# Chapter 11
# South Africa's (Unequal) Digital Learning Journey: A Critical Review


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**Abstract** This chapter is an attempt at a critical review of South Africa's digital learning (DL) journey since the dawn of democracy in 1994. It reviews DL policy, practice and scholarship based on six themes: DL policy, DL infrastructure, digital integration in learning and teaching, digital skills and competencies of learners and teacher professional development. It combines Feenberg's critical theoretical approach to technology with Cultural-Historical Activity Theory (CHAT) as analytical framework. It uses a social justice and equity lens to review three national government policies related to digital learning: the *eEducation White Paper*, the *White Paper on Post-School Education and Training* and *the National Integrated ICT Policy White Paper.* Four key tensions in the digital learning activity system are highlighted: between rules and subject, subject and object, subject and mediational tools and subject and division of labour. It concludes with the need for more critical research, conversations and interventions that challenge predominant globalization narratives and calls for a more concerted social justice research agenda that engages with current debates on decolonizing education in South Africa.

**Keywords** ICT in education · Digital learning · Equity · Social justice · South Africa · Education transformation · Digital integration

## 11.1 Introduction

Whilst there are some examples of positive learning effects (Hull and Duch, 2018; Peters et al., 2018), the vast majority of digital interventions globally, have had either no impact or a negative impact on student learning (Slavin, 2018; World Bank, 2018: 146). Coupled with reports on the negative effects of Internet addiction among youth (Kim, Lee, Lee, Nam, & Chung, 2014; Yu & Shek, 2013) a more critical reflection on digital learning investments in education is emerging. The French government's

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2018 legislation banning smart devices from their schools, offers one example of a policy decision influenced by evidence of screen addiction by teenagers and higher test scores in schools where cell phones were banned (Smith, 2018). While this negative view has not gone unchallenged (Livingstone et al., 2017) it shows the beginning signs of a technology backlash in education on the one hand. On the other hand, this backlash' combines with another a potential hype cycle trigger (Gartner, 2016) on why education systems need to explore artificial intelligence (Xing & Marwala, 2017) and consider frontier technologies to meet education's development goals (UNESCO, 2018).

These divergent perspectives have also characterised the national discourse on digital learning in South Africa (SA), where techno-hype has met with complex local reality amidst conflicting discourses and a limited evidence base. Since the onset of DL interventions in the late 1990s in SA, there has been some evidence of learning success and improved digital access. These include amongst others, a mobile learning Mathematics (Maths) application which enabled both improved motivation to learn Maths and better Math test scores (Roberts, Spencer-Smith, Vanska, & Eskelinen, 2015); and an integrated teacher tablet project in 26 schools in deep rural Eastern Cape which showed growth in teacher confidence and improved their teaching practice (Botha & Herselman, 2015a). These successes have been the result of carefully designed projectized interventions. At a number of universities, institutional DL policies (Ng'ambi, Brown, Bozalek, Gachago, & Wood, 2016) have also enabled across-campus digital access and learning programmes for students and lecturers to a limited extent.

However, when viewed with a system-wide lens, the much-vaunted positive relationship between digital technologies and expanding education access, quality and equity, show mixed results and arguably more 'failures' (Amory, Rahiman, & Mhlanga, 2015). Interventions to date have focused on expanding digital access, growing digital skills and to a lesser extent in schools than higher education institutions (HEIs), on institutionalizing shifts in learning cultures. These mixed results are opening up opportunities to reframe the national conversation beyond a narrow focus on access, skills and improved learner and teacher performance because more critical issues are at play: issues of equity and social justice which have been marginalised in the national DL discourse. SA can learn from countries like Peru (Cristia, Ibarraran, Cueto, Santiago, & Severín, 2017) and Uruguay (Pittaluga & Rivoir, 2012) who framed their One Laptop Per Child (OLPC) initiatives as social equity programmes, especially from their experiences of failure to realise quallity learning and social equity objectives. The inequality crisis in education ranks among SA's most urgent problems (Chisholm, 2012) and takes centre stage in national conversations. This chapter argues that a similar urgency and attention to social justice and equity is required in the national DL discourse.

The chapter combines a critical theoretical view with cultural historical activity theory (CHAT) as a systems-oriented lens in reviewing SA's DL transition since 1994. It is guided by the question: *How has equity and social justice, been framed in DL policy, practice and scholarship in South Africa?* It examines six themes: DL policies; digital infrastructure; digital integration in learning and teaching; learner performance, competencies and digital skills; and teacher professional development.

## 11.2 Snapshot of an Inequality Crisis in Education

DL interventions emerged in the late 1990s when SA's fledgling democracy promised socially-just education transformation (Ambrosio, 2017; Badat & Sayed, 2014) amidst the pressures of intensifying neoliberal globalisation (Tikly, 2011), underscored by exponential growth in consumer technologies and paradigmatic shifts in learning and teaching (Facer, 2011).

Significant strides were made in eradicating the formal racialised structures in education. These strides are evidenced by the following: the enshrinement of the right to basic education for everyone in SA's Constitution (Republic of South Africa (RSA), 1996); approximately 70% of public schools are fee-free schools; the number of formally qualified teachers have expanded substantially (Chisholm, 2012); more children are accessing registered Early Childhood Development (ECD) services and a reception year (Grade R) had been introduced in schooling with significant enrolment increases (Atmore, 2013; Department of Basic Education, 2016b); enrolment in higher education doubled in terms of its racial and gender demographic (Department of Higher Education and Training (DHET), 2018); the government is feeding 9.1 million children in the most disadvantaged schools (Jet Education Services, 2016); and issues more than 12 million child-support grants to poor families monthly (Hall, 2017). By 2017, the education system had grown larger and institutionally more diverse as illustrated by Table 11.1.

