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Volume 3

Education for sustainable development in BRICS

Zoom on higher education

EDITED BY

Ewelina K. Niemczyk & Zacharias L. de Beer

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BRICS Education
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EDITORS
Ewelina K. Niemczyk
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Peer review declaration

The publisher (AOSIS) endorses the South African 'National Scholarly Book Publishers Forum Best Practice for Peer Review of Scholarly Books'. The manuscript underwent an evaluation to compare the level of originality with other published works and was subjected to rigorous two-step peer review before publication, with the identities of the reviewers not revealed to the editor(s) or author(s). The reviewers were independent of the publisher, editor(s) and author(s). The publisher shared feedback on the similarity report and the reviewers' inputs with the manuscript's editor(s) or author(s) to improve the manuscript. Where the reviewers recommended revision and improvements the editor(s) or author(s) responded adequately to such recommendations. The reviewers commented positively on the scholarly merits of the manuscript and recommended that the book be published.

Research justification

The main objective of this manuscript is to place higher education at the core of the necessary transformation towards sustainable practices and policies, especially in the BRICS (Brazil, Russia, India, China and South Africa) member states. As indicated in the lead chapter, the exploration of sustainable development (SD) at the higher education level in BRICS has been neglected. In fact, there is a scarcity of research studies exploring education for sustainable development (ESD) within the higher education sector, especially through the comparative method. Considering the potential of higher education institutions (HEIs) to shape sustainability-orientated citizens capable of making decisions and taking action to address global challenges, we believe that the examination of higher education for sustainable development (HESD) is a matter of urgency.

The ten chapters of this manuscript contain original research and provide rich information on HESD in the BRICS countries. Some of the chapters are comparative in nature, zooming on specific BRICS countries, while others delve deeper into one specific member state, showcasing findings and interpretations that can be informative to and applied by other contexts. The collective chapters of this manuscript followed an interpretive paradigm focusing on understanding the world around us, in this case the sector of higher education in BRICS. Relevant methodologies and data collection methods are described in each individual chapter. The chapters are not driven by a specific theory; however, they are informed by the notion of 'becoming'. In alignment with that notion, the authors of the chapters acknowledge the constant changes, often caused by humans, to human life and the planet that require action to transform higher education for the benefit of sustainable societies. The manuscript is meant to stimulate further dialogue between scholars about higher education for sustainable development in BRICS.

The target audience consists of academia and specialists in the educational sciences. The book constitutes original research that has not been published elsewhere and is not plagiarised.

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Abbreviations and acronyms, boxes, figures and tables appearing in the text and notes

List of abbreviations and acronyms

1IR	First Industrial Revolution
2IR	Second Industrial Revolution
3IR	Third Industrial Revolution
4IR	Fourth Industrial Revolution
ACE	Advanced Certificate in Education
ACT	Advanced Certificate in Teaching
ADE	Advanced Diploma in Education
BA	Bachelor's degree
BEd	Bachelor in Education
BRICS	Brazil, Russia, India, China and South Africa
BRL	Brazilian real
CAT	computer applications technology
CNY	Chinese yuan or renminbi
DBE	Department of Basic Education
DHET	Department of Higher Education and Training
Dipl Gr R	Diploma in Grade R Teaching
EC	European Council
ECCE	early childhood care and education
ECD	early childhood development
EEU	Eurasian Economic Union
ESD	education for sustainable development
EU	European Union
FET	further education and training
GDP	gross domestic product
GED	general education and training
HEIs	higher education institutions
HESD	higher education for sustainable development
HET	higher education and training
HLPF	High-level Political Forum on Sustainable Development
Hons	Honours degree
ICT	information and communication technology

INR	Indian rupee
IoT	Internet of Things
IT	information technology
LGBTQI+	lesbian, gay, bisexual, transgender, queer and intersex
LSC	learning support centre
LSCs	learning support centres
MA	Master's degree
MDGs	millennium development goals
MEd	Master's in Education
MIPT	Moscow Institute of Physics and Technology
NEP	national education plan
NPDE	National Professional Diploma in Education
NQF	National Qualifications Framework
NSFAS	National Student Financial Aid Scheme
NWU	North-West University
OECD	Organisation for Economic Cooperation and Development
PDF	portable document format
PhD	Doctoral degree
PGCE	Postgraduate Certificate in Education
PPP	purchasing power parity
RUB	Russian ruble
SD	sustainable development
SDG	sustainable development goal
SDGs	sustainable development goals
TVET	technical and vocational education and training
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Emergency Fund
UODL	Unit for Open Distance Learning
UoTs	universities of technology
WHO	World Health Organization
ZAR	South African rand

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Chapter 1

Sustainability-orientated higher education institutions in BRICS

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Introduction

In our rapidly changing and challenging world, there is a growing urgency to consider the role of higher education institutions (HEIs) in contributing to the creation of sustainable societies through the preparation of competent and sustainability-aware citizens. More specifically, nurturing citizens (e.g. teachers, leaders and researchers) should be developed who are capable of sustaining

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themselves, their local and global communities, and the well-being of the planet. Overall, there is a need to explore and enhance the capacity of universities to nurture citizens who can take informed action towards existing sustainability challenges and pursue sustainable development (SD). The United Nations (UN) (1987:43) defined 'sustainable development' as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs'. The United Nations Educational, Scientific and Cultural Organization (UNESCO) Roadmap for Implementing the Global Action Programme on Education for Sustainable Development (2014) stated that this could be accomplished by integrating sustainability into curricula, providing teacher training with a practical understanding of sustainability principles and delivering capacity-building programmes.

According to Fehlner (2019), in the past decade, the concept of education for sustainable development (ESD) has become one of the main initiatives in education systems to draw attention to current global issues. As pointed out by Nevin (2008), ESD is meant to promote the development of the knowledge, understanding, competencies, values and behaviour required to create a sustainable world that ensures environmental preservation, supports social equity and cultural diversity, fosters respect for human rights and stimulates economic sustainability. However, ESD was mainly introduced to and explored within primary and secondary education while receiving less attention in higher education. It is essential to note that the focus on basic education took academic attention away from conducting research on the relationship between higher education and SD. As reported by Oketch, McCowan and Schendel (2014), only recently has the scholarly discourse on this topic made progress.

Undeniably, all levels of education can be instrumental towards SD; however, HEIs are in a unique position to nurture sustainable mindsets in future teachers, researchers and leaders. Scholarly literature (Novo-Corti et al. 2018; Zermeno & De la Garza 2020) indicates an urgent need to shift students' mindsets, which requires them to explore and engage in activities that enhance their awareness of SD and their competence to make sustainable decisions and take sustainable actions. The literature further validates ESD as an effective method to transfer sustainability-related knowledge and competencies (Novo-Corti et al. 2018:818). O'Malley (2019) explained that the realisation of the sustainable development goals (SDGs) is unattainable without the contribution of HEIs through teaching, research, innovation and community engagement. Other scholars (e.g. Farinha, Caeiro & Azeiteiro 2020; Mula et al. 2017) also emphasised the value of universities showing their responsibility for SD through engagement in international dialogue and pledging their commitment to sustainability.

We can deduce from the previous paragraphs that HEIs that are driven by SDG 4 (the goal to provide inclusive and equitable quality education) are a major pillar that supports the realisation of all SDGs. Avila et al. (2017) argued that sustainability-related teaching, research and other academic activities have the potential to contribute to the sustainability of the people and the planet. In fact, there are no disciplinary boundaries in SD, as it encompasses inter-related natural and social elements such as the economy, society and the environment. On that note, several scholars (e.g. Farinha, Azeiteiro & Caeiro 2018; Ferguson & Roofe 2020; Novo-Corti et al. 2018) claimed that HEIs have a responsibility to prepare sustainability literate graduates and serve as role models for other social institutions. Batson (2021:para. 18) added that 'universities must agree globally that their main mission – and state this in their mission statements – is to create a sustainable human civilisation'. The report of the International Association of Universities (2020) indicates that enhancing the role of higher education for SD ensures a sustainable legacy for future generations.

In the next section, the concept of organisation is explained, whereafter current and relevant knowledge regarding the development of the BRICS (Brazil, Russia, India, China, South Africa) organisation and the positioning of BRICS in the world are described. The research design is then clarified, and the layout of the book is presented. The last section indicates the actual contribution and value of the collective chapters.

Conceptual framework

In discussing BRICS, the definition, conceptualisation, characteristics and functioning of organisations are unpacked in this section. Renowned thinkers and scholars progressively regenerate the concept of *organisation*; however, a common ground remains between the views of early scholars and modern academics. Allen (1958:51) defined 'organisation' as a process of identifying and grouping work to be performed, defining and delegating responsibility and authority, and establishing relationships to allow people to work together most effectively in accomplishing given objectives. Koontz and O'Donnell (1972) regarded an organisation as a coordinating point for people working in an entity, while Basson, Van der Westhuizen and Niemann (1995:583) and Theron (2013:81) agreed that an organisation is a framework within which human activities are directed and coordinated to achieve a core goal. In other words, an organisation is a formal structure in which people stand in a specific relationship with one another to achieve specific goals. *Pharos Online Dictionary* (2022) positions the definition of an organisation simply as the way something is organised or a group that acts as an organised body, while *Cambridge Dictionary* (2022) conceptualises an

organisation as a group of people who work together in an organised way for a shared purpose. Therefore, 'organisation' can be defined as a group of people hierarchically structured to work together to achieve goals within a specific time and within a specific cost plan (De Beer 2017:71). The BRICS organisation fits into the framework of the organisation concept defined earlier; however, it should be pointed out that BRICS can be regarded as a meta-organisation.

The BRICS organisation

The acronym 'BRICS' refers to Brazil, Russia, India, China and South Africa as the world's leading emerging economies. Annually, the BRICS leaders' summit invites members to discuss spheres of political and socio-economic coordination in which prospects for business and economic complementarities have been identified. Over and above the BRICS summit, collaboration in the past decade has expanded into an annual programme of over 100 sectoral meetings. Each year, the chairpersonship of the forum rotates between the five member states in accordance with the position of the name of the country in the acronym 'BRICS'. Cooperation amongst the members is organised laterally on three levels, namely, government-to-government diplomacy and engagement of government institutions (such as state-owned enterprises), business councils and engagement of civil society, and people-to-people initiatives. The BRICS organisation aims to promote peace, security, development and cooperation. Moreover, it seeks to make a significant contribution to humanity's development and establish a more equitable and fairer world. Based on the systematic literature review, the next paragraphs give a condensed presentation of the BRICS summits. As evident in the following text, although SD was on the agenda of all of the BRICS summits, only from the tenth summit were SD action plans attended to diligently. The evident focus on SD is emphasised in the separate part showcasing the 10th to the 13th BRICS summits.

BRICS summits 1–9: General synopsis

First BRIC summit (2009)

In June 2009, the BRIC leaders met in Yekaterinburg, Russia, for the first summit to discuss the global financial crisis, the international state of affairs, the future direction of BRIC dialogue and BRIC cooperation, the G20 summit, financial reform, food security and climate change. In a joint statement, the summit called for emerging markets and developing countries to have a stronger voice in international financial institutions (Russian Federation 2009).

☐ Second BRICS summit (2010)

The second annual BRICS summit took place in Brasilia, Brazil, in April 2010. Amongst the topics discussed were the global financial crisis, the international geopolitical situation, UN reforms, G20 affairs, the selection process for the senior management of the World Bank and the top management of the International Monetary Fund, climate change, and international and regional hot spots. The group adopted the acronym 'BRICS' after South Africa was invited to join the organisation in December 2010 (University of Toronto 2010).

☐ Third BRICS summit (2011)

In March 2011, the third BRICS summit was held in Sanya, China, and was attended by the heads of state and government of the five member countries – Brazil, Russia, India, China and South Africa. The main theme of the summit was 'Broad vision and shared prosperity'. Points on the agenda were the international economic situation, international finance, BRICS development, BRICS cooperation and the global economy. The summit adopted the Sanya Declaration and its action plan. Meetings of the trade ministers, the academic forum, the financial forum and the business forum were all held on the sidelines of the third BRICS summit (South African Institute of International Affairs 2022).

☐ Fourth BRICS summit (2012)

The fourth BRICS summit took place in New Delhi, India, in March 2012. At this summit, the theme was 'competitiveness, security and prosperity in the BRICS'. Global governance and SD were amongst the topics discussed by the leaders. The summit issued the New Delhi Declaration and Action Plan as well as the BRICS Report on the developing prospects of the BRICS countries, the cooperation process and areas of competitive advantage to enable the BRICS countries to play a more important role in the global economy in the post-financial crisis era (Government of India 2012).

☐ Fifth BRICS summit (2013)

In March 2013, the fifth BRICS summit was held in Durban, South Africa, with the theme 'BRICS and Africa: Partnership for development, integration and industrialisation'. The summit issued the eThekwini Declaration and Action Plan, as well as the decision to establish the New Development Bank and the contingent reserve arrangement. Furthermore, it was announced that the BRICS Business Council and Think Tank Council would be formed. During this summit, the BRICS Leaders-Africa Dialogue Forum was also held (Government of India 2013).

Sixth BRICS summit (2014)

The sixth BRICS summit took place in Fortaleza, Brazil, in July 2014, with the theme 'Inclusive growth: Sustainable solutions'. Political cooperation, SD and inclusive growth were among the topics discussed by the leaders. The Fortaleza Declaration and Action Plan were issued at the summit. The leaders observed the signing of the treaty on the establishment of a BRICS contingent reserve arrangement and the agreement on the New Development Bank. During the summit, the BRICS leaders met with South American heads of government (Government of Brazil 2014).

Seventh BRICS summit (2015)

The seventh BRICS summit took place in Ufa, Russia, in July 2015, with the theme 'BRICS partnership – a powerful factor of global development'. The presidents discussed global political and economic issues and BRICS cooperation. The Ufa Declaration and Action Plan and the BRICS Economic Partnership Strategy were announced at the summit. During the summit, the BRICS leaders met with the heads of the Eurasian Economic Union, the Shanghai Cooperation Organisation and the leaders of observer countries (National Committee for BRICS Research 2015).

Eighth BRICS summit (2016)

In October 2016, the eighth BRICS summit was held in Goa, India, with the theme 'building responsive, inclusive and collective solutions'. The leaders conversed about the international political and economic situation, global governance, counter-terrorism, climate change, the SDGs, BRICS cooperation and people-to-people and cultural exchanges, amongst other topics. The Goa Declaration and Action Plan were announced at the summit, and the commitment of the member states to deepening the BRICS alliance was reaffirmed. During the summit, the BRICS leaders met with leaders of the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation member countries for an outreach summit (Government of India 2016).

Ninth BRICS summit (2017)

The theme of the ninth BRICS summit in Xiamen, China, was 'BRICS: Stronger partnership for a brighter future'. The leaders expanded on previous accomplishments by agreeing on a shared vision for the future development of the BRICS organisation, reviewing international and regional problems of mutual concern and signing the Xiamen Declaration (Government of India 2017).

BRICS summits 10–13: Sustainable development synopsis

Tenth BRICS summit (2018)

The tenth BRICS summit was held in Johannesburg, South Africa, in July 2018. The theme of the summit was 'BRICS in Africa: Collaboration for inclusive growth and shared prosperity in the Fourth Industrial Revolution'. The SD agenda of the BRICS organisation was highlighted in the Johannesburg Declaration, with SD stated 27 times in this document. The following treatise summarises what the Johannesburg Declaration of the tenth BRICS summit accentuated regarding SD (Government of South Africa 2018):

- Committing to enhancing our strategic partnership for the benefit of our people through the promotion of peace, a fairer international order, SD and inclusive growth.
- Upholding multilateralism and working together on the implementation of the 2030 SDGs as we foster a more representative, democratic, equitable, fair and just international political and economic order.
- Supporting the UN as the universal intergovernmental organisation entrusted with the responsibility for maintaining international peace and security and advancing SD.
- Committing to fully implementing the UN's 2030 Agenda for SD and the SDGs to provide equitable, inclusive, open, all-around, innovation-driven and sustainable development in its three dimensions – economic, social and environmental – in a balanced and integrated manner.
- Strengthening BRICS cooperation in energy, especially in transitioning to more environmentally sustainable energy systems supportive of the global SD agenda.
- Committing to enhancing cooperation in the field of water-based SD in an integrated way, addressing the themes of water-access flood protection, drought management, water supply and sanitation.
- Acknowledging the importance of scientific, technical, innovation and entrepreneurship cooperation for SD in the BRICS organisation and enhancing inclusive growth.
- Enabling all countries and people to share the benefits of globalisation, which should be inclusive and support SD and the prosperity of all countries.
- Supporting the importance of stimulating investment in the infrastructure because of mutual benefit to support industrial development, job creation, skills development, food and nutrition security, SD and the eradication of poverty in Africa.
- Expanding green financing to promote SD in the BRICS countries.
- Welcoming the first World Health Organization Global Ministerial Conference on Ending Tuberculosis in the Sustainable Development Era: A Multisectoral Response (Government of South Africa 2018).

In the Johannesburg Declaration, the BRICS member states emphasise the importance of SD in all three spheres (economic, social and environmental) with the foci on international peace, fair trade, a just political order, security, the environment, energy, water, technology, entrepreneurship, infrastructure, ending poverty and green financing. All people and countries may share in the benefits of globalisation with SD as an ethics barometer.

Eleventh BRICS summit (2019)

The eleventh annual BRICS summit, an international relations conference, was held in 2019 and was attended by the leaders of the state or government of the five BRICS member states. The gathering took place at the Itamaraty Palace in Brasilia, Brazil, in November 2019. The motto of the summit was 'economic growth for an innovative future'. The priorities of the eleventh BRICS summit were as follows (Government of Brazil 2019):

- Strengthening cooperation in science, technology and innovation.
- Strengthening collaboration in the digital economy.
- Strengthening cooperation in the fight against transnational crime, especially organised crime, money laundering and drug trafficking.
- Commending the rapprochement between the New Development Bank and the BRICS Business Council.

The main established areas of concrete cooperation after the eleventh BRICS summit were as follows (Government of Brazil 2019):

- *Economic and financial* cooperation includes the New Development Bank with US$100bn and the contingent reserve arrangement, which is an important mechanism in the macro-economic support of the BRICS member countries. The arrangement is aimed at supporting the member countries in the event of a crisis in their payment.
- *Health care* cooperation involves the identification of common health care issues and problems, such as the incidence of infectious diseases and the lack of equitable access to medical services and medicine. The Tuberculosis Research Network, which aims to promote combined research and development initiatives in the battle against tuberculosis, is another tangible achievement in health care cooperation.
- In *science, technology and innovation cooperation*, one of the most promising areas of collaboration in the grouping is the *BRICS Science, Technology and Innovation (STI) Framework*. It all began in 2014 with the first ministerial meeting on the subject that yielded tangible results in terms of the exchange of know-how and the funding of research projects.
- In terms of *security cooperation*, the main space for meetings of BRICS security is the gathering of national security advisers and working groups on security matters. The BRICS partners discuss worldwide security

challenges and transnational crimes, such as narcotics trafficking, cyberattacks, money laundering, corruption and terrorism, during these meetings.
- The BRICS Business Council and the BRICS Business Forum are the key instruments for *business cooperation* inside the grouping. They intend to bring the business communities of the five countries closer together by sharing knowledge and looking for new business opportunities. Infrastructure, manufacturing, energy, agribusiness, financial services, regional aviation, capacity development and the harmonisation of capacity levels are the focus of the nine working groups of the council.

Sustainable development was again highlighted in the declarations of the eleventh BRICS summit (Government of Brazil 2019) and featured in five of the declaration points. These points are as follows (Government of Brazil 2019):

- The BRICS organisation remains committed to multilateralism and sovereign state cooperation to maintain peace and security, promote SD and ensure the promotion and protection of human rights and fundamental freedom for all while helping the international community to build a brighter shared future.
- In a balanced and integrated manner, the BRICS countries convey their commitment to SD in its three dimensions – economic, social and environmental. All of the residents of these countries, in all regions of their respective territories, including remote locations, have the right to fully benefit from SD.
- The BRICS countries emphasise the importance of implementing the 2030 Agenda for SD and demand increased effort to ensure that it is implemented on schedule.
- The work of the New Development Bank in infrastructure and SD finance is praised by the BRICS organisation.
- Membership of the New Development Bank will be expanded in accordance with its articles of agreement, enhancing the bank's function as a global development finance institution and helping to mobilise resources for infrastructure and SD projects in the BRICS countries.

Hence, the BRICS organisation again emphasised the importance of SD during the eleventh summit. The member countries were resolute in implementing the 2030 Agenda for SD timeously.

☐ Twelfth BRICS summit (2020)

The 2020 BRICS conference was the twelfth yearly BRICS summit. It was initially scheduled to be held in Saint Petersburg from 21–23 July, but was rescheduled to 17 November 2020 and held as a video conference because of

the global coronavirus disease (COVID-19) pandemic. The theme of the summit was 'BRICS partnership for global stability, shared security and innovative growth' (Government of Russia 2020). The Moscow declaration had 97 different statements, which were divided into the following main themes:

- United for a better world
- Policy and security
- Cultural and people-to-people exchanges.

Again, the declaration emphasised SD and stated the commitment of the BRICS organisation to SD 14 times (Government of Russia 2020). These statements are as follows:

- The UN fulfils a central role in the international system in which sovereign states collaborate to maintain peace and security, advance SD and ensure the promotion and protection of democracy, human rights and the fundamental freedoms of all to build a brighter shared future for the international community through mutually beneficial cooperation.
- The use of relevant space technology for peaceful purposes will make a tangible contribution to the achievement of the SDGs.
- Encouraging investment is important to support industrial development, create jobs, ensure food security, combat poverty and ensure SD in Africa.
- Information exchange on nationally implemented initiatives, short- and mid-term stimulus packages aimed at effectively reducing the effects of the current crisis and full implementation of the 2030 Agenda for SD are of major importance.
- It is essential that strong and sustainable macro-economic policies are promoted, economic resilience is fostered, financial stability is maintained and significant structural reforms are implemented to ensure that all three pillars of the SD agenda – economic, social and environmental – are pursued to ensure that no one is left behind and the most vulnerable are helped first.
- The BRICS organisation welcomes the adoption of the BRICS economic partnership strategy for the period of 2021–2025 as a key guideline for enhancing BRICS cooperation in trade, investment and finance, the digital economy and SD in order to help the BRICS countries recover quickly and raise the living standards of their citizens.
- The BRICS organisation appreciates the ratification of the BRICS investment facilitation understanding, which stresses the voluntary steps of the BRICS countries to increase transparency, efficiency and cooperation as the path ahead in promoting investment for SD.
- The function of the New Development Bank as a global development financial institution is expanded, and more is contributed to the mobilisation of resources for infrastructure and SD projects in the member countries.

- The desire to enhance international energy cooperation based on equality, non-discrimination and complete respect for sovereignty and national interests is stated, highlighting the critical role of energy in fostering SD.
- The importance of education is emphasised in improving human capital, re-skilling and up-skilling individuals, attaining SD and allowing for inclusive economic growth in the post-COVID-19 recovery.
- The BRICS organisation recommits itself to implementing the 2030 Agenda for SD and realises that eradicating poverty in all forms and dimensions, including severe poverty, is the biggest global challenge and a prerequisite for long-term development.

The golden thread of SD is enshrined in all of the BRICS declarations and action plans over the previous 13 summits.

☐ Thirteenth BRICS summit (2021)

The thirteenth BRICS summit was held in September 2021 under the chairmanship of India. India hosted the BRICS summit for the third time, following 2012 and 2016. The theme of the BRICS summit was 'BRICS at 15: Intra-BRICS cooperation for continuity, consolidation and consensus' (Government of India 2021). The three pillars of cooperation were penned as political and security cooperation, economic and financial cooperation, and cultural and people-to-people cooperation. Priorities under the declaration of political and security cooperation are the reform of multilateral systems and counter-terrorism cooperation. The economic and financial cooperation cluster will focus on the implementation of the BRICS Economic Partnership Strategy 2020–2025 and the operationalisation of the BRICS agriculture research platform. The focus will also be on disaster resilience cooperation and innovation cooperation. Lastly, the BRICS organisation will focus on digital health care and traditional medicine.

The SDGs were again central to the declaration and action plans of the thirteenth summit (Government of India 2021). The prominence of SD in BRICS cooperation was highlighted as follows:

- The BRICS organisation is committed to using creative and inclusive solutions, such as digital and technology tools, to promote SD and ensure that all people have affordable and equal access to global public goods.
- BRICS reaffirms its commitment to putting the 2030 Agenda for SD into action in all three areas – economic, social and environmental. The organisation is concerned that the COVID-19 pandemic has hampered efforts to attain the 2030 Agenda, reversing years of progress on poverty, hunger, health care, education, climate change, access to clean water and the protection of the environment.
- The BRICS organisation prioritises the effective and efficient use of technology and data for development in its many tracks of work and

encourages deeper cooperation as the decade of action for the fulfilment of the SDGs is entered.
- The member countries reiterate their commitment to attaining the 2030 Agenda for SD and its goals, especially SDG 12, which highlights sustainable consumption and production patterns as a critical component of SD.
- The organisation recognises that, in the context of SD and poverty eradication, the peaking of greenhouse gas emissions will take longer for developing countries.
- BRICS applauds the progress made under the pillar of economic and financial cooperation in strengthening the capacity of the organisation to achieve its SDGs, especially considering the challenges of the COVID-19 pandemic.

The importance of implementing the SDGs was again given high priority during the thirteenth BRICS summit.

Positioning of BRICS in the world

According to Larionova (2020), the BRICS organisation has had a great impact on the global economy since its first summit. The author stated that the prominent role of the BRICS countries in global economics is evident in the economic power of the member states and their contribution to transforming international economic institutions, including international financial institutions and threatening systems. The economic influence of BRICS is apparent in the following aspects (Larionova 2020):

- The average gross domestic product (GDP) per capita of the BRICS countries of 5.4% is three times higher than the global average of 1.7%.
- The BRICS global GDP has added 10% points; in 2019 it was 33%.
- The growth rate of the BRICS member states of 4.5% is higher than the world rate of 2.5%, which will lead to a further increase in the share of the five countries.
- BRICS countries account for 19% of world exports, 16% of global imports, 19% of incoming direct investment and about the same proportion of outbound direct investment.

This information and statistics strongly highlight the presence of the BRICS countries in the global economy. The World Bank (2022), an international financial institution, provides additional interesting facts about the presence of BRICS in the world. For instance, the BRICS organisation has united the economic markets of five major emerging countries; together, the BRICS member states cover 26.7% of the world's land surface, and the five countries make up 41% of the world population (3.2 billion people), 24% of the global GDP and nearly 17% of world trade. These numbers display the impact of the BRICS organisation in relation to the world.

Research design

As stated earlier, the topic of SD in HEIs calls for urgent exploration. Higher education institutions provide a unique educational environment to nurture sustainability-orientated citizens who are capable of addressing global sustainability challenges and fostering SD. Grounded in the BRICS context, the collective chapters of this volume followed an interpretive paradigm focusing on understanding the real world (see Bhattacherjee 2012). The individual methodologies and data collection methods are described in each chapter. This particular chapter employed a systematic literature review to provide the background of the topic under investigation. Purposeful sampling guided the selection of sources. Thirty-seven scholarly articles, government reports and institutional documents were selected and coded to inform this chapter.

The collective chapters are not driven by any theory in particular. However, the collective is informed by the notion of 'becoming'. As Downes (2019) said, to think about becoming is to invoke a line of thought that emphasises potential, rejects determinism and expresses a flexible openness to novelty. In this regard, the chapters of this book acknowledge the constant changes, often caused by humans, to human life and the planet that require action to transform higher education for the benefit of sustainable societies. This implies that HEIs accept the process of becoming and changing towards more sustainable practices and policies. With the premise that knowledge and learning are at the core of transformation in human minds and societies, the becoming of HEIs, along with the changing world, is a must for SD.

This study is part of a larger research project within the Education and Human Rights in Diversity Research Unit at North-West University (NWU), South Africa. All aspects of the study are aligned with the ethical clearance granted by the university.

Chapter layout

The chapters of this book unfold from this chapter, which serves as the lead segment providing an extended understanding of BRICS as an organisation and its development throughout the 13 summits held up to 2021. Moving from this chapter, the following nine chapters provide rich information on ESD in the HEIs of the BRICS member states. Some of the chapters are comparative in nature, putting the spotlight on specific BRICS countries, while others delve deeper into one specific context, providing lessons learnt and best practices that can be informative to and applied by other member states and beyond. As accurately noted in the UN's 2030 Agenda for SD, societal problems are territorially blind, meaning that no country has sufficient knowledge to solve all challenges or address all SDGs. Therefore, learning from one another and

comparing diverse practices and approaches utilised by the BRICS countries are of the essence.

From the standpoint that higher education is at the centre of indispensable transformation to realise the SDGs, Chapter 2 explores how two BRICS member states – Brazil and South Africa – approach and integrate sustainability in their respective HEIs. Furthermore, the chapter provides an extensive explanation of SD, principles of sustainability, the relationship between SD and sustainability, the goals of ESD and SD, and the role of HEIs in sustainability. The author argues that HEIs are in a unique position to educate citizens who are able to address the challenges of global sustainability and pursue sustainable decisions and actions. The findings indicate that the complexity and uncertainty regarding the application of sustainability within different academic areas may restrict the actual implementation thereof. Further findings point out that limited research related to the implementation of sustainable practices within HEIs may cause some universities not to shift towards SD principles and practices.

Chapter 3 charts the global higher education revolution and surveys the 17 SDGs. Taking into consideration each BRICS member state, the main argument of this chapter is that higher education is an indispensable vehicle for attaining these global goals. The other argument is that the HEIs in the BRICS countries present a valuable laboratory case for other countries. In fact, as the author claims, the universities in the BRICS countries display small pockets of excellence, but at the same time, the BRICS higher education sector has not risen to its full potential.

Chapter 4 explores the role of higher education in a specific education system to understand the complexities and possibilities of the implementation of ESD. The authors claim that in order to understand how the higher education sector contributes to education for SD, the role that HEIs play in a given education system as a whole must be clear. Based on the South African context, the authors explore the structure and administration of the education system. After that, the external and internal contextual tendencies influencing the functioning of the higher education sector are outlined, including factors such as demography, culture, language and politics, as well as the connection between different types of education.

The focus of Chapter 5 is on the value of the degrees offered by universities. The author explores the applicability of the relevance of non-selection higher degrees to the employability of people with non-selection higher degrees to enhance the quality of higher education in the BRICS countries. The findings indicate that all BRICS member states must focus on the quality and applicability of their higher education degrees. Statistics regarding graduate unemployment in the BRICS member states indicate that in terms of sustainability, the market must be considered when curricula are created and

degrees are planned at HEIs. The BRICS countries are encouraged to add to their declarations for education the need for 4IR higher education degrees that will attend to the high number of unemployed graduates.

The notion of the importance of the 4IR is further explored in Chapter 6. The BRICS countries are gradually including the 4IR in their HEIs, mainly to enable teachers to use and teach 4IR knowledge, skills and values in schools. This process is part of the global agenda of implementing SDG 4, which means to ensure inclusive, quality and lifelong education for all, and SDG 9, which encourages countries to introduce 4IR infrastructure and foster innovation. From the perspective of education law and policy, Chapter 6 focuses on three BRICS member states, namely, Brazil, India and South Africa. The two main questions addressed in this chapter are as follows: How do the selected BRICS countries regulate, guide and plan to adapt HEIs in terms of enabling teachers to use and teach 4IR knowledge, skills, values and attitudes in school? What are the roles of various education stakeholders in this process? The results suggest that the countries under investigation have outdated curricula and are only in the process of developing legislation, policies and plans meant to regulate and guide HEIs in the preparation of competent teachers.

The preparation of graduates and their employment prospects are further explored in Chapter 7, which specifically focuses on the goal of higher education for SD to maximise the potential of students' future employability. As reported by the author, the current situation shows that some South African HEIs present courses and offer degrees that do not provide students with adequate competencies and qualifications to secure employment successfully. In fact, keeping sustainability in focus while acknowledging globalisation and constant technological development makes the task of teaching and learning more complex. The author suggests that for courses and degrees to be regarded as sustainable and for institutions to contribute to SD, the groundwork for employability needs to be maximised in teaching and learning practice. More specifically, teaching and learning in the higher education environment must nurture and educate students in a sustainable manner that will enhance their academic paths in order to equip individuals with the relevant skills of employability that will carry them towards a future career.

Chapter 8 pays close attention to the current situation and the impact of the COVID-19 pandemic on teaching and learning and the overall quality thereof at HEIs, as encapsulated in SDG 4. The authors describe different concepts and practices resulting from this crisis, including social distancing, working from home and employing remote learning, which affected the functioning of HEIs. Based on the researchers' journey and students' experiences, the chapter provides a narrative about teaching, learning and research in the 'new normal' with the final goal of sharing lessons learnt. As there are limited research findings on the influence of COVID-19 and the

implications of the COVID-19 pandemic on SDG 4, the documented lessons contribute to this body of knowledge. Furthermore, the lessons are informative for making sustainable decisions and taking sustainable action during the interruption of academic work.

In Chapter 9, the focus is on sustainable learning processes. From the standpoint that HEIs need to investigate sustainable ways of teaching, learning and assessment to narrow the gap between theory and practice, the authors investigate how traditional assessment can be transformed for the professional development of prospective teachers. They propose the use of e-portfolios as an alternative assessment tool that can ensure quality education and the preparation of students with the necessary 21st-century skills. As described in this chapter, the assessment provides evidence of the acquisition of flexible and reflective skills through a sustainable learning process while completing a module or programme.

