand for online resources was substantially lower in areas with lower income, lower internet access, and more rural schools. Malaysia likely experienced similar inequalities; based on crude observations, during the first lockdown, keyword searches for learning resources were higher in affluent states such as Selangor and Kuala Lumpur.

There was also a gender dimension to distance learning, which raises questions for further research and policy deliberation. In Malaysia, while the proportion of women in the population remained steady from 2012 to 2018, the proportion of internet users who were women declined (Gong 2020). Concurrently, the teaching profession was dominated by women, who disproportionately bore the burden of care work (KRI 2019), which increased during lockdowns.

Figure 3.2. Expenditure on education by decile income group, 2019



Source: DOSM (2020a).

Meanwhile, boys' disengagement from education was expected to worsen with distance learning (UNESCO 2020). The reduction in learning time due to school closure was larger for boys than for girls (Grewenig et al. 2020). This may have exacerbated the 'lost boys' problem in Malaysia, where boys made up only 30% of higher education enrolment. These 'lost boys' either left school early or did not further their education (KRI 2018).

Without discrediting the benefits of education technology (edutech) for students and teachers alike, for-profit edutech has long-term consequences for how education as a public good is perceived and practised (Williamson, Eynon, and Potter 2020). In 2019, poorer households in Malaysia spent considerably less on education than richer households did, both in absolute terms and as a proportion

of their total expenditures (Figure 3.2) (DOSM 2020a). Further research is needed to understand how the increasing 'platformisation' of education impacts the education of poor and digitally disadvantaged households. While the pandemic hastened the adoption of digital technology in education, it is doubtful whether this was an inclusive digital transformation.

Adult learning and digital exclusion

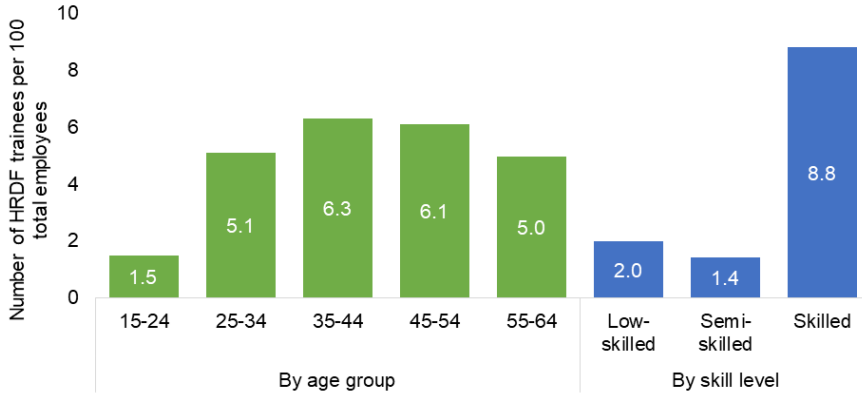
The lack of digital inclusivity went beyond education. It also affected adult learning, which was essential given the changing nature of work due to technological advancements and globalisation (World Bank 2019). COVID-19 might have accelerated the effects of labour market megatrends such as automation and increased the incentive to substitute capital for labour (Bloom and Prettner 2020). This increased the importance of adult learning to ensure people remained competitive in the labour market.

Malaysian policymakers had been actively encouraging reskilling and upskilling prior to the pandemic. However, pre-pandemic participation in adult learning was generally underwhelming. The training participation rate among registered employers topped out at 25%, compared to 49% in Singapore and 77% in Australia (HRDF 2019a). Only 33% of surveyed manufacturing firms offered formal training, far lower than peer countries (Nur Thuraya and Siti Aiysyah 2020). Lack of awareness, inadequate resources, overlapping programmes, and recognition issues have been cited as the main challenges of adult learning (HRDF 2019c).

Participation in adult learning was unequal, with young and very old trainees under-represented. Adult learning at work was also skewed towards the skilled workforce, compared to the semi-skilled and low-skilled workforce (Figure 3.3). Unfortunately, COVID-19 exacerbated the vulnerabilities of groups not actively participating in adult learning. Youth workers were found to be disproportionately adversely affected by the pandemic (Gonzalez, Gardiner, and Bausch 2020), while lower-skilled workers were most likely to be replaced if firms decided to automate their business operations during the pandemic (KRI 2020).

The digital divide further increased these inequalities. First, not all training programmes could be conducted online. In fact, the adoption rate of e-learning and mobile learning was less than 1% for Human

Figure 3.3. HRDF trainees as a share of total employees, disaggregated by age and skill level, 2018



Sources: HRDF (2019c); HRDF (2020); DOSM (2020b).