**Table 11.1** Size of the SA education system. 2017

| **Early childhood development** | Registered early childhood development centres | 20,233 |
|---|---|---|
| Basic education (2017 estimates) | Schools (including public and independent) (2017) | 25,762 |
| | Educators in public and private schools (2017) | 433,320 |
| | Learners in public and private schools (2017) | 12,892,273 |
| Post-school education (2016 estimates) | Public universities (2016) | 26 |
| | TVET colleges (2016) | 50 |
| | Registered private universities (2016) | 123 |
| | Registered private colleges (2016) | 279 |
| | Community education and training colleges (2016) | 9 |
| | Total no. of post schooling institutions (2016) | 487 |
| | Total no. of learners enrolled in post-schooling institutions (2016) | 2,290,984 |

*Source* DBE (2018), DHET (2018)

That deep-seated structural inequalities in education have persisted, despite these substantial changes, have been well-documented. By any measure SA ranks among the most unequal countries in the world (Sulla, Zikhali, & The World Bank, 2018), recording the world's highest income inequality (Alvaredo, Chancel, Piketty, Saez, & Zucman, 2018). Despite recent signs of improvement (Roberts, 2018), SA's education system continues to rank low in international tests: 134th out of 138 countries in terms of the quality of its education system in 2016 compared to 139th out of 143 countries in 2015 (WEF, 2017). These indicators have been used not to validate performative truths, but for illustrative purposes whilst noting that their methodologies are flawed (Bowen & Moesen, 2007; Fougner, 2008). High levels of teenage pregnancy and a lack of access to sanitary towels militate against the participation of girls in school; high attrition among over-aged learners who drop out from school; and the prevalence of anxiety and depression among learners and teachers, are further manifestations of a 'silent exclusion' (Chisholm, 2012). Continuing protests heightened by the 2015–2017 student struggles against high university fees, further awakened SA society to the deepening inequality crisis in education (Mutekwe, 2017).

Scholarly analyses of this crisis range from illuminating tensions between equity, redress and global competitiveness (Spreen & Vally, 2010); to recognising the intersection between academic under-performance and racial, spatial, gendered, linguistic, disability and class manifestations of marginalisation and exclusion (Spaull 2013; Chisholm, 2012). Inequality is also experienced as a systemic, naturalised and institutionalised misrecognition of predominantly poor, black power-marginalised learners (Agherdien & Petersen, 2016; Fataar, 2018). Bozalek and Boughey (2012) applies Fraser (2008, 2009) three-dimensional model (economic, cultural and political) of social justice to analyse the way inequality has been framed or misframed in higher education. These analyses challenge a prevailing neo-liberal onslaught in education (Tikly, 2011) that perpetuates a deepening systemic inequality, leading to calls for social justice-oriented actions (Badat & Sayed, 2014).

Under the influence of dominant global discourse focused on performativity and competitiveness, analysis on equity and social justice has been glaringly absent from the DL literature. Czerniewicz, Williams, and Brown (2009) rank among the few scholars who frame the experience of disadvantaged students at three universities and their lack of access to ICT within an analysis of the socially-determined structure of exclusion and the lack of agency of disadvantaged students within this.

## 11.3 Analytical Framework and Methodology

This review distinguishes between equality and equity. Equality addresses the principle of sameness, uniformity and standardization for everyone but which on its own do not address systemic structural deficits. Equity however, relates more substantively to systemic, fair and just treatment that includes redress through positive discrimination towards those who have been historically disadvantaged as part of a broader social justice-oriented institutional and systemic transformation agenda

(Ambrosio, 2017; Badat & Sayed, 2014; Cooper, 2015). Here Fraser's (2008, 2009) three-dimensional theory of social justice which incorporates an economic dimension relating to redisribution, the cultural dimension relating to recognition, and a political dimension, relating to representation, informed this chapter's framing of social justice.

'Digital learning' is an overarching reference to the integration of emerging digital technologies (Bozalek, Gachago, Alexander, Watters and Wood, 2013) in education, as adopted by the Department of Basic Education (DBE). It incorporates eLearning, ICT in education, mobile learning and 'edtech' (DBE and UNICEF, 2017).

In taking a critical theoretical stance, the review draws on Feenberg (2017) whose philosophical underpinnings have been informed by the Frankfurt School Critical Theory and Science and Technology Studies (STS) and who acknowledge affordances of technologies to catalyse change but within a social context where power is unequally distributed. Such a critical stance is reconciled with Engeström, Miettinen, and Punamäki-Gitai (1999)'s third generation cultural-historical activity theory (CHAT) as an analytical lens. CHAT has been widely applied in analysis of socially situated transformation including in human computer interaction (Kuutti, 1996); student views on social learning (Agherdien & Petersen, 2016); and in the adoption of authentic learning by higher education educators (Bozalek et al. 2013).

CHAT evolved over three generations of thought originally inspired by Vygotsky's (1978) classic mediational triangle depicting the tool mediation and object-orientation of an individual subject within a social system which was identified as the first-generation CHAT. Leontiev (1981) drew a distinction between individual and collective activity and added the division of labour to a second generation framing of CHAT. Engeström (1999, 2001) expanded rules, community and division of labour as crucial nodes within a dynamic, complex and contradictory activity system. His third generation CHAT applies to larger systems and institutions and locates the activity system within a social transformational milieu centering on historically-accumulating, endemic internal tensions and contradictions. Here he highlights how the transitions and re-organisation of interacting activity systems emerge from these inherent tensions and contradictions, as illustrated in Fig. 11.1.