The final chapter (ch. 10) focuses attention on the private university sector, which, according to the author, has been overlooked in terms of the value it may add to attaining the SDGs. Taking into consideration a variety of private universities in the BRICS countries, this chapter explores, firstly, the role and potential of the private university sector in furthering the SDGs; secondly, the promise of private universities in pursuing and realising the SDGs in the BRICS countries; and, lastly, what the BRICS partners can learn from one another. Particular attention is paid to what South Africa can learn from the other BRICS countries with respect to the value of private higher education in the realisation of the SDGs. The key takeaway from the survey of the BRICS experience with the private university sector clearly indicates the need to create space for private universities to broaden students' access to higher education and enhance the pursuit of 17 SDGs.

Conclusion

The intent of this book is to place higher education at the core of the necessary transformation to create awareness and change towards more sustainable practices and policies in the BRICS countries and beyond. The aim was to provide students, scholars, support staff, practitioners, managers and other education stakeholders with an accessible and informative text exploring SD in HEIs, a level of education that, as mentioned in the introduction, has been somewhat neglected, especially in the context of the BRICS member states. By reading the individual chapters, readers will have the opportunity to select information that is relevant to them and engage with the text in connection to their own context, field and educational role. Ideally, the information shared in this book will allow readers to adapt ESD practices in their institutions and local communities.

As indicated in the opening paragraph of this chapter, times are rapidly changing – too fast to anticipate the future. A certain sense of the past and the present that defines the future is long gone. However, we can anticipate that unsustainable practices will not secure a safe future for people and the planet. Therefore, there is an urgent need to focus on higher education for SD. We believe that sharing lessons and effective practices with others is part of the contribution of universities to SD; therefore, as scholars, we feel the responsibility to contribute to the scholarly dialogue on sustainability in HEIs. We suggest slowing down academic endeavours to reflect on the essence of sustainability in all academic activities.

Chapter 2

Fostering higher education for sustainable development: Quest for change in Brazil and South Africa

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Introduction

Our current complex world calls for the expansion of knowledge of sustainable development (SD) and greater change towards more sustainable practices. In the ever-changing 21st century, replete with often human-caused challenges to human life and the planet, there is a growing need to reflect on a new vision for higher education to promote sustainable societies. As is evident in the scholarly literature, it is imperative to transform learning systems and the generation of knowledge to support a sustainable future, and higher education is at the centre of this indispensable transformation, as it equips teachers, researchers and citizens with the capacity to address challenges of global sustainability and pursue sustainable decisions and actions. This chapter

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explores how two BRICS member states – Brazil and South Africa – approach and integrate sustainability in their respective higher education institutions (HEIs). As evident from the exploration, both countries share similar struggles, including a lack of financial and political capacity to empower the implementation of education for sustainable development (ESD). In addition, it is evident from the findings that limited research related to the implementation of sustainable practices within HEIs may cause some universities not to shift towards the principles and practices of SD.

This chapter builds upon the opening chapter of this book and explores the status of higher ESD in Brazil and South Africa. The introduction is followed by three sections that describe, in turn, the relationship between SD and sustainability, the connection between ESD and SDGs, and the role of HEIs in achieving sustainability. The author then contextualises ESD in HEIs in Brazil and South Africa and culminates the chapter with reflections and recommendations.

Relationship between sustainable development and sustainability

Although at times the terms 'sustainable development' and 'sustainability' are used interchangeably, it is important to distinguish between them in order to accurately identify their respective roles. As summarily noted by Da Silva et al. (2018), sustainability is a principle, while SD corresponds to a social process involving decision-making and actions taken in relation to sustainability. In other words, commitment to ongoing SD is needed to achieve and maintain sustainability in various social areas, including multiple aspects of higher education.

Based on their analysis of SD concepts discussed in the literature, Čiegis, Ramanauskienė and Martinkus (2009) concluded that none of the proffered definitions are comprehensive enough to encapsulate all aspects of SD. While acknowledging such a limitation, they refer to the most accurate interpretation of SD provided in the report of the World Commission on Environment and Development titled *Our Common Future* (also known as the 'Brundtland Report'): '[s]ustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (UN 1987:54). Expanding on the initial interpretation of the World Commission on Environment and Development, Ciegis et al. deemed SD to be a multidimensional organising principle, comprising efficiency, equity and intergenerational fairness. They elaborated as follows on the concept of SD (Ciegis et al. 2009):

> As a general concept, sustainable development encompasses three fundamental approaches: *economic*, *environmental*, and *social development*, which are inter-related and complementary. Traditionally, the concept of sustainable development

> involves three equivalent components: environmental, economic, and social development; as well as three dimensions of well-being, i.e. *economic*, *ecological*, and *social*, and their complex interrelations. (p. 28; [*emphasis in original*])

Sustainability has garnered attention in academia mainly because of its impact on the economy, environment and society itself (Bell & Morse 2008). Yet, despite its importance for social well-being globally, the complexity and uncertainty regarding the application of sustainability within different social and academic circles may limit any practical accomplishments concerning sustainability. In terms of academic disciplines, SD is also defined differently. For instance, in economics, SD means ensuring that future generations' per capita income is not lower than that of the present generation; in sociology, SD implies the preservation of community, that is, maintaining close social relationships in communities, while in ecology, SD is about preserving the diversity of biological species, essential ecosystems and ecological processes (Ciegis et al. 2009:31).

Goals of education for sustainable development

In 2002, the UN forecasted the period 2005–2014 as the decade of education for SD, calling on governments to include the principles of sustainability in their educational strategies and action plans (UNESCO 2020:55). Increasingly, ESD is recognised internationally as an integral part of quality inclusive education, and there is a growing need to fulfil the UN's 17 symbiotic SDGs that are crucial for creating a sustainable future (United Nations Department of Economic and Social Affairs 2015).

Education for sustainable development is a lifelong learning process and a fundamental aspect of quality education, specifically in relation to SDG 4 – it ensures inclusive and equitable quality education and promotes lifelong learning opportunities for all (United Nations Department of Economic and Social Affairs 2015). Not only is ESD highly relevant to the global education agenda, but it is also important to recognise its contribution to all 17 SDGs, as education empowers people with the necessary knowledge and skills to achieve such goals. Indeed, education is a human right and fuels SD. In turn, ESD is at the core of Target 4.7 of SDG 4, which aims to achieve the following (UNESCO 2020):

> [*E*]nsure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development. (p. 57)

In further explicating ESD, UNESCO (2014) makes the following statement:

> ESD empowers learners to take informed decisions and responsible actions for environmental integrity, economic viability and a just society, for present and future generations, while respecting cultural diversity. It is about lifelong learning, and is an integral part of quality education. ESD is holistic and transformational education which addresses learning content and outcomes, pedagogy and the learning environment. It achieves its purpose by transforming society. (p. 12)

As indicated in UNESCO's (2020) ESD for 2030 roadmap report, all UN member states are invited to:

- Encourage a review of the 17 SDGs within local, national and regional contexts in education settings as part of ESD activities to identify relevant issues, trends and questions that need to be further examined and discussed.
- Conduct thematic research related to ESD and the SDGs based on the key issues, trends and questions raised in relation to the five priority action areas; higher education and research institutions should play a key role in this type of research activity, which can be included as a part of the initiatives of a country on ESD for 2030.
- Disseminate and review the outcomes of research to create learning opportunities to raise critical questions, in particular on the interlinkages and tension between the various SDGs.
- Collaborate with other countries to review SD- and ESD-related emerging issues and trends in specific contexts in order to find appropriate educational responses thereto.

As evident, all the aforementioned activities are applicable to HEIs.

In July 2020, 47 countries – amongst them representatives from some of the BRICS member states – took part in the annual (and this year, virtual) High-level Political Forum (HLPF) on SD, a platform designed to review the ongoing implementation of the 2030 Agenda for SD. Although the conversations during the 2020 HLPF focused on issues related to the COVID-19 pandemic, a pivotal message was that the response to the pandemic should stimulate major changes required to achieve the 2030 Agenda and thus the SDGs. As indicated in the reports presented during the 2020 HLPF, the SDGs need to serve as the world's roadmap to betterment (UN 2020). In response to this call, many countries have adjusted their strategies and designated budgets to achieve the SDGs. In addition, many of them strengthened or created new institutions to support the implementation of the SDGs.

Based on the 2020 HLPF, O'Malley (2019:para. 1) reported that the UN's SDGs cannot 'be achieved without the contribution of higher education through research, teaching and community engagement'. O'Malley made several powerful statements pertaining to the role of HEIs in fulfilling the SDGs in response to the most recent HLPF (see also Mallow et al. 2020).

Firstly, through research, universities play a unique role in producing new knowledge and innovation to address global challenges and provide evidence for informed public policy. Secondly, through teaching, universities develop generations of new leaders and skilled professionals who can drive socio-economic development. Thirdly, through community engagement, universities work alongside a variety of stakeholders (including governments, the private sector and civil society) that together can advance SDGs locally, nationally and globally. These statements are as true today as they were in 2019.

In 2019, Joanna Newman, secretary-general of the Association of Commonwealth Universities, stated that up to then, SDGs 'have only been paid lip service [in universities] and there still isn't a good way of measuring higher education's contribution to SDG 4 or any of the other goals' (cited in O'Malley 2019:para. 12). Therefore, universities need to transform themselves to invest in and value interdisciplinary approaches. Newman (as cited in O'Malley 2019) puts it this way:

> If you are talking about the importance of interdisciplinary research for the SDGs, most universities find it difficult to promote [...] because at the high end of science people still tend to think in silos. (par. 3)

Thus, it is essential to acknowledge that societal challenges are transnational and cannot be addressed by individual nations or HEIs (Hazelkorn 2020). Moreover, any SDG initiative depends on multilateral, multidisciplinary approaches.

Role of HEIs in sustainability

As described earlier in this chapter, SD seeks to satisfy the needs of the present without jeopardising the ability of future generations to satisfy their needs (UN 1987). If one is consistent with this definition, it is evident that SD extends beyond environmental concerns. Put simply, meeting the needs of the present without compromising future needs means we must address social, cultural and economic issues that otherwise may create instability and conflict for the generations to come. As evident in the literature, the growing global population is forecasted to consume more natural resources than ever before to achieve economic growth, most likely jeopardising socio-environmental sustainability. If we intend to disrupt and redirect the manifestation of such predictions, it is reasonable to look for help in the human capital nurtured by HEIs.

The world's current predicament calls for expanded knowledge of SD and changes toward more sustainable practices. There is a growing urgency to reflect on a vision of higher education and the promotion of learning practices that are aligned with the development of sustainable societies. The role of HEIs in transforming societies and creating a sustainable future is undeniable,

as these institutions shape and nurture teachers, researchers, leaders and citizens who, together, can directly address the challenges of global sustainability and pursue sustainable actions and decisions. To that end, it is vital to infuse SD issues and practices into all aspects of research and teaching; it means providing students with knowledge and competencies that will allow them to make sustainable decisions and take sustainable actions. This calls for critical and creative thinking, a responsible approach to life, integrity, caring for others and respect for diversity.

Marques et al. (2018) reminded us that universities have a remarkable role in the development of sustainability, as they are institutional agents of change in society; they not only are capable of spreading awareness about sustainability but also serve as an example for other institutions and their immediate community based on their approach to sustainability. Still, as reported in the literature, the introduction of sustainability in higher education faces several barriers, even if many universities are proactive in implementing sustainability (Barth & Rieckmann 2012; Brandli et al. 2015).

As Beringer (2007) pointed out, the role of HEIs in sustainability has grown globally in tandem with the expansion of international higher education programmes. According to Hawken (2007), universities have a moral responsibility to create a vision for and foster sustainability moving forward. Cortese (2003) went a step further and stated that universities are in a good position to make a significant contribution to SD because of the diverse competencies, knowledge and innovative ideas they may promulgate through ESD. The scholarly literature suggests that HEIs should align teaching and research even further regarding sustainability and should focus on strategic planning and policies that promote well-being and quality of life. Although Alghamdi, Den Heijer and De Jonge (2017) and Lozano et al. (2013) noted that declarations, policies and other guidelines on sustainability are readily available to universities to help them understand and incorporate SD, the number of universities that currently are signatories to such declarations remains somewhat insignificant in relation to the total number of HEIs worldwide. Moreover, while such declarations appear to be founded upon a moral obligation to promote sustainability within HEIs, 'none of them offers concrete prescriptions on an operational level for what higher education should do exactly in order to contribute maximally to sustainable development' (Roorda 2002:6).

In 2006, the Higher Education Associations Sustainability Consortium, recognising the need for a system that assesses and compares the sustainability efforts of HEIs, founded the Association for the Advancement of Sustainability in Higher Education as a coordinating body to advance such a system. Shortly thereafter, the Sustainability Tracking, Assessment and Rating System was created by and for HEIs, with the following key goals recommended to

institution participants (Association for the Advancement of Sustainability in Higher Education n.d.:par. 1):

- gain international recognition for your sustainability efforts
- generate new ideas
- engage your community
- create a baseline for continuous improvement
- inform strategic planning and budgeting
- integrate sustainability into the curriculum
- make real progress towards sustainability
- be part of a global community of Sustainability Tracking, Assessment and Rating System institutions.

The Sustainability Tracking, Assessment and Rating System reporting tool is the most widely recognised standard globally for ESD and is designed to measure institutional sustainability performance. While Alghamdi et al. (2017) accurately stated that it is essential for universities to apply proper assessment tools in teaching and research, there is also an urgent need for active engagement and sustainable institutional governance to create a culture of sustainability both within and outside universities. Alghamdi et al. further explained that such assessment of sustainability remains a complex and challenging process and that less is known about the accuracy of such indicators used to evaluate sustainability in universities.

Case studies: Brazil and South Africa

Having established the potentially important role of HEIs in achieving a sustainable future, the following subsections showcase how Brazil and South Africa have integrated sustainability within their respective HEIs.

Brazil

Based on Brazil's first systematic evaluation of its fulfilment of the 2030 Agenda for SD (Government of Brazil 2017b), it is evident that the educational sector has undertaken several initiatives. Besides sustainable actions in teaching, research and institutional management, some of the initiatives mobilise the engagement of the youth in community volunteer work with an underlying agenda to foster the SDGs. Overall, however, very little is reported (in English) about the implementation of SD practices within HEIs. Moura, Frankenberger and Tortato (2019) confirmed that there is a lack of research related to the sustainable practices universities are performing in Brazil. 'Much information is missing about what are the most developed practices in the country regarding sustainability in HEIs' (Moura et al. 2019:833). Because of this gap in the literature, Moura et al. conducted a study exploring the practices of HEIs in Brazil that is related to sustainability. Based on the data they

collected from 123 universities, it was evident that 31 institutions did not focus on sustainability. The results provided in the remainder of this section reflect the activities of 92 HEIs in Brazil.

Moura et al. (2019:839) found that a majority of the 92 investigated institutions practised some sustainable activities, mainly focusing on the social and ecological aspects of SD. The findings show that behaviour, teaching and curriculum are the main practices of these institutions. Many of these activities are developed throughout the campus, involving students, teachers and staff, bringing together the entire academic community, while others are practised within specific courses. Regarding sustainable practices, for 28 of the 92 institutions, their only forms of sustainable practice are MA programmes and specialisation courses, lectures and debates related to sustainability (mainly in architecture and urbanism courses), publications of articles, booklets and newsletters on the topic of sustainability, technical courses and sustainability centres. The main subjects in these curricula include energy and sustainability, environmental management, sustainable environmental systems, regional development, plant protection, environmental conservation and irrigation, sustainable business, environmental control, and clean buildings and technologies. Based on their analysis, Moura et al. concluded that sustainability is related mainly to the areas of engineering, architecture and business. Other sustainable activities in which universities engage according to their location include helping people who live around the campus with social projects or health care prevention and improving the surrounding environment 'while others work to help nature with new forms of energy, garbage collection, and plastic new consumption patterns' (Moura et al. 2019:836).

In addition, the following social activities engaged in pertain to sustainability (Moura et al. 2019:836–837):

- **Education:** Free application of social technology that promotes quality basic education; disciplinary activities developed by students of educational institutions with public school students; social inclusion for pickers of solid waste to make their rights feasible; access to technology for needy communities; and literacy of young adults.
- **Health care:** Projects related to blood donation; biotechnology in partnerships with private companies and the government to know better the social needs in the medical, pharmaceutical, sustainable and socio-environmental areas; bone marrow donation campaigns; and guidelines for HIV prevention and other sexually transmitted diseases. Some HEIs have joint efforts by offering blood pressure measurements, blood glucose tests and breast examinations, amongst other examinations, and practices of weekly physical activities with the elderly.

- **Guidance and the provision of services to the community:** Legal guidance, community communication and psychological care; the provision of free legal advice in the specific penitentiary; the legal defence of vulnerable populations, such as pickers of recyclable material and agro-extractive communities; and guidance on income tax provided by accounting students.
- **Financial aid:** Programmes to encourage income generation; financial incentives and technical support for communities in Rio Grande do Norte in the areas of civil construction and industrial production; and financial and infrastructure support for partner organisations that carry out social projects.
- **Social well-being:** Initiatives to improve the lives of campus employees and hire services and professionals who live near the campus to generate greater integration of students with the local community.

Moura et al. (2019) found that Brazilian HEIs were aligned with international practices towards sustainability. Moreover, many of the educational institutions under investigation offer courses on sustainability and share new knowledge in this area. Although the researchers assumed that the dissemination of knowledge about sustainability would generate awareness and the competencies needed to implement sustainable practices, they emphasise that the implementation of sustainable practices requires much dedication and financial resources and presume that some HEIs in Brazil may not engage in sustainable practices because of the financial cost of doing so.

The study of Marques et al. (2018) provides valuable information on SD initiatives in a Brazilian university. They investigated a new multicampus university in order to identify how sustainability was infused in the spaces of teaching, research and university management. The sample university offers 62 undergraduate courses divided across ten campuses. In the 39 courses analysed, Marques et al. found 93 subjects related to sustainability. There is an expectation that the inclusion of sustainability themes in the curriculum of various courses will eventually allow future professionals to develop socially and environmentally responsible behaviour and actions. However, based on their findings, Marques et al. reported that the courses have a curricular structure focused on traditional training subjects, with little space for themes that have content that integrates sustainability matters. In addition, the results show that the curricula of some courses are not aligned with current regulations in Brazil that set the following requirements (Marques et al. 2018):

> Environmental Education must be present, in an articulated way, at all levels and modalities of the educational process, both formal and non-formal. Therefore, all courses should have subjects related to environmental education, sustainable development and sustainability in their curricula. (p. 47)

After analysing the teaching activities of the sample university, Marques et al. (2018) explored its research activities related to sustainability. More specifically, they reviewed research projects carried out at each campus in 2016 and selected those dealing with themes related to sustainability. The findings show that very few projects are connected to sustainability. The study results raise an important question: are researchers interested in sustainability, and do they understand the value of adding a sustainability component to a given subject? Marques et al. (2008) further reported that research activities focusing on sustainability have a direct link to specific disciplines (e.g. fewer projects connected to sustainability are observed in health care sciences and linguistics, language and arts).

Furthermore, Marques et al. (2018) looked at ways the university implemented sustainability in its daily management activities. They reported that although sustainable management shows some progress, there is a dearth of effective policies to implement the necessary actions related to sustainability. Moreover, they argued that HEIs that are in the process of technological development should foster SD and thus should also incorporate the principles and practices of sustainability (Marques et al. 2018):

> [*W*]hether to initiate a process of awareness at all levels, reaching teachers, staff and students, or to make fundamental decisions about planning, training, operations or activities common in their physical areas. (p. 43)

It is important to mention here that the targets of SDG 4 were, to some extent, foreseen by the actions of the government of Brazil. Brazil approved the ten-year National Education Plan in 2014 – a year before the launch of the 2030 Agenda – and several targets listed on the National Education Plan are indeed aligned with those set out in the UN's SDG 4 (Manhas 2019).

As reported by the Government of Brazil (2017a), the SDGs listed in Agenda 2030 for the period 2015–2030 extend from the millennium development goals (MDGs) established for 2000–2015. As a result of achieving the MDGs, Brazil secured a seat on the UN's high-level group overseeing the worldwide implementation of Agenda 2030. Brazil created a national commission for the SDGs – composed of 16 representatives from federal, state, district and municipal governments and civil society – as its main institutional mechanism for the implementation of Agenda 2030. The role of the commission is to guide coordinated and integrated actions and liaise with federal entities and civil society to implement Agenda 2030 at the national level. In this regard, Henrique Vila, national social liaison secretary of the Presidency of Brazil, remarked that (Government of Brazil 2017a):

> It's a global agenda for sustainable development that gathers together nearly 200 UN countries. Several actions are underway in Brazil, including integration actions and calls to governance. The idea is to have our internal agencies understand the targets internally so they can contribute to this agenda through their programmes, projects and initiatives. (para. 8)

Based on the literature, it is fair to assume that Brazil may not be capable of implementing the SDGs. As Cardoso, David and De Oliveira (2017) explained, the underlying issue is not the inability of the public policies and institutions in Brazil to carry out the SDGs; instead, it is an economic matter linked to the current government's deep lack of political commitment with adequate funding via public policies defined by the National Education Plan. For instance (Cardoso et al. 2017):

> *Constitutional Amendment 95* (EC 95), approved in December 2016, establishes a freeze of primary expenses by the federal government in real terms for 20 years, producing a deep change in the current fiscal regime. EC 95 entered into force in 2017, and its essence is the role of limiting expenses for public policies and social programmes in order to direct resources for debt repayment, thus setting a priority on the financial system, and not on Brazilian citizens. (p. 8)

Cardoso et al. (2017) questioned which policies are being sacrificed to secure the expenses cap and the use of additional resources to pay for the high interest rates of the public debt of Brazil. The response seems to be that all policies intended to support the achievement of SDGs are being sacrificed to some extent (Cardoso et al. 2017):

> Data from INESC [*Brazil's Institute for Socio-economic Studies*] shows that the functions, bodies and programmes closest to the most vulnerable and least powerful segments of the population vis-à-vis the state and its structures are the ones that lost the most. (p. 9)

In summary, it is possible that Brazil will not be able to implement the SDGs as a result of a lack of necessary budgetary allocations resulting from current policies. These policies reinforce limits for social expenses and introduce budgetary cuts of more than 50% in several governmental bodies, along with other reforms that lead to social exclusion and increased inequalities. The following points expressed by Brazil at UN meetings in 2017 further demonstrate the possibility that SDGs will not be fulfilled: Brazil voted against the drafting of a report on the effects of austerity measures for human rights at a meeting of the Human Rights Commission, and Brazil did not support the draft text containing fiscal justice suggestions for attaining women's rights at the 61st session of the Commission on the Status of Women (Cardoso et al. 2017:12). Cardoso et al. (2017) gave the following warning:

> We are facing an imposed and illegitimate Brazilian government that promotes actions and sets up makeshift devices on behalf of the SDGs to justify its commitments internationally, while it is rendering these same SDGs unattainable as a result of its political and economic decisions. We are indeed facing dark times in the present and in our prospects of a future for Brazil, for the region and globally. In this context, the SDGs are a minimum reference – with a rugged path ahead. (p. 3)

The situation described did not change after the 2018 elections. Several reports (e.g. Cernov & Pietricovsky 2020; Manhas 2019) draw attention to the

current conservative political situation in Brazil and the impact thereof on human rights, the education system and thus also the materialisation of SDG 4. Manhas (2019) explained the situation as follows:

> Human rights are being questioned, as well as the promotion of what is being called gender ideology and cultural Marxism, leading to multiple episodes of teachers being constrained in classrooms, preached against speaking about gender, since it would be anti-religious and anti-family values. This has been strengthened since the PNE vote, when conservative groups managed to remove 'promotion of gender equality' from the text. In addition to that, there are efforts en vogue to eliminate from the curricula all forms of diversity, even regarding the history of Africa. There is a strong ethnocentric and colonialist attack. […]
>
> Ultraconservative ideas and actions are also threatening, as they attack rights already guaranteed, such as the recognition of the need for policies to encourage access to universities by the black population, the fight against institutional racism and LGBTQI+ phobia. (paras. 14, 16)

These are alarming signs, as ESD cannot be achieved without respect for human rights and principles such as non-discrimination and inclusivity.

South Africa

Since 1994, as part of its transition from apartheid to democracy, South Africa has sought to create a more inclusive society, providing previously disadvantaged people with access to quality education, health care services, water, electricity, housing and social security (Department of Environmental Affairs 2016). In 2008, South Africa also adopted a systems approach to sustainability, which is described as follows (Department of Environmental Affairs 2008):

> [*In this approach*] the economic system, socio-political system and ecosystem are seen as embedded within each other, and then integrated via the governance system that holds all the other systems together within a legitimate regulatory framework. Sustainability implies the continuous and mutually compatible integration of these systems over time; sustainable development means making sure that these systems remain mutually compatible as the key development challenges are met via specific actions and interventions to eradicate poverty and severe inequalities. (p. 15)

As explained earlier in this chapter, the HLPF is a platform designed to review the implementation of the 2030 Agenda for Sustainable Development by different nations. In 2019, South Africa presented a voluntary national review report (Statistics South Africa [StatsSA] 2019) to the HLPF, describing several accomplishments in a historical context along with challenges that needed to be addressed to meet the targets of the 2030 Agenda. In the report, Cyril Ramaphosa, the president of South Africa, gave the following statement (StatsSA 2019):

> The SDGs give us the opportunity to collaborate more sharply, more effectively and more deliberately in 'leaving no one behind'. We seek to eradicate poverty and create conditions for our people to resonate with the programmes of Government

> as well as trust the objectives of multilateral fora of governance and international organisations like the United Nations and the African Union. As the SDGs are interlinked, their realisation requires an integrated policy response. Indeed, accelerating inclusive growth to deliver on the SDGs must be at the centre of all our actions. [...] If we wish to remain relevant within the global community, we need to work together and invest in education, training, re-skilling and new skills, to be able to cope with the challenges of the future. (p. iii)

Teise and Le Roux (2016) claimed that the *Constitution of the Republic of South Africa* (Republic of South Africa 1996) fosters SD by protecting social, economic, cultural and environmental rights, thus paving the way for regulations for sustainability. In other words, in reference to this chapter, South African higher education is designed to shape the citizens of South Africa into being capable of creating a sustainable future. They made the following point (Teise & Le Roux 2016):

> It may be said that the constitutional values reflect the vision for a sustainable society. In addition, constitutional values such as equity, non-discrimination, non-sexism, ubuntu, and democracy resonate strongly with the commonly accepted values for SD and ESD. In other words, it could be said that South African education policy embraces values for social, environmental and economic sustainability, which might ultimately ease the transformation towards a sustainable South African society. (p. 71)

Teise and Le Roux (2016) constructed a model case scenario by means of conceptual analysis. They then commented on the extent to which South African education has already responded to ESD. In this regard, they reported that in the context of South African education, ESD is considered to have the following characteristics (Teise & Le Roux 2016):

> It has an integrated and holistic approach; it is value-driven in nature; it is characterised by critical thinking, it is orientated towards problem-solving and action; it is multi-methodological; and it is participatory. These elements not only suggest the minimum criteria for what should form the crux of the conceptualisation of ESD, they also suggest what is required for SD. (p. 77)

Although Teise and Le Roux (2016) referred to all levels of education, there is an implied need for a multidisciplinary approach towards higher education for SD through which teaching and learning, as well as other university activities, are performed with a consistent commitment to sustainability. Furthermore, there is a need to include SD in the entire curriculum for all subjects, as it cannot be confined to selected subjects. Moreover, Teise and Le Roux underscored the importance of instilling in students, through teaching and learning, values that will encourage them to make sustainable decisions and actions. The actions and overall performance of HEIs must also set an example of values that promote the agenda of sustainability. Such values must be critically examined and considered in practice (Teise & Le Roux 2016):

> A critical engagement with values moves beyond a mere values orientation on paper. Engaging learners, teachers, parents and stakeholders who challenge the

> values that are in contrast with the SD and ESD agenda, opens up the possibility for the translation of values-on-paper into values-in-action. Since values-in-action assumes that they are 'lived' values, a particular responsibility is placed on educational practice to demonstrate a commitment to values of ESD. This requires particular effort, through ESD, to internalise in learners the values deemed necessary for transformation and sustainability. (p. 72)

Padayachee, Matimolane and Ganas (2018) noted that the post-apartheid South African government has recognised the merit of transforming the higher education system as a means to improve societal well-being. To that end, the need for the curricula of universities to be adapted to 'better prepare graduates for current and future uncertainties also echoes the calls for universities to include, more explicitly, the critical issue of SD in all university curricula' (Padayachee et al. 2018:290). Padayachee et al. cited several scholars (e.g. Lotz-Sisitka 2017; Maringe & Ojo 2017) who focus on interconnections between decolonisation and ESD, recognising the need to shift the purpose of HEIs and reshape existing curricula. They further reported that universities must prioritise two critical and interwoven challenges, namely, students' call for the decolonisation of curricula and alignment with UNESCO's ESD goals. The following argument is made (Padayachee et al. 2018):

> Given the high prioritization of the issue of decolonisation of higher education nationally, the equally important global prioritization of education for sustainable development, and the potentially detrimental effects of non-responsiveness on individual, institutional and societal well-being, we believe that academic development should prioritize curriculum knowledge and design as an integral requirement of professional staff development. Informed and contextually relevant curriculum design can enable the integration of the principles of sustainable development while responsive to the curriculum decolonisation calls. (p. 302)

Other scholars too link ESD with social justice. For instance, Waghid (2014:1453) explored the notion of SD as an instance of social justice in higher education that is linked with 'cultivating pedagogical activities in universities' that aim to make students aware of 'the socio-cultural dimensions of SD, in particular emphasising the importance of human co-existence through peace, citizenship, ethics, equality, poverty reduction and cultural diversity'. Waghid explained that sustainability is a reflection of social justice; hence, ESD provides awareness of and reflection on human rights, social equity, the protection of the environment and sustainable practices. As such, higher education cultivates well-informed citizens who are capable of making sustainable decisions. In addition, Waghid drew attention to the fact that SD does not solely refer to environmental issues but also refers to social, economic, political and environmental domains. As Waghid (2014:1450) puts it, education is a prerequisite for 'promoting behavioural changes and providing all citizens with the competencies required to achieve SD, and success in revising unsustainable trends depends largely on high-quality education'.

Much like in the case of Brazil, scholars report that there is very limited research about the actual implementation of SD in South African HEIs. This may indicate that regardless of the best intentions of the government, implementing SD poses a huge challenge for HEIs in South Africa. In order to address this lacuna, Awuzie and Emuze (2017) explored how universities in South Africa aligned teaching, learning, research and community engagement with the SD agenda. Awuzie and Emuze (2017:1176) claimed that the implementation of the SD agenda in South African HEIs is gradually garnering more attention because universities have a 'desire to support the national government's SD aspirations through their core activities of teaching and learning, research and operations'. However, most studies look at factors driving the adoption of sustainable practices and not the actual implementation of SD. More specifically, according to Awuzie and Emuze, the literature emphasises barriers and drivers associated with the adoption or acceptance of SD in HEIs, which is not equivalent to the actual act of implementation.

Through a case study, Awuzie and Emuze (2017) investigated one institution – the Central University of Technology – that sought to align its programme with the national strategic SD plan. Based on the data gathered, they identified nine implementation drivers, which were further grouped into four categories, namely, cost-related, regulations, competitive advantage and community engagement. As the authors reported, financial resources were listed as essential to maintain adequate financial sustainability and meet the requirements of the SD framework. They noted operational costs as a salient factor that had an impact on the decision of an institution to implement an SD strategy or not and emphasised the current alarmingly decreasing funding situation of universities. Policies and declarations were identified as initiating and sustaining implementation drivers that served to develop and put to immediate use the sustainability implementation framework. The competitive advantage is listed as a third driver that motivates the Central University of Technology to implement the SD agenda. This driver refers to the goal of the Central University of Technology to compete with other sustainable universities in South Africa. To achieve a competitive advantage, the Central University of Technology partnered with a leading German university in the implementation of SD. The findings indicate that ongoing engagement with the community, either at municipality, regional or national levels, has been identified as a factor that influences the implementation of SD (Awuzie & Emuze 2017:1186). For instance, being a university of technology, the Central University of Technology helps local high school learners who are interested in science, engineering and technology. The learners' pass rates in the relevant subjects were very poor; therefore, the Central University of Technology created projects that supported and improved these learners' performance (Awuzie & Emuze 2017:1186). It is expected that the identified drivers can be applied towards

the development of a framework for stimulating awareness and understanding of the importance of SD amongst the various stakeholders within the South African higher education context.

Likewise, Mawonde and Togo (2019) conducted a case study to explore how one campus of a distance education institution (the University of South Africa [Unisa]) incorporated SDGs in its practice. They emphasised that the value of their work lies in the fact that very few studies have been conducted in Africa on the implementation of SDGs in universities, not to mention specifically in open, distance and e-learning institutions. Their work demonstrates that universities can play a vital role in implementing SDGs and that universities have an advantage in responding to social challenges through teaching, research, community engagement and campus management.

In 2007, the top management of the University of South Africa had already committed itself to the implementation of sustainability initiatives by signing the UN's Global Compact. After that, a sustainability office was established that is responsible for instilling sustainability principles into university activities. This office 'coordinates sustainability meetings, hosts sustainability awareness programmes and spearheads recycling projects and community engagement projects' (Mawonde & Togo 2019:940). In teaching and learning, students are exposed to SD content that provides them with awareness and competencies to make informed decisions and convert knowledge into action in their lives. The data in Mawonde and Togo's (2019) study also revealed that many students were actively involved in sustainability initiatives in their communities. In terms of research, the University of South Africa promotes research on sustainability at the Hons, MA, PhD and postdoctoral levels. A directorate of student funding provides grants for research and innovation, including research on sustainability. This funding is aligned with SDG 4 (inclusive education for all and lifelong learning). Whereas some of these funding mechanisms promote social inclusivity, for example, by targeting females, others are accessible to both citizens and non-citizens of South Africa. Yet, other mechanisms are targeted at specific areas of sustainability (Mawonde & Togo 2019:945). As per other initiatives, the University of South Africa has partnered with several organisations that implement SD through quality teaching and learning, research and community engagement.