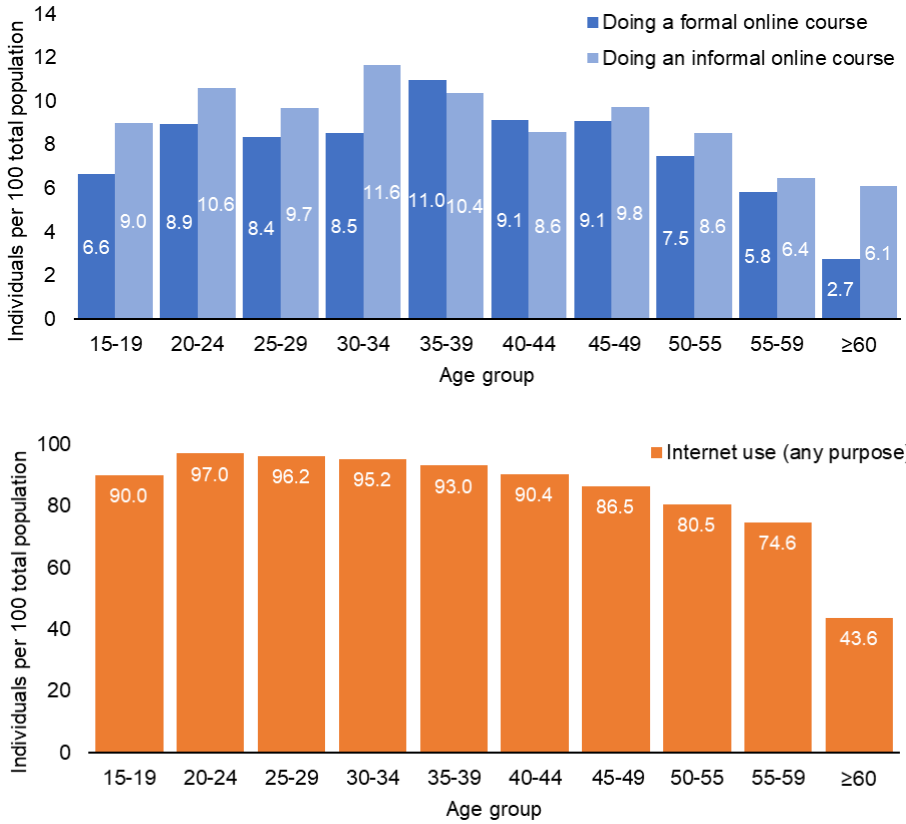
Resource Development Fund (HRDF) training programmes in 2018 (HRDF 2019b). Training for non-digital technical skills such as machine handling and safe food preparation could not be conducted online because they required practical learning activities.

Second, not all employers were supportive of employee training, as evident in the low training participation rates among employers. In economic downturns, employers face financial constraints in supporting workers' skills development. Additionally, the HRDF only covered selected sectors, and a substantial segment of the workforce not covered by the HRDF (micro-enterprises, workers in the informal sector, and the self-employed) could not afford to invest in adult learning.

Moreover, the lack of digital literacy among the older population has been a significant barrier in accessing online adult learning courses. More mature individuals were not only less likely to use the internet; they were also less likely to use it for learning purposes (Figure 3.4). Online adult learning was likely challenging for lower-income households too, as they faced higher trade-offs between spending on essential goods and investing in adult learning (Rao 2009). Poorer households also faced significant barriers to digital access that limited their adult learning opportunities (Siti Aiysyah 2020).

Reskilling and upskilling were important to help workers navigate the changing nature of work and employment challenges brought on by the pandemic. However, focusing solely on digital skills when many training providers, employers, and workers do not have the capacity

Figure 3.4. Share of internet use by type of activity and age group, 2019 (percentage)



Source: DOSM (2020b).

to do so could further exacerbate existing structural issues in adult learning. Failure to address the digital gap among workers might also perpetuate inequality in the labour market.

Conclusion

The COVID-19 pandemic accelerated digitalisation in many ways, but digital adoption has not been equitable. More research is needed to assess the long-term impacts of the digital divides described in this chapter. While distance schooling is unlikely to fully replace physical schooling for children, online learning is likely to be incorporated into teaching methods. Inclusive education requires an understanding of how digital and analogue inequalities affect educational attainment

and subsequent socio-economic opportunities. Improving internet coverage and quality, increasing access to digital devices, and providing digital pedagogy training for teachers must be part of the national socio-economic agenda.

Businesses and governments were proactively encouraging online adult learning during the pandemic to enhance worker resilience. However, many adult learning programmes were costly and had limited participation and impact. These programmes did not consider different adult learning styles, competing family, care, and work demands, and socio-economic constraints (World Bank 2019). Effective adult learning, offline or online, must address these challenges to bring returns to post-schooling human capital investment.

Broadly applying digital solutions to every available situation does not lead to an inclusive digital transformation. Rushed and improperly considered digital adoption is rife with unintended consequences. Diversity of input and research is needed, especially among groups typically under- or ill-served by digital technologies, in order to ensure that digital transformation is beneficial and sustainable for society in the long run.

Acknowledgements

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