Based on five principles, Engestrom's third generation CHAT provides a conceptual framework with which to analyse conversations, multiple perspectives and networks of interactive activity systems. The first principle places as a unit of analysis, the tool-mediated, object-oriented base upon which the network of relations interact within an activity system. The second principle acknowledges the prevalence of many actors and role-players ('multi-voicedness'). The third highlights the historical evolution of a system over time (its 'historicity'). The fourth highlights the internal contradictions that drive change within and between interacting activity systems whilst the fifth proclaims the expansive qualitative transformation of the activity system over time.

The review locates the emergence of DL policy, practice and scholarship in SA as an activity system (Fig. 11.2) within a historical and cultural context and it situates

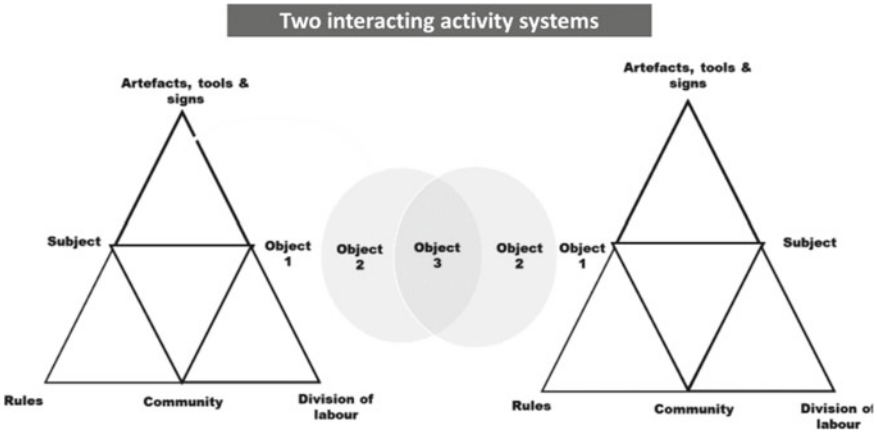


**Fig. 11.1** Illustration of two interacting activity systems (Engeström, 2001)

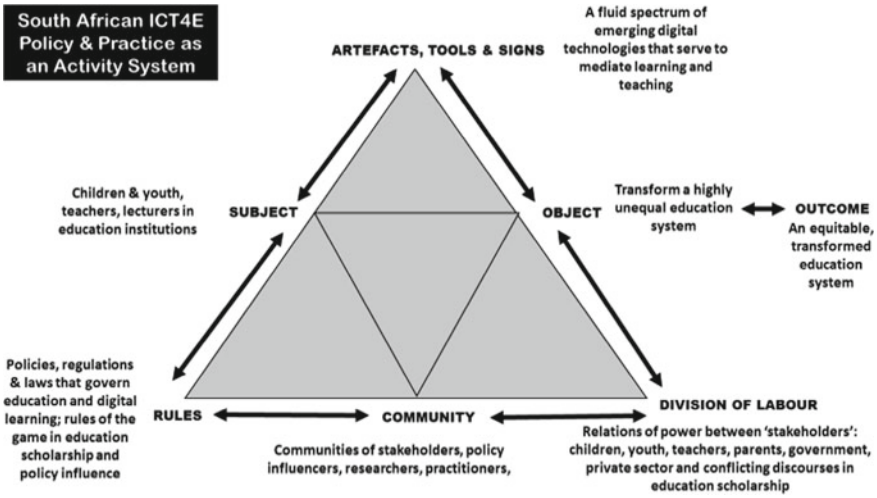


**Fig. 11.2** SA DL policy and practice as an activity system

the transformational, emancipatory object-orientation towards an equitable education system, within an analysis of internal tensions and contradictions. Conceptually, digital technologies are not value neutral and are viewed as a fluid spectrum of socially-constructed emerging digital artefacts, tools and symbols which mirror power relations in society (Feenberg, 2017). These relations predominate in rapid change and convergence of technologies that are becoming increasingly mobile, wearable, embodied, artificially-intelligent and embedded within the social fabric of education systems and society over time (Adams Becker et al., 2018; Freeman, Adams Becker, Cummins, Davis, & Hall Giesinger, 2017).

The 'subjects' of the DL system are the diverse range of children, youth, teachers, lecturers, in and out of schooling and post-schooling institutions, particularly those who are marginalized from power and resources while the 'object' as espoused in policy texts and practice, is to transform a highly unequal education system towards an outcome based on a transformed, equitable education system. The DL activity system recognises the laws, regulations and policies at system and institutional levels as the socially constructed rules of the activity system; the range of actors in the policy and practice community that engage with the subjects, make up the community while the division of labour highlight the power relations that prevail between the various actors and role players especially in relation to the subjects.

Document analysis (Prior, 2008) was applied to the review three national government policies that relate to DL and the framing of equity and social justice whereas journal articles on DL trials and evaluations in SA were reviewed as reflective of practice and scholarship. Google Scholar, Mendeley and the University of Johannesburg online library databases were searched with South Africa and education policy, education practice, DL, ICT in education and mobile learning as key words. Specific references to inequality, equity and social justice were considered when scanning scholarly literature and policy documents.

## 11.4 DL Policies and Strategies

By illuminating policy as the rules within a cultural and historical activity system, this review acknowledges Ball's (2015, 1990, 1998) evolving conceptualisation of policy as both text and deeds in a given context; as the outcome of contestations between different role players; and a function of both local and global influences.