Mawonde and Togo's (2019) findings revealed a number of practices that are aligned with SDGs (including SDG 4). However, some of the initiatives were not funded or lacked funding to fully materialise. The authors' recommendation in this regard is to focus on initiatives that do not require significant financial resources and to raise awareness in communities with minimal financial investment. They also recommended that institutions should begin with small-scale initiatives that are not resource-intensive. Mawonde and Togo also reported that as an open, distance and e-learning institution,

for the University of South Africa to involve students in sustainability practices constitutes an additional challenge, as most initiatives that are part of its community engagement and operations and management are done exclusively by staff members. According to the authors, involving students would help to scale up the projects and provide the students with an opportunity for experiential learning. Distance forms of education necessarily decrease direct student involvement on campus. Still, the data indicated that the students engaged in sustainability through curriculum and research activities. Mawonde and Togo concluded that while the most obvious contribution of universities to SDGs was towards quality education (SDG 4), higher education could play an active role in implementing other SDGs as well.

Conclusion

Our current complex world calls for the expansion of ESD to promote, create and maintain sustainable societies. As evident in the literature, it is imperative that we transform learning systems and the generation of knowledge to achieve a more sustainable future. Higher education is a powerful social sector responsible for nourishing teachers, researchers, leaders and citizens with the capacity to address the challenges of global sustainability and pursue sustainable decisions and actions. To that end, there is an urgency to reflect on and re-evaluate the visions and missions of HEIs. Higher education institutions can lead the implementation of SD through teaching and learning, research studies, the generation and sharing of knowledge, and community involvement. It was, however, very evident in the reported studies that the complexity and uncertainty regarding the application of sustainability within different academic areas might restrict the actual implementation thereof.

Brazil and South Africa are both developing nations that share similar struggles. In terms of this work, the identified struggles refer mainly to a lack of financial and political capacity to empower the implementation of ESD. We learn from the reports that in Brazil, the principles of SD are aligned with the National Education Plan established in 2014, yet, the government's lack of economic commitment to the National Education Plan precludes the implementation of the SDG. Similarly, although the Constitution of the Republic of South Africa fosters the principles of SD and the vision of becoming a sustainable society, the country is still struggling to eradicate poverty and social inequalities, which ultimately hampers the transformation towards a sustainable society.

In both contexts, the literature denotes a lack of research related to the implementation of sustainable practices within HEIs. Scholars clearly indicate that although several studies focus on the adoption of declarations and policies of SD, there is a pronounced dearth of studies showcasing the actual

effective implementation of SD practices at universities. Such an absence of research studies detailing the exact steps needed to transform into sustainable HEIs may have potentially influenced the decision of some universities not to proceed with transformation. An obvious recommendation would be to call for research studies focusing on the implementation of SD. Comparative studies across the BRICS member states would be especially valuable, calling attention to effective implementation practices and indicators used to assess the effectiveness of such practices. It is fair to say that at this point, solidarity and partnership amongst nations in terms of sharing successful practices regarding sustainability are in the interest of not only these nations but also the global community.

In the literature about Brazil and South Africa, the message was clear that HEIs must strive to infuse principles of SD into undergraduate and graduate courses and provide relevant training for educators and curriculum developers. Through research, HEIs can produce new knowledge and innovation to spread awareness of SD and address global challenges. Students and university staff may become agents of change through their community engagement. Mawonde and Togo (2019) emphasised the following point:

> A good university is reflected by how it interacts with its community. Most universities impart knowledge through education and awareness campaigns about SD and SDGs, showing the pivotal role of SDG 4 in addressing the rest of the SDGs. (p. 935)

Marshall McLuhan once aptly noted, 'there are no passengers on spaceship Earth. We are all crew'. Each of us is responsible for the decisions we make and the actions we take, which include rethinking higher ESD. Meadows (2012) stated that having a vision is an essential aspect of knowing where we are going, and we, therefore, need a clear vision of the sustainable world we wish to create and maintain. It is essential that we start thinking long-term and avoid focusing on short-term gratifying achievements. We need to commit ourselves to the quest for change and follow the roadmap to betterment. Without a doubt, the current COVID-19 pandemic has reminded us that short-term plans may lead nowhere, and only a long-term vision can lead to the sustainable future we wish to create for ourselves and future generations. The pandemic has shown us that change is possible and that we can slow down and disrupt business as usual to protect something priceless – our health and thus also our well-being. Now is the time to stop viewing the role of HEIs as employment factories focused solely on economic profit and, instead, shift the focus to sustainability. The status quo has been challenged, and we need to use this example to recognise the urgency of engaging in SD practices in the name of sustainable wellness.

Chapter 3

Higher education and the global sustainable development goals

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Introduction

For the past 30 years, one of the most salient events in education has been the global higher education revolution. The international community has formulated 17 sustainable development goals (SDGs) as its vision for the world in 2030. Strangely, these two concepts (revolution and goals) have been kept separated in the scholarly and public discourse on higher education and the SDGs. This chapter charts the global higher education revolution and then surveys the 17 SDGs. Then, it is argued, firstly, that higher education is an indispensable vehicle in attaining the SDGs and should be recognised as such, and secondly, that the BRICS countries and their higher education systems present a valuable laboratory case for developing higher education to take on this mission that the world can take note of and learn from. The BRICS

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countries are put forth as a laboratory case on the strength of the societal contextual richness of these countries and the geographic, demographic, economic and political weight of these countries in the contemporary world.

Three major events have significantly shaped the modern era in world history. The first is the global education expansion project, which came into motion in the middle of the 20th century. One of the ramifications of this expansion was the global higher education revolution, the second of the three major events, commencing around 1990. The third major event is the SDGs, adopted in 2015 by the global community as its vision of 2030 for the world. The aim of this chapter is to explore the intersection between education, higher education, sustainable development (SD) and the BRICS countries. The thesis of this chapter is that the global education expansion project was motivated by an array of societal goals and, further, that the particular globalised societal contextual forces of the 1990s co-shaped, and in some respects contorted, the particular form this expansion project took when it hit the higher education level in full force. The role of the higher education sector in pursuing the SDGs has largely been overlooked, and the value of the BRICS countries as a lodestar for the international community in leveraging higher education in its pursuit of the SDGs has been underappreciated. The objective of this book is to assist in setting the record straight.

The chapter commences with a portrayal of the global education expansion project, followed by a discussion of the global higher education revolution. The focus then shifts to the SDGs. The place of higher education in the pursuit of these goals is pointed out, and lastly, the value of higher education in the BRICS countries as an object lesson in this pursuit is highlighted.

The global education expansion project since the mid-20th century

In the scholarly literature, the 20th century has been defined in various ways by different scholars, such as the space age (much in vogue in the 1960s with space exploration and the lunar landing), the nuclear age, the population explosion and the technological revolution. Similarly, various features are offered as the signature feature of the early 21st-century world, such as globalisation, the rise of a knowledge society or a knowledge economy, and the Fourth Industrial Revolution (4IR). But one often-overlooked distinguishing feature of the contemporary world is the worldwide education expansion, which gained traction after the midpoint of the 20th century. Formal education had remained for centuries, even millennia, on the fringe of society – outside the public sphere, limited to the elite and not regarded as something of any public value. For the aggregate global population, the 50% adult literacy rate, that is, where the majority of the adults in the world could read and write

(i.e. had reached the very rudimentary level of educational achievements), was achieved only as late as 1955. Then, during the second half of the 20th century, the belief took hold in the scholarly as well as in the public discourse that education is the panacea for every societal problem or challenge. These encompass challenges pertaining to the demographic, political, economic and social sectors or aspects of society. Some of the most salient of these challenges will now be surveyed, with the role assigned to education highlighted.

The Earth has faced a population explosion since the mid-20th century, interpreted by many as problematic. To illustrate this point, taking it home to South Africa (the vantage point from which this book has been written by South African authors) and to education, Harmse (1996) drew attention to the fact that every day, the South African population increases by 3 000 (this figure has not changed significantly since 1996, when Harmse's remark was made). This means that just to maintain current levels of supply, large schools with a capacity to host 1 000 learners each need to be built every day. To belabour that point further from the theme of this book, those 3 000 additions from 1996 are, in 2022, knocking at the doors of universities in South Africa for access. At present, the 15- to 19-year-old age group in South Africa totals 4.9 million, and the next waves (which will in coming years represent the university student population), that is, the 10- to 14-year-olds, and even more so the one after that, the 4- to 9-year-old group, are even more numerous (Population Pyramid 2021).

Expanding education has been widely looked up to as a way to curb unchecked population growth on the strength of the belief that there is an inverse relation between the level of education and fertility (Coetzee 1990; Jordaan 1991). Education is widely believed to be the means to attain a host of political objectives, from giving legitimacy to the state and nurturing a citizenry loyal to the state to educating a civil service corps to moulding national unity (Thompson 1981) and entrenching a culture of democracy (Idenburgh 1975). With respect to all of these objectives, higher education (in particular, the university as the top education institution) is regarded as pivotal.

Education is believed to be the means to create a society characterised by opportunity, meritocracy and social mobility (Schleicher 2018). With education having been regarded as a consumer item for a long in history, Theodor Schultz's theory of human capital (stated in his 1961 Presidential Address before the American Association of Economists) and the theory of modernisation (Fägerlind & Saha 1984) resulted in a Copernican revolution about education thought; hence, education came to be seen as a production factor contributing to economic output (Sobel 1982). The seminal publication by Harbison and Myers (1964) on a study calculating

the correlation between indicators of education development and economic performance in 75 countries provided hard, empirical validation of the belief in the economic returns on investment in education.

This borderless belief in the societal amelioration potency of education gave rise to a worldwide drive for massive education expansion. This worldwide education expansion project, which gained momentum during the decades following the Second World War, is still relentlessly surging ahead, gaining ever more momentum, as is clear in the growth in enrolments and enrolment ratios worldwide since the mid-20th century. This worldwide education expansion drive was first extensively reconstructed in the scholarly literature in two books by Coombs (1968, 1985). This growth in enrolments and enrolment ratios worldwide are depicted in Table 3.1 and Table 3.2, respectively.

However noble and commendable this international education expansion drive and the motives behind it are, it has also attracted its share of criticism, objections, challenges and discontent. For example, the quantitative expansion was not always matched by corresponding efforts on the quality and equality dimensions, cancelling out much of the gain (ostensibly) shown by enrolment figures measuring the quantitative dimension (see Hanushek 2013). A major problem was that the expected (individual and societal) benefits from

TABLE 3.1: Growth in enrolments worldwide (× 000), 1950–2019.

Education level year	Primary education	Secondary education	Higher education
1950	177,145	38040	6 317
1960	243,487	68926	11174
1970	411,304	169,227	28084
1980	541,556	264,379	51037
1990	596,853	315,008	88613
2000	654,722	450,397	99511
2010	695,204	543,488	180,207
2019	739,447	601,262	227,555

Source: UNESCO (1971, 1977, 1999, 2018, 2020).

TABLE 3.2: Growth in gross education enrolment ratios in percentage, 1950–2019.

Education level year	Primary education	Secondary education	Higher education
1950	59	13	5
1960	62	40	8
1970	89	36	9
1980	96	46	12
1990	99	52	14
2000	99	60	19
2010	107	70	30
2019	102	76	38*

Source: UNESCO (1971, 1977, 1999, 2018, 2020).
Note: The 1950 figures were imputed from the best available data on demographics and enrolments.
Key: *2018 value.

investment in education, which motivated the education expansion drive, failed to materialise, at least to the extent promised by the most vociferous advocates of investment in education. For example, instead of resulting in economic growth and eradicating unemployment, by the mid-1970s, after the first oil crisis, the world was hit by the spectre of (the hitherto unknown phenomenon of) stagflation and growing schooled unemployment. Indeed, during the decade of the 1970s, the optimism of the preceding decades made way for widespread disillusionment regarding the value of education. In time, a more nuanced view regarding the value of education in changing society developed (e.g. Stromquist 2005), namely, that the power of education to change society in a particular location is being co-shaped by the specific societal ecology of that location. How this worldwide expansion of education by the turn of the 20th century reached the level of higher education will be explained in the next section.

The global higher education revolution since 1990

The worldwide education expansion project had, in its incipient decades after 1950, its main thrust at the levels of primary and secondary education. By 1990, however, a major expansion drive at the level of higher education became visible (Altbach, Reisberg & Rumbley 2009). The global higher education revolution was shaped by the specific societal contextual ecology at the time, which was not identical to that of the world of the 1950s and 1960s. Therefore, the global higher education revolution had nuances of its own, different from those of the worldwide education drive of the preceding decades. Subsequently, the societal drivers of this revolution will be discussed, followed by the main features of the global higher education revolution. Lastly, this revolution will be assessed.

The global higher education revolution can be traced back to nine inter-related societal forces. These are demographic trends, growing affluence, nascent knowledge economies, the neoliberal economic revolution, the information, communication and transport technology (ICT) revolution, multicultural societies, democratisation, individualisation and the emergence of the *Creed of Human Rights*.

The Earth is the scene of population growth. However, this growth is concentrated in the Global South, which has a young population. The median ages of the populations of the various continents are as follows: Western Europe 42-years-old, North America 35-years-old, Oceania 33-years-old, Asia 31-years-old, Latin America 31-years-old and Africa 18-years-old (Visual Capitalist 2021). This demographic pyramid means that in the Global South, more and more young people are lining up every year to gain access to

institutions of higher learning. The global population is an increasingly mobile population (Urry 2007), which facilitates the internationalisation of universities. The number of international migrants in the world (i.e. those residing in a country other than the country of their birth) stands at 258 million, or 3.4% of the global population (Institut National d'Etudes Démographiques 2020). This number of international migrants in the world increases at a rate of 2.4% per year (Institut National d'Etudes Démographiques 2020).

The period since 1990 has been one of a forceful, sustained economic upswing. During the decade 2005–2015, the annual total world economic output has grown by more than 100%, from US$29.6tn to US$78.3tn (World Bank 2016). This growth has surged to reach US$84.4tn in 2018 (World Bank 2020). While at the time of writing (January 2022), the long-term impact of the COVID-19 pandemic is not certain, this upswing has made higher education affordable to larger numbers of people. Two further economic trends are manifested in this era. The vanguard economies of the world are currently stepping into a stage of becoming knowledge economies (World Bank 2003). A knowledge economy is an economy where the production and consumption of new knowledge have become the dynamo of the economy. The second trend, which occurred at the same time as, and in tandem with, the economic upswing, is the neoliberal economic revolution (Stiglitz 2018). This revolution, which took off around 1990 as well, entailed curtailing the role of the state, not only in the economy but also in other societal spheres, such as health care services, transport and – significant for its impact on universities – education, granting powers and principles of the free market in a new field.

The ICT revolution has put in place an instant, 24-hour planetary information and communication network (Castells 1996). The revolution has enabled the population to become more mobile (the demographic trend pointed out earlier). For these reasons, societies are no longer as homogenous as in the past but have become diverse and multicultural.

Parallel to the neoliberal economic revolution and the economic upswing, a wave of democratisation has swept over large parts of the world since 1990 (Lührmann & Lindberg 2019). The process of democratisation, combined with the rise of the *Creed of Human Rights*, another contemporary trend, and the empowerment that the ICT revolution has given to individuals have added up to another trend in contemporary society, namely, individualisation (see Santos, Varnum & Grossmann 2017).

The confluence of all these societal trends brought about a global higher education revolution, which has gained traction since 1990 (Altbach et al. 2009) and is still surging ahead today. The signature feature of this revolution is massification. In virtually every national higher education system in the world, enrolments have increased spectacularly as higher education becomes more affordable to larger numbers of people and where democratisation,

individualisation and the *Creed of Human Rights* have underscored the belief that everyone is entitled to higher education. The ICT revolution made it possible that more people could have access to higher education, especially by means of distance education programmes. Globally, higher education enrolments have surged from 6.3 million in 1950, to 100.1 million in 2000, to 227.6 million in 2019 (UNESCO 2020). Even after factoring in global population growth, the enrolment swell in higher education remains spectacular. At the global aggregate level, gross higher education enrolment ratios have increased from 5% in 1950, to 19.8% in 2000, to virtually double again in the short space of eighteen years to reach 38.04% in 2018 (UNESCO 2018, 2020).

The runaway expansion of higher education, in the context of globalisation (and the fierce economic competition as part of this globalisation), gave rise to two, in many ways seemingly contradictory, trends in higher education. On the one hand, competition is taking place between institutions of higher education, with virtually any university wishing or striving to become a world-class university (eds. Altbach & Salmi 2011). On the other hand, there is a process of differentiation discernible as various institutions attempt to find a niche in the higher education landscape (eds. Altbach, Reisberg & De Wit 2017).

The principles of the neoliberal economic revolution have been imported into the higher education sector as well. This is evident in, for example, the rising cult of managerialism around, *inter alia*, performance measurement (see eds. Locke, Cummings & Fisher 2011). A growing part of the burden of higher education costs has been transferred from state to consumer (e.g. see Cloete & Van Schalkwyk 2021; Mitchell, Leachman & Saenz 2019). However, as far as the state is still shouldering (in most countries) the largest part of the funding for higher education, in line with the fundamental beliefs of the neoliberal economic revolution, the state is now demanding in return some say in and accountability from HEIs, endangering the principle of academic autonomy (see Etzkovitz 2008). Meanwhile, students also claim a right to power and to have a say in the governance of universities, not only on the argument of financing a substantial part of their study fees themselves but also encouraged by the philosophy or beliefs brought about by democracy, individualisation and the *Creed of Human Rights*.

The demand for relevance is evident in the shift from Mode 1 knowledge to Mode 2 knowledge. 'Mode 2' is a term created by Gibbons et al. (1994) to describe the trend whereby knowledge is no longer established, systematised and transmitted in a discipline-ordered way (Mode 1 knowledge) but in a trans- and interdisciplinary open system where knowledge is organised and evaluated in terms of its practical value (Mode 2 knowledge) rather than scientific criteria. For the academic profession, or then the historical student–professor unit, searching unperturbedly for truth has been the guiding value for (also the

management and governance of) the university; this has been substituted by the principles of the neoliberal economic revolution, such as the profit motive, efficiency and quality control, which more and more become the ruling principles by means of which universities are governed, replacing the historical model of (senior) faculty leading universities. Principles such as profitability, cost-effectiveness and efficiency are threatening to replace the search for truth as the highest value being pursued by the academic community. The academic profession finds itself crushed between two strong forces – on the one side, the two-layer managerialism of institutional governance and governmental rulings, and on the other, an empowered and demanding student corps.

Turning to an evaluation of the global higher education revolution, while the global higher education revolution constitutes a remarkable achievement of humanity in the past 30 years, and while access to higher education has opened new possibilities to students and education represents a benevolent force in society, a number of cautionary notes should be raised as well. The first is the rising graduate unemployment amidst this enrolment expansion (e.g. see Mncayi 2014; Razak et al. 2014; see also ch. 8). At the aggregate level, higher education can boast impressive rates of return. According to the World Bank (2021), the economic returns for tertiary education graduates are the highest in the entire educational system – a 17% increase in earnings as compared with 10% for primary and 7% for secondary education (global aggregate figures). These high returns are even greater in sub-Saharan Africa, with an estimated 21% increase in earnings for tertiary education graduates. However, at the same time, graduate unemployment levels are rising. This constitutes a wastage of public funds as well as those of the student and his or her family. Secondly, the question of who should carry the high cost of higher education has no unanimous or easy answer. Arguments for billing students include that they will personally benefit from it and that public funds are limited, facing many other competing claims. Arguments against expecting students to foot the bill paying for higher education (and therefore favouring the use of public funds) include that state-subsidised higher education opens opportunities for access to higher education for all and does not limit higher education to those from well-endowed families. It is also argued that society as a whole or as a collective reaps the benefits of the products of higher education, and therefore, public funds should be allocated to higher education (see Cohen 2021).

Then, there is the quantity–quality dilemma. Indiscriminate enrolment expansion, more so at times when the sources of funding have not been opened correspondingly, always endangers the quality of the teaching and learning taking place. The rising trend of managerialism (to be unpacked and evaluated later in full) cannot be taken to safeguard quality. A regimen of rules and procedures, such as those of quality-assurance at universities, always has the caveat of eliciting nothing more and deeper than a perfunctory or

surface-compliant culture (see ed. Altbach 2011; Altbach, Gumport & Behrdahl 2011; Zammuto, Gifford & Goodman 2000).

The university, as an institution in society, to maintain its integrity and perform its functions (e.g. teaching and research at the most advanced level and the university's role to exercise social critique) is dependent on two ruling principles, namely, excellence and autonomy. These two principles are seriously undermined by some features of the global higher education revolution, especially the rising managerialism, the increased involvement of government and of industry (private sector of the economy), and the power given to students. The pursuit for relevance, the short-sighted assessment of programmes and research on the basis of their immediate pecuniary value means that the university is forsaking other functions, such as basic research and the mission of the university with respect to the preservation, maintenance and development of the cultural treasures of humanity. The short-sightedness and, in the longer term, perniciousness of the forsaking of basic (or 'blue sky') research has been explained by former World Bank president Stiglitz (2018) – a high-ranking person from the cockpit of the global neoliberal economy.

This impressive and expanding (though not perfect) global higher education project that the global community has had at its disposal as it pursues the SDGs is the global community's collective vision for itself and for the world by the year 2030.

The SDGs: The global community's vision for 2030

A yearning for a new global order

The technology of the 20th century (the spectre of nuclear weapons in particular), the devastation of the two world wars, and the atrocities and excesses of totalitarian governments were conducive to the international community formulating a common understanding and basis for peaceful, humane co-existence (UN 2015b). Carlos Torres, University of California, Los Angeles, UNESCO professor of Global Citizenship Education, talks about the global commons, which all people pursue. He makes the following declaration (Torres 2015):

- We all have only one planet.
- We all desire peace.
- We all should enjoy the right to pursue life, prosperity and happiness.

These global commons can be seen in the efforts that commenced during the 20th century to establish a basis for sustained global peace and the creation of a humane world (Torres 2015). A political-philosophical superstructure for these efforts can be found in the *Creed of Human Rights*, which had been developed over the previous 200 years (Russell, Sirota & Ahmed 2019:1).

Opposing the idea of the state as an omnipotent, untouchable force to which its subjects are exposed, Rousseau (1933) in the 18th century tabled the idea of the social contract, according to which the state exists for the sake of its people to provide them with some basics (such as security) in turn for them to sacrifice their freedom and subject themselves to the law of the state (the social contract). Then, John Locke, Thomas Jefferson and others came up with the idea of basic, fundamental or natural human rights. According to this doctrine, all human beings are by nature (of being human beings) entitled to a set of basic human rights. These rights are beyond the touch of any government or any democratically elected majority; in other words, these rights are inalienable and cannot be taken away or changed by the government.

The creation of the United Nations and the proclamation of the Universal Declaration of Human Rights

From the ruins of the Second World War, the UN came into being in 1945. According to the Charter of the UN (2020a), the aims of this organisation are to promote international peace and security and to develop cooperation and collaboration amongst its member states. Currently, the UN has 193 member states. In 1948, the UN promulgated the *Universal Declaration of Human Rights* (UN 2016). The *Creed of Human Rights* was now internationalised, and this document was important in the subsequent development of the *Creed of Human Rights* becoming the moral code of the global community. This *Universal Declaration of Human Rights* entails 30 articles. It enumerates a number of basic human rights every person is entitled to, regardless of 'race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status' (art. 2). These include the right to life, liberty and freedom of person (art. 3) and the right to opinion and expression (art. 19). While up to this point, education was absent from the discourse about human rights and absent in declarations of human rights, such as the Manifesto which became part of the Constitution of the United States of America, the *Universal Declaration of Human Rights* includes a section on education (s. 26), worded as follows (UN 2016):

1. Everyone has the right to education. Education shall be free, at least in the elementary and fundamental stages. Elementary education shall be compulsory. Technical and professional education shall be made generally available, and higher education shall be equally accessible to all on the basis of merit.
2. Education shall be directed to the full extent of human development of human personality.
3. Parents have a prior right to choose the kind of education that shall be given to their children.

UNESCO

In 1945, UNESCO was established as an arm of the UN. This organisation was founded from the belief that as war starts in the minds of people, the best strategy to combat and prevent wars was likewise in the minds of people, that is, through education. Thus, UNESCO was established as a response to the firm belief of nations shaped by two world wars in less than a generation that political and economic agreements are not sufficient to secure lasting peace (UNESCO 2016a). UNESCO's founding document stated, 'Peace must be established on the basis of the moral and intellectual solidarity of humanity' (UNESCO 2016a).

UNESCO strives to build networks amongst nations that enable this kind of solidarity by (UNESCO 2016a):

- mobilising for education so that every child, boy or girl, has access to quality education as a fundamental human right and as a prerequisite for human development
- building intercultural understanding through the protection of heritage and support for cultural diversity (UNESCO created the idea of world heritage to protect sites of outstanding universal value)
- pursuing scientific cooperation, such as early-warning systems for tsunamis or transboundary water-management agreements to strengthen ties between nations and societies
- protecting freedom of expression – an essential condition for democracy, development and human dignity.

Since its founding, UNESCO has lodged or coordinated a number of global education initiatives. The organisation ran its Experimental Adult Literacy Project in twelve countries during the years 1962–1968. In the second half of the 20th century, UNESCO rallied the global community behind its vision for universal adult literacy by the year 2000. By the year 2000, the global adult literacy rate was 76.96%, while there were still 788.26 million illiterate adults in the world (UNESCO 2016b).

A major initiative that was launched by UNESCO and captured the imagination of the global community was the 'education for all' drive. In 1990, delegates from 155 countries, together with representatives from some 150 governmental and non-governmental organisations, reached a consensus at the World Conference on Education for All in Jomtien, Thailand (05–09 March 1990), to 'make primary education accessible to all children and to massively reduce illiteracy by the end of the decade' (UNESCO 2016c). The conference adopted the *World Declaration on* '*education for all*' (or *Jomtien Declaration*) (UNESCO 1990). The aim of universalising access to primary education was spelt out in the declaration.

Ten years after Jomtien, an assessment exercise was carried out from 26 to 28 April 2000 in Dakar, Senegal. More than 1 000 participants from 164 countries attended, and in the end, the Dakar Framework for Action, Education for All, Meeting Our Collective Commitments was adopted, which spelt out a range of education objectives that were intended to be reached by 2015. These included expanding and improving comprehensive early childhood care and education (ECCE) (for the most vulnerable and disadvantaged children in particular), attaining a 50% improvement in the level of adult literacy by 2015 (especially for females), and equitable access to basic and continuing education for all adults, eradicating gender inequality in primary and secondary education by 2005, attaining gender equality by 2015, improving all aspects of the quality of education and ensuring excellence of education for all (UNESCO 2000:43).

What should be noted is that thus far, up to 2000, the emphasis has been on basic education (literacy) and primary and secondary education; higher education has not enjoyed priority.

The exigencies of the late 20th century to the early 21st century

In the meantime, the global community had to take note of a number of forceful societal trends that visibly distracted it from or compromised its central thrust of securing basic human rights for all or which rendered human rights rather meaningless, assuming they could be brought to all. The two salient trends – which are important in gaining a comprehensive picture of the SDGs – are the ecological crisis and the persistence of widespread poverty in the world.

For the past half a century (and even longer), social scholars have cautioned with increasing seriousness that humanity is facing an ecological crisis. This crisis is of such gravity that the future of humanity, and even of the planet, is in danger if not checked. For example, in his book *Hot, flat and crowded: Why the world needs a green revolution – and how we can renew our global future*, Friedman (2009) contended that the environmental crisis involves three highly critical pivotal issues that will shape the trajectory of humanity through the current century. Meanwhile, Mortimer (2014) ended his brilliant survey of the history of humanity for the past millennium by explaining that the present unsustainable overuse of the natural habitat can terminate and reverse the ectopic history of humanity of the past millennium.

The fast-growing global population and increasing industrial activity and consumption by an ever more numerous and affluent global population, made possible by more highly developed technology, place growing pressure on and make growing use of environmental resources, with increasing amounts

of waste products. The major parts of the ecological crisis are air pollution (together with one of the frightening consequences thereof, namely, global warming), deforestation, the pollution of marine resources, the depletion and pollution of freshwater resources, soil depletion and the destruction of biodiversity. A graphic illustration of humanity's overtaxing of natural resources is that each day, all over the world, humanity uses an amount of water derived mainly from borehole water or groundwater, the volume of which is enough to fill a convoy of trucks lining up from the Earth to the Moon (400,000 km) above the amount of freshwater replenished by rain (Gribbin 2006).

A second salient feature of the world is widespread poverty and, viewed from one perspective, gross inequality. Despite the growing affluence of the world (this growth, which has assumed new speed since 1990, was explained earlier when the societal drivers of the global higher education revolution were discussed), widespread (though diminishing) poverty also remains a feature of the world. Six hundred and ninety-one million people in the world survive on less than US$1.90 per day (the World Bank's international poverty line) (World Bank 2020), down from 1.923 billion in 1990 (World Bank 2015:35). This gross and growing inequality was recently highlighted in a series of books by economist Piketty (2020). A graphic illustration of this inequality is that the 22 richest people in the world have more wealth than all the people of Africa combined (Herman 2020:328).

The millennium development goals

The threatening environmental crisis on the one hand and widespread poverty and inequality on the other can be formulated as a need for development (for the lack of a better word, as this term has also been discredited in the recent past). Taking into account these two contextual factors, it becomes clear that the pursuit of human rights by the international community (in the UN as one of its main organisational forms), however commendable, does not make sense if these two contextual factors are not factored into its long-term plan. Therefore, the first initiative in this regard – the MDGs – makes sense.

At the beginning of the new millennium in 2000, world leaders were convened by the UN to design a broad vision to combat poverty in its many forms. That vision, which was spelt out in the eight MDGs, became the development blueprint for the world for the following 15 years (UN 2015a:4). These goals, one of which directly addressed education, were:

- to eradicate extreme poverty and hunger
- to achieve universal primary education (the primary school net enrolment rate in the developing regions had reached 91% in 2015, up from 83% in 2000)
- to promote gender equality and empower women

- to reduce child mortality
- to improve maternal health care
- to combat HIV and AIDS, malaria and other diseases
- to ensure environmental sustainability
- to develop a global partnership for development.

These were indeed commendable (if lofty) ideals, serving as inspiration and rallying points for the international community, although few would have believed these goals would be attained in the space of 15 years. But when 2015 came, it was time for a new stocktaking and the spelling out of a new vision. Bringing in the ecological crisis and development imperative in one formula as a vision for the international community resulted in the formulation of the SDGs.

The sustainable development goals

The term 'sustainable development' can be traced back to the *Brundtland Report of 1987*. Concern about development increased and, especially in the Global South, the need for even more accelerated development on the one hand and, on the other hand, the concern-raising deterioration of the natural environment under pressure of this development drive increased as well. The chairperson of the Brundtland Commission was appointed by the UN secretary-general of the time, Javier Pérez de Cuéllar, in December 1983. The report of this commission, for the first time, explained and popularised the term 'sustainable development' (Brundtland 1987).

When the MDGs had not materialised on their target date, 2015, the international community (by means of the UN as its organised form) formulated as a follow-up project the 17 interlinked SDGs as its vision for the world of 2030. These 17 goals are as follows (UN 2020b):

- **No poverty:** End poverty in all its forms everywhere.
- **Zero hunger:** End hunger, achieve food security and improved nutrition and promote sustainable agriculture.
- **Good health and well-being:** Ensure healthy lives and promote well-being for all at all ages.
- **Quality education:** Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.
- **Gender equality:** Achieve gender equality and empower all women and girls.
- **Clean water and sanitation:** Ensure the availability and sustainable management of water and sanitation for all.
- **Affordable and clean energy:** Ensure access to affordable, reliable, sustainable and modern energy for all.

- **Decent work and economic growth:** Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.
- **Build resilient infrastructure:** Promote sustainable industrialisation and foster innovation.
- Reduce inequality within and amongst countries.
- Make cities and human settlements safe, inclusive, resilient and sustainable.
- Ensure sustainable consumption and production patterns.
- Take urgent action to combat climate change and the impact thereof.
- Conserve and sustainably use the oceans, seas and marine resources.
- **Life on land:** Sustainably manage forests, combat desertification, halt and reverse soil degradation and halt biodiversity loss.
- **Peace, justice and strong institutions:** Promote just, peaceful and inclusive societies.
- **Partnership for the goals:** Revitalise the global partnership for SD.

It should be stated that two lacunae for which this scheme as a vision for humanity and the world for 2030 can be and has been criticised are the lack of attention to the demographic (population policy) and ethical aspects.

The Incheon Declaration: The vision of the global community for education in the world of 2030

The United Nations Children's Emergency Fund (UNICEF), the World Bank and a few other organisations held the World Education Forum 2015 in Incheon, Republic of Korea, from 19–22 May 2015, unpacking SDG 4. More than 1 600 delegates from 160 countries, amongst them over 120 ministers, heads and members of delegations, heads of agencies and officials of multilateral and bilateral organisations, and representatives of civil society, the teaching profession, the youth and the private sector, accepted the *Incheon Declaration for Education 2030*, which spelt out a new vision for education for the next 15 years (see UNICEF 2015). This plan spells out a vision of inclusive and equitable quality education and lifelong learning for all. As its goal, the plan sets (UNICEF 2015):

> [...] the provision of 12 years of free, publicly funded, equitable quality primary and secondary education, of which at least nine years are compulsory, leading to relevant learning outcomes. While acknowledging that the fundamental responsibility for successfully implementing this agenda lies with governments, the declaration calls for strong global and regional collaboration, cooperation, coordination and monitoring of the implementation of the education agenda, based on data collection, analysis and reporting at the country level, within the framework of regional entities, mechanisms and strategies. (p. 7)

The vision thus spelt out does not explicitly foreground higher education, although as the pinnacle of any education system, the vision cannot stand disconnected from the higher education sector.