SA's DL policy space is a complex, fluid web of policies, laws and regulations that govern a growing education system and its intersection with information and communication technologies (ICT), media, publishing, broadcast, skills development and social development sectors and differing perspectives of wide-ranging stakeholder networks (Isaacs, 2015). These digital policies are linked to broader policies and strategies in education such as the *South African Schools Act*, the *National Education Policy Act* and the *2001 National Plan for Higher Education.*

Three DL-related policies are reviewed: the *e-Education White Paper, or White Paper 7* (Department of Education (DOE), 2004); the *White Paper on Post-School Education and Training* (DHET, 2013), and *the National Integrated ICT Policy White Paper* (Department of Telecommunications and Postal Services (DTPS), 2016). Notably these policies fall within the broader SA government's 15-year strategic vision, defined in the National Development Plan (NDP) 2030, which articulate a role for digital technologies in educational change (National Planning Commission, 2011).

*White Paper 7* highlights the importance of connecting learners and teachers to each other and to professional support services and provides for the establishment of

platforms for eLearning. It also seeks to connect learners and teachers to better information and ideas via an effective combination of pedagogy and technology in support of education reform. Its primary goal is to equip every basic and further education and training learner with the knowledge and skills needed to use ICT confidently, creatively and responsibly by 2013. This goal is supported by a strong policy framework consisting of four components: equity; access to ICT infrastructure; capacity building; and norms and standards. The policy also outlines the characteristics of a typical e-school which includes learners using ICT for meaningful learning; principals and teachers who are competent at managing and teaching with ICTs respectively; ICT access to support curriculum delivery; access to ICT infrastructure and connects with the community. Equity is mentioned 44 times as a policy principle and objective although it emphasises equity in access to digital resources. Social justice does not feature in *White Paper 7* although redress is mentioned twice in the context of equity.

Vandeyar (2015) found that district and provincial officials had a superficial understanding of this policy; they lacked a sense of ownership of the policy; and considered themselves responsible mainly for disseminating policy. Officials also lacked capacity and competency to implement the policy and the silo-ed behaviour between different directorates within education departments militated against effective policy implementation. Mooketsi and Chigona (2014) confirm, based on their study of teachers from schools in a black township in the Western Cape, that teachers were not aware of the policy nor were they basing their embrace of digital technologies on an understanding of *White Paper 7*. Others show the challenges and failures that have been experienced with policy implementation based on techno-centric design of DL initiatives (Ford & Botha, 2010). Ineffective implementation limited the extent to which the policy was able to meet its espoused goals for access, quality and equity in education (Amory et al., 2015).

The *White Paper on Post-School Education and Training* adopted in 2013 covers all education and training provisions for those who have completed school, those who have not and those who have never attended school. It highlights the need for equitable access to appropriate technology. Whilst SA does not have a coherent national policy on DL in higher education, this *White Paper* recognises that ICT is indispensable for effective education provision and central to open learning. It suggests plans to improve ICT access and calls for teaching and learning interventions using ICT to be carefully planned and implemented. It also commits to promoting open learning and supporting the development and use of open education resources (OER). Equity is mentioned 15 times in the text: as a policy principle along with social justice which is mentioned seven times and redress, four times. Equity is raised in terms of gender, race and disability; in ensuring employment equity and the provision of student financial aid to the poorest students. The policy draws a distinction between equity of access and equity of outcomes and it frames social justices as being central to the policy, as part of historical struggles for social change (DHET, 2013).

This policy was adopted amidst contesting ideas transforming the post schooling sector in SA, reinforced by student voices calling for free, decolonised higher education. At the heart of these debates are challenges to whether this *White Paper* promotes

equity and social justice with some arguing that the labour market-centric nature of the transformation agenda focuses narrowly on skills and loses sight of the broader systemic ways in which exclusion and marginality are perpetuated (Maringe & Osman, 2016; Valley and Motala, 2014). Alternative pedagogical and epistemological models are currently being debated in the context of decolonisation (Fataar & Kruger, 2017; Osman & Hornsby, 2018). However, these conversations do not include the digital aspects of the transformation project whilst DL in higher education literature raises the equity and social justice issues marginally. Whilst Ng'ambi et al. (2016) anticipate that the next phase of digital integration will demand of higher education institutions (HEIs) to respond to more widespread digital access, cloud-based services, the growth in OERs and Massively Open Online Courses (MOOCs); they do not include in their analysis, challenges faced mainly by black students from impoverished backgrounds with digital access and the lack of policy to reflect this reality, Czerniewicz and Rother (2018) applied an equality lens to analyse the discourse in institutional policies at four SA universities. They conclude that explicit reference to the enabling role of technologies to support equity imperatives are absent from the institutional policies. Moreover, in her response to UNISA's open distance and eLearning (ODeL) policy, Nqubane-Mokiwa, (2017) warns of the potential to perpetuate exclusion and inequality since black students living in remote areas would not have access to connected devices to participate meaningfully in ODeL.

The *National Integrated ICT Policy White Paper* outlines how government plans to provide access to modern communications infrastructure and services to facilitate the entry of new players and meaningful participation of all citizens, including those in rural areas. Its provisions include the creation of wireless open access network (WOAN) which will be a public-private sector-owned and managed consortium; open government and open access; net neutrality; cyber security and combatting cybercrime; creating an enabling environment to facilitate universal service and access; and meeting set targets for broadband access to all. It also emphasises policy provisions on e-literacy and e-astuteness as critical areas for intervention and propose the need for collaboration with all stakeholders across government, business, education, civil society and global development partners to address this decisively. It also proposes more co-ordination at building e-literacy skills; an assessment of skills gaps and capacity needs to drive digital transformation; and support training at public access sites. It envisages that e-skills programmes will be integrated into primary, secondary and tertiary education institutions to the benefit of all students. This policy makes no reference to equity or social justice but references equality 23 times and social inclusion twice, in the context of the constitutional rights of everyone; the NDP's aspiration to grow an inclusive and equal society by 2030; the need to mobilise the potential of ICT to reduce poverty and inequality and a recognition of Government obligation to address inequality by ensuring access to digital networks and services to all and that interventions need to address market failure and the need for social inclusion (DTPS, 2016).

Whilst all three are aspirational about promoting equity in digital access and skills development and frames equity as part of interventions to promote social inclusion, the three policies differ in their equity orientation. The two education DL

policies reflect more of a policy commitment to equity, human rights and social justice compared with SA's cross-cutting ICT policy which is more exposed to and strongly influenced by the needs of the ICT industry. This explains this policy's technology-determinist market logic focused on global competitiveness and economic growth. These global economic pressures faced by the ICT industry invariably influences government to compromise on the issues of equity because there is often a trade-off between equity and economic growth thereby causing tensions between the policy, the subjects, object, community and division of labour within the DL activity system.

### *11.4.1 Action Plans and Implementation*

Isaacs (2015) provides a descriptive overview of a host of national action plans, strategies and flagship programmes in basic and post-schooling education that relate to implementing these national policies. By then the national system had experienced the 'failures', successes and lessons of large scale initiatives like Gauteng Online; the Khanya Project (Ford and Botha, 2010; Sadek, 2016); the leadership development modules (Musgrave & De Wet, 2017) and the Ukufunda Virtual School (Isaacs, Roberts and Spencer-Smith in press; Spencer-smith & Roberts, 2016). In their analysis of the status of ICT in education in 2015/2016, Meyer and Gent (2016) propose a pathway to progress that emphasises system capacity building in view of slow progress with policy implementation. Moreover, one of SA's recent flagship initiatives to implement the *White Paper 7*, is *Operation Phakisa in Education (OPE)*, an overarching presidential initiative designed to fast-track the implementation over a short period of time (DPME, 2016). These reports and articles confirm that the equity and social justice imperatives were not considered nor prioritised because their purposes were focused mainly on enabling access to relevant digital resources as well as training teachers to use technologies in their pedagogical practice.

## 11.5 Equity and Digital Access in Education

In SA promoting universal quality access to digital infrastructure and services is framed as a quest for digital equity in view of the prevalence of a 'digital divide'. The three national policies and scholarly research highlighted above, express a shared view that the digital divide is a multi-faceted, dynamic concept that locates digital access disparities within the complex, deeply entrenched societal inequities that have racial, class, linguistic, gendered, geographic and cultural manifestations.

However, reports on progress with digital access still emphasize physical access to digital resources, particularly the Internet. This is consistent with Gillwald's (2018) view that data related to digital access and use remain deficient. At school level, 64.9% had some form of access to the Internet and 32.6% had a computer centre in 2016 (Kekana, 2018). Kekana (2018) does not elaborate on the nature and quality

of digital access at these schools; nor the disparate levels of access across school quintiles.[1] Moreover, it does not report beyond physical access to include levels of motivation, access, skills, use and learning cultures by learners and teachers. However, Chingona, Chingona, Kayongo, and Kausa (2010) and Gudmundsdottir (2010) explain the linkages between digital inequality in schools and other forms of societal disparities.

Post-schooling institutions tend to have greater institutional digital access provisions in their libraries and via computer labs initially which later evolved to both institutional and personal access and use by students and staff. Ng'ambi et al. (2016) show that digital access models evolved toward bring your own device (BYOD) approaches that leveraged individual staff and student access to their own networked devices and more recently, their use of social media, social networking. They also show how the pedagogical integration shifted from using ICT to reinforce traditional practice to more diffuse use of technologies at both individual student, staff and institutional levels.

Makoe's (2010, 2012) studies on mobile phone use in distance learning are further examples. However institutional-level studies also reveal multi-faceted nature of digital disparities that are skewed against poorer, black students attending post-schooling institutions. Czerniewicz and Rother (2018) show how disadvantaged students at a university in Cape Town, face problems of access and accessibility including language inaccessibility causing them to be reluctant to interact with digital technologies.

Digital infrastructure also relies on basic physical infrastructure which remain elusive for a number of schools. Of SA's 23,577 schools in 2016, 2923 schools had an unreliable electricity source and 5004 had an unreliable water supply (DBE, 2016a, 2016b).

At household level in 2016, 59.3% of South Africans had an internet connection at home, work, place of study or Internet cafés or at least one person per household had access whilst 87% of SA households exclusively used cellular phones (Statistics South Africa, 2017a).

At an individual level, explosive growth mobile subscriptions opened up personal access to digital resources and the prospect of mobile learning (Isaacs, Roberts and Spencer-Smith in press). By 2017, 3G connectivity via mobile phone was almost universal while 4G networks reached 75% of the South African population (GSMA, 2017). However Spencer-smith and Roberts (2016) show limited access to mobile data by disadvantaged communities unless they are zero-rated and that even when physical access to a mobile learning resources were available, they were under-utilized.

The lack of adequate digital infrastructure in poor communities; high data costs and bureaucratic constraints with policy implementation, have been major influencing factors prohibiting universal, quality access. A 2017 study found that the

[1] According to SA's National Norms and Standards for School Funding, the quintile system allocated all government schools into one of five categories, with quintile 1 schools designating the poorest institutions while quintile 5 denoted the least poor public schools (Department of Education, 1998).

"cheapest cost for a 1 GB basket" in SA was much higher at US$7.49, compared to Egypt (US$1.41), Kenya (US$4.92) and Nigeria (US$3.21). Even though more people access the Internet via their mobile phones, high data package costs and out-of-bundle rates still pose a challenge to affordable quality access for low income users (Mothobi, 2017). In this context, the recent #datamustfall campaigns and calls for zero rating of education data will remain ongoing struggles (Du Plooy, 2017). These continuing struggles for basic infrastructure alongside universal access to digital infrastructure raise questions about the efficacy of scaling high-cost technologies like robotics and virtual reality required to prepare children and youth for the 'fourth industrial revolution'.