The university sector and the SDGs

The SDGs have been slow in gaining traction in the university sector. The Brundtland Report did not pointedly specify the role of the higher education section as a constituency in the realisation of its vision of SD. In none of the titles of the 17 goals is the higher education or university sector explicitly mentioned, while in the Incheon Declaration, it is only mentioned in passing that one of the (long list of) aims is to increase participation in higher education.

By nature of its unique role in society (teaching and research at an advanced level of various branches of scholarship, community service and the role of the university with respect to societal critique), it is not difficult to see an important and irreplaceable role for the university sector in steering humanity towards accomplishing the SDGs. These pertain to the following:

- **The role of the university in the individual empowerment of students:** University-educated students have a better income-generating potential, enabling them to attain many of the SDGs, such as evasion or moving out of poverty, having clean water and securing meaningful employment. They can also take part in public or civic life as better-informed citizens.
- **The role of the university in the upliftment of the immediate community:** Here, the service function of the university comes to mind.
- **The research function of the university.**

Unfortunately, the response of the university sector to the SDGs thus far has been damped (Warden 2020). However, an International Conference on Sustainable Development Goals, Higher Education and Science Take Action was organised by the Global University Network for Innovation in Barcelona, Spain, on 05–06 March 2020. Also, the National Union of Students in the United Kingdom created an offshoot of their organisation called 'Students Organising for Sustainability'. Furthermore, the International Association of Universities designated 16 universities, each taking on one of the first 16 SDGs and each in collaboration with a dozen or so allies for its specific purpose. Then, the Times Higher Education, known for its pioneer work on the ranking of universities, introduced the *Times Higher Education Impact Rankings*, designed to evaluate the degree to which universities are succeeding in fulfilling the UN's SDGs (Calderon 2020). In 2021, the third edition of the *Times Higher Education Impact Rankings* was published, ranking 1 118 universities in 94 countries (Times Higher Education 2021).

TABLE 3.3: Universities in the BRICS countries on the 2021 *Times Higher Education Impact Rankings*.

Brazil	Russia	India	China	South Africa
1. University of São Paolo (rank 48; score 90.0)	1. Altai State University (rank 101–200; score 77.5–85.2)	1. Amrita Vishwa Vidyapeetham (rank 81; score 87.4)	1. Shanghai University (rank 94; score 86.4).	1. University of Johannesburg (rank 92; score 81.5)
2. Federal University of Espírito Santo (rank 101–200; score 77.5–85.2)	2. Bauman Moscow State Technical University (rank 101–200; score 77.5–85.2)	2. JSS Academy of Higher Education and Research (rank 101–200; score 77.5–85.2)	2. Tongji University (rank 101–200; score 77.7–88.2)	2. University of Cape Town (rank 101–200; score 77.5–85.7)
3. Universidade Estadual de Maringá (rank 201–300; score 71.0–77.4)	3. Plekhanov Russian University of Economics (rank 101–200; score 77.5–85.2)	3. Lovely Professional University (rank 101–200; score 77.5–85.2)	3. Soochow University (rank 301–400; score 66.3–70.9)	3. University of Pretoria (rank 201–300; score 71.0–77.4)
4. São Paulo State University (UNESP) (rank 201–300; score 71.0–77.4)	4. Peter the Great St. Petersburg Polytechnic University (rank 201–300; score 71.0–77.4)	4. Kalinga Institute of Industrial Technology (KIIT) (rank 201–300; score 71.0–77.4)	4. Beijing Institute of Technology (rank 401–600; score 56.6–66.2)	4. Nelson Mandela University (rank 301–400; score 66.3–70.9)
5. Universidade Federal do ABC (UFABC) (rank 201–300; score 71.0–77.4)	5. Peoples' Friendship University of Russia (rank 201–300; score 71.0–77.4)	5. Vellore Institute of Technology (VIIT) (rank 201–300; score 71.0–77.4)	5. Guangdong University of Technology (rank 401–600; score 56.6–66.2)	5. University of the Western Cape (rank 401–600; score 56.6–66.2)
6. Universidade Federal do Paraná (rank 201–300; score 71.0–77.4)	6. ITMO University (rank 301–400; score 66.3–70.9)	6. University of Calcutta (rank 301–400; score 66.3–70.9)	6. University of International Business and Economics (rank 401–600; score 56.6–66.2)	–
7. Londrina State University (rank 201–300; score 71.0–77.4)	7. Herzen University (formally the Russian State Pedagogical University) (rank 401–600; score 56.6–66.2)	7. Don Bosco University (rank 301–400; score 66.3–70.9)	7. Shantou University (rank 401–600; score 56.6–66.2)	–
8. Nove de Julho University (UNINOVE) (rank 201–300; score 71.0–77.4)	8. Immanuel Kant Baltic Federal University (rank 401–600; score 56.6–66.2)	8. B.S. Abdur Rahman Crescent Institute of Science and Technology (rank 401–600; score 56.2–66.2)	8. China University of Petroleum, Beijing (rank 601–800; score 47.6–56.5)	–
9. Universidade Federal de Ouro Petro (rank 301–400; score 66.3–70.9)	9. Irkutsk National Research Technical University (rank 401–600; score 56.6–66.2)	9. Chitkara University (rank 401–600; score 56.2–66.2)	9. Nanjing Normal University (rank 601–800; score 47.6–56.5)	–
10. Federal University of Pará (rank 301–400; score 66.3–70.9)	10. Moscow Institute of Physics and Technology (rank 401–600; score 56.6–66.2)	10. Mahatma Gandhi University (rank 401–600; score 56.2–66.2)	10. University of South China (rank 601–800; score 47.6–56.5)	–
11. Federal University of Pernambuco (rank 301–400; score 66.3–70.9)	11. National Research Nuclear University MEPhI (rank 401–600; score 56.6–66.2)	11. Manipal Academy of Higher Education (rank 401–600; score 56.2–66.2)	11. Southwest Jiaotong University (rank 601–800; score 47.6–56.5)	–

Table 3.3 continues on the next page→

TABLE 3.3 (Cont.): Universities in the BRICS countries on the 2021 *Times Higher Education Impact Rankings*.

Brazil	Russia	India	China	South Africa
12. Universidade Federal de São Paolo (UNIFESP) (rank 301–400; score 66.3–70.9)	12. North-Caucasus Federal University (rank 401–600; score 56.6–66.2)	12. National Institute of Technology Rourkela (rank 401–600; score 56.2–66.2)	12. Yangzhou University (rank 601–800; score 47.6–56.5)	–
13. Federal University of Uberlândia (rank 301–400; score 66.3–70.9)	13. Rostov State University of Economics (rank 401–600; score 56.6–66.2)	13. NITTE (rank 401–600; score 56.2–66.2)	13. Beijing Technology and Business University (rank 801–1 000; score 36.5–47.5)	–
14. Pontifícia Universidade Católica de Paraná (rank 301–400; score 66.3–70.9)	14. Russian State Agrarian University – Moscow Timiryazev Agricultural Academy (RSAU – MTAA) (rank 401–600; score 56.6–66.2)	14. Saveetha University (rank 401–600; score 56.2–66.2)	–	–
15. Universidade Federal do Ceará (UFC) (rank 401–600; score 56.6–66.2)	15. Tomsk Polytechnic University (rank 401–600; score 56.6–66.2)	15. Thapar Institute of Engineering and Technology (rank 401–600; score 56.2–66.2)	–	–
16. Universidade Federal de Ciências de Saúde de Porto Alegre (rank 401–600; score 56.6–66.2)	16. Volgograd State University (rank 401–600; score 56.6–66.2)	16. Anna University (rank 601–800; score 47.6–56.5)	–	–
17. Federal University of Itajubá (UNIFEI) (rank 401–600; score 56.6–66.2)	17. Belgorod State National Research University (rank 601–800; score 47.6–56.9)	17. Hindustan Institute of Technology Gandhinagar (rank 601–800; score 47.6–56.5)	–	–
18. Federal University of Mato Grosso do Sul (rank 401–600; score 56.6–66.2)	18. Financial University under the Government of the Russian Federation (FinU) (rank 601–800; score 47.6–56.9)	18. Indira Gandhi Delhi Technical University for Women (rank 601–800; score 47.6–56.5)	–	–
19. Federal University of Piauí (rank 401–600; score 56.6–66.2)	19. Kazan National Research Technical University (rank 601–800; score 47.6–56.9)	19. Mizoram University (rank 601–800; score 47.6–56.5)	–	–
20. Universidade Federal de Santa Catarina (rank 401–600; score 56.6–66.2)	20. Kuban State Technological University (rank 601–800; score 47.6–56.9)	20. National Institute of Industrial Engineering (rank 601–800; score 47.6–56.5)	–	–
21. Federal University of Santa Maria (rank 401–600; score 56.6–66.2)	21. Moscow State University of Food Production (rank 601–800; score 47.6–56.9)	21. Pondicherry University (rank 601–800; score 47.6–56.5)	–	–

Table 3.3 continues on the next page→

TABLE 3.3 (Cont.): Universities in the BRICS countries on the 2021 *Times Higher Education Impact Rankings*.

Brazil	Russia	India	China	South Africa
22. Fluminense Federal University (rank 401–600; score 56.6–66.2)	22. North-Eastern Federal University (rank 601–800; score 47.6–56.9)	22. Sathyabama Institute of Science and Technology (rank 601–800; score 47.6–56.5)	–	–
23. Pontifical Catholic University of Minas Gerais (rank 401–600; score 56.6–66.2)	23. Novosibirsk State Technical University (rank 601–800; score 47.6–56.9)	23. Sri Padmavati Mahila Visvavidyalayam (University for Women) (rank 601–800; score 47.6–56.5)	–	–
24. Universidade Tecnológica Federal do Paraná (rank 401–600; score 56.6–66.2)	24. Perm National Research Polytechnic University (rank 601–800; score 47.6–56.9)	24. SRM Institute of Science and Technology (rank 601–800; score 47.6–56.5)	–	–
25. Universidade Estadual de Oeste de Paraná (rank 601–800; score 47.5–56.5)	25. Ryazan State Medical University (rank 601–800; score 47.6–56.9)	25. Tata Institute of Social Sciences (rank 601–800; score 47.6–56.5)	–	–
26. Federal University of Lafia (rank 601–800; score 47.5–56.5)	26. St. Petersburg State University (rank 601–800; score 47.6–56.9)	26. Vishwakarma University (rank 601–800; score 47.6–56.5)	–	–
27. Universidade Federal de Sergipe (rank 601–800; score 47.5–56.5)	27. Samara National Research University (rank 601–800; score 47.6–56.9)	27. Yenepoya (Deemed to be University) (rank 601–800; score 47.6–56.5)	–	–
28. University of Franca (rank 601–800; score 47.5–56.5)	28. Samara State Medical University (rank 601–800; score 47.6–56.9)	28. Banasthali University (rank 801–1 000; score 36.5–47.5)	–	–
29. University of South Santa Catarina (UNISUL) (rank 601–800; score 47.5–56.5)	29. Samara State Technical University (rank 601–800; score 47.6–56.9)	29. Bharathiar University (rank 801–1 000; score 36.5–47.5)	–	–
30. Unisinos University (rank 601–800; score 47.5–56.5)	30. Southern Federal University (rank 601–800; score 47.6–56.9)	30. Institute of Chemical Technology (rank 801–1 000; score 36.5–47.5)	–	–
31. Ceará State University (rank 801–1 000; score 36.5–47.5)	31. South Ural State University (rank 601–800; score 47.6–56.9)	31. CHRIST (Deemed to be University) (rank 801–1 000; score 36.5–47.5)	–	–
32. Federal University of Paraíba (rank 801–1000; score 36.5–47.5)	32. Saint Petersburg Electrotechnical University (rank 601–800; score 47.6–56.9)	32. Indian Institute of Technology Bhubaneswar (rank 801–1 000; score 36.5–47.5)	–	–

Table 3.3 continues on the next page→

TABLE 3.3 (Cont.): Universities in the BRICS countries on the 2021 *Times Higher Education Impact Rankings*.

Brazil	Russia	India	China	South Africa
33. Pontifical Catholic University of Rio Grande do Sul (rank 801–1 000; score 36.5–47.5)	33. Togliatti State University (rank 601–800; score 47.6–56.9)	33. Indian Law Institute (rank 801–1 000; score 36.5–47.5)	–	–
34. Vila Velha University (rank 801–1 000; score 36.5–47.5)	34. Tomsk State University of Control Systems and Radioelectronics (rank 601–800; score 47.6–56.9)	34. Indraprastha Institute of Information Technology Delhi (rank 801–1 000; score 36.5–47.5)	–	–
35. Cogna Educação (rank 1 000+; score 9.2–36.4)	35. Tver State Technical University (rank 601–800; score 47.6–56.9)	35. Kalasalingam Academy of Research and Education (rank 801–1 000; score 36.5–47.5)	–	–
36. Universidade Federal de Juiz de Fora (rank 1 000+; score 9.2–36.4)	36. Ufa State Petroleum Technological University (rank 601–800; score 47.6–56.9)	36. KL University (rank 801–1 000; score 36.5–47.5)	–	–
37. Federal University of Tocantins (rank 1000+; score 9.2–36.4)	37. Voronezh State University (rank 601–800; score 47.6–56.9)	37. National Institute of Technology; Tiruchirappalli (rank 801–1 000; score 36.5–47.5)	–	–
–	38. Bashkir State University (rank 801–1 000; score 36.5–47.5)	38. National Institute of Technology Silchar (rank 801–1 000; score 36.5–47.5)	–	–
–	39. Don State Technical University (rank 801–1 000; score 36.5–47.5)	39. Sri Sri University (rank 801–1 000; score 36.5–47.5)	–	–
–	40. Kazan National Research Technological University (rank 801–1 000; score 36.5–47.5)	40. Vel Tech University (rank 801–1 000; score 36.5–47.5)	–	–
–	41. Kazan State Medical University (rank 801–1 000; score 36.5–47.5)	41. Andhra University (rank 1000+; score 9.2–36.4)	–	–
–	42. Kazan State Power Engineering University (rank 801–1 000; score 36.5–47.5)	42. Gangadhar Meher University (rank 1 000+; score 9.2–36.4)	–	–

Table 3.3 continues on the next page→

TABLE 3.3 (Cont.): Universities in the BRICS countries on the 2021 *Times Higher Education Impact Rankings*.

Brazil	Russia	India	China	South Africa
–	43. Lobachevsky State University of Nizhny Novgorod (rank 801–1 000; score 36.5–47.5)	43. ICFAI University, Dehradun (rank 1000+; score 9.2–36.4)	–	–
–	44. Moscow State University of Design and Technology (rank 801–1 000; score 36.5–47.5)	44. ICFAI University, Jharkhand (rank 1000+; score 9.2–36.4)	–	–
–	45. National Research Saratov State University (rank 801–1 000; score 36.5–47.5)	45. Indian Institute of Technology Indore (rank 1 000+; score 9.2–36.4)	–	–
–	46. Pavlov First Saint Petersburg State Medical University (rank 801–1 000; score 36.5–47.5)	46. KPR Institute of Engineering and Technology (rank 1 000+; score 9.2–36.4)	–	–
–	47. Perm State University (rank 801–1 000; score 36.5–47.5)	47. PSG College of Technology (rank 1 000+; score 9.2–36.4)	–	–
–	48. Platov South-Russian State Polytechnic University (rank 801–1 000; score 36.5–47.5)	–	–	–
–	49. Pyatigorsk State University (rank 801–1 000; score 36.5–47.5)	–	–	–
–	50. Samara State University of Economics (rank 801–1 000; score 36.5–47.5)	–	–	–
–	51. Saratov State Medical University (rank 801–1 000; score 36.5–47.5)	–	–	–
–	52. Saratov State Agrarian University (rank 801–1 000; score 36.5–47.5)	–	–	–
–	53. Sergo Ordzhonikidze Russian State University for Geological Prospecting (rank 801–1 000; score 36.5–47.5)	–	–	–

Table 3.3 continues on the next page→

TABLE 3.3 (Cont.): Universities in the BRICS countries on the 2021 *Times Higher Education Impact Rankings*.

Brazil	Russia	India	China	South Africa
–	54. Tambov State Technical University (rank 801–1 000; score 36.5–47.5)	–	–	–
–	55. Tver State University (rank 801–1 000; score 36.5–47.5)	–	–	–
–	56. Ural State Medical University (rank 801–1 000; score 36.5–47.5)	–	–	–
–	57. Dostoevsky Omsk State University (rank 1 000+; score 9.2–36.4)	–	–	–
–	58. Innopolis University (rank 1 000+; score 9.2–36.4)	–	–	–
–	59. Ivanovo State University of Chemistry and Technology (rank 1 000+; score 9.2–36.4)	–	–	–
–	60. Kursk State Medical University (rank 1 000+; score 9.2–36.4)	–	–	–
–	61. Moscow Polytechnic University (rank 1 000+; score 9.2–36.4)	–	–	–
–	62. Moscow Technical University of Communications and Informatics (rank 1 000+; score 9.2–36.4)	–	–	–
–	63. Novosibirsk State University of Economics and Management (rank 1 000+; score 9.2–36.4)	–	–	–
–	64. Omsk State Agrarian University (rank 1 000+; score 9.2–36.4)	–	–	–
–	65. Omsk State Technical University (rank 1 000+; score 9.2–36.4)	–	–	–

Table 3.3 continues on the next page→

TABLE 3.3 (Cont.): Universities in the BRICS countries on the 2021 *Times Higher Education Impact Rankings*.

Brazil	Russia	India	China	South Africa
–	66. Orel State University named after I.S. Turgenev (rank 1 000+; score 9.2–36.4)	–	–	–
–	67. Privolzhsky Research Medical University (rank 1 000+; score 9.2–36.4)	–	–	–
–	68. Russian New University (rank 1 000+; score 9.2–36.4)	–	–	–
–	69. Russian State Social University (rank 1 000+; score 9.2–36.4)	–	–	–
–	70. Saint Petersburg State Pediatric Medical University (rank 1 000+; score 9.2–36.4)	–	–	–
–	71. Southwest State University (rank 1 000+; score 9.2–36.4)	–	–	–
–	72. St Petersburg V.M. Bekhterev Psychoneurological University (rank 1 000+; score 9.2–36.4)	–	–	–
–	73. University of Tyumen (rank 1 000+; score 9.2–36.4)	–	–	–
–	74. Voronezh State Technical University (rank 1 000+; score 9.2–36.4)	–	–	–

Source: Times Higher Education (2021).
Key: BRICS, Brazil, Russia, India, China and South Africa.
Note: The score of a university on the Sustainability Development Goals Impact Index can range from 0 to 100.

According to the 2020 Sustainable Development Report, the world is running behind schedule on its measured track towards the SDGs (Bertelsmann Stiftung 2020). This underscores Levi's (2020) argument for the university sector as a critical constituency to be taken on board in the crusade of the global community towards the SDGs.

BRICS countries

It has been argued that on the strength of their combined geographical, demographic and growing economic weight in the world, the BRICS grouping is assuming a bloc of gravity on the global scene, countering – depending on which perspective is taken – the northern hegemony or the nascent Western-Eastern bipolarity (Lo, Hiscock & Edward Elgar 2014). This grouping can be taken as the vanguard of emerging countries or the entire Global South in its march towards affirming its rightful place in the world. The value of the BRICS countries as the terrain of a revised epistemological and thematic focus of scholarship in the social sciences fitting a new global order has been argued (Sudakova & Astafyeva 2020).

The way the BRICS countries are registered on the 2021 *Times Higher Education Impact Rankings* is presented in Table 3.3.

Conclusion

During the past century, the world was hit by three successive, strong, still-continuing trends. The first was the global education expansion project, which began in the decades after the conclusion of the Second World War. This project was fanned by commendable motivations, albeit by a society that was often too naïve about the societal ameliorative power of education. Being simultaneously the zenith and ultimate increment of this project and shaped by the particular societal contextual ecology at the time of its formation, the global higher education revolution – the second of the three trends – took off in 1990. In 2015, the global community crafted 17 SDGs as its vision of what the world should look like by 2030. These goals included, correctly, education. The focus was, however, too much on the lower echelons of education. Higher education has thus far been a lacuna in the global community's scheme for harnessing education in its pursuit of the SDGs. If the *Times Higher Education Impact Rankings* are anything to go by, the universities in the BRICS countries display small pockets of excellence (see universities listed in Table 3.3), but at the same time, it is a university sector that has by and large not risen to the occasion. It is trusted that this book will contribute to an appreciation of the role of the university sector in the pursuit of the SDGs, in the BRICS countries specifically, as a laboratory for the global world.

Chapter 4

The role of the higher education sector within the national education system to realise sustainable development

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Introduction

To understand how education for sustainable development (ESD) can be implemented within higher education, it must be clear how it is aligned with particular external contextual factors of the national education system, such as demography, socio-economics, culture and language, and politics. Then, it must be clear how the national education system and independent education

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systems react to the challenge of sustainable development (SD) in different types of education, namely, formal education, non-formal education and continuous education. In addition, it needs to be clear how the national education system should respond to SD in its constituting components, namely, the structure for education system policy, education system administration and the structure for teaching.

The way in which higher education institutions (HEIs) integrate ESD in national education systems – in this case, in the education systems of the BRICS nations – can only be evaluated if SD is understood within the context of the role that higher education plays as part of a comprehensive education system. To that end, this chapter draws attention to the role that higher education plays within the context of the school system to realise the aims of ESD. Understanding the effect of ESD requires clarity on how it overlaps with the external contextual factors of the national education system, namely, demography, socio-economics, culture and language, and politics. Clarity is also required on how the national education system and independent education systems react to the challenge of SD through different types of education, namely, formal education, non-formal education and continuous education. These depart from the aims of the education system, such as providing target groups with educational needs, selecting aims through differentiated education opportunities and preparing responsible citizens who can contribute to the welfare of the nation. In addition, clarity is needed on how the national education system should respond to the challenges of SD in its constituting components, namely, the structure for education system policy, education system administration and the structure for teaching.

To explore all of the aforementioned components, this chapter draws attention to one specific BRICS member state, namely, South Africa. The information reported in this work relies on an extensive literature review, employing the method of systematic review. The systematic review allows for the selection of scholarly literature and other documents that meet the eligibility criteria for this work, namely, relevance to the topic under investigation and validity of the selected sources. As explained by scholars, literature reviews can serve as a background for a study or as a standalone piece (Templier & Paré 2015). The latter refers to meaning-making reviews based on existing literature about a specific topic. This is accomplished through the collection, interpretation and explanation of available research studies (Xiao & Watson 2017).

The nature and characteristics of sustainable development

The UNESCO 2020) described SD as the ability of the present community to provide for their existential needs without compromising the possibilities of

future generations to achieve their unique needs. In the case of SD, four intertwined aspects are identified, namely, society, environment, culture and economy. According to scholarly literature, demography should also be included among these keywords. For the betterment of the future, it would be essential to focus on the number, settlement and movement of people as well. For example, the increase and decline of the population and urbanisation will, without a doubt, influence the sustainability of future generations. The concept of sustainability in development is recognised as the effort to think about the future, considering how the environment, society, economy and culture would react to present attempts to improve the quality of life of mankind at the local, regional, national and international level. According to UNESCO (2020), the concept of ESD has been integrated into many global frameworks and conventions related to key areas of SD.

As far as higher education is concerned, we learn from scholarly literature that ESD is not an option but a priority. Moreover, there is a broad understanding that higher education for SD should comprise the relevant social, environmental and economic dimensions while also integrating science and social science in order to achieve transformation towards sustainable societies (Wu & Shen 2016). To this end, higher education must be transformative in terms of challenging accepted norms, evaluating assumptions and, in general, questioning the status quo. In addition, Brudermann et al. (2019) stated the following:

> [...] [*transformation*] towards a more sustainable pathway requires an understanding of highly interlinked social, economic and environmental factors that determine the addressed real-world problems. Hence, it has been argued that for a profound system understanding, the integration of different kinds of knowledge and modes of thinking, and thus an interdisciplinary orientation of study programs is urgently needed. Bringing together competences from different fields in an interdisciplinary way is necessary to integrate different paradigms and methodologies. (p. 2)

In their work exploring the South African context, Teise and Le Roux (2016) highlighted the need for a multidisciplinary approach towards higher education for SD, where teaching and learning, as well as other university activities, are performed with a consistent commitment to sustainability. Furthermore, there is a need to include SD in the entire curriculum for all subjects, as it cannot be confined to selected subjects. The authors also underscore the importance of instilling in students, through teaching and learning, values that will encourage them to make sustainable decisions and take sustainable actions. The actions and overall performance of universities must also set an example of values that advance the agenda of sustainability. Such values, of course, need to be critically examined and considered in practice (Teise & Le Roux 2016):

> A critical engagement with values moves beyond a mere values orientation on paper. Engaging learners, teachers, parents and stakeholders who challenge the

> values that are in contrast with the SD and ESD agenda, opens up the possibility for the translation of values-on-paper into values-in-action. Since values-in-action assumes that they are 'lived' values, a particular responsibility is placed on educational practice to demonstrate a commitment to values of ESD. This requires particular effort, through ESD, to internalise in learners the values deemed necessary for transformation and sustainability. (p. 72)

In this chapter, SD is linked to the competencies (knowledge, skills and values) that individuals and societies need in order to ensure their attempts to improve the quality of life while thoroughly considering these attempts alongside the prospects of future generations to provide for their existential needs. Obviously, education provisioning, including the focus on SD as an outcome of the education system at the national and international levels, is of vital importance.

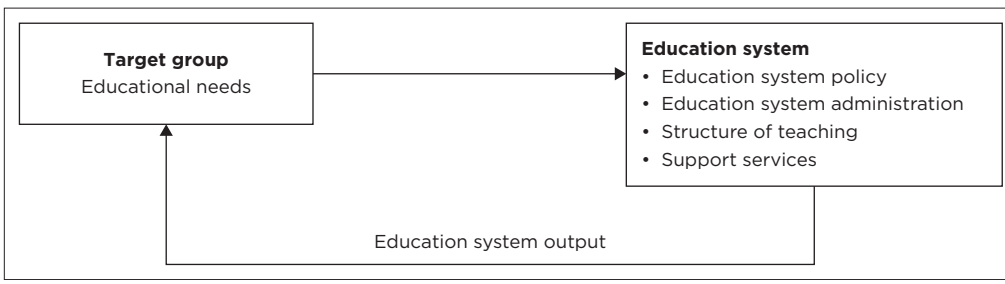
The nature of the education system

The aim of the education system

To ensure the relevant contribution of the education system to SD, the education system should be understood as a structure consisting of various components meant to serve the educational needs of the target group. Such a structure is illustrated in Figure 4.1.

From the mentioned outline, it is clear that the sole and primary aim of an education system is to be a sustainable structured organisation able to successfully provide for the needs of the target group. This includes equipping the target group with the necessary knowledge, skills, attitudes and values to allow them to make sustainable decisions and take sustainable actions. To achieve this primary aim, the education system should strive, *inter alia*, to achieve the following sub-aims (Bondesio & Berkhout 1987:41–43):

- **Cultural aim:** The target group should be provided with sufficient opportunities to maintain and develop its cultural characteristics.



Source: Steyn et al. (2002:43).

FIGURE 4.1: The structure of the education system.

- **Selecting aim:** Through differentiated education, individual students should have opportunities to develop their unique potential and thus contribute differently to the development of society.
- **Preparation of responsible citizens:** Individual students should be supported to contribute to the welfare of the country and not live off the welfare of the country. This includes the preparation of citizens who are able to make informed and sustainable decisions for themselves and the generations to come.
- **Preparation for meaningful spending of leisure time:** Students should be supported to enable themselves to spend their leisure time meaningfully and productively.
- **Settlement in the community:** Students should be supported to prepare themselves to settle in society and cope with a changing society. This includes addressing the challenges of SD.

These primary and explanatory aims immediately point to the ultimate aim of higher education, namely, to provide higher education students with ample quality education opportunities to contribute to the maintenance and development of the more complex competencies of the target group, especially within the context of the ever-changing national and international world. It is also a fact that the success of the education system and the level at which the target group can identify with the education system are linearly related to each other.

With regard to SD, the target group and the national community need to realise the importance of keeping this challenge in focus and that higher education will provide students with the necessary opportunities to acquire the knowledge, skills and attitudes necessary to manage present development while planning for the future. The target group in higher education consists of undergraduate and postgraduate students who will become teachers, researchers, policymakers, leaders and informed citizens. Higher education for SD can provide them with competencies that will allow them to address the challenges of global sustainability, make sustainable decisions and take sustainable actions. Cortese (2003) went a step further and stated that HEIs can contribute to SD because of the diverse competencies and knowledge they generate and the innovative ideas they provide on the challenges of SD. It is vital to infuse issues and practices of SD into all aspects of teaching and researching.

Different types of education systems

To cater for the diverse and often differing educational needs of the target group, several types of education systems have developed over the years. The following education systems have been identified by Steyn et al. (2002:44–51):

- **National education system:** A national education system can be defined as a system that provides for the educational needs of the national population as its target group. It is the responsibility of the government to provide for the educational needs of the national community in diverse ways. To maximise success, it is important that the national community relates to the structure and functioning of the national education system. It is the responsibility of the national education system to provide education at the pre-primary, primary, secondary and tertiary levels in order to meet the educational needs of a specific national community. In the case of the BRICS nations, this would, for instance, translate to the Russian education system providing appropriate education to meet the needs of the citizens of Russia, while the South African education system is responsible for the provision of education based on the needs of the citizens of South Africa (Steyn & Wolhuter 2014:60).
- **Mini-education system and mini-training system:** A *mini-education system* can be defined as a system that provides for the educational needs of a target group that is not representative of all members of the national community. Meanwhile, *mini-training* can be defined as a training system tailored to the needs of a particular group of people that do not represent all members of the national community. Both a mini-education system and a mini-training system comply with all the characteristics of an education system and focus on delivering only specific education or training. This characteristic highlights a major feature of such systems, namely, that a mini-education system addresses the specific needs of a given target group that may have been neglected or not comprehensively delivered by a national education system. Typical examples of mini-education systems are the private education systems of different religious and cultural groups, while the different private vocational higher institutions are typical examples of mini-training systems at the tertiary level (Steyn & Wolhuter 2014:60).
- **Dependent and independent education or training systems:** *Dependent education or training systems* can be defined as systems that 'belong' to the target group and are constituted to provide for the changing educational needs of their target group. All national education systems are dependent education systems, as are training organisations established to deliver training in accordance with the needs of members of companies in commerce and industry. Independent education and training systems refer to systems that are established by their owners to provide education for a specific target group that was chosen by the owners of the independent education or training system (Steyn & Wolhuter 2014:65). Several such independent education and training systems function as distance and web-based systems (Whatford 2010). The Saints Christian School (2020) and Boston City Campus (2020) are examples of such private education or training systems.

- **Formal and non-formal systems of education provisioning:** Formal education provisioning refers to a system directed at delivering well-planned, goal-directed, often nationally recognised education programmes. They are provided regularly on a yearly basis and are independent of the enrolment of learners. Meanwhile, non-formal education refers to those education programmes that fall outside the formal programmes of the national education system. They are often provided on a short-term basis when the need arises and are dependent on the enrolment of learners. Non-formal education occurs outside any structured schooling or classroom and can take place in any setting where people expand their own knowledge or competence. This is true for both pre-tertiary and tertiary education (Council of Europe 2021; Steyn & Wolhuter 2014:67).

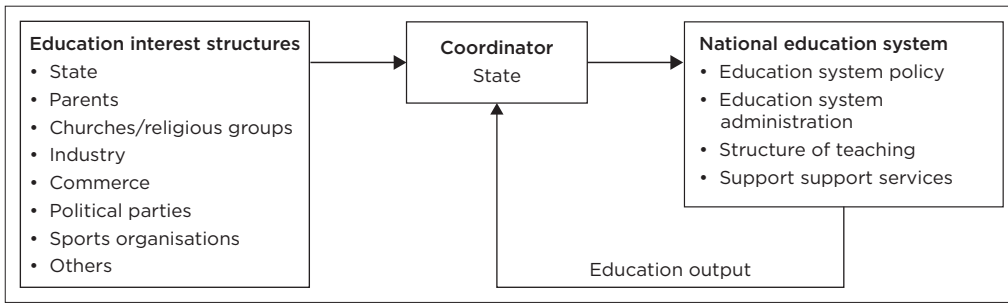
The strength of the education system in any country lies in the provision of different types of education systems that are complementary to one another and serve the diverse and wide-ranging educational needs of the national society. This applies to all four levels of education provisioning, namely, pre-primary, primary, secondary and tertiary education. The social justice orientation of all education stakeholders should accomplish such a goal, especially to provide for the different interests, abilities, philosophies, religions, politics, cultures, languages and commercial and industrial activities present in the national community.

Such complementary and planned cooperation amongst the different types of education systems also contributes to the level at which national communities will be able to integrate international and national changes and address challenges in their daily lives. Ultimately, they will be able to meet their own developmental needs without limiting the opportunities of future generations.

The integrated educational needs of the target group

The educational needs for which the education system (and thus higher education) should provide are complex, integrated and often different. Educational needs should be understood as competencies (knowledge, skills and attitudes) that learners need to acquire in order to contribute to the maintenance and development of a sustainable community. The educational needs that should be provided for by the education system must be identified by analysing the unique and overarching educational needs of the different education interest groups. The composition of different education interest groups is illustrated in Figure 4.2.