## 11.6 Digital Integration in Learning and Teaching

Digital integration in learning and teaching involves harnessing the mediational capabilities of emerging digital technologies to support the DL activity system subjects in realizing the educational object and outcome. Digital integration under appropriate and relevant conditions, catalyzes curriculum and pedagogical shifts in the learning process and teaching practice, enabling flexible, self-directed, self-paced, active, interactive, formal and informal mobile learning in and across contexts. These are dependent on a context that includes optimal digital access, teacher knowledge, relevant digital content and scaffolded local learning ecologies that build learner trust (Henning & Van der Westhuizen, 2004). Tedre, Apiola, and Cronje (2011) proposes 100 different attributes that influence digital integration in developing country contexts reflecting the multi-faceted complexity involved.

The SA literature confirm that in general teachers lack access to ICT to support their teaching practice (Mofokeng & Mji, 2010) although they have personal access to mobile technologies (Sadek, 2016); they are not trained sufficiently to integrate technologies in their teaching of subjects (Mofokeng and Mji 2010); they do not integrate technologies in their teaching practice (Chikasa, Ntuli, & Sundarjee, 2014); where they have access, they resist technologies or fear the associated changes (Ostrowick, 2015: 61) or use technologies to reinforce traditional teaching practice (Ndlovu & Lawrence, 2012).

Ndlovu (2015) found however, that the teachers she researched, believed in the affordances of digital technologies; the value of their pedagogical beliefs about their subject teaching; and the value in meeting the needs of learners. These beliefs enabled them to overcome their challenges with digital access. Similarly, Chikasha et al.'s (2013) showed that teachers who believed ICT had potential to enhance teaching and learning of their subjects, were more likely to integrate ICT. Sadek (2016) found that teachers at two school in the Western Cape were engaged in using technologies in their lessons, in teacher assessments providing learners with digital resources and getting them to find information.

Whilst digital integration at universities that have been studied, appear to be more widespread including the use of massive open online courses (MOOCs) (Batchelor &

Lautenbach, 2015; Goto, Batchelor, & Lautenbach, 2015), equity issues also militate against their optimal use and integration by faculty and learners both in and beyond campus (Czerniewicz & Rother, 2018). Xakaza-Kumalo (2017) highlight the influence of a range of contextual, pedagogical, content and cognitive motivational factors that influence digital integration at two SA universities.

## 11.7 Learners: Performance, Competencies and Digital Skills

The 'learner' is identified as one of the subjects in the DL activity system. However, there is a disconnect with how 'the learner' is theorized in DL literature relative to the general education literature. In DL scholarship the learner is conceived as a 'digital native', drawing on Prensky (2001) or in the case of youth from marginalized contexts at SA universities, as 'digital stranger' based on their lack of physical and social access, experience and opportunities with technologies, particularly off-campus (Czerniewicz & Brown, 2013), or as consumer at the behest of the DL market (Selwyn and Facer, 2014), or in neutral terms as active learning agent who can through the affordances of digital technologies learn creatively and build knowledge flexibly, interactively, autonomously, authentically and engage collaboratively in complex problem solving (Scardamalia & Bereiter, 2014).

The reference by Czerniewicz and Brown (2013) to power-marginalised learners as 'digital strangers' compares with a social constructivist conceptualisation of the learner in non-digital education literature, as social being (Agherdien & Petersen, 2016; Fataar, 2010) or learning subject (Fataar, 2010; Soudien, 2006) imbued with cultural wealth that they mobilize to navigate challenging conditions. Joorst (2015) shows how five black, poor, working class Grade 11 youth in a rural township in the Western Cape are 'self-schooled' through their display of aspiration; religion-inspired hope; imaginativeness and bodily adaptation practices. More recently, Fataar's (2018) edited volume highlight the educational practices and pathways of working-class youth appealing for recognition of their hidden cultural wealth.

This contrasts with a dominant performative discourse that highlight learner performance in standardized tests; the connection between under-performance and social, economic, cultural and political marginality; and a focus on preparing learners for a globally competitive labour market. For example, the recent PIRLS study that revealed 78% of SA's Grade 4 learners could not read for meaning in any language, sparked concern about the widespread prevalence of a learning crisis in SA (Martin & Hooper, 2016; Spaull, Pretorius, & Mohohlwane, 2016). This raises the spectre that should this situation continue, those learners who do not make it through the education pipeline to the labour market, fall within the ranks of the structurally unemployed youth, sometimes referred to in deficit-speak, as not-in-employment-education-or-training (NEETS). Youth unemployment which was 54.3% in the first quarter of 2017 (Statistics South Africa, 2017b) is one feature of the skills crisis in

SA alongside a shortage of people with 'e-skills'. E-skills includes digital literacy skills; workplace e-skills and ICT specialist skills. The extent and nature of the e-skills shortage is unclear due to conflicting reports (Alexander, Lotriet, & Matthee, 2009). Kraak (2013) highlights state failure in addressing the challenge of NEETs and also highlight how non-government organisations at a micro level have been able to support unemployed youth with entry into their first jobs.

Amidst these challenges, a wave of optimism about the need to grow 'fourth industrial revolution skills' among youth and children including coding and robotics, have emerged. The Tshimologong Digital Innovation Precinct in Johannesburg has been host to many such programming and coding workshops, supported by the private sector. Some of these have also focused on tackling youth unemployment through the promotion of start-ups (Wits University, 2018). A number of private sector coding workshops for children and youth have also been sprouting, as once-off training programmes outside of formal schooling hours or during school holidays (Lotz, 2018; Moeng, 2018). The bigger systemic challenge relates to 'coding as literacy' as identified by Freeman et al. (2017) to be integrated into the curriculum and how coding can support reading skills, the arts and mathematical understanding.

## 11.8 Teachers and Teacher Professional Development

The pre-service and in-service teacher is another subject in the DL activity system. Many interventions in SA have attempted to provide teachers with digital access and have included a host of DL and teacher professional development (TPD) programmes for pre-service teachers at university (Batchelor & Lautenbach, 2015; Goto et al., 2015) and in-service teachers, often supported by private companies. Some, like (Botha & Herselman, 2015b) also developed a locally-relevant model for digital integration in teacher professional development.

In 2017, the DBE adopted a *Professional Development Framework for DL* (DBE and UNICEF, 2017) based on extensive consultations with teacher unions, provincial education departments, higher education institutions and the South African Council of Educators (SACE). It is SA's response to UNESCO's ICT Competency Framework for Teachers and builds on a previous *Guidelines for Teacher Training and Professional Development in ICT* adopted in 2007. This PD Framework serves to guide the ecosystem of TPD providers involved in delivering ICT integration training for in-service teachers and to support and guide higher education institutions who are preparing pre-service teachers to be competent in DL. The Framework provides 4 major learning areas, 13 competencies and 69 indicators that guide individualised learning pathways for all teachers, education officials and policy intermediaries in the system. This allows the many teacher development projects and programmes currently under way, with an opportunity to align to a national framework (DBE and UNICEF, 2017). The framework states its main aim as defining professional development for digital learning in an education system that seeks to improve access, quality, equity, redress and efficiency. Whilst this framework identifies equity as part of its

main objective, it is not designed to engage with the inequity issues related to SA teachers such as the crisis in teaching and teacher capacity, their lack of pedagogical and content knowledge and teacher shortages (Chisholm, 2012). Whilst DL promises opportunities for virtual teaching to help address teacher shortages, these attempts have been limited. Moreover, no links are drawn between their life histories, identities and life-worlds of teachers in general and their digital cultures or lack thereof in particular. Paige, Chartres, and Kenyon (2008) and Henning (2000) provide examples of ways to understand the life-worlds of SA teachers while Fataar and Feldman (2014) show the importance of understanding the internalized habitual pedagogical practices and professional socialization of teachers over time, in order to shift their teaching practice. These analyses provide conceptual maps towards understanding the digital cultures of teachers that can inform how professional learning can be designed.

## 11.9 Discussion

Applying CHAT involves surfacing relevant tensions and contradictions within and between nodes in the activity system. In applying CHAT as an analytical framework, it is evident from the above that there are a number of tensions inherent in policy and practice of DL that militate against the system achieving its espoused transformational and emancipatory equity outcomes. Four inter-related tensions are identified in Fig. 11.3.

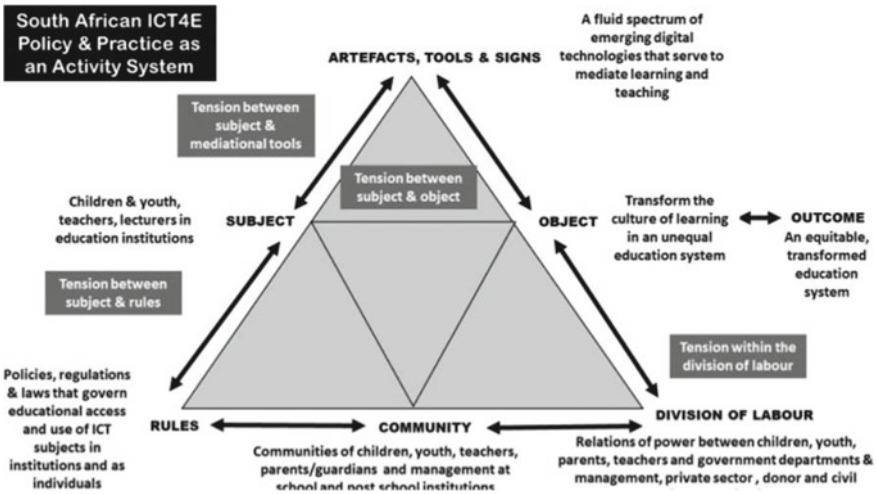


**Fig. 11.3** Four tensions in the DL activity system

### 11.9.1 Tension Between Rules and Subject

A key tension exists between equity and social justice as espoused in DL policy (or not) and the disposition of SA learners and teachers as subjects. Not only is this reflected in the limited implementation or 'failure' of existing policy, but also in the absence of a national DL policy for the post-schooling sector and the need to update White Paper 7. Perhaps above all, attempts to reconcile contradictions between international policy-borrowed performative discourse (Ball, 2016) on digital access and skills for a globally competitive economy with 'social inclusion' yet not institutionalising the realities of power-marginalised learners and teachers as social beings (Fataar, 2012), how this experience still reflect the deep psycho-social nature of the legacy of apartheid (Crain, 2006) and the cultural capital to navigate their precarious lives. The irony is that the DL policy, practice and scholarship place great emphasis on 'learner-centredness' again borrowing from a global discourse.

The lack of awareness of existing policy and lack of agency by teachers are further manifestations of this tension. Perhaps the most glaring evidence of this tension is the growing protests by students against the lack of transformation through the #feesmustfall and Equal Education movements (Lance Robins & Fleisch, 2016) and their proactive calls for education decolonisation. These tensions demonstrate that the impetus for change in SA's education system reside not only in the technical and technological domains but that social mobilization by the subjects in their interaction with the system's rules continue to drive change is a consistent feature of the country's historical and cultural context.