As explained earlier, the aim of the education system is to provide for the educational needs of its target group. However, it is important to



Source: Steyn and Wolhuter (2014:113).
FIGURE 4.2: The relationship between the education system and education interest structures.

remember that the target group of a particular education system is by no means simplistic in nature. The target group consists of an array of groups and individuals who have a direct interest in the education that is being offered within a specific education system. The following groups have a direct interest in education (Fulton 1984; Kumalo 2005:5; Ness, Tandberg & McLendon 2015:152; Organisation for Economic Cooperation and Development 2007; Rambiyana & Kok 2002:10; Shrestha et al. 2019:7–8; Steyn & Wolhuter 2014:115–117; UNESCO 2021; Venter & Van Heerden 2001:24):

- *The state* has a direct interest in education because it is expected that present and future citizens will acquire the necessary competencies to develop and maintain the nature and fabric of society. In the case of higher education, the state expects university graduates to become competent teachers, researchers, lawyers, doctors and leaders, among other professionals. All these higher-level positions are indispensable to ensure a quality, prosperous society in an ever-changing world.
- *Parents* expect differentiated education opportunities to be available to their children in order to ensure them a good life in which they can take care of themselves and their family members. In terms of higher education, parents expect that their children will attend good institutions and complete education programmes that will support the fulfilment of their potential.
- *Churches and religious groups* have an interest in the outcomes of the education system, as they wish to ensure that their present and future members acquire competencies to participate in the full realm of church activities. In addition, it is expected that the education learners receive will provide them with competencies on which the church can build its philosophy. Churches anticipate that higher education prepares leaders who are able to play their roles in the development of a given church or religious group.

- *Commerce and industry* expect the education system to support learners in becoming knowledgeable participants and users of the products of commerce and industry, such as informed users of computers, cell phones, electricity, roads and vehicles. Moreover, they expect the education system to equip their current and future workforce with the desired competencies to become high-quality employees who can continuously adapt to and interact with an ever-changing national and international environment. These expectations increase when it comes to higher education. Commerce and industry expect that their employees have completed relevant programmes at the graduate and postgraduate levels, enabling them to effectively, productively and creatively contribute to the well-being and survival of the organisation within the context of a changing and competitive environment.
- Different *political parties and political organisations* that function within a community also have an interest in education. Obviously, these political entities, with clear opposing principles and policies, hope that their viewpoints will at least be incorporated into the outcomes of the education system. This would enable them to build on the foundation that is being laid in education and ultimately get an advantage in this regard.
- *Sporting and other society-based organisations* include, for example, the sporting organisations and clubs of various branches of sport (soccer, tennis, athletics, etc.); road safety organisations; voluntary community-based health care organisations; and international, national and local organisations for environmental conservation. Each of these groups wishes that learners acquire the basic competencies that are required to promote the principles and aims of their respective organisations.
- The *learner population* is not only a central part of an education system but can also be regarded as a pertinent education interest group, as learners have particular expectations of the education system. In short, learners expect that the education system will provide them with a range of competencies that will offer them many employment opportunities so that they can lead successful lives and participate in an ever-changing world.

Generally, it is the responsibility of interest groups to provide the required funding and infrastructure to establish and maintain the education system. In the case of the national education system, the required funding can be and is usually collected by way of taxation, teaching fees or donations.

The role that should be played by coordinators, as represented in Figure 4.2, is another feature of the manner in which education interest groups are organised. In the case of the national education system, the state, through a state organisation such as an education department, acts as the coordinator because of the historical and intrinsic relationship between the state and the national education system. The state is also legally proficient to be the coordinator because it has the judicial authority to protect the interests of

individuals and social structures. As the coordinator of the national education system, the state typically has the following responsibilities (Steyn & Wolhuter 2014:118–120; UNESCO 2021):

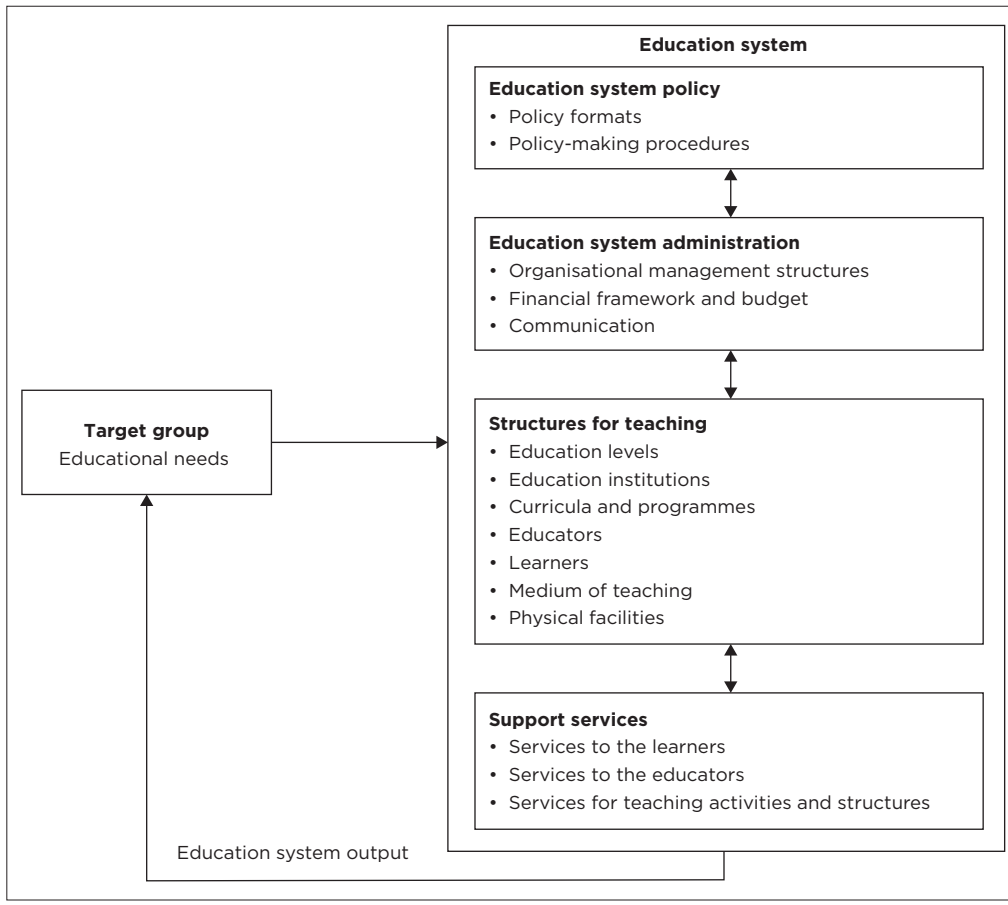
- The coordinator must determine the overarching philosophical basis, the basic principles that should be adhered to, and the nature and functioning of the education system. In addition, the coordinator decides on the overarching aims that will guide the functioning of the education system in the short and long term.
- The coordinator must identify which of the wide range of educational needs of the education interest groups the education system should provide. For instance, should the education system provide for the confessional type of educational needs of particular religious groups or guide the majority of the learners to enter vocational education? Furthermore, the coordinator should prioritise which of the identified educational needs should get more attention. Both these actions depend on the nature of the national society the state envisages and which needs will support the safety and well-being of the national society.
- The coordinator is also responsible for arranging the financing of the education system. The state has the legal power to use taxation to acquire the required funding to ensure the effective, sustainable and productive functioning of the education system.

To ensure the best possible decisions with regard to and prioritisation of the educational needs of the education interest groups included in the target group, good communication between the coordinator and interest groups should be maintained on an ongoing basis. In the formulation and prioritisation of these educational needs, SD should have a central place and be integrated into the educational needs that a particular education system should deliver.

The structure of the education system

The structure of the education system, regardless of the type of system, consists of four components comprising various elements. The structure evolves over time as the best organisation of functionaries and services in order to effectively provide for the educational needs of its target group. To understand and plan education services in a country, it is necessary to know and understand the nature, aims and functioning of the four components and associated elements. The structure of the education system is illustrated in Figure 4.3.

Unique responsibilities are assigned to the functionaries of each of these components. Although each has a particular role, they are not meant to function in isolation. The responsibilities of the functionaries towards higher education in the different components are summarised in the following subsections.



Source: Steyn et al. (2017:18).

FIGURE 4.3: The structure of the education system.

☐ Component I: Education system policy

Education policy represents the decisions about the methods in which education will be delivered to the target group. It can also be explained as the agreement between the education provider and education interest groups on how the educational needs of the target group will be provided for. The elements contained in this component are as follows (De Beer 2017:12; Steyn et al. 2017:19):

- **The vision:** A short statement of what the education system intends to achieve.
- **The mission:** It provides, in short, the characteristics education should strive to achieve.

- **Aims, goals and objectives:** These represent the milestones that the education system should reach in the short and long term.
- **Policy formats and policy-making procedures.**

Regarding the vision of the South African education system, the following is of importance for higher education (Department of Basic Education 1995):

> It is the joint responsibility of all South Africans who have an interest in the education and training system to help build a just, equitable and high-quality education system for all the citizens, with a common culture of disciplined commitment to learning and teaching. This vision immediately set the scene for the nature and functioning of higher education in South Africa, for example, included in the following: joint responsibility [...] high quality [...], all citizens [...], disciplined commitment to learning and teaching. (ch. 3, §13)

The following aspects of the mission of the South African education system are of particular importance for higher education (Republic of South Africa 1996a:art. 4):

- Education should promote independent and critical thought.
- Differentiated education should equip learners with the competencies required by the economy and career development.
- The delivery of mathematics, science and technology education is crucial to human understanding and economic advancement.
- Environmental education should be promoted to aid the enjoyment of quality life and sustainable use of natural resources.
- The principles of attainability, sustainability, efficiency and productivity should form the basis of education provision.

All policies on education provision should be available and can be provided in different formats, such as acts, ordinances, government notices, department regulations and rules of individual educational institutions. In South Africa, four main acts form the basis of the education policy. They are the *National Education Policy Act* (27 of 1996), the *South African Schools Act* (84 of 1996), the *Higher Education Act* (101 of 1997) and the *South African Qualifications Authority Act* (58 of 1995). The latter two acts, which are of particular importance for higher education, are discussed next.

Higher Education Act No. 101 of 1997

This act is meant to regulate higher education and the provision of the establishment of the Council on Higher Education and to make provision for the establishment and maintenance of HEIs. In this act, guidelines on the following important issues are provided (Republic of South Africa 1997:ch. 2, 3, 4, 5, 7):

- The establishment, composition, functions and role of the Council on Higher Education.

- The responsibility of the Council on Higher Education in quality-assurance.
- The establishment and maintenance of HEIs.
- The governance of HEIs.
- The funding of public higher education.
- The situation of private HEIs.

South African Qualifications Authority Act No. 58 of 1995

The aim of this act, legislated by the national government, was to establish the *South African Qualifications Authority Act* and the *National Qualifications Framework* (NQF) with the purpose of organising and coordinating education programmes and qualifications on different levels of formal and non-formal education in South Africa. This was done to ensure an integrated and developmental education career path for learners, from pre-primary education to tertiary education. The *South African Qualifications Authority Act* holds the administrative power to ensure the implementation of the NQF (Republic of South Africa 1995). The Council on Higher Education was accredited as an education and training quality-assurance body of higher education with the role of ensuring the registration of tertiary programmes according to the requirements of the NQF and ensuring that the quality of these programmes is maintained (Republic of South Africa 1998a).

Component II: Education system administration

Education system administration refers to the combination of the organisational structures – all the functionaries responsible for the development and implementation of all education policies on different levels and in all sectors of education control. This component includes the following elements (Kashyap 2010; Steyn et al. 2017; UNESCO International Institute for Educational Planning 2015):

- **Organisational management and administrative structures:** In South Africa, the importance of higher education is emphasised by the fact that it is represented at the highest level of the South African government by the minister of higher education and the Department of Higher Education and Training (DHET), with the responsibility to develop and maintain higher education. The Council on Higher Education and the Committee of University Principals fulfil the advice-giving role to the minister of higher education on policies and the control of higher education. Furthermore, it must be noted that all universities in South Africa can be categorised as semi-autonomous institutions because all of them function according to their own private laws (Republic of South Africa 1998b). These laws constitute the roles of the university board, the senate and the faculty boards to enable the provisioning of quality higher education.

- **Financing of education:** In this element, the funding of public education on different levels is regulated. In the case of South Africa, higher education is not free, and HEIs are funded by subsidies from the state, as well as by means of tuition fees and donations. However, national bursary schemes go a long way towards supporting students who do not have the financial means to enrol in higher education. Private HEIs, however, receive no funding from the state. Nevertheless, they must register with the DHET, and their programmes must be registered with the NQF.
- **Communication:** This element emphasises the importance of internal communication in the particular education system and the external communication between the education system and the external environment, especially with the target group. In the case of higher education in South Africa, the DHET and the Council on Higher Education are the entities responsible for such communication. However, as tertiary institutions are semi-autonomous, they are primarily responsible for internal communication with personnel and students, as well as external communication with their target group and the external environment.

☐ Component III: Structure for teaching

This component is considered the heart of the education system, as it provides the plan for the distinguished education career of every learner on different education levels. Elements of this component include the following (Beynon 1997; DegreeChoices 2021; Glossary of Education Reform 2015; Nath 2010; Steyn et al. 2017:20–21; UNESCO International Bureau of Education 2022):

- Identified levels of education.
- A combination of education institutions.
- An integrated combination of education programmes that provide a road map for learners to move through the recognised education levels, from pre-primary to higher education, and including the applicable quality-assurance measures.
- The demographical needs of educators as well as their expected qualifications, preservice and in-service development, task outline and remuneration.
- The demographic characteristics of learners on different levels and relevant learner policies are provided.
- The medium of teaching, which sets the practices of the languages of teaching and learning in the particular education system.
- Physical facilities, referring to the demographic characteristics of infrastructure provision and needs in the education system.

Table 4.1 illustrates the NQF and thus the education career path of learners in the South African education system. As illustrated in Table 4.1, higher education covers NQF Levels 5–10 in the third band, from national certificates to PhD degrees. The primary higher education entrance qualification is one or another

TABLE 4.1: The education career path of learners in South Africa, according to the National Qualifications Framework.

Career path	NQF level	Band	Qualifications and certificates	Institutions
Higher education and training (HET) certificates	10	HET band	PhD degrees/further research	Universities, tertiary/research professional institutions
	9		MA degrees	Universities, tertiary/research professional institutions
	8		Professional qualifications Hons degrees	Universities, colleges, private/ professional institutions/places of work
	7		Diplomas National first degrees	Universities, colleges, private/ professional institutions/places of work
	6		Higher certificates	Colleges, private/professional institutions/places of work
	5		National certificates	Colleges, private/professional institutions/places of work
Further education and training (FET) certificates	4	FET band	Grade 12 school/ college	Public and private secondary schools
	3		Grade 11 school/ college	
	2		Grade 10 school/ college	
General education and training (GET) certificates (*end of compulsory education*)	1	GET band	Senior phase ABET Level 4 Intermediate phase ABET Level 3 ABET Level 2 Foundation phase ABET Level 1	Public secondary schools – rural, urban, farm, special education and early childhood development centres Work-based – training, occupation training, RDP labour market schemes, upliftment programmes and community development NGOs – churches, adult centres, private providers, industry training boards, unions and workplace training

Source: Steyn et al. (2017:129).
Key: NQF, National Qualifications Framework; HET, Higher Education and Training; FET, Further Education and Training; GET, General Education and Training; PhD, doctoral degree; MA, master's degree; Hons, honours degree; RDP, Reconstruction and Development Programme.

kind of Grade 12 qualification. These qualifications are provided by a number of public and private universities and other types of registered HEIs. One of the national requirements is that SD should be encouraged and implemented. As reported by Awuzie and Emuze (2017), HEIs in South Africa are keen to support the government's SD agenda through teaching and learning, research and other activities. These authors reported a visible increase in the adoption of SD strategies by HEIs. However, they also underscored that, although some of these strategies have been enunciated 'at the strategic level in many South African HEIs in the form of policy documents, vision and mission statements, not a lot has been reported on their implementation' (Awuzie & Emuze 2017:1177).

Component IV: Education support services

The elements of education support services are as follows (Mafisa 2017; Mosi 2019; Steyn et al. 2017:21–22):

- **Education support services to educators:** These include legal advisory services, professional support services and psychological and social services.
- **Education support services to learners:** These include orthodidactic services, medical services, transport and housing services, and feeding schemes.
- **Education support services to specific educational activities and structures:** These include library and media services. In the case of South African higher education, most of these services are provided by individual institutions.

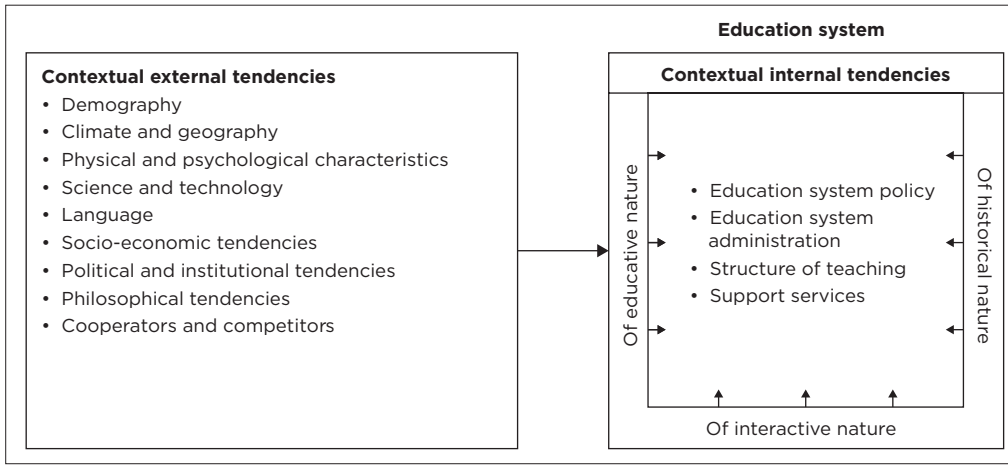
It is evident that the education system as a structure, with higher education as an integral part thereof, is complex and should be strategically used to provide for the educational needs of the target group. Also, it is clear that a subject studied in education should always be considered within the context of all the components and elements of the entire education system. To contribute to the realisation of SD, we need to consider whether SD is sufficiently included in, for example, education system policies. Is funding and management guidance available to effectively realise this focus, and are the different issues regarding SD adequately included in various education programmes?

The external and internal contextual tendencies influencing the nature and functioning of higher education

The nature and functioning of an education system, regardless of the type, are directly influenced by external and internal contextual factors. The nature and presence of these factors are illustrated in Figure 4.4.

The impact of different external contextual tendencies on the education system, and in this case, on higher education, is almost self-explanatory. It can be summed up as follows (Maarman, Steyn & Wolhuter 2006:295; O'Neill et al. 2020; eds. Wolhuter & Steyn 2021:57–67; World Bank 2022):

- The demographical context – that is, the number, settlement and movement of people – will determine the number of students, the number and location of institutions and their keeping up with tendencies such as urbanisation. This particular factor refers to one of the biggest challenges, namely, the number of students who wish to enrol and the actual availability of facilities and funding.



Source: Steyn and Wolhuter (2014:151).

FIGURE 4.4: Contextual external and internal tendencies or factors in the education system.

- Scientific and technological tendencies will influence the programmes in higher education regarding their content as well as the use of distance education to provide for the needs of the target group for continuing education and education in the workplace or while working.
- The use of language can affect the quality of teaching and the internationalisation of tertiary education. The main challenge often relates to students' limited language abilities in the language in which a particular module is delivered. Although multilingualism is promoted in HEIs and universities are responsible for linguistic diversity, in practice, the delivery thereof is not always effective. To succeed in a sustainable way, higher education needs to equally embrace the development of English as well as the indigenous African languages and empower students to function effectively in more than one of the official languages.
- Socio-economic tendencies will influence many aspects of the education system, including the challenge of universities to provide equal opportunities to all students and communities while also promoting SD in tertiary education.
- The recognition of co-operators and competitors will enable institutions to improve their education if the cooperation of applicable workplace facilities can be employed. On the contrary, the presence of other universities will determine the recruitment strategies of a particular university.

Similarly, the influences of the internal contextual tendencies are equally self-explanatory, for example (Steyn & Wolhuter 2014:136):

- The education theory will influence the composition of education programmes, for example, the manner of quality-assurance and the way

technology is applied to deliver distance education in order to address the needs for SD at the level of higher education.
- The historical nature of tertiary programmes will determine the future development of and changes in tertiary education programmes in meeting the needs of SD.
- The interactive nature of the elements of the education system will affect the way they will reciprocally influence one another – for example, the number of students will inform the funding that is required to finance education.

As is evident, it is of the utmost importance that, when researching and planning tertiary education, the influence of the different external and internal contextual tendencies is thoroughly considered in order to increase the quality and applicability of the research. The recognition of scientific and technological tendencies, socio-economic tendencies and demographic tendencies confirms that SD is an important contextual tendency that, without a doubt, should inform the content and functioning of all the elements within the education system. According to the adopted vision for a sustainable society (Department of Environmental Affairs 2008):

> South Africa aspires to be a sustainable, economically prosperous and self-reliant nation state that safeguards its democracy by meeting the fundamental human needs of its people, by managing its limited ecological resources responsibly for current and future generations, and by advancing efficient and effective integrated planning and governance through national, regional and global collaboration. (p. 19)

Conclusion

This chapter explored the role of higher education in a given education system so as to understand the complexities and possibilities for realising ESD. Firstly, the nature of SD and the South African education system was discussed. The aims of the education system, along with the structure, types of education and the needs of diverse target groups, were connected to the sector of higher education and ESD. Secondly, the external and internal contextual tendencies influencing the nature and functioning of higher education were outlined.

The national requirements are clear on the fact that SD should be encouraged and implemented in the education system through teaching and learning, research and other activities. Therefore, the principles of sustainability should form the basis of organisation management and education provision. Higher education institutions have a crucial role to play in addressing all challenges of SD, whether these involve the education they provide or the work they do to create sustainable communities. Joanna Newman, chief executive and secretary-general of the Association of Commonwealth

Universities, recognises that the role of universities has not always been acknowledged when 'talking about solving global challenges and it should be, because all the responses lie within universities, whether it is through educating students or through producing knowledge' (cited in O'Malley 2019, para. 32).

The systematic literature review of this work showed that the structure and functioning of the entire education system are clear to envision sustainable structured organisations that are able to successfully provide for the needs of a specific target group. This includes equipping the target group with the necessary knowledge, skills, attitudes and values that will allow them to make sustainable decisions and take sustainable actions. Higher education institutions build human capital in terms of teachers, researchers, policymakers, leaders and informed citizens – individuals with the capacity to manage present development with attention to global sustainability challenges. Furthermore, they prepare responsible citizens who are able to contribute to the welfare of the country and deal with its challenges, including the challenges of SD. Higher education institutions may also contribute to SD through the knowledge they generate and the innovative ideas they provide about SD challenges. It is, therefore, vital to infuse SD issues and practices into all aspects of teaching and researching. Higher education institutions need to foster critical thinkers who are aware of the complexities of sustainability. In the context of South African education, it is clearly stated that (Teise & Le Roux 2016):

> [*C*]urriculum, teaching methods, and textbooks at all levels and in all programmes of education and training education [*should*] encourage independent and critical thought, the capacity to question, enquire, reason, weigh evidence, and form judgments, achieve understanding. (p. 73)

It was indicated in this chapter that the strength of the education system of any country lies in the provision of different types of education systems that complement one another and serve the diverse and wide-ranging educational needs of the national society. This, in turn, allows national communities to integrate international and national changes and address challenges in their daily lives. Ultimately, they will be able to meet their own developmental needs without limiting the opportunities of future generations. It is also important to reiterate that the state has a direct interest in education because it is expected that present and future citizens acquire the necessary competencies to develop and maintain a sustainable society. Overall, SD should have a central place in the formulation and prioritisation of and be integrated into the educational needs that a particular education system should deliver. The question that we must ask is whether education systems sufficiently integrate the sustainability theme into their curricula, research and other institutional activities to allow for the development of professionals who are socially and environmentally responsible.

Chapter 5

BRICS higher education degrees menu versus Sustainable Development Goal 4: Can we serve what we bake?

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Introduction

The United Nations' (UN's) fourth sustainable development goal (SDG) aims to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. Brazil, Russia, India, China and South Africa (BRICS) have agreed on ideals regarding quality education. These include strengthening the collaboration amongst BRICS universities and the importance of working with the United Nations Educational, Scientific and Cultural Organization (UNESCO) to accelerate progress with regard to the goal of education for all. One aspect of quality higher education is the value of the degrees that universities confer. In this

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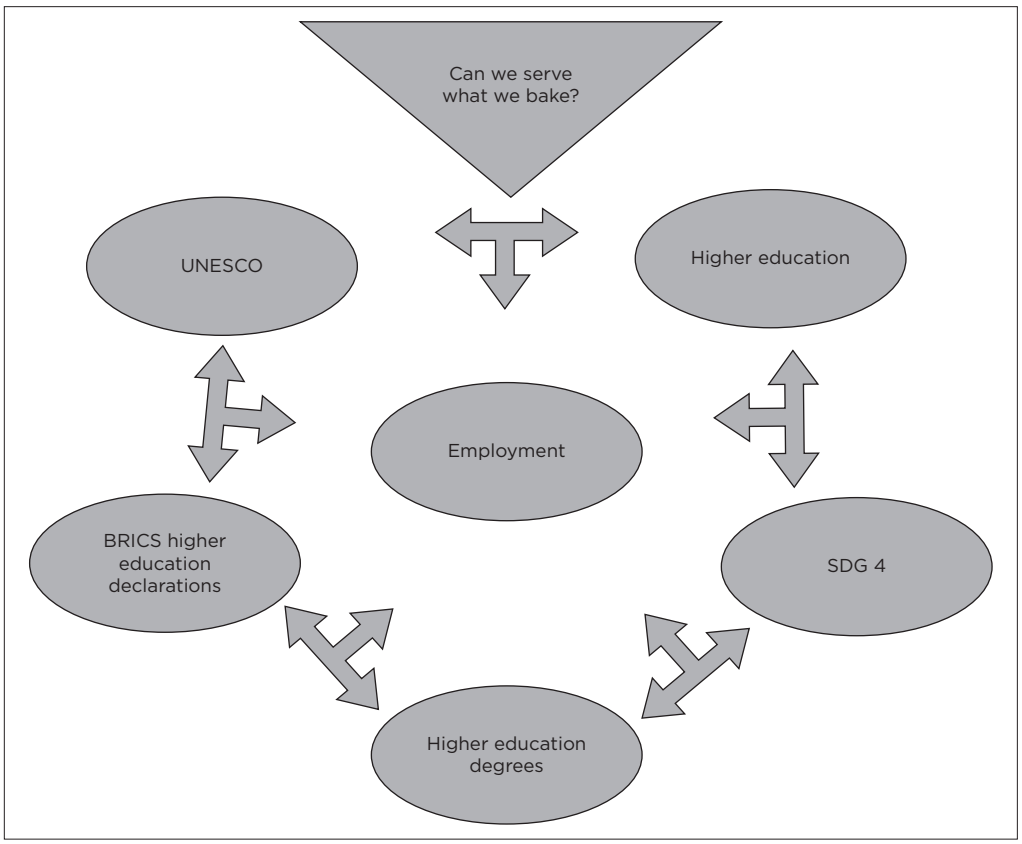
chapter, the relevance of higher degrees to the employability of people with higher degrees to enhance quality higher education in the BRICS countries is investigated. Sustainable development of higher education institutions (HEIs) implies that graduates can be employed. The outputs of BRICS HEIs must be reassessed and fine-tuned to address offerings (graduates) that are linked to the economic and sustainability needs of the applicable society.

Conceptual theoretical framework

The conceptual framework of this research defines the relevant variables identified to determine the value of higher degrees in the BRICS society. The study was framed by relevant concepts, such as higher education, BRICS declarations, SDG 4, UNESCO, the Education for All drive and degrees in higher education. Figure 5.1 encapsulates the conceptual boundaries of this research. These concepts are reconnoitred and demarcated in the following section.



Source: De Beer (2022).
Key: UNESCO, United Nations Educational, Scientific and Cultural Organization; SDG 4, Sustainable Development Goal 4; BRICS, Brazil, Russia, India, China and South Africa.

FIGURE 5.1: Conceptual boundaries and variables relevant in measuring the value of higher degrees in the BRICS society.

Higher education

Higher education is defined as education and training following high school or secondary school. Higher education transpires at universities or similar educational establishments, such as colleges. These HEIs include all postsecondary education, including public and private universities, colleges, technical training institutes and vocational schools. Higher education empowers students by providing them with skills, knowledge, values and critical thinking for employment. Higher education institutions confer degrees and certificates in various academic and technical fields. Smedegaard and Barnett (2020:1–2) accentuated the current philosophical thinking about higher education, specifying four strands of higher education, namely, knowledge, truth, critical thinking and culture. Knowledge concentrates on the meaning of academic knowledge as forming a link between the surrounding world and the knower. Truth is inquiries into epistemic responsibilities and potentials to seek and tell the truth. Critical thinking discourses on which understandings of being critical are suitable for higher education. The last strand, culture, is concerned with the possibility and ability of academics to intersect and contribute to complex cultural societies. This study earmarked the fourth strand: what is the value of a higher education degree to society? Can we eat (the outcome of higher education) what we bake (the certificate and its contribution to society)?

The World Bank (2020) stated that higher education is instrumental in fostering growth, reducing poverty and boosting shared prosperity. It benefits the individual and the entire educational system. The World Bank highlighted the importance of higher education as follows (World Bank 2020):

> A highly skilled workforce, with a solid postsecondary education, is a prerequisite for innovation and growth: well-educated people are more employable, earn higher wages, and cope with economic shocks better. (n.p.)

Therefore, higher education must provide individuals with relevant qualifications. Qualified individuals must meaningfully contribute to the economy of their country. Moreover, HEIs must not provide training that does not contribute to the necessary skills needed. A non-market-focused qualification will not advance the economy and will lead to unemployment.

The European Commission (2020) dissected the various types of HEIs as follows:

- University education comprises public universities, private universities and university institutions, as well as advanced artistic education.
- Non-university education comprises advanced vocational training, plastic arts and design, advanced vocational education and advanced vocational education in sports.

The state typically partially or fully funds public universities. Public universities are enacted by legislation processes and a legal framework as politicised by

the applicable government. Any individual or legal entity can create a private university if they adhere to the constitutional principles of the relevant country. Secondary education schools and integrated vocational training centres can provide non-university education in the form of advanced vocational training. Public and private universities comprise different schools of faculties. These faculties can include Economic and Management Sciences, Education, Engineering, Health Sciences, Humanities, Law, Natural and Agricultural Sciences, and Theology (NWU 2020). The faculties are further apportioned into units, such as Chemical and Minerals Engineering; Electrical, Electronic and Computer Engineering; Mechanical and Nuclear Engineering; and Industrial Engineering, in the case of an engineering faculty. Higher education must produce graduates who are relevant to societal expectations. The human capital and signal theories in higher education will be the main theories underpinning this chapter.

BRICS declarations on higher education

The BRICS organisation comprising five member states (Brazil, Russia, India, China and South Africa) had its first meeting in 2009 in Yekaterinburg, Russia. Since then, the BRICS member states have met annually, and in 2020, their twelfth meeting was held (BRICS India 2016:1–3). The 2020 BRICS annual summit took place online due to the COVID-19 pandemic. The BRICS member states cooperate on a multitude of common interests. Cooperation exists in shared areas, but the focus areas are economic and financial cooperation, the New Development Bank, the Contingent Reserve Arrangement, health care, science, technology and innovation, security, business and education. BRICS education ministers signed the New Delhi Declaration on Education on 30 September 2016 and thereby committed themselves to deeper cooperation amongst the member states. The New Delhi Declaration set forth the following fourteen areas for cooperation (BRICS India 2016:1–3):

- Echo commitment to SDG 4, ensuring inclusive and equitable quality education, and the *Education 2030 Framework for Action*.
- Pledge actions to formulate country-specific targets within the broader scope of SDG 4.
- Assimilate the SDG 4-related targets with education sector development plans and programmes at the subnational and national levels.
- Build capacity at the subnational and national levels for measuring and monitoring progress towards SDG 4 and corresponding targets using the indicators adopted by the UN General Assembly.
- Share best practices available to the BRICS nations on partnership in education, innovation and research through the BRICS Network University.
- Establish a yearly BRICS Network University conference in the country of the current BRICS chair. Encourage participation of more universities in the

BRICS university league to collaborate on research and facilitate student mobility.
- Consolidate coordination within the BRICS Technical and Vocational Education and Training (TVET) Working Group to develop national reports and share experiences related to workforce demands and supplying skilled personnel.
- Use ICT to improve access to education and teacher development, enhancing the quality of the teaching-learning process.
- Develop an institution within each country and an institutional network to share e-resources, e-libraries, open educational resources and ICT policies.

The commitment of BRICS higher education to deepening cooperation was confirmed at the 2017 meeting of education ministers from the BRICS countries that was held on 05 July in Beijing, China. The ministers discussed reforming education, promoting equity in education, fostering quality education and organising student exchanges. The *Beijing Declaration on Education* reaffirmed its commitment to achieving quality education (SDG 4). In this declaration, the ministers agreed to (InfoBrics 2017):

- share their experiences and practices to achieve SDG 4
- foster a more favourable policy environment to achieve SDG 4
- advocate for global education policies that consider the common concerns and priorities
- reiterate their support for the joint initiative for collaboration amongst universities in the five BRICS countries, known as the BRICS Network University
- cooperate on language education
- support the professional development of academics working in higher education
- promote teacher exchanges
- develop joint projects in technical and vocational education
- expand student scholarship opportunities.

The sixth meeting of the BRICS education ministers in Cape Town, South Africa, on 10 July 2018, further deepened the cooperation and enhanced the fifth education declaration (DHET 2018). In the Cape Town Declaration, the education ministers pledged to (DHET 2018):

- reaffirm the commitment of the BRICS member states to SDG 4
- strengthen collaboration in technical and vocational education
- support establishing a coordinating process for the BRICS Network University
- support an initiative by South Africa to develop a proposal for a BRICS Network University PhD programme
- harmonise the educational quality standards in their areas of expertise
- improve learning and student mobility across the BRICS member states
- share information on existing funding mechanisms

- actively pursue research collaboration on the 4IR
- actively develop proposals for the mobility of educators and students
- develop a proposal on digitisation to improve education and training
- promote values and ethical practices in education
- explore the possibility of granting BRICS scholarships to BRICS students.

The education declarations of the BRICS member states are extensive. This chapter only focuses on the value of the degrees presented by BRICS member state universities. Do students obtain employment after they have obtained a selection degree at a BRICS university? The gap in the extensive BRICS declarations is the value of such degrees to society. Hence, the BRICS declarations should also include this critical issue.

UNESCO

The United Nations Educational, Scientific and Cultural Organization works to generate environments for discourse amongst nations, philosophies and individuals based on reverence for commonly shared ideals and values. Therefore, UNESCO programmes underwrite attaining the SDGs defined in Agenda 2030, adopted by the UN General Assembly in 2015 (UNESCO 2020a). United Nations Educational, Scientific and Cultural Organization wants to improve the quality of life of all inhabitants of the Earth by 2030 by achieving the following 17 goals:

- Eliminate poverty (SDG 1)
- Erase hunger (SDG 2)
- Establish good health and well-being (SDG 3)
- Provide quality education (SDG 4)
- Enforce gender equality (SDG 5)
- Improve clean water and sanitation (SDG 6)
- Grow affordable and clean energy (SDG 7)
- Create decent work and economic growth (SDG 8)
- Increase industry, innovation and infrastructure (SDG 9)
- Reduce inequality (SDG 10)
- Mobilise sustainable cities and communities (SDG 11)
- Influence responsible consumption and production (SDG 12)
- Organise climate action (SDG 13)
- Develop life below water (SDG 14)
- Advance life on land (SDG 15)
- Guarantee peace, justice and strong institutions (SDG 16)
- Build partnerships for the goals (SDG 17).

This chapter focuses on SDG 4, which aims to provide quality education for all. Quality education includes quality higher education degrees. The outputs of universities must be relevant to the 4IR and its employment needs.

Sustainable Development Goal 4 will be discussed in more detail in the next section.

Sustainable development goal 4

The United Nations Educational, Scientific and Cultural Organization's SDG 4 comprises the goals for education for all. Sustainable Development Goal 4 aims to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all (UNESCO 2020b). Sustainable Development Goal 4 for 2030 comprises seven outcomes-based targets and three goals. The first target is free primary and secondary education for all, the second is equal access to quality pre-primary education and the third is equal access to affordable technical, vocational and higher education and training. The fourth target is to increase the number of people with relevant skills for financial success, with the fifth target focusing on eliminating discrimination in education. The sixth target is aimed at universal literacy and numeracy, and the seventh target is aimed at enhancing SD and global citizenship. Sustainable Development Goal 4.1 is to build and upgrade safe schools; SDG 4.2 aims to expand scholarships for developing countries; and SDG 4.3 focuses on increasing the supply of qualified teachers in developing countries (UNESCO 2020b).

This chapter focuses on SDG 4.3 and SDG 4.4, aiming for equal access to affordable technical, vocational and higher education and for substantially increasing the number of youths and adults who have relevant skills, including technical and vocational skills for employment, decent jobs and entrepreneurship. The targets and goals focus on access, quality, skills, employment and decent jobs. This chapter approximates the quality and employability of degrees confirmed to youths in the BRICS member states. Are the knowledge and skills covered in university modules adequate to provide a well-trained workforce able to obtain decent jobs from higher education degrees?

Education for all

The *Universal Declaration of Human Rights* (UN 1948) was a momentous publication for the historical evolution of human rights in general, and education rights in particular, conscripted by representatives with dissimilar legal and cultural experiences from different countries globally. The UN General Assembly decreed the declaration in Paris on 10 December 1948 as a common norm of accomplishments for all inhabitants and countries. Article 26 of the *Universal Declaration of Human Rights* (UN 1948:1) states the following regarding education:

1. Everyone has the right to education. Education shall be free, at least in the elementary and fundamental stages. Elementary education shall

be compulsory. Technical and professional education shall be made generally available, and higher education shall be equally accessible to all based on merit.
2. Education shall be directed to the full development of the human personality and the strengthening of respect for human rights and fundamental freedoms. It shall promote understanding, tolerance and friendship amongst all nations, racial or religious groups and shall further the activities of the UN for the maintenance of peace.
3. Parents have a prior right to choose the kind of education that shall be given to their children.

Brazil

In the Brazilian context regarding education rights, Article 205 of the Brazilian Constitution (Government of Brazil 1988) declares that everyone has the right to education. The responsibility for this right rests with the state and parents. The same article further specifies that access to compulsory and free education is a public right. Article 211 highlights that public education must be organised in collaboration with all role players, such as the Brazilian Union and the different states, federal districts and municipalities in Brazil.

In the *Global Economic Forum Comparative Report* of the World Economic Forum (2019), Brazil is placed 71st (72nd in 2018) out of 141 countries in the global competitive ratings. This report evaluated the 12 pillars of competitiveness. Pillar 6 focuses on the skills and education of a specific country, measuring the current workforce and its skills and the future workforce and its skills. These statistics can be correlated with the output of higher education, where Brazil is rated 110th out of 141 countries for the current workforce. The current workforce has only an average of 15.1 years of schooling. Regarding the skills of the current workforce, Brazil is ranked 131st out of 141 countries. In the categories of quality of vocational training (127/141), the skill set of graduates (131/141) and critical thinking in teaching (126/141), Brazil is part of the quadrant. Therefore, the value of university degrees for society must be explored (World Economic Forum 2019).

Russia

When zooming in on the legislative framework of the Russian Federation, the focus is on the *Russian Federal Decree* (295 of 2015), which sets out the Development of Education Programme (Russian Federation 2015). This programme sets out Russia's objectives of education for all. The decree focuses on different goals of education for all, such as developing preschool education, general education, additional education for children and career-focused education and training. De Beer (2017) supported the success of the

Russian Federation regarding the goals of education for all in SDG 2 (ECCE), SDG 3 (learning needs of all young people and adults are met through equitable access to appropriate learning and life skills programmes), SDG 4 (universal primary education) and SDG 5 (gender equality). The *Global Economic Forum Comparative Report* of the World Economic Forum (2019) rated the Russian Federation 54th out of 141 countries (43rd in 2018) on Pillar 6, which measures skills. The following ratings are given:

- Current workforce – 47th out of 141 countries
- The mean years of schooling – 48th out of 141 countries
- Quality of vocational training – 76th out of 141 countries
- Skill set of graduates – 77th out of 141 countries
- Digital skills amongst the population – 27th out of 141 countries
- Critical thinking in teaching – 43rd out of 141 countries
- Gross domestic product (GDP) based on purchasing power parity (PPP) as % of world GDP – 3.12%
- Unemployment rate – 4.7%
- Population – 144 million
- GDP per capita US$ – 11 326.8
- Global gender gap – 0.7

The Russian Federation scores in the top third globally with a focus on education and skills. Moreover, Russia scores high in SDG 4 of 'education for all', as indicated in the previous paragraph.

India

The Constitution of India guarantees free and compulsory education in Article 21A of the Constitution (Government of India 2015). This legal framework concurs with the goals for education for all as set out in the *Universal Declaration of Human Rights* of the UN. In 2009, India advanced its goals of 'education for all' with the law on free and compulsory education (Government of India 2009). The legislation aimed to accelerate India's targets for education for all. The *Global Economic Forum Comparative Report* of the World Economic Forum (2019) rated India 68th out of 141 countries (58th in 2018) on Pillar 6, which measures skills. The following ratings are given (World Economic Forum 2019):

- Current workforce – 107th out of 141 countries
- The mean years of schooling – 117th out of 141 countries
- Quality of vocational training – 67th out of 141 countries
- Skill set of graduates – 93rd out of 141 countries
- Digital skills amongst the population – 59th out of 141 countries
- Critical thinking in teaching – 55th out of 141 countries
- GDP (PPP) as % of world GDP – 7.77%

- Unemployment rate – 2.6%
- Population – 1 334.2 million
- GDP per capita US$ – 2 036.2
- Global gender gap – 0.7

The criterion 'skill set of graduates' is concerning, indicating a problem in the higher education sector. This also validates the aim of this chapter regarding measuring the value of higher education degrees against the economic development of the county.

China

The People's Republic of China set out to achieve goals for education for all by establishing the *Guidelines for Reform and Development of Education in China* in 1993 (Ministry of Education [China] 1993). These guidelines emphasise universal basic education and eradicating illiteracy. China demonstrated its willingness and commitment to education for all by holding 12 meetings on education for all from 2000–2012. In the *Fourteenth Five-Year Plan (2021–2025) for National Economic and Social Development*, education features 137 times in the document. The government's focus on education in the current five-year plan is as follows (Communist Party of China 2020):

- The agronomy of ethics and morals has been noted as a central task of educational development, underpinning the importance of beliefs, values and attitudes.
- Fast-tracked educational renewal will be the goal of the next five-year plan, supporting modernisation throughout all of China. The government will continue efforts for ten priority actions mapped out in Education 2035 with a new ideology, ethos and strategies.
- Quality will be the trademark of educational development over the next five years, a swing away from access towards quality learning opportunities for all, as China has universalised basic education and is moving towards achieving mass higher education.

The government of China is now focusing its efforts with regard to education on quality rather than access. It has nearly achieved all goals for education for all, except for quality. This goal also focuses on the quality of higher education degrees.

The World Economic Forum's (2019) *Global Economic Forum Comparative Report* rated the People's Republic of China 28th out of 141 countries (28th in 2018) on Pillar 6, which measures skills. The following ratings are given (World Economic Forum 2019):

- Current workforce – 77th out of 141 countries
- The mean years of schooling – 95th out of 141 countries

- Quality of vocational training – 41st out of 141 countries
- Skill set of graduates – 35th out of 141 countries
- Digital skills amongst the population – 59th out of 141 countries
- Critical thinking in teaching – 25th out of 141 countries
- GDP (PPP) as % of world GDP – 18.69%
- Unemployment rate – 4.4%
- Population – 1 395.4 million
- GDP per capita US$ – 9 608.4
- Global gender gap – 0.7

The People's Republic of China scores high in its graduate skills and critical thinking in teaching. Hence, China may have some answers and experience regarding higher education. These results indicate that the other BRICS countries should find best practices based on the Chinese model. Contextual factors (language, geography, politics and demography) must always be considered when comparing different ideas on education reform.

South Africa

Chapter 2 of the *Constitution of the Republic of South Africa* (108 of 1996) (Republic of South Africa 1996a) focuses on human rights. Everybody has the right to basic education. The *South African Schools Act* (84 of 1996) provides for compulsory free education (Republic of South Africa 1996b). Access to higher education has also been advanced with the National Student Financial Aid Scheme (NSFAS) (2020) bursary scheme.

The *Global Economic Forum Comparative Report* of the World Economic Forum (2019) rated the Republic of South Africa 60th out of 141 countries (67th in 2018) on Pillar 6, which measures skills. The following ratings are given (World Economic Forum 2019):

- Current workforce – 72nd out of 141 countries
- The mean years of schooling – 60th out of 141 countries
- Quality of vocational training – 119th out of 141 countries
- The skill set of graduates – 120th out of 141 countries
- Digital skills amongst the population – 126th out of 141 countries
- Critical thinking in teaching – 102nd out of 141 countries
- GDP (PPP) as % of world GDP – 0.58%
- Unemployment rate – 27%
- Population – 57.7 million
- GDP per capita US$ – 6 377.3
- Global gender gap – 0.8

South Africa stands out when the focus is placed on the unemployment rate. The skill set of graduates and the quality of vocational training in South Africa are also in the lower quadrant.

If we juxtapose the statistics of the BRICS member states focusing on education and socio-economics, a correlation exists between the quality of vocational training, the skill set of graduates and unemployment (see Table 5.1).

When these statistics are compared, it is clear that Brazil and South Africa are lagging far behind China and Russia, while India is average in the outcome of the overview of the World Economic Forum's *Global Economic Forum Comparative Report*. This concurs with De Beer's (2017:131–137) report on evaluating the BRICS goals of education for all. He stated the following with regard to SDG 3 of 'education for all' (equal access to affordable technical, vocational and higher education):

- Brazil is far from the target.
- Russia is on target.
- India is far from the target.
- China is near the target.
- South Africa is far from the target.

South Africa, Brazil and India should study the success of China and Russia. Both China and Russia are in the top 20% of countries worldwide and are achieving SDG 4 of 'education for all', as set out by UNESCO.

Graduates

According to the *Cambridge Dictionary* (2022), 'graduate' means to complete one's schooling or to become a graduate of one's high school or university. Graduate programmes have prerequisites. A prerequisite for a PhD degree is a MA degree in the relevant field. The entrance criteria for some doctoral studies also require a minimum mark or achievement level in the previous degree. The

TABLE 5.1: Correlation between the quality of vocational training, the skill set of graduates and unemployment.

Correlation criteria	Brazil versus BRICS	Russia versus BRICS	India versus BRICS	China versus BRICS	South Africa versus BRICS
Global rating out of 141 countries	71 (5)	43 (2)	68 (4)	28 (1)	60 (3)
Current workforce out of 141 countries	110 (5)	49 (2)	105 (3)	37 (1)	101 (4)
Quality of vocational training out of 141 countries	127 (5)	76 (3)	67 (2)	41 (1)	119 (4)
Skill set of graduates out of 141 countries	131 (5)	63 (2)	93 (3)	35 (1)	102 (4)
Critical thinking in education out of 141 countries	126 (5)	43 (2)	55 (3)	25 (1)	95 (4)
Unemployment (%)	12.5 (4)	4.7 (3)	2.6 (1)	4.4 (2)	27 (5)
GDP per capita US$	8 967.7 (3)	11326.8 (1)	2 036.2 (5)	9 608.4 (2)	6 377.3 (4)

Source: World Economic Forum (2019).
Key: BRICS, Brazil, Russia, India, China and South Africa; GDP, gross domestic profit.

criteria for a degree are described in the outcomes and are usually quantified by credits or levels. After attaining one's initial undergraduate (BA) degree, further studies in the same academic field are called postgraduate studies. It relates to the Latin meaning of the word 'grad', namely, to take a step up or forward. Higher education institutions present students with a degree after successful completion of all appropriate criteria.

See the generic qualification framework adopted from the South African Qualifications Authority (2020) for the steps in education in most BRICS countries. The phases are age-coherent, but different countries name the levels differently:

- Early Childhood Development (ECD) Phase: Birth to four-years-old
- ECD Phase: Grade RR (five-years-old)
- Foundation Phase: Grade R (six-years-old)
- Foundation Phase: Grade 1 (seven-years-old)
- Foundation Phase: Grade 2 (eight-years-old)
- Foundation Phase: Grade 3 (nine-years-old)
- Intermediate Phase: Grade 4 (ten-years-old)
- Intermediate Phase: Grade 5 (11-years-old)
- Intermediate Phase: Grade 6 (12-years-old)
- Senior Secondary or Senior Phase: Grade 7 (13-years-old)
- Senior Secondary or Senior Phase Grade 8 (14-years-old)
- Senior Secondary or Senior Phase Grade 9 (15-years-old or Level 1).

Grade 9 is the first exit level for learners in most countries and is compulsory:

- Further education and training (FET) Phase: Grade 10, national (vocational) certificate, Level 2 or occupational certificates (16-years-old).
- FET Phase: Grade 11, national (vocational) certificate, Level 3 or occupational certificates (17-years-old).
- FET Phase: Grade 12, national (vocational) certificate, Level 4 or occupational certificates (18-years-old).

Grade 12 is the second exit level for learners:

- Higher education and training (HET): Higher certificate, advanced national (vocational) certificate, Level 5 or occupational certificates.
- HET Diploma, advanced certificate or occupational certificate, Level 6 or occupational certificates.
- HET BA degree (undergraduate), advanced diploma or postgraduate certificate, Level 7.
- HET Hons degree or postgraduate diploma, Level 8.
- HET MA degree, Level 9.
- HET PhD degree, Level 10.

This chapter highlights the relevance of higher education degrees.

Unemployed graduates

This chapter explores and measures the value of the higher education certificate in terms of the expectations of the job market in particular and society in general. Can new graduates obtain work with their degrees? Are they adequately equipped with the knowledge, skills and values required for employment?

Comparative method

Comparing is human nature. Comparative international researchers use the comparative method to identify, describe, juxtapose, differentiate, integrate and propose best practices. This study used only the first three actions of comparative research. The researcher wanted to highlight the plight of unemployed graduates in the BRICS member states.

Research design and methodology

This qualitative study used the interpretivism paradigm. The interpretivism paradigm 'is concerned with understanding the world as it is from the subjective experiences of individuals' (Reeves & Hedberg 2003:32) and requires putting analysis into a specific context. The researcher investigated the value and employability of the higher education graduates of the BRICS member states through comparison to explore the best education practices in these countries that could ensure the relevancy of higher education. Therefore, data were collected and analysed considering the respective contexts of each country. The procedures and sources were selected based on their ability to provide insight into the phenomenon under investigation. Data comprising relevant policies, legislation and other governmental sources were collected. The comparative method was used to compare the value of higher education degrees for the BRICS member states. The following question was posed: do graduates obtain jobs when they have graduated? Steyn (2008:1) described the distinct phases of the comparative method as follows:

- **Action 1:** Identifying features to be compared with applicable higher education systems. These characteristics are identified based on theoretical and practical analysis and the boundaries and limitations set out by the research design and foci for comparison.
- **Action 2:** Describing the features that must be equated. Describing or ordering is done based on the available theoretical basis and employing a relevant phenomenon analysis. The description is fragmented (simplified) into short declarations or indicators to summarise the crucial features of the topic.
- **Action 3:** Sequencing (juxtaposing) the aspects to be compared. In this phase, the indicators of the aspects to be compared are arranged side by

side or such that the variables can be seen. The pointers are thus described in such a way that corresponding indicators can be linked.
- **Action 4:** Writing down similarities and differences. Obvious and multifaceted or implicit similarities and differences between the relevant indicators are demarcated clearly. From similarities, general or universal characteristics can be developed, and from differences, individual characteristics can emerge.
- **Action 5:** Explaining similarities and differences in the context of relevant theory and external and internal determinants.
- **Action 6:** Developing the best practice. From the equation and explanation of the equations, lessons learnt or generalisable practices can be deduced for comparison research. After linking these lessons to existing theory or practice, guidelines can be provided as best practices for application in practice or theory.

Purposeful sampling was the most appropriate method to select relevant documents from the BRICS member states regarding unemployed graduates. The sample size was guided by documents of the BRICS member states available in English. These documents included government documents, academic journals and international statistics provided by international organisations.

BRICS university graduates

This investigation will now focus on the BRICS member states and the unemployment rate of their university graduates, focusing on Smedegaard and Barnett's (2020) culture pillar. Do we have irrelevant degrees in higher education in BRICS member states? Can BRICS universities eat what they bake? According to Hwang (2017):

> The graduate unemployment rate is one of the current issues being discussed by higher education scholars. College students spend their time and money to receive educational advantages unavailable to high school graduates. So, if they face unemployment, they are more vulnerable to unfavourable economic conditions because they have already spent their resources pursuing higher education. (p. 1)

The cost of higher education is substantial. However, the return on this investment is not always what was expected. Hwang's (2017) quoted statement summarises the dilemma of the unemployed graduate. Higher education institutions must self-evaluate their relevance to society. Graduate students invest significant financial resources to attain their qualifications. The following example of a BRICS member state highlights the financial implication of tertiary education for a South African student.

This example is generic and focuses on the financial implication of a four-year degree at BRICS universities. The tuition cost is R50 000 per year (NWU 2020). Textbooks and learning material will add another R6 500 annually.

Accommodation and municipal costs will be R48 000 (OppiKampus 2020). Travelling and food will add another R20 000. Therefore, the total annual cost of studying at a university is an estimated R150,000. The cost of a four-year-long tuition cycle could be estimated at around ZAR600,000, which is comparable to INR2,900,509.20 (Indian rupee), or = BRL202,707.60 (Brazilian real), or = RUB2,921,267.40 (Russian ruble), or = CNY257,166.00 (Chinese yuan or renminbi). Graduates expect a positive outcome after such a huge investment in education. However, Cairo and Cajner (2016) stated that although people who are more educated than uneducated have a better chance, they still struggle to survive in the job market. Hwang (2017:3–6) gave the following four indicators regarding graduate versus employment factors:

- **Market condition: How does the market affect graduate unemployment?** The marketplace and conditions are ever-changing. In prosperous times, the job market is undersupplied. When the economic marketplace deteriorates, as in the COVID-19 era, graduates will have to be retrained, and employment strategies will be different.
- **Overeducation – mismatching supply or demand:** Students often make mistakes in measuring the employment marketplace. They want to study what they are passionate about, but sometimes those skills are not needed in the marketplace. If students are overeducated in a field, they will find it difficult because of the market demand.
- **The imbalance between individual perspectives and reality:** The perspective of the future student or new graduate is skewed and unaligned with reality.
- **Skills and the ability to be employed:** The breach between students' established skills and abilities on campus and real-world occupation requirements can be another reason for unemployment.

The BRICS member states, therefore, must prioritise their education declarations on the employability of BRICS graduates. The 4IR needs different skills, and students must align their dreams with the reality of the job market. Higher education institutions must also adapt and focus on skills, knowledge and values to prepare the future generation. We must bake what we are willing to eat. The following paragraph focuses on the current scenario in each BRICS member state regarding the unemployment of graduates.

Federative Republic of Brazil: Graduate unemployment

Ana Carolina Gomes da Silva's story highlights the plight of unemployed graduates in São Paulo, Brazil (Reuters 2017). She was the first in her family to obtain a higher education. She obtained not only a first degree but also a MA degree in paediatric medicine. Brazil's worst recession occurred in 2014, and Ana has been jobless for four years. Her situation correlates with Hwang's (2017) first indicator, showing the effect of market conditions on graduate unemployment.

The International Labour Organisation (2016) stated the following about the employment record of Brazil's youth with post-high school education. *Youths* in this report are defined as between 15- and 29-years-old. Of youths (male and female) with postsecondary vocational training, 9.7% are unemployed, and 8.3% of youths (male and female) with university or postgraduate degrees are unemployed. Gender imparity is also highlighted, with 5.4% of males with university or postgraduate degrees being unemployed compared with 11.1% of females with such degrees being unemployed (International Labour Organisation 2016). This figure highlights the unemployability of higher education graduates. Higher education scholars should research this phenomenon in Brazil, where nearly 10% of youths with FET do not get employment. Hwang's (2017) fourth indicator comes into play – the skill and ability to hire are not coordinated.

Russian Federation: Graduate unemployment

Vorotnikov (2019) zoomed in on the problem of high graduate unemployment in the Russian Federation. He stated that the Russian government earmarked resources and action plans to solve the persistently high unemployment rate amongst graduates of domestic universities over the past 20 years. He quoted Prime Minister Dmitry Medvedev when he pointed out that 25% of graduates (i.e. one in four graduates) do not find employment in the first year after graduating. He indicated two main reasons for the unemployment situation: firstly, the complex economic situation, and secondly, the inadequate quality of higher education in Russia. Even before Vorotnikov, Cobb (2017) highlighted, regarding the crisis of unemployed graduates in Russia, that a third of Russia's unemployed youth had advanced degrees or had completed other tertiary education. 'Approximately 30% of Russian university graduates under 25-years-old do not have a full-time job. If they do, they've had a rough time getting there' (Deutsche Welle 2020).

The problem of unemployed educated people is a major issue in the Russian Federation. Different international sources and the Russian government acknowledge the problem. BRICS, as a cooperative international organisation, must earmark the high unemployment figures of graduates as a significant challenge. It must form part of the BRICS education declarations for attention.

Republic of India: Graduate unemployment

The employment situation in India, according to a report by the Azim Premji University (2016:1), pinpoints the following regarding graduates:

- India's unemployed are typically higher educated and young people.
- Amongst inner-city females, graduates account for 10% of the employed population but 34% of the unemployed.

- The age cluster of 20–24-years-old is vastly overrepresented amongst the jobless. Amongst inner-city males, this age group accounts for 13.5% of the employed population but 60% of the unemployed.
- Females are affected considerably worse than males. They have higher unemployment rates and lower labour force participation rates.

India has the lowest unemployment rate of the BRICS member states at 2.6%. Analysing the 2.6% of unemployed people in the Republic of India highlights a thought-provoking issue. A statistical analysis of the different educational levels of the unemployed shows that postsecondary-educated individuals have the highest figures. Statista (2020) shared the following figures with regard to unemployment in India: the percentage of uneducated people (illiterate people, below primary education, primary schooling, middle schooling, secondary schooling and upper-secondary schooling) makes up only 20.8% of the total unemployed people in India of 2.6% of the working population. A staggering 52.9% of the unemployed have postsecondary schooling, such as diplomas, certificates and degrees. Hwang's (2017) Pillar 1 is the most applicable to India because the market condition affects graduate unemployment.

People's Republic of China: Graduate unemployment

Tang (2020) narrated the bleak employment situation of Rita Zhang. According to Tang, the 23-year-old had been looking forward to starting employement at an advertising agency start-up. She graduated from the University of Beijing with a degree in cultural industry management. The employer retracted the offer and Zhang had to accept a job as an assistant for CNY 2 000. The job lasted only two months. The United Overseas Bank (2020) stated that while the unemployment rate in China is 5.7%, its unemployment rate amongst new graduates is 19.3%. Regarding the serious lack of skilled workers and the high number of graduates seeking work in China, the International Labour Organization (2016) has concluded that projections show that one-third of graduates working in China work in an occupation disparate from their education field. Studying technical, engineering or scientific subjects leads to a higher correlation, whereas liberal arts, environment and law subjects have the lowest correlation (Schucher 2014). Hwang's (2017) Pillar 1 is more prominent in China because its overeducation has led to mismatching the supply versus demand.

Republic of South Africa: Graduate unemployment

Bafana Kunyane, 31-years-old, echoes the challenges of unemployed graduates in South Africa with this statement: 'You live on hope and faith, especially

hope'. The *Mail & Guardian* newspaper article by Bangani (2019) focused on graduate unemployment in South Africa. Bafana Kunyane graduated with honours in a Bachelor of Science degree in Geology from the University of the Western Cape. In 2019, he was working at a learning centre but had not been paid for two months, and the job responsibilities were not aligned with his education. Colette Seema asked the following question in the article: What is a degree to an impoverished family? She, too, was the first to graduate in her family, but the tuition and other fees had taken a toll on their finances. She thought that life would be better, but in the end, she was stuck with mounting debt and no job.

The results of Statistics South Africa (2019) for the first quarter of 2019 present an unemployment rate of 31% among graduates up to 24-years-old. The database of the South African Council for Graduates Cooperative (2020) comprises about 30 000 unemployed graduates, 3 580 graduates from universities, 7 890 from universities of technology (UoTs) and 20 008 from technical and vocational education and training (TVET) colleges in South Africa. The higher education fraternities in South Africa should take notice of their outputs. These statistics about unemployed graduates highlight the unsustainable outputs of HEIs in South Africa.

Conclusion

The UN's SDG 4 aims to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. The BRICS member states have agreed on ideals regarding quality education, including strengthening the collaboration amongst the BRICS universities and the importance of working with UNESCO to accelerate progress in terms of education for all. One aspect of higher-quality education is the value of the degrees confirmed by universities. This aspect measures the sustainability of HEIs. When HEIs produce graduates that cannot get a job, these institutions cannot justify sustainable higher education development. The data presented reveal that all BRICS member states must focus on the quality and applicability of their higher education degrees. The statistics regarding graduate unemployment in the BRICS member states indicate that the market must be considered when creating curricula and doing degree planning at HEIs. We must be able to present the cakes we bake, and the cakes must adhere to the needs of the market. The BRICS organisation and BRICS HEIs must add to their education declarations the need for sustainable 4IR higher education degrees that will attend to the high number of unemployed graduates in the member countries. The unemployment of graduates comments on the sustainability of higher education in the BRICS countries. Sustainable Development Goal 4 sets targets for quality education. The high employment rate amongst graduates highlights the sustainability and quality of specific graduate programmes at BRICS HEIs.

Chapter 6

The Fourth Industrial Revolution in the higher education institutions of selected BRICS countries: An education law and policy perspective

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Introduction

The BRICS countries are in the gradual process of accommodating the Fourth Industrial Revolution (4IR) in their higher education institutions (HEIs) in terms of enabling teachers to use and teach 4IR knowledge, skills, values and attitudes in schools. This process is part of the global agenda of implementing the sustainable development goals (SDGs), specifically SDG 4 and SDG 9. Sustainable Development Goal 4 ensures inclusive, qualitative and lifelong education for all, while SDG 9 encourages countries to introduce 4IR infrastructure and information technology and foster innovation to improve education. Based on scholarly

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literature, there is a lack of clarity on how education legislation, policy and plans in selected BRICS countries regulate and guide HEIs in terms of preparing teachers for 4IR knowledge, skills, values and attitudes.

This chapter focuses on three selected BRICS countries, namely, Brazil, India and South Africa, and addresses the following two questions: how do the selected BRICS countries plan on, regulate and guide adapting HEIs in terms of enabling teachers to use and teach 4IR knowledge, skills, values and attitudes in schools? What are the roles of various education stakeholders in that process? Findings suggest that the selected BRICS countries have inflexible and outdated curricula; they are in the process of developing legislation, policies and plans that will directly and indirectly regulate and guide HEIs to prepare teachers to use and teach 4IR knowledge, skills, values and attitudes; some of the National Qualification Framework (NQF) level descriptors that regulate the competencies in the selected BRICS countries do not promote 4IR knowledge, skills, values and attitudes; the selected BRICS countries have established independent bodies that deal with accreditation and the setting of academic standards, while some are in the process of establishing them; and lastly, the selected BRICS countries involve stakeholders in the process of introducing 4IR knowledge, skills, values and attitudes in schools. Even though they are working hard to achieve SDG 4 and SDG 9, the three selected BRICS countries are not doing well in terms of ensuring that they will achieve SDG 4 and SDG 9 by 2030. A model with recommendations on how these findings can be addressed is provided.

Higher education institutions have a very important role to play in preparing teachers to use and teach 4IR knowledge, skills, values and attitudes in schools. These institutions should provide 4IR knowledge, skills, values and attitudes that will enable teachers to achieve the SDGs in all countries, including those of the BRICS organisation. Higher education institutions have a responsibility to ensure that SDG 4 and SDG 9 are achieved (Boeren 2019; Gleason 2018). The achievement of SDG 9 in a country will enable the HEIs and schools in this country to also achieve SDG 4. Gleason (2018) indicated that HEIs should work towards introducing 4IR. This means that HEIs should empower teachers to use 4IR tools and teach learners 4IR knowledge, skills, values and attitudes. For HEIs to achieve SDG 4 through the implementation of SDG 9, governments, including those of the BRICS countries (Boeren 2019; Pant 2013:91), should provide clear legislation, policies and plans that regulate and guide HEIs on what is expected from them when preparing teachers to use and teach 4IR knowledge, skills, values and attitudes in schools.

In this chapter, the author discusses the progress that has been made and the challenges that are experienced in selected BRICS countries – Brazil, India and South Africa – in terms of regulating and guiding HEIs in preparing their teachers to use and teach 4IR knowledge, skills, values and attitudes in schools. The author starts by providing a short background about 4IR and its relationship

to education. Against this background, international legislation, policies and plans that regulate and guide the BRICS countries in the preparation of teachers to use and teach 4IR knowledge, skills, values and attitudes in schools are examined as well. Furthermore, the way in which SDG 4 and SDG 9 are implemented by the selected BRICS countries to achieve the goal of introducing 4IR in their educational institutions is discussed. Existing challenges in regulating and guiding HEIs are briefly highlighted. Essential concepts that are used in the chapter are clarified and brought forth as the focus of the chapter. Also discussed is the method of data collection. The legislation, policies and plans of the selected BRICS countries are analysed to find out how they regulate and guide HEIs in preparing teachers to use and teach 4IR knowledge, skills, values and attitudes. Thereafter, a summary of essential findings that should be considered by the BRICS countries is provided. Lastly, the author provides a model that recommends how the findings can be addressed. In the next section, the background of this chapter is given.

Background

The 4IR follows the three previous industrial revolutions, which are called the First, Second and Third Industrial Revolutions (Presidential Commission on the Fourth Industrial Revolution 2020). According to Gleason (2018:1), the First Industrial Revolution emerged in the 1780s with engines that used steam power. The Second Industrial Revolution (2IR) emerged in the 1870s with mass production and electricity, while the Third Industrial Revolution (3IR) emerged with information technology (Gleason 2018). It should be noted that some of the teachers in some of the BRICS countries are still living in one of the three previous revolutions. Higher education institutions have a major role to play in moving them from the previous revolutions to the present one, which is commonly called 4IR or 4.0.

In 2015, the United Nations (UN) launched the 17 SDGs (Pandey 2018:7). This chapter refers to two of these goals, namely, SDG 4 and SDG 9. The purpose of SDG 4 is to make sure that countries provide quality teaching and learning opportunities that benefit everyone (UNESCO 2016:7). Countries should also provide education equally, and learning should last throughout a person's life (UNESCO 2016:7). Therefore, HEIs should prepare teachers who will be able to achieve this goal (SDG 4). Sustainable Development Goal 9 encourages countries to introduce a strong and effective infrastructure that supports the delivery of inclusive and quality education and should ensure that innovative measures that promote education are taken (UN 2020:2, 14). Therefore, HEIs should prepare teachers to be innovative and also teach learners to be innovative. All of the BRICS countries are expected to implement the SDGs, and for the purpose of this chapter, the focus is on their implementation of SDG 4 and SDG 9 of the 2030 Agenda for Sustainable Development. That is why they are also expected to develop legislation,

policies and plans that will regulate and guide their HEIs in preparing teachers to use and teach 4IR knowledge, skills, values and attitudes. The next section provides the problem statement of this chapter.

Problem statement

Many countries, including some of the BRICS countries, could not effectively use online teaching during the COVID-19 lockdowns that took place during the past two years. The lack of teacher training on the use of technology, especially online teaching, has been a cause of the aforementioned challenge. This is supported by Jantjies (2020), who stated that before COVID-19, some teachers had not received formal training on how to use online teaching. The use of online teaching would not be a challenge if all countries made significant progress in the implementation of SDG 4 and SDG 9. For instance, SDG 4.2 targeted that by 2020, communication and information technology should have been expanded in both developed and developing countries. Furthermore, SDG 9.3 states that by 2020, the least developed countries should have been able to provide affordable Internet to their communities. Unfortunately, most of the least developed countries had not achieved this goal (SDG 9.3) by 2020. As we are in the era of the 4IR, it is important that BRICS countries should prepare their teachers to use and teach learners the knowledge, skills, values and attitudes of the 4IR. The problem with regard to the introduction of the 4IR in schools is that it is not clear how the BRICS countries regulate and guide their HEIs to prepare teachers to use and teach 4IR knowledge, skills, values and attitudes in schools. This may be caused by the fact that the 4IR is a new phenomenon that has introduced new ways of doing things. Education legislation, policies and plans need to regulate and guide the process of introducing the 4IR in education. Abusendra (2019) posited that the introduction of the 4IR in schools should be well-governed and regulated. Even though HEIs have academic freedom, they need to be regulated and guided by the departments or ministries that are responsible for higher education in their countries. At the same time, over-regulating them on this aspect may end up affecting their autonomy and academic freedom.

Another problem involves the preparedness of the BRICS countries to introduce the 4IR. Lifelong learning and technology are the keys to introducing 4IR knowledge, skills, values and attitudes in schools. Higher education institutions should use lifelong learning, which is a key element of SDG 4 (Boeren 2019), to prepare teachers who are already in the system to provide 4IR knowledge, skills, values and attitudes to learners in schools. At the same time, the state of readiness of a country regarding technology is important.

As indicated, the BRICS countries are required to implement SDG 4 and SDG 9 to ensure that everyone enjoys the right to inclusive, quality, lifelong and innovative education by providing the required infrastructure and

resources (UNESCO 2016:7, 2020:2, 14). Various countries, including the BRICS member states, are in the process of implementing these goals. According to the *Global Social Mobility Report*, where 82 countries participated in a study, Switzerland ranked first in lifelong learning, with a score of 81.1% (World Economic Forum 2020:185). Denmark ranked first in access to technology, with a score of 94.1% (World Economic Forum 2020:77).

The BRICS countries did not perform very well in this study, according to the *Global Social Mobility Report* (World Economic Forum 2020), which provides the following figures: Brazil ranked number 80 for lifelong learning, with a score of 37.9%, and ranked number 55 for access to technology, with a score of 67.8%. The Russian Federation ranked number 61, with 46.1%, for lifelong learning, and number 44, with 73.6%, for access to technology. India ranked number 41, with 52.6%, for lifelong learning, and number 73, with 52%, for access to technology. China ranked number 31, with 59.7%, for lifelong learning, and number 40, with 75%, for access to technology. Lastly, South Africa ranked number 67, with 43.1%, for lifelong learning, and number 69, with 56%, for access to technology.

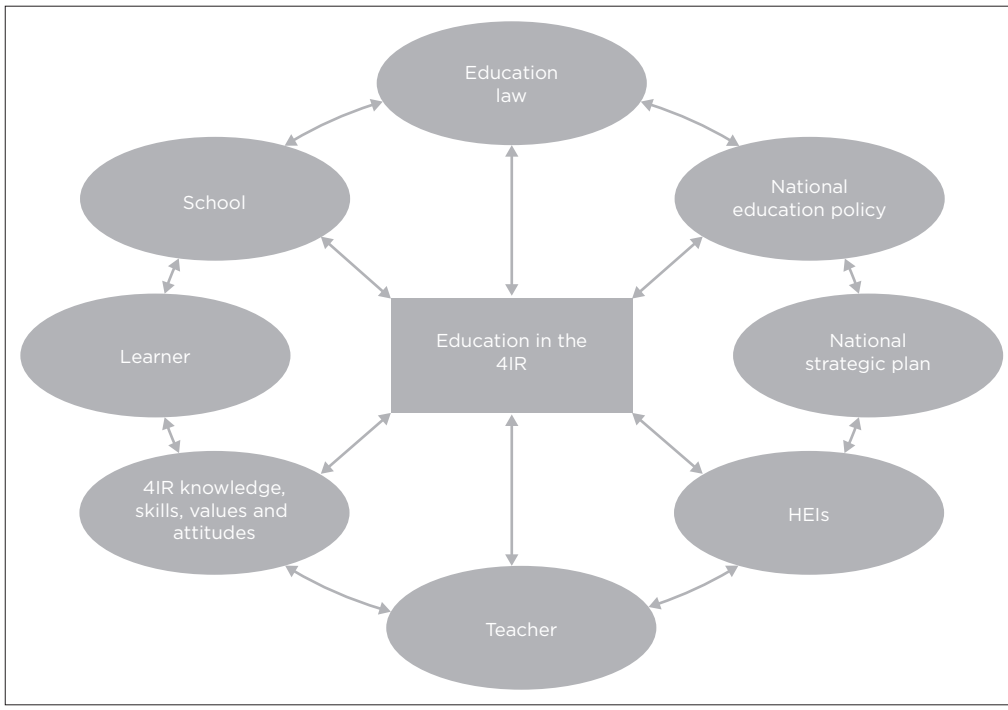
When looking at the scores and rankings provided, it is clear that there is a need for the BRICS countries to substantially improve their preparation for 4IR in order to reach the standard of Switzerland in terms of lifelong learning and Denmark in terms of access to technology.

Furthermore, the *Sustainable Development Report 2021* by Sachs et al. (2021) showed that most of the BRICS countries are not doing well in terms of ensuring that they will achieve SDG 4 and SDG 9 by 2030. The two BRICS countries that have made significant progress in terms of SDG 4 are Russia and China. None of the BRICS countries will achieve SDG 9 by 2030 at the current rate (Sachs et al. 2021:33–37). The HEIs in BRICS countries cannot implement SGD 4 and SGD 9 to prepare teachers for 4IR knowledge, skills, values and attitudes if the issues of lifelong learning and access to technology are not addressed.

Based on the problem statement, this chapter focuses on addressing the following two questions: how do the selected BRICS countries regulate, guide and plan to adapt their HEIs in terms of enabling teachers to use and teach 4IR knowledge, skills, values and attitudes in schools? What are the roles of the various education stakeholders in that process? The next section provides the clarification of concepts that informed this chapter.

Clarification of concepts

In this section, key concepts that are used in this chapter are clarified. Figure 6.1 is a visual presentation of these concepts and shows how they are interconnected with one another.



Source: Author's own work.
Key: 4IR, Fourth Industrial Revolution; HEIs, higher education institutions.
FIGURE 6.1: A visual presentation of the key concepts.

The central rectangle provides the key concept on which all of the other concepts are based. The oval shapes have important concepts that are attached to the main concept and should be clarified in order to provide a clear understanding, meaning and purpose of this chapter. The concepts are 'education in the 4IR', 'education law', 'national education policy', 'national strategic plan', 'HEIs', 'teacher', '4IR knowledge, skills, values and attitudes in education', 'learner' and 'school'. Together, these concepts provide an overview of how education legislation and education policies should regulate and guide HEIs to prepare teachers to use and teach 4IR knowledge, skills, values and attitudes in schools. These concepts are clarified in the subsections that follow.

Education in the Fourth Industrial Revolution

The 4IR is the 'integration of multiple exponential technologies such as artificial intelligence, biotechnologies and nanomaterials' (Penprase 2018:215). The 4IR is associated with advanced technologies, such as artificial intelligence,

drones, machine-learning, 3D-printing, blockchain, the Internet of Things (IoT), robotics, cloud computing, big data, cyber-physical systems, coding and high-level engineering (National Planning Commission 2020:48, 51, 67, 68). For the purpose of this chapter, education in the 4IR focuses on multiple exponential technologies that can be used by teachers and schools; can be taught to learners as knowledge, skills, values and attitudes; and can be practically applied by learners. Education in the 4IR should enable teachers and schools to achieve SDG 4 and SDG 9. For this reason, HEIs should prepare teachers to successfully implement education in the 4IR in order to achieve SDG 4 and SDG 9.

Education law

Education law is derived from the two concepts 'education' and 'law'. 'Education' is the process of educating or being educated (Dictionary Unit for South African English 2002:369). 'Law' refers to rules that are used to regulate people's actions (Dictionary Unit for South African English 2002:656). Joubert (2015:2) defined 'law' as 'a body of norms and rules that must be accepted by society as its legal system'. These norms and rules are passed by a legislative body that has the power to make law (Joubert 2015:4). Based on these clarifications, the author of this chapter defines 'education law or legislation' as the norms and rules that have been passed by a legislative body that has the power to regulate the actions of people who are involved in the process of educating or being educated. The concept of law is used in this chapter to refer specifically to education law. Education law should regulate the introduction of 4IR in schools and enable teachers to achieve SDG 4 and SDG 9. Higher education institutions should also prepare teachers to use education law so that they introduce 4IR in schools as required by law and do not infringe on other people's rights.

National education policy

De Waal and Beckmann (2019:5) defined 'education policy' as a guideline for education-based 'functionaries', and it does not have legal power. They further stated that if a policy meets all legal requirements, it also has the power of the law. Based on this clarification by De Waal and Beckmann, the author of this chapter defines 'education policy' as a guideline that meets legal requirements that guide persons who must perform official functions or duties in education. The concept of education policy is used in this chapter to refer to the national education policy of various countries. The national education policy should guide teachers and schools in the introduction of 4IR in schools for the achievement of SDG 4 and SDG 9.

National strategic plan

The concept of a 'strategic plan' is derived from the two words 'strategy' and 'plan'. Maleka (2014:6) argued that a strategy has to do with the integration of activities, the allocation of resources and the utilisation of allocated resources in order to achieve the goals of an organisation. The *South African Concise Oxford Dictionary* (2002:892) defined 'plan' as 'a detailed proposal for doing or achieving something'. Based on the clarification of the previous two concepts, the author of this chapter defines 'strategic plan' as a detailed proposal that provides activities and suggests how scarce resources should be allocated and utilised to achieve the goals of a specific country. For the purpose of this chapter, the national strategic plans of governments should be informed by SDG 4 and SDG 9. This chapter focuses on national educational plans that have an element of 4IR in them. The concept of a 'plan' is used in this chapter to refer to the national strategic plan. To achieve SDG 4 and SDG 9, the national strategic plan should provide activities and suggest how scarce resources should be allocated and utilised to introduce 4IR in schools. Higher education institutions should prepare teachers to work towards achieving the national strategic plans of their countries when introducing 4IR in their schools.

Higher education institution

Section 1 of the *Higher Education Act 101 of 1997* (Republic of South Africa 1997) defined HEI as a public or private institution that offers higher education programmes on a full-time, part-time or distance basis. Higher education institutions have an important role to play in ensuring that teachers are prepared to achieve SDG 4 and SDG 9.

Teacher

The *South African Concise Oxford Dictionary* (2002:1202) defined 'teacher' as 'a person who teaches at a school'. For the purpose of this chapter, the concept of teacher refers to a person who teaches in a pre-primary, primary or secondary school and not at the tertiary level at an HEI. The term refers to both preservice and in-service teachers.

Knowledge, skills, values and attitudes in education for the Fourth Industrial Revolution

The concept 'knowledge, skills, values and attitudes in education for the 4IR' refers to knowledge, skills, values and attitudes that are based on the 4IR, which teachers should use and teach learners. In this chapter, this concept is

also referred to as '4IR knowledge, skills, values and attitudes'. For the governments of the selected BRICS countries to achieve SDG 4 and SDG 9, they should work together with various stakeholders, including HEIs, in deciding on 4IR knowledge, skills, values and attitudes that should be taught to learners. This will also inform the curriculum for teacher training and development that should be provided by HEIs.

Learner

Section 1 of the *South African Schools Act* (84 of Republic of South Africa 1996b) defined 'learner' as any person who is receiving education from a school. In other BRICS countries, the word 'student' is used to refer to this concept.

School

Section 1 of the *National Education Policy Act* (27 of Republic of South Africa 1996a) defined 'school' as a pre-primary, primary and secondary school where education is offered.

The section that follows explains how the BRICS countries and the documents that have been analysed were selected.

Methodology

This chapter is qualitative in nature. Data were collected and analysed through content and discourse analysis. The literature and documents that were analysed include legislation, national policies, national strategic plans and academic documents of the selected BRICS countries. The selection of the three BRICS countries that have been studied was based on the accessibility of the required documents. The author managed to access the necessary documents of Brazil, India and South Africa, while Russia and China were not studied because the author could not access the required documents. The documents that were selected have an element of 'education in the 4IR', and they focus on the selected BRICS countries. They directly and indirectly regulate and guide HEIs to prepare teachers to use and teach 4IR knowledge, skills, values and attitudes in schools. Furthermore, depending on the relevance, availability, accessibility and richness of the documents, either legislation, policies or plans were selected for analysis. In some countries, more than one relevant document was analysed. The following section deals with the analysis and discussion of the legislation, policies and plans of the selected BRICS countries and relevant literature.

Legislation, policies, and plans in BRICS countries that guide and regulate higher education institutions in preparing teachers to teach Fourth Industrial Revolution knowledge, skills, values, and attitudes

In this section, the author analyses and discusses the way in which the three selected BRICS countries – Brazil, India and South Africa – regulate and guide their HEIs to prepare teachers to use and teach 4IR knowledge, skills, values and attitudes in schools. It has been stated in the problem statement that these three countries are not doing well in ensuring that they achieve SDG 4 and SDG 9 by 2030 (Sachs et al. 2021:33–37). Therefore, the governments and HEIs of these three countries need to make a significant improvement in preparing teachers who will assist in achieving these goals.

This section focuses on legislation, policies and plans that directly and indirectly influence the preparation of teachers for 4IR in HEIs. For instance, legislation, policies and plans that are developed by the departments or ministries of higher education of countries with the purpose of regulating and guiding HEIs have a direct influence on HEIs. At the same time, legislation, policies and plans that are developed by these countries' departments or ministries of basic education with the purpose of regulating and guiding schools have an indirect influence on HEIs. This is because HEIs have to prepare teachers to teach according to the legislation, policies and plans of these departments or ministries of basic education. Therefore, they should be trained in legislation and policies and implement the plans. In the subsections that follow, the author analyses and discusses the legislation, policies, plans and relevant literature based on the selected three countries, starting with Brazil.

Brazil

The Organisation for Economic Cooperation and Development (OECD) (2015:14) indicates that the education system of Brazil is controlled, to a great extent, by the state and municipalities. Brazil has one department that controls both higher and basic education. It has various structures and systems that can play various roles in preparing teachers to use and teach 4IR skills in schools. The Ministry of Education is responsible for providing the principles and framework that guide education at all levels (OECD 2018:69). This means that the Ministry of Education has the responsibility to provide the guiding principles of how HEIs can prepare teachers to use and teach 4IR skills.

The Brazilian Ministry of Education consists of numerous secretariats, and for the purpose of this chapter, the author focused on the Secretariat of

Higher Education and the Secretariat of Regulation and Supervision of Higher Education (OECD 2018:69). One of the roles of the Secretariat of Higher Education is to develop the overall strategy of the federal government in higher education (OECD 2018:69). The OECD stated that the Secretariat of Regulation and Supervision of Higher Education is responsible for regulating and supervising the education system to ensure quality education. This means that the secretariat has a role to play in regulating and guiding HEIs to prepare teachers for 4IR. This can be done by ensuring that teacher education programmes that are approved by the Secretariat of Regulation and Supervision of Higher Education provide for 4IR knowledge, skills, values and attitudes. The *White Paper – Skill Development for Industry 4.0* (BRICS Business Council 2016:36) stated that Brazil depends on generic certification systems instead of using the National Qualification Framework.

The National Council for Education is a body that develops national education plans that provide guidance to all basic and tertiary education institutions (OECD 2015:14). Brazil's *National Education Plan* (NEP) *of 2002* provides two main goals for the training of teachers in 4IR-related skills (Federal Republic of Brazil 2002). The first goal of the NEP 2002 was to train 12 000 teachers in a period of ten years to provide educational technology (Federal Republic of Brazil 2002:17). The second goal was to provide training to 150,000 teachers on skills that are related to educational computer technology in a five-year period in order to increase annual training by 20% (Federal Republic of Brazil 2002). The HEIs in Brazil were assigned the role of implementing this plan in order to prepare teachers to use and teach 4IR knowledge, skills, values and attitudes in school.

In 2014, the Brazilian National Council for Education approved Brazil's NEP 2014–2024 (Federal Republic of Brazil 2014), which was established in terms of the *Federal Law* (13 005 of 2014) (Bucci & Gomes 2017). In terms of Article 1(VII) of the NEP 2014–2024, the guidelines of this plan promote humanity, science, culture and technology. This means that one of the roles of the NEP 2014–2024 is to promote technology in Brazil. Strategy 5.6 of the plan states that the government of Brazil intends to provide teachers who are involved in initial and continuing training with knowledge that is based on modern educational and pedagogical technologies and innovations. Higher education institutions have an essential role to play in teacher preparation for 4IR knowledge, skills, values and attitudes. Strategy 12.14 of the NEP 2014–2024 indicates that one of its strategies is to ensure that the personnel of HEIs are trained to improve quality education (SDG 4) and address the technological and innovation needs (SDG 9) of the country. Brazil's strategy of training lecturers in the education faculties of HEIs on 4IR-related skills will assist in preparing teachers to use and teach 4IR knowledge, skills, values and attitudes in schools.

Furthermore, Strategy 15.6 of the NEP 2014–2024 provides that Brazil is in the process of curriculum reform and pedagogical renewal to 'incorporate modern information and communication technologies (SDG 9.3), in conjunction with the common national base of basic education curricular (SDG 4)' (Federal Republic of Brazil 2014). In this case, Brazil has aligned its Strategy 15.6 of the NEP 2014–2024 with SDG 4 and SDG 9.3 of the UN. Strategy 4.1 of the plan indicates that the purpose of curriculum reform is to address the needs of the country so that it is not left behind regarding development. It is targeted that Brazil's national curriculum framework for learners and teachers should be completed by 2021 (Strategies 4.30 and 5.28 of the NEP 2014–2024). What is interesting about the existing Brazilian curriculum is that it provides vocational education to primary and lower secondary school learners (BRICS Business Council 2016:36). Higher education institutions should prepare teachers for these skills.

UNESCO (2010) stated that the Brazilian government's law no. 10.861 of 14 April 2004 'established the National System of Higher Education Evaluation'. The National System of Higher Education Evaluation is supervised and coordinated by the National Committee for the Evaluation of Higher Education and is responsible for evaluating and supporting the development of tertiary institutions. United Nations Educational, Scientific and Cultural Organization indicates that the main function of the National Committee for Evaluation of Higher Education is to ensure that the evaluation process in HEIs takes place properly.

The organisation Coordination for the Improvement of Higher Education Personnel has the task of monitoring and evaluating postgraduate courses. Both the National Committee for Evaluation of Higher Education and the organisation Coordination for the Improvement of Higher Education Personnel have very important roles to play in evaluating the impact of teacher courses in preparing the use and teaching of 4IR skills in schools.

The training of teachers at HEIs is also influenced by legislation, policies and plans that regulate and guide basic education. This is because HEIs must prepare teachers to teach according to basic education legislation, policies and plans. For instance, Strategy 5.4 of Brazil's NEP 2014–2024 states that one of its strategies is to provide educational technologies and innovative pedagogical practices (SDG 9.3) that ensure literacy and improve the school flow and learning of learners (SDG 4) (Federal Republic of Brazil 2014). Strategy 7.20 of the plan indicates that all public schools of basic education should be provided with equipment and digital technological resources for pedagogical use in a school environment. It cannot be overemphasised that the HEIs in Brazil have an essential role to play in preparing teachers so that the aforementioned two strategies are achieved in schools. The NEP 2014–2024 mentioned that professors, teachers, students, school managers and

community structures should be involved in achieving Brazil's strategic goal (Federal Republic of Brazil 2014:4). The statement shows that the Brazilian government recognises the role that should be played by its stakeholders in the introduction of 4IR in education.

Despite the fact that Brazil's curriculum is inflexible and outdated in terms of 4IR requirements, the Brazilian government is working to achieve SDG 4 and SDG 9, which will assure quality education and the provision of 4IR knowledge, skills, values and attitudes in schools. It should also be noted that while Brazil is still facing challenges in the implementation of SDG 4 and SDG 9 (Aujouannet 2017:3), it has managed to make some improvements in the provision of quality education and fostering infrastructure and innovation comparative to most developed countries (Federal Republic of Brazil 2017). In May 2017, the government managed to launch an innovative infrastructure that enabled schools in remote locations to have access to broadband Internet (Federal Republic of Brazil 2017:64). The introduction of broadband Internet in remote locations plays an important role in the provision of quality education in schools in Brazil.

While all the aforementioned instances of progress have been made, the *Sustainable Development Report 2021* indicates that in terms of making progress toward achieving SDG 4 by 2030, many challenges remain (Sachs et al. 2021:35). Nevertheless, the implementation of SDG 4 in Brazil is increasing at the needed rate to achieve this goal by 2030. Regarding the achievement of SDG 9, Brazil is still experiencing significant challenges, and the increase rate to achieve SDG 9 by 2030 is below 50%.

India

Education in India is controlled by the Ministry of Education of the Government of India, which was formerly known as the Ministry of Human Resource Development (Ministry of Education [India] 2020b). The Ministry of Education consists of two departments, namely, the Department of School Education and Literacy and the Department of Higher Education (Ministry of Education [India] 2020b). The Department of School Education and Literacy deals with 'primary, secondary and higher secondary education, adult education and literacy', while the Department of Higher Education 'deals with University, technical, scholarship, etc.' (Ministry of Education [India] 2020b). The Ministry of Education is responsible for developing and implementing the National Policy on Education (Ministry of Education [India] 2020b). The Department of Higher Education of India houses one of the world's largest higher education systems and comes after those of the United States of America and China (Ministry of Education [India] 2020b). India has a National Qualification Framework (BRICS Business Council 2016:36).

The NEP 2020 of the Government of India is a recent policy that has been developed by the Ministry of Education. In this section, the author analyses how this policy regulates and guides HEIs to prepare teachers to use and teach 4IR knowledge, skills, values and attitudes in schools. Also discussed is the way in which the education legislation, policy and plans that are developed by the Department of School Education influence the way HEIs should train teachers to use and teach 4IR knowledge, skills, values and attitudes in schools. India's NEP 2020 states that in 2015, India adopted the global education development agenda that was based on SDG 4. The NEP 2020 is aimed at re-establishing teachers of India at all levels.

Item 5.1 of the NEP 2020 indicates that the quality of teachers' education is not where it is supposed to be in terms of desired standards (Ministry of Education [India] 2020a). This item provides that teachers should be developed to ensure the best future for learners. Item 5.15 of the NEP 2020 states that teachers will be given an opportunity to learn the latest innovations. Some of these teacher development programmes on innovation should be provided by HEIs.

India is in the process of developing the National Standards for Teachers (Item 5.20 of the NEP 2020). The process of developing these standards is planned to be completed by 2022. In terms of Item 5.20 of the NEP 2020, the National Standards for Teachers will be developed by the National Council for Teacher Education in its restructured new form as a professional standard-setting body under the General Education Council. Furthermore, HEIs and other institutions will also be consulted so that the standards that have been developed meet the required standards and competencies. It is important that the standards should also be designed in such a way that they prepare all teachers to use and teach 4IR skills in various subjects.

Item 5.20 of the NEP 2020 provides that teacher training in India will 'gradually be moved by 2030 into multidisciplinary colleges and universities' (Ministry of Education [India] 2020a). India is in the process of ensuring that the four-year BEd degree offered by HEIs becomes a minimal degree qualification for school teachers (Item 15.5 of the NEP 2020). All BEd degree programmes will include training on recent techniques that include the use of educational technology (Item 5.24 of the NEP 2020).

Item 9.1.1 of the NEP 2020 states that higher education should provide capabilities that meet 21st-century requirements (Item 9.1.1 of the NEP 2020). These capabilities include 4IR knowledge, skills, values and attitudes. Item 9.1.2 provides that learners should be developed holistically with identified skills and values, including those of 4IR, from preschool to HEIs.

The regulatory system of higher education in India is undergoing transformation. The country aims to ensure that independent bodies deal

with various aspects, including the regulation, accreditation and setting of academic standards (Item 18.2 of the NEP 2020). The National Higher Education Regulatory Council is responsible for regulating teacher education (Item 18.3 of the NEP 2020), the National Accreditation Council is responsible for accreditation (Item 18.4 of the NEP 2020) and the General Education Council should deal with outcomes for higher education programmes (Item 18.6 of the NEP 2020). The General Education Council is given the power to form the National Higher Education Qualification Framework to describe higher education qualification. For teacher education, the National Council for Teacher Education acts as the standard-setting body for teacher qualifications (Item 18.7 of the NEP 2020). Higher education institutions will decide how their educational programmes, such as teacher educational programmes, should respond to these standards. The bodies that deal with the regulation, accreditation and setting of academic standards for teachers should regulate and guide HEIs to achieve SDG 4 and SDG 9 and prepare teachers to use and teach 4IR knowledge, skills, values and attitudes.

In preparing learners for 4IR, India has identified essential subjects that learners should learn in order to achieve SDG 9.3, which focuses on access to information technology (Item 4.23 of the NEP 2020). Subjects such as mathematics, mathematical thinking, scientific temper and evidence-based thinking, creativity and innovativeness, digital literacy, coding, computational thinking, artificial intelligence and design thinking are some of the subjects that are essential for the introduction of 4IR in India (Items 4.23 and 4.24 of the NEP 2020). Higher education institutions should prepare teachers to teach these subjects.

Item 4.30 of the NEP 2020 states that India is in the process of formulating a national curricular framework that is new and comprehensive. This curriculum will be based on the NEP 2020, which includes offering learners 4IR-related subjects. Item 23.2 of the NEP 2020 indicates that the introduction of advanced (4IR) technologies will change not only what is learnt by learners but also how they learn. That is why teachers should be empowered with 4IR knowledge, skills, values and attitudes.

India intends to improve teaching, learning, assessment, teacher preparation, professional teacher development, access to education, educational planning, and managerial and administrative skills using technological interventions (Item 23.5 of the NEP 2020). Item 23.6 of the NEP 2020 provides that in order to achieve the aforementioned goal, teachers and learners at all levels will be provided with software. Teachers will be provided with technological equipment so that they can integrate e-content into teaching and learning activities. India is also planning to optimise and expand the digital platforms and ICT-based education initiatives that were used during the COVID-19 pandemic (Item 24.1 of the NEP 2020). Teachers will be trained to use online

and blended teaching (Item 24.3 of the NEP 2020) and to create high-quality online content (Item 24.4[g] of the NEP 2020). The policy also provides for stakeholder involvement in this reform. This is provided in Items 4.30, 4.34, 5.11, 5.13, 7.5, 7.7 and 7.9, and many more of the NEP 2020. To ensure that all the aforementioned objectives are achieved, HEIs should consider the NEP 2020 as a regulatory document that will guide them in their planning and implementation of teacher education programmes in India.

India is also one of the countries that have inflexible and outdated curricula in terms of 4IR requirements. The country is in the process of implementing SDG 4 and SDG 9. Even though there is still a lot to be done, according to Pandey (2018), India has made some progress towards achieving SDG 4. The implementation of several initiatives to enable digital empowerment in society, including schools, also proves that India is working towards achieving SDG 9 (UN 2017:23). In terms of the *Sustainable Development Report 2021*, India's SDG 4 challenges remain (Sachs et al. 2021:33). Sachs et al. (2021) provided a different picture to what Pandey stated in 2018 in terms of the progress made to achieve SDG 4 in India. Sachs et al. asserted that India is moving in the wrong direction when it comes to the implementation of SDG 4, and there is a significant challenge in terms of the implementation of SDG 9 in India. Sachs et al. further stated that progress on the implementation of SDG 9 in India is moderately improving.

South Africa

The South African education system is managed separately by two departments, namely, the Department of Basic Education (DBE) and the DHET (Government Communication and Information Systems *c*. 2015:56). The DBE oversees primary and secondary education, while the DHET oversees tertiary education, which includes academic institutions and postsecondary technical training (Government Communication and Information Systems *c*. 2015:60).

This section discusses how South Africa regulates and plans to adapt HEIs to 4IR in terms of enabling teachers to use and teach 4IR knowledge, skills, values and attitudes in schools. Various laws, policies and plans have been introduced by the South African government to regulate and guide the preparation of teachers to use and teach technology in schools. Some of these laws, policies and plans regulate and guide the formation and the roles of independent bodies. These range from general legislation and policies to specific educational legislation and policies. Section 5(2)(a) of the *Higher Education Act 101 of 1997* (Republic of South Africa 1997) provides that one of the functions of the Council on Higher Education is to advise the minister of higher education about qualifications. This means that the Council on Higher

Education has the responsibility to advise the minister on the need to review legislation and policies that regulate the training of teachers. It has the power to advise the minister of higher education to provide legislation and policies that regulate and guide the South African Qualifications Authority to ensure that teacher qualifications are able to prepare teachers to use and teach 4IR knowledge, skills, values and attitudes in schools.

The *South African Qualifications Authority Act 58 of 1995* (Republic of South Africa 1995) provides for the development and implementation of the NQF and, for this purpose, to establish the South African Qualifications Authority. Based on Section 5(1) of the *South African Qualifications Authority Act*, the South African Qualifications Authority has the responsibility to ensure that the bodies that deal with the establishment of education and training standards or qualifications for teachers develop standards or qualifications that prepare teachers to use and teach 4IR knowledge, skills, values and attitudes in schools. This should be done by providing policies and ensuring that these are implemented.

The South African Qualifications Authority provides 10 NQF-level descriptors that regulate the competencies that learners should attain in schools and HEIs in South Africa (South African Qualification Authority 2012:3). For each level descriptor, there are ten categories that describe applied competencies. All teachers' qualification modules that are offered by HEIs should provide for these categories, and they should differ according to the level of the qualification (level descriptor). In the South African NQF, the concepts that describe the competency that is relevant to 4IR, which is 'technology', are found in NQF Levels 6, 9 and 10. In NQF Level 6, the policy mentions that a learner should be able to present and communicate using technology (South African Qualification Authority 2012:9). The policy mentions that in NQF Level 9, a learner should also be able to use technology to solve problems, and NQF Level 10 takes it further by indicating that a learner should also be innovative and able to use technology to solve problems (South African Qualification Authority 2012:12). This means that there are three level descriptors that directly provide for competency that is based on technology. These level descriptors (NQF Levels 6, 9 and 10) regulate how educational institutions in South Africa should achieve SDG 9. The other NQF-level descriptors do not specifically provide for 4IR knowledge, skills, values and attitudes. This means that the NQF does not provide clear guidance at other levels regarding the achievement of SDG 9 in educational institutions.

Item 1 of the *Norms and Standards for Educators* (DHET 2000) guides HEIs regarding the competencies and standards that should be considered during the development of teachers. Higher education institutions should consider the *Norms and Standards for Educators* when they train teachers. Regarding

how the *Norms and Standards for Educators* (DHET 2000) regulate HEIs regarding 4IR, this policy provides that a teacher should be a scholar, researcher and lifelong learner who is practically and foundationally competent in technological literacy. It should be noted that this should be applicable to all teachers who are trained at HEIs.

As previously indicated, HEIs in South Africa are also regulated and guided by the legislation, policies and plans that regulate basic education, the reason being that HEIs should produce teachers who will be able to teach in schools according to the requirements of the DBE. South Africa is in the process of introducing 4IR subjects in schools. The introduction of 4IR in South African schools was confirmed by the minister of basic education of South Africa when she announced Ms Zora, an artificial intelligence-based education platform (Malinga 2020).

In the process of developing legislation, policies and plans to regulate how teachers should use and teach 4IR knowledge, skills, values and attitudes, the National Planning Commission released the *DRAFT digital futures – South Africa's Digital Readiness* on 06 July 2020. In this draft, the National Planning Commission (2020) stated that it is important that learners and teachers are prepared to use digital skills. Furthermore, the National Planning Commission (2020:82) indicated that learners should be prepared to use digital skills from primary school and the 'school curriculum should be revamped, not only to advance the take-up of science, technology, engineering and mathematical courses but also to promote critical thinking, flexibility and creativity'. Even though the draft does not specifically regulate and guide HEIs on their role in preparing teachers to use and teach 4IR knowledge, skills, values and attitudes, it goes without saying that HEIs have a role to play in preparing teachers for this task.

The Department of Communications and Digital Technologies published the *National Digital and Future Skills Strategy* on 20 August 2020. This strategy promotes the provision of 4IR knowledge, skills, values and attitudes in various institutions, including ECD centres, schooling and post-school education. It should be used by HEIs in preparing teachers for 4IR (Department of Communications and Digital Technologies 2020). The first element (strategy) of the *National Digital and Future Skills Strategy* deals with the digital foundations (basic and intermediate digital skills) that should be provided by teachers in schools. Higher education institutions should prepare teachers to provide these basic and intermediate skills. Furthermore, this strategy indicates that the DBE and the DHET are of crucial importance in the promotion of digital skills at schools, technical and vocational education colleges, and tertiary institutions (Department of Communications and Digital Technologies 2020). The strategy emphasises the role that should be played by HEIs in preparing teachers to use and teach 4IR knowledge, skills, values

and attitudes. The strategy also indicates that digital knowledge, skills, values and attitudes should be embedded in 'as many of the subject curricula as possible, including mathematics and languages, not only in two subjects which are Computer Applications Technology (CAT) and Information Technology (IT)' (Department of Communications and Digital Technologies 2020:10).

Strategic action point 1.1 of the *National Digital and Future Skills Strategy* mentions that the DBE should introduce computing, coding and other types of digital skills subjects. The introduction of these subjects will include but is not limited to the basics required for further studies and work in the field such as '3D printing, algorithms design and use, artificial intelligence applications, big data analytics, cybersecurity, digital content design, drone applications, gamification, mechatronics and robotics, and software engineering' (Department of Communications and Digital Technologies 2020:10). Strategic action point 1.2 of the strategy indicates that HEIs should train all preservice and in-service teachers who are at tertiary institutions in various subjects that are related to 4IR, and one of them is coding. This strategic action point also provides that teacher training curricula need to be adjusted to include 4IR knowledge, skills, values and attitudes in all subjects and modules (Department of Communications and Digital Technologies 2020:11).

The *Professional Development Framework for Digital Learning* was developed by the DBE (2017). This framework gives guidance on how teachers can improve their competencies in 4IR knowledge, skills, values and attitudes and provides the learning competencies that teachers should have in South Africa (DBE 2017). The *Professional Development Framework for Digital Learning* (DBE 2017:31) stated that the DHET should:

- Promote the development of appropriate qualification-based continuous professional development programmes aligned to the framework by universities and support them to do so as funds become available.
- Promote the integration of the framework in the design and delivery of preservice teacher education programmes and courses.
- Support the further development of teachers at tertiary institutions to integrate digital technologies into their own teaching.
- Support research on digital learning at tertiary institutions.

The DHET should play a pivotal role by regulating and guiding HEIs in preparing teachers to use and teach 4IR knowledge, skills, values and attitudes. Furthermore, the *Professional Development Framework for Digital Learning* (DBE 2017:31) stated that education faculties and teacher training institutions should:

- Integrate digital learning competencies in their teacher education programmes.
- Model digital learning competencies during teacher education activities.
- Develop students' digital learning competencies during teacher education activities.
- Conduct research, where the opportunity arises, related to the implementation of the framework and the development of digital learning competencies.

Moreover, the South African government is not leaving out stakeholders in the process of introducing 4IR in education. For instance, in the *National Digital and Future Skills Strategy*, it is provided that stakeholder collaboration will be facilitated across government departments, state agencies, government-appointed committees, organised business and labour, academia, scientific organisations and civil society (Department of Communications and Digital Technologies 2020).

Even though South Africa has inflexible and outdated curricula regarding the implementation of 4IR knowledge, skills, values and attitudes in schools, it has shown some slow improvement in the implementation of SDG 4 and SDG 9. The implementation of SDG 4, especially on access to education, has shown improvement (Statistics South Africa 2019:95). Regarding the implementation of SDG 9, the infrastructure for mobile network coverage in South Africa is also improving, albeit at a slow pace (Statistics South Africa 2019:132).

The *Sustainable Development Report 2021* (Sachs et al. 2021) revealed that South Africa has significant challenges when it comes to the achievement of SDG 4. Sachs et al. (2021:37) further stated that South Africa is moving in the wrong direction regarding the implementation of SDG 4. Regarding the implementation of SDG 9, South Africa is experiencing significant challenges as well; nevertheless, the country is moderately improving in terms of this goal (Sachs et al. 2021:37).

The section that follows provides a summary of the findings that informed the development of a model for practice.

Findings of the analysis of the legislation, policies and plans

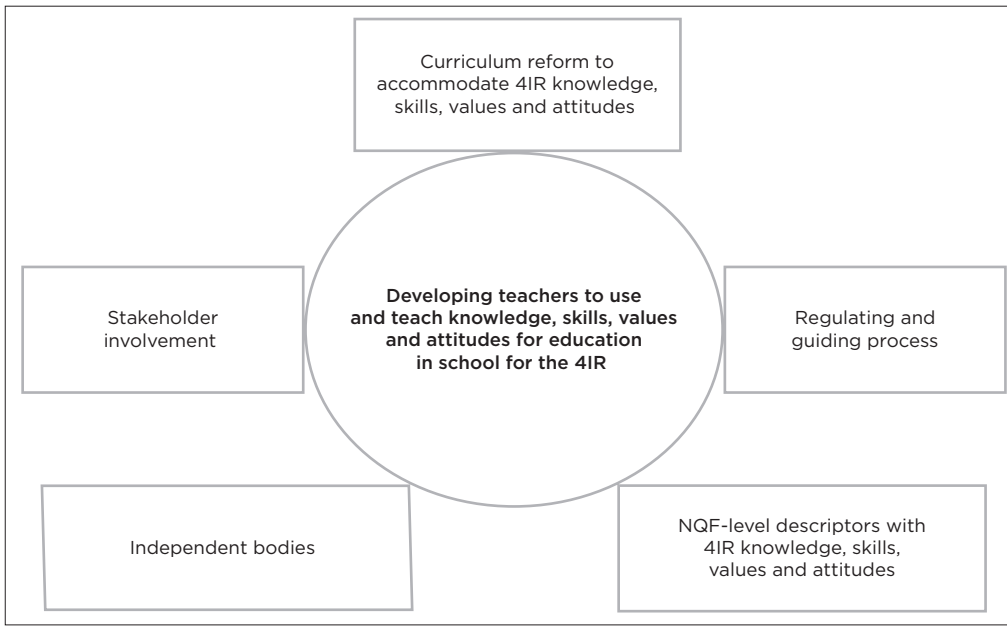
The following findings are based on the analysis of the selected BRICS countries:

- The three selected BRICS countries are not doing well in terms of ensuring that they will achieve SDG 4 and SDG 9 by 2030.

- The selected BRICS countries have inflexible and outdated curricula in terms of 4IR requirements that promote the implementation of SDG 4 and SDG 9. They are in various stages of progress in the introduction of 4IR subjects in schools. Higher education institutions cannot prepare teachers for 4IR knowledge, skills, values and attitudes in schools if the governments of the BRICS countries do not provide legislation, policies and plans that regulate and guide them (HEIs) in achieving SDG 4 and SDG 9. Without the support of the government, HEIs cannot prepare teachers for 4IR.
- The selected BRICS countries are in the process of developing legislation, policies and plans that directly and indirectly regulate and guide HEIs to prepare preservice and in-service teachers to use and teach 4IR knowledge, skills, values and attitudes in schools. Some have finished the process of developing these legislations, policies and plans and have started implementing them. Some of the selected countries have more than one law, policy or plan that is developed by various departments or ministries that provide for the introduction of 4IR knowledge, skills, values and attitudes in schools.
- Some of the NQF-level descriptors that regulate the competencies do not promote 4IR knowledge, skills, values and attitudes. Two of the selected BRICS countries – India and South Africa – have their own National Qualification Framework (BRICS Business Council 2016; SAQA 2012).
- The selected BRICS countries have independent bodies that deal with accreditation and the setting of academic standards, and some are in the process of establishing such bodies. These independent bodies are in the process of ensuring that the government and the HEIs of the selected BRICS countries achieve SDG 4 and SDG 9.
- The selected BRICS countries have started involving various stakeholders in the introduction of 4IR knowledge, skills, values and attitudes in schools.

A model for BRICS countries to prepare teachers to use and teach Fourth Industrial Revolution knowledge, skills, values, and attitudes

This model provides recommendations on how the BRICS countries can regulate and guide their HEIs in preparing teachers to use and teach 4IR skills in schools. This model can be used by departments or ministries of education of the BRICS countries, HEIs and schools to prepare teachers to use and teach 4IR knowledge, skills, values and attitudes in schools. The model is illustrated in Figure 6.2. The recommendations of the model are set out in the following:



Source: Author's own work.
Key: 4IR, Fourth Industrial Revolution; BRICS, Brazil, Russia, India, China and South Africa; NQF, National Qualifications Framework.

FIGURE 6.2: A model for BRICS countries to use to prepare teachers to use and teach Fourth Industrial Revolution knowledge, skills, values and attitudes in schools.

Reforming curriculum to integrate Fourth Industrial Revolution skills, values, and attitudes

It is indicated in the findings that the selected BRICS countries are in the process of reviewing their curricula in order to accommodate 4IR knowledge, skills, values and attitudes in schools. It is recommended that all BRICS countries should have a curriculum reform as soon as possible to avoid being left behind. The curriculum reform should be implemented in HEIs and schools and should focus on promoting SDG 4 and SDG 9. Higher education institutions should start preparing all preservice and in-service teachers to use and teach 4IR knowledge, skills, values and attitudes at school. In preparing teachers and teaching learners, it is recommended that 4IR knowledge, skills, values and attitudes should be embedded in all school subjects and the subjects offered at HEIs and should be used and taught from preschool to the level of higher education. Furthermore, HEIs should prepare all teachers, regardless of the subjects they are teaching, to use and teach 4IR knowledge, skills, values and attitudes in all subjects.

Regulating and guiding process

The analysis of the legislation, policies and plans in the earlier sections of this chapter has proved that all of the BRICS countries are directly and indirectly regulating and guiding HEIs to prepare teachers to use and teach 4IR knowledge, skills, values and attitudes in schools. It is recommended that each BRICS country should have regulatory (legislation) and guiding (policy and plan) documents that directly regulate and guide HEIs on the preparation of teachers to use and teach 4IR knowledge, skills, values and attitudes in schools. These regulatory and guiding documents should be developed by the department or ministry that is responsible for higher education. They should be developed in such a way that they do not affect the autonomy of HEIs.

NQF-level descriptors with Fourth Industrial Revolution knowledge, skills, values and attitudes

It is recommended that all NQF-level descriptors in the BRICS countries should be modified to include 4IR knowledge, skills, values and attitudes as part of competencies. The BRICS Business Council (2016) made the following provision:

> The BRICS Governance Body can oversee the development of a standard qualification framework for the BRICS nations. This will help countries in standardising the outcomes of learning and occupational standards across the five nations. Such a standard qualification will support a worker's mobility from one BRICS nation to another BRICS nation, and at the same time, will allow him or her to pursue education for the next level of qualification, avoiding repetition. (p. 49)

BRICS countries that are behind in the introduction of 4IR knowledge, skills, values and attitudes in schools can benefit from those that are advanced regarding the modification of the levels of descriptors.

Independent bodies

It is recommended that the BRICS countries should use independent bodies to deal with accreditation and the setting of standards for teacher qualifications. This will help to regulate and guide HEIs to design teacher education programmes that are based on qualitative and credible standards that have an element of 4IR knowledge, skills, values and attitudes. To avoid a contradiction in the setting of standards, government departments or ministries and HEIs in the BRICS countries should not perform the tasks of independent bodies. Independent bodies in the BRICS countries should

perform their role of ensuring that the government and HEIs achieve SDG 4 and SDG 9 in a qualitative and credible way.

Stakeholder involvement

The concept of stakeholder involvement in this chapter refers to the involvement of role players from the BRICS countries and within the countries themselves. Stakeholders from various BRICS countries should discuss curriculum reform and help one another, using their various types of experience. The recommended curriculum reform discussions should not be intended to introduce the same curricula as in the other BRICS countries but to share good practices and experience in curriculum reform. Stakeholders should develop guidelines and plans that will be used by all BRICS countries in regulating and guiding HEIs to prepare teachers to use and teach 4IR knowledge, skills, values and attitudes in school. Various stakeholders, such as the quality authorities of the BRICS countries, should work together in developing the NQF guidelines that can be used by the BRICS countries in modifying their own NQFs. They should ensure that the guidelines recommend the inclusion of the elements of 4IR knowledge, skills, values and attitudes in all NQF-level descriptors. Various independent bodies that deal with teacher education should come together to discuss their roles as BRICS independent bodies. Accreditation authorities that are responsible for teacher education should create guidelines for modifying the accreditation of teacher qualifications in the BRICS countries. Those that are responsible for setting standards can develop guidelines for setting teacher development standards that are based on 4IR knowledge, skills, values and attitudes. However, it does not mean that all teacher development standards should be the same in all of the BRICS countries.

In each BRICS country, stakeholders from various departments or ministries, HEIs and independent bodies should support the department or ministry of higher education in regulating and guiding HEIs in preparing teachers to use and teach 4IR knowledge, skills, values and attitudes in schools. The support will be based on resources and information that can be of benefit to the departments or ministries that are responsible for higher education. Other stakeholders should include the business sector, teacher unions and civil society, to mention but a few.

Increase the rate of achieving the fourth and ninth sustainable development goals

The selected BRICS countries should increase the rate of achieving SDG 4 and SDG 9 so that they can achieve these goals by 2030. All five BRICS countries

should strengthen their collaboration with one another so that they can share their best practices in terms of implementing SDG 4 and SDG 9.

Conclusion

This chapter provided information on the importance of curriculum reform in the selected BRICS countries in order to introduce 4IR in schools. In response to the questions that were addressed in this chapter, the findings of this chapter provided that the selected BRICS countries had outdated curricula in terms of 4IR knowledge, skills, values and attitudes. They are in the process of developing legislation, policies and plans that will regulate and guide HEIs in preparing teachers for the provision of 4IR knowledge, skills, values and attitudes that will assist in achieving SDG 4 and SDG 9. The selected countries prefer that the functions of accreditation and the setting of standards for courses that will be provided to teachers to prepare them for 4IR should be the responsibility of independent bodies. All the selected BRICS countries emphasise that stakeholder involvement is key to the achievement of SDG 4 and SDG 9. Even though they are working hard to achieve SDG 4 and SDG 9, the three selected BRICS countries are not doing well in terms of ensuring that they will achieve SDG 4 and SDG 9 by 2030.

The author recommends that the selected BRICS countries should increase their rate of achieving SDG 4 and SDG 9 so that they can achieve these goals by 2030. They should update their school curricula so that HEIs will be able to prepare teachers who meet the needs of SDG 4 and SDG 9. They should not work in silos but should collaborate and support one another when introducing 4IR in schools. Moreover, they should continue involving independent bodies that will deal with accreditation and the standardisation of teacher qualifications that will help these countries to achieve SDG 4 and SDG 9.

This chapter contributes to the body of knowledge in the field of technology and education legislation by providing a new model and recommendations for preparing teachers to use and teach 4IR in BRICS schools. The limitation of this chapter is that it only focuses on three BRICS countries – Brazil, India and South Africa. Areas for future study should include the analysis and discussion of the BRICS countries in terms of preparing teachers to use and teach 4IR knowledge, skills, values and attitudes in schools.

Chapter 7

Educating for sustainable development by maximising employability of graduate students within higher education teaching and learning

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Introduction

Education for sustainable development in universities is meant to empower students with the ability to make sustainable choices and decisions in their daily lives. This, in turn, connects with the engagement of students in teaching and learning that facilitates the enhancement of their knowledge, skills, values and attitudes aligned with sustainability principles. This chapter focuses on the goal of higher education for sustainable development (SD) to maximise the potential of students' future employability. The current situation shows that some

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South African higher education institutions (HEIs) present courses and offer degrees that do not provide students with adequate competencies and qualifications to gain employment successfully. A clear connection between education, society and economic development has been widely recognised within the scholarly literature and governmental reports. With globalisation and technological developments unpredictably changing at a dynamic, ever-increasing pace, the task of sustainably enhancing the employability of students makes teaching and learning more complex. Against this rapidly changing background, teaching and learning within the higher education environment have been subjected to various difficulties, resulting in students with degrees not being able to find work in the area or field they trained in for several years. Having said that, this chapter suggests that for courses and degrees to be considered sustainable and institutions to contribute to SD, the groundwork for employability needs to be maximised in teaching and learning practice. More specifically, teaching and learning in the higher education environment must nurture and educate students in a sustainable manner that will enhance their academic paths to facilitate individuals with the relevant employability skills that will carry them towards a fulfilling future career.

Higher education institutions are credited with playing a significant role in preparing graduate employability and career prospects (Pham & Udoh 2021:1). Because of this important role, both educators and institutions are pressured to enhance graduate employability (Pham & Udoh 2021:1), as it is often assumed that graduates possess the necessary and desirable skills for the world of work. These skills include communication competencies, innovation, critical thinking capabilities and functioning well in a team (Pham & Udoh 2021:2). However, evidence indicates that graduate employability is broader and more complex, with education for sustainable development (ESD) being seen as fundamental in the shift to realising sustainability (Foley 2021:52). In fact, ESD is recognised as a key enabler of all SDGs, because it has the potential to transform society by embracing and empowering all people, ensuring an employable workforce for future generations, including teaching and learning in HEIs (UNESCO 2019). Furthermore, it is also accepted that SD is the only way to avert environmental, economic and social disasters (Brundtland 2019).

Considering the previously stated concerns regarding graduate employability, universities, through their teaching and learning practices, must focus more on ESD in such a way that these practices can explicitly link sustainability to employability (Reid, Richards & Willox 2021:99; Winfield & Ndlovu 2019:1329). As the graduate job market is very competitive, in order to succeed, newly graduated students need to be a cut above the rest and set themselves apart from other general applicants (Reid et al. 2021:99; Winfield & Ndlovu 2019:1331). It has become necessary for job-seeking students to come across as empowered, confident and self-aware (Winfield & Ndlovu 2019:1331). Thus, presenting themselves as knowledgeable, competent, having the

necessary skills and displaying the best-accepted values and attitudes maximises the potential of a student's future employability. Against an ever-changing workplace and environmental background, the importance of the connections between education, society and economic development has been emphasised, with employability involving students' ability to make meaning for their learning experiences for personal and professional growth (Reid et al. 2021:110). In this mammoth task, a balanced answer to future success lies in higher education teaching and learning for SD with a specific focus on employability.

This work is grounded in the most recent and relevant international literature, which was reviewed to provide a stance for encouraging HEIs to become more flexible and maximise the implementation of ESD practices within their curricula. The chapter is divided into four main sections. The first one orientates the reader by providing a discussion of the concepts of sustainability and SD, teaching and learning for sustainability, and employability as sustainability with a focus on unemployment status in the BRICS countries – Brazil, Russia, India, China and South Africa. In the second section, attention is paid to ESD and sustainable education for employability. Thereafter, barriers and challenges that arise when educating for SD are explored and tentative solutions are offered. The third section offers reflections and recommendations specific to the BRICS countries and beyond. The chapter culminates with a brief conclusion.

Concept clarification and context

Sustainability versus sustainable development

Sustainability and SD are perhaps the most important notions of our time. These concepts can be thought of as the capacity for the Earth and human civilisation to perpetually and harmoniously co-exist over time. 'Sustainability' is used as a broad term that often refers to the general management of resources (Maryville University 2022), that is to say, managing resources in such a manner that future generations will still have adequate access to these resources. Thus, the concept of sustainability goes beyond environmental sustainability and incorporates economic and social sustainability (Maryville University 2022), focusing on adequately meeting people's current needs without depleting the environment or compromising the needs of future generations. Views of sustainability seem to have a stronger focus on the present moment and keeping things above a specific level for future use.

The concept of SD, on the other hand, can be interpreted in many different ways (Sustainable Development Commission 2011). The essence of this approach is that the element of development looks to balance different and often conflicting needs against an awareness of the environmental, social and

economic limitations that are faced in society (Sustainable Development Commission 2011). A fine, but important point, is that we live in an environment with limits. Thus, SD is far wider than just the environment; it also concerns being a strong, healthy and just society that meets the diverse needs of all people in the present and future communities and promotes their well-being, inclusion and opportunities. So, in general, SD means developing a socially cohesive progressive society and enhancing the quality of life across the globe (You Matter 2021). In the *Brundtland Report* (1987:41), SD is defined in short as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs'. This report has provided the world with the most comprehensive, widely accepted definitions regarding SD yet.

We can say that sustainability can be regarded as the foundation for today's leading global framework for international cooperation, as suggested by the 2030 Agenda for Sustainable Development and its 17 sustainable development goals (SDGs) adopted by all UN member states in 2015. The 17 SDGs universally apply to all countries around the world. In conclusion, the approach of SD can be defined as people, communities or societies developing and growing by using resources in such a manner that enables both present and future generations to renew and continue to exist in a socially balanced manner.

The concept of teaching and learning

In the higher education institutional (HEI) environment, teachers are no longer the only source of knowledge (eds. Varghese & Mandal 2021:4). Furthermore, the process of teaching and learning is not a corresponding, synchronised process that is demarcated to a specific time or place (eds. Varghese & Mandal 2021:4). As Varghese and Mandal (eds. 2021:4) point out, 'the teaching and learning process is asynchronous, anonymous, and invisible'. This implies that teaching and learning are a dynamic relationship that focuses more on the transferences of experiences that facilitate the acquisition of knowledge evident in all human encounters with people, places and objects. This scenario thus redefines the parameters of teaching and learning to extend outside the constraints of the classroom.

Teaching

Teaching practices and competencies that are required by competent teachers are not only pedagogic in nature but further extend to management and expertise in one's subject area and require a range of complex interactional relationships amongst the teacher, learners, classroom settings and learning activities (eds. Varghese & Mandal 2021:4). Around the world, the objectives

of higher education have become more complex. The teachers of today are expected to assist and support learners to develop knowledge, solve problems, become creative, successfully cooperate in teams (group work) and have the ability to work with diverse groups of peers and colleagues (eds. Varghese & Mandal 2021:4).

Sustainability needs to become part of the training of prospective teachers, as they will be responsible for educating future generations from this perspective (García-Gonzalez, Jiménez-Fontana & Azcaráte Goded 2020:1). Unfortunately, the integration of ESD (especially in higher education) is poor (Foley 2021:52), with many barriers being evident.

Learning

The concept of learning is positioned in the environment of students' lifeworlds, their perceptions and understandings of the world around them and how they create meaning (Fry, Ketteridge & Marshall 2009:8). However, learning is not a solo event but involves various other cognitive aspects, such as mastering abstract principles; understanding evidence; remembering and recalling factual information; seeking out and acquiring methods, techniques and approaches; recognising; reasoning; debating ideas; and developing appropriate behavioural responses to specific situations (Fry et al. 2009:8). In short, learning is about constant change, re-alignment and appropriate responses. In higher education, unlike in school education, students are expected to understand concepts and, in addition, try to interpret the study material (eds. Varghese & Mandal 2021:3) by using higher-level thinking and a more critical approach. Such variations in processing the study material should be accepted, as it is necessary to differentiate between surface learning and deep learning (eds. Varghese & Mandal 2021:3). Surface learning focuses more on rote learning and memorisation for examination purposes, whereas deep learning can be seen as an element of understanding and interpretation that is added (eds. Varghese & Mandal 2021:3). Therefore, deep learning leads to a deeper understanding and higher-quality outcomes.

For the student, learning, therefore, consists of the acquisition of knowledge during his or her academic career at an HEI and then acquiring the skill to confidently apply and develop the new knowledge in the world of work when employed (eds. Varghese & Mandal 2021:6). Acquiring this knowledge (learning) does not come from the teacher alone but various other sources of formal and informal exposure (eds. Varghese & Mandal 2021:6). Nevertheless, regardless of the source of any knowledge or information, the student should seek out this extra knowledge and make it meaningful, authentic and usable, which should lead to creativity and problem-solving (eds. Varghese & Mandal 2021:6).

The concept of employability

Employability is the quality of being suitable for employment or having a set of achievements and attributes that makes an individual more likely to obtain employment. The concept of employability has become one of the most important outcomes of higher education despite it being weakly conceptualised for the sector (Behle 2020:105). Thus, employability is seen as an individual's ability to gain and maintain or sustain employment, as well as confidently move between roles and secure suitable and sufficiently fulfilling work (Behle 2020:106). Therefore, employability is not just about getting a job but also about keeping and continuing with job opportunities (sustainability) and doing well in one's job.

Employability and being unemployed

Most students regard a higher education degree as preparation for their professional life (Eimer & Bohndick 2021:114). If one considers the present high student numbers and the diverse student populations linked with a dynamic, vibrant, constantly transforming labour market, the focus is immediately set on the employability of well-trained, confident professional individuals (Eimer & Bohndick 2021:114).

'Employability' can be described as a multifactorial construct in which various influencing factors play a role (Eimer & Bohndick 2021:115). Therefore, when considering employability, one can understand the concept as an umbrella idea under which various qualities result in career success (Eimer & Bohndick 2021:115). Thus, employability suggests, firstly, achieving career success and obtaining the desired employment, and secondly, maintaining or sustaining this career success by achieving aspects in the world of work regarded as desirable, namely, a good salary, promotion and job satisfaction. By creating favourable conditions for graduate newcomers to the work environment, these individuals can have a long, healthy and happy career, remaining sustainably employed.

According to Cheng et al. (2021:7), there is a wide understanding of the concept of employability, leading to various student views of the matter. One of the most notable student's views of employability is as follows (National Union of Students 2011):

> [*A*] set of attributes, skills and knowledge that all labour market participants should possess to ensure they have the capability of being effective in the workplace – to the benefit of themselves, their employer and the wider economy. (p. 12)

From this definition, it can be assumed that students also understand the importance of the present university degree regarding future career prospects (employability), which seems to be an important motivational factor. However, the starting point for sustainable employability is the skills learnt at an HEI.

The skills that are learnt reflect an individual's ability to be employed and remain a productive contributor to the field in which he or she has been trained. Furthermore, these skills should capture individuals' capacity to function in the world of their specialisation and the wider labour market. In contrast to this situation, the situation of unemployment arises. The concept of unemployment refers to a situation when a person who is actively searching for employment is unable to it (Hayes 2022). Unemployment is considered to be a key measure of the health of the economy (Hayes 2022).

An overview of the unemployment status in the BRICS countries

The BRICS organisation is a growing global economic grouping that reflects a shift in economic power from the more mature economies to these new, emerging markets. However, unemployment tendencies in the BRICS countries remain problematic (see Table 7.1).

From the overview presented in Table 7.1, it is evident that unemployment figures are high in many of the BRICS countries. The International Labour Organisation (2022) states that the unemployment rate in the BRICS countries was estimated at 6.7% in 2020, which can be interpreted as about 9.8% of the

TABLE 7.1: Unemployment tendencies in the BRICS countries: A comparative overview.

Country	Unemployment tendencies
Brazil	In 2020, the unemployment rate amongst Brazil's population stood at approximately 13.67% (Statista, O'Neill 2022)
Russia	In October 2021, the unemployment rate in Russia stood at 4.3%. The country's unemployment situation deteriorated in the summer of 2020, though the rate has started to recover since then. To compare, in July 2020, 6.3% of the workforce aged 15-years-old and older nationwide were unemployed (Statista, Elagina 2022).
India	From September to December 2021, in both rural and urban households, graduates, including those who went further in their education, had the highest unemployment rate in India in 2021, with a share of 19.4%, making up the highest unemployment rate in 2021. This trend continues; as the level of education is reduced, the unemployment rate is reduced (Statista Research Department 2022).
China	In 2020, the rate of registered unemployment in the urban areas of China increased to about 4.2% because of the COVID-19 pandemic. The unemployment rate is estimated to return to below 4% in 2021. Quarterly unemployment figures indicated a peak in the third and fourth quarters of 2021 but decreased considerably in the following quarters (Statista, Textor 2021).
South Africa	The figure for graduate unemployment in South Africa is 12.5%. This is reflected across all major education levels, including tertiary and school qualifications, implying that almost one in every two (1 : 2) young people in the labour force did not have a job in the first quarter of 2021 (BusinessTech 2021). In 2019, South Africa had the largest component of mismatched workers, with skill mismatches of more than 50%, resulting in the lowest productivity levels compared with 30 countries, including India and Russia (Anon. 2021).

Source: Unemployment tendencies in the BRICS countries: A comparative overview compiled from Statista, O'Neill (2022); Statista, Elagina (2022); Statista Research Department (2022); Statista, Textor (2021); BusinessTech (2021) and The Conversation (2021).
Key: BRICS, Brazil, Russia, India, China and South Africa; COVID-19, coronavirus disease 2019.

adult and 28.4% of the youth labour force being underutilised in 2019. This means that this potential workforce is either unemployed, underemployed or only in the potential labour force not optimally applied (International Labour Organisation 2022). Except for Russia, all the other BRICS counties have a clear link between poverty and unemployment (Wolhuter & Chigisheva 2020:91–92). Table 7.2 indicates the connection between severe poverty and unemployment. India has the highest number, with 86.8% of the population living on less than US$5.50 per day. South Africa is second, with 57.1% of the population living on less than US$5.50 per day. The figure for China is 27.2%, and in Brazil, 21% of the population lives on less than US$5.50 per day.

Education for sustainable development

To achieve the SDGs (UN 2019), António Guterres, the secretary-general of the UN, suggested that success with regard to the SDGs includes collective action to accelerate progress and the role of education (i.e. SDG 4) (Guterres 2019). These aspects are specifically noted as critical in achieving sustainability. To achieve what Guterres (2019) suggests, namely, collective action to accelerate progress, an educational framework for empowerment is needed (Brundiers et al. 2021:13). The main features of such a framework suggest broadly acceptable yet detailed descriptions of key competencies in sustainability (Brundiers et al. 2021:14). This provides a shared language and promotes understanding regarding what sustainability is for society and what can be offered by graduates (Brundiers et al. 2021:1), as well as effectively enabling students to become effective in positively contributing to sustainability by applying problem-solving in their lives, professions and communities. Thus, ESD can be seen as the process that equips and empowers students with knowledge and understanding, as well as the required skills and attributes needed to work and live in a way that protects and defends the environment and promotes social and economic well-being for present functioning and future generations. The general agreement for the key components of the framework is discussed in the following paragraphs.

TABLE 7.2: Incidence of poverty and unemployment in the BRICS countries.

Country	Poverty percentage of the population living on less than US$5.50 per day (%)	Unemployment rate (percentage of the unemployed working-age population) (%)
Brazil	21.0	12.54
Russia	2.7	4.74
India	86.8	2.55
China	27.2	4.41
South Africa	57.1	26.95

Source: Adapted from Wolhuter and Chigisheva (2020:92).

The first key component of sustainability focuses on 'enabling and empowering students to become effective in positively contributing to sustainability problem-solving in their lives, professions, and communities' (Brundiers et al. 2021:23). Thus, the first component addresses the individual and his or her relationship with the concept of sustainability. To achieve this on an individual level, teaching and learning in higher education should provide students with the knowledge and skills to sustain their lives, which include their working careers. Teaching and learning performed in this manner should achieve the required key component of an individual student's attributes, namely, being a positive, productive, constant and continuous producer within his or her profession and community.

Secondly, the basic definition of sustainability focuses on (Brundiers et al. 2021):

> [*T*]he competency-related knowledge, skills, motives, and attitudes independent of and complementary to sustainability topics and the integration of the key competencies into a sustainability problem-solving framework that reflects the integrated problem-solving competency. (p. 23)

With this component, the definition of sustainability delineates various specific elements of the concept of sustainability that emphasises the various aspects of teaching and learning within the higher education environment that should empower the individual student. Thus, teaching and learning approaches within the curriculum, as well as the curriculum itself, must be designed in such a way that they promote sustainability and SD.

Lastly, sustainability involves (Brundiers et al. 2021):

> [*T*]he integration of the key competencies into a sustainability problem-solving framework that reflects the integrated problem-solving competency; and the introductory set of learning objectives for each of the key competencies. (p. 23)

This key component reflects the integration of the previous aspects to ensure a transdisciplinary approach to sustainability. Thus, working together and cooperation within the teaching and learning environment of the HEI is profoundly important.

In addition, Brundiers et al. (2021:26) referred to a more refined overarching framework, highlighting nuanced definitions and proposing a hierarchy of values-thinking competency as an underpinning competency with two additional key competencies, namely, intrapersonal and implementation competencies. This aspect enhances and highlights the humanistic element in the scenario, with the emphasis being put on human interaction and relationships and people's will to want to implement and apply the principles of sustainability. With these highlighted aspects of specified learning objectives for aspiring sustainability professionals and sustainability researchers, it is obvious to see that teaching and learning approaches have a direct impact on the teaching and learning strategies of an HEI regarding

educating towards sustainability and SD. Furthermore, Brundiers et al. commented that some competencies are not naturally developed in the teaching-and-learning-settings of HEIs. Therefore, obtaining such competencies would require a more targeted and ongoing effort to promote these abilities. The promotion of these skills can be achieved by consciously including the concept, method and skill of each required competency by all role players, including the students, lecturers and faculty of the HEI (Brundiers et al. 2021:26). Therefore, ESD at HEIs should promote competent, applicable and appropriate workforce students who are employable and fit the required profile need in the workplace. Moreover, teaching and learning at HEIs should be pertinent and fitting to accommodate ESD and employability.

Sustainable education for employability

At present, there is a worldwide acknowledgement of the need for all nations to promote higher education of high quality in the HEIs within their borders (Cheng et al. 2021:1; Thi Tuyet 2016:56; Yorke 2010:2). This re-alignment has been highlighted in order to cope with the demands of knowledge-based economies and has become the consensus in the literature regarding the attitude of HEIs towards employability (Cheng et al. 2021:2; Thi Tuyet 2016:58). As such, this re-alignment can be considered as central to higher education teaching and learning (Yorke 2010:2). However, the concept of skills used in the global understanding of employability, sustainability and education is often poorly defined and seemingly used more as a mantra than as anything more substantial (Yorke 2010:3). Thus, to adopt a more employment-orientated approach to the curricula of HEIs, which is aligned more with traditional academic values (Yorke 2010), a consensus is needed regarding core definitions of the generalised concepts of skills. Thus, the loosely cited concepts of skills were narrowed down to two core concepts, namely, capability and graduate attributes.

Firstly, the meaning and concept behind the word ‘capability’ are clarified. Capability can be seen as a trait in an individual that alludes to one’s having confidence in one’s ability, being effective and taking appropriate actions, being a good team player and a lifelong learner, and functioning well in a diverse, ever-changing society (Yorke 2010:3). Furthermore, the general understanding behind the concept of capability also suggests specialist expertise, with the confidence to apply one’s specialised knowledge and skills within a given situation, with the aim of further developing these skills and knowledge after one has left the HEI environment (Yorke 2010:3).

The concept of graduate attributes can be noted as the qualities, skills and understandings that a university community agrees its students should acquire and develop during their career as a student at the HEI (Yorke 2010:3). These attributes include but are not limited to the specific discipline and

technical knowledge that forms part of the particular course of the HEI, which prepares