### 11.9.2 Tensions Between Subject and Mediational Tools

There are evident tensions between the subject of the activity system and their embrace and adoption of learning technologies in formal institutional settings in particular. The literature points to limited examples at an institutional level. The tensions reside in the non-use or under-utilisation by learners and teachers due to limited institutional access to digital resources especially Internet connectivity; the non-use of available digital resources due to lack of awareness that they are available; the lack of relevance of digital content; the non-use of available resources among teachers due to their unfamiliarity with the digital resources; and that teachers use the technologies for administrative purposes in the main and less for learning and teaching. Moreover, in at pre-service level, teachers are reportedly under-prepared to use technologies because of the way they have been taught (Chigona & Chigona, 2013).

The analysis to date speak less of teacher and learner digital identities and cultures based on their life-worlds, their worldviews and their embedded pedagogical habits in and across contexts. Further study in this regard would surface clarity on the learning lives in naturalistic informal settings and what the implications are for designing appropriate learning interventions.

### *11.9.3 Tension Between Subject and Object*

The literature also highlights tension between learners and teachers and the object to transform a highly unequal education system. The analyses on continuing inequality in relation to digital access and skills, the misrecognition of power-marginalised learners and teachers in the context of a performative discourse are systemic tensions that are evident in the literature. These tensions are a function of a deep-seated structural problem with the education transformation project in South Africa that relate to the lack of active participation and inclusion of the 'subjects' particularly from marginalized communities, in the process of change. Because of the exclusion from engagement and decision-making, protests have emerged among students, teachers and university staff from disadvantaged communities who will continue to demand that their voices, views and perspectives be considered.

### *11.9.4 Tension Between Object and Division of Labour*

This tension relates to contending approaches towards DL by different policy networks involving private sector, government and civil society. These range from challenging technocentric versus pedagogy-centred approaches to DL policy and practice (Ford & Botha, 2010) to market-centric versus social-justice-centric approaches (Selwyn, Facer, & EBSCOhost, 2013) which also manifest as tensions between contending stakeholders. These tensions are often obfuscated by a dominant neutral discourse related to forging partnerships and networks without engaging with inherent contradictions in world-views within and between partners. These tensions suggest that the DL space will continue to be a contested terrain with strong political overtones.

## 11.10 Conclusion

In answering the question: *How has equity and social justice, been framed in DL policy, practice and scholarship* this chapter has attempted to combine a critical, high-level review of six intersecting dimensions of DL in SA with a deeper analysis and conversation that foregrounds equity and social justice. This approach aligns with a call by UNESCO to rethink education towards a global common good (UNESCO, 2015b), echoed by the Qingdao Declaration on ICT in Education that was inspired by a humanistic vision of education focused on human rights and social justice (UNESCO, 2015a).

The chapter shows how equity, social justice and related concepts such as redress and social inclusion, are marginal in DL policy, practice and scholarship. Based on a brief analysis of three digital learning related government policies the absence

of explicit references to social justice and equity reflect a marginalisation of an important goal of SA's burgeoning democracy. The reasons for this marginalisation could be attributable to a systematic erosion of developmental and equity-centric goals in view of global pressures to shift the policy narrative over two and a half decades as explained by Bozalek and Boughey (2012) and (Badat & Sayed, 2014).

The chapter has also shown that digital infrastructural inequality is organically linked to systemic social, economic and political inequality in SA society. Framing the prioritisation of universal sustainable, quality access to digital infrastructure, resources and services needs to be tied to the broader equity and social justice goals for societal transformation.

Similarly, digital integration in learning and teaching, learner performance and skills and teacher professional development are not isolated from broader systemic influences. The chapter has shown a dominant market-centric performative discourse, under the influence of globalisation have influenced the narrowing of focus to issues of digital access, skills, capacity building and institutionalising shifting cultures geared towards the needs of a twenty first century education and labour market. That more impoverished and remote rural schools and institutions have consistently been chosen as sites for DL intervention, reflecting an imagination of equity associated with access to resources and opportunities for communities who are marginalised from power. Whilst results have been mixed, it raises questions about how to reframe the national conversation more strongly towards an emancipatory objective.

The tensions identified in the DL activity system will likely exacerbate as inequality deepens in the face of a rapid technological change. Current narratives related to the fourth industrial revolution and education threaten to intensify already existing intersectional disparities along race, class, gender, language, geography and ability and the spectre of a deeply-entrenched oppressive society in which the majority are relegated to social oblivion.

This raises questions about whether and how the fourth industrial revolution can be captured in support of an equitable education system and society. An approach towards a socially-just DL system will require recognition of trade-offs and contestations between market-centric and social-centric interventions that invariably relates to the distribution of power. Here the SA DL community can learn much from researchers in the social science and humanities disciplines in South Africa who have addressed ways to model emancipatory approaches that draw on SA's rich experience with community organisation and mobilization. The DL research communities elsewhere have developed critical agency frameworks that focus on power-marginalised communities identifying, acknowledging their disempowered condition and mobilizing their resources through strategies that conform, reform and transform their lives (Roberts, 2015).

The impetus for change in education in SA is partially technological but has largely been social and political. A recognition of this also challenges the dominance of an unchangeable, taken-for-granted technological inevitability narrative. The analysis in this chapter has been very limited and served mainly to open the door to reframing the national DL discourse towards an equity-centric research agenda and expanding

the theoretical and methodological repertoire on DL in ways that engages with current debates on decolonizing education in South Africa.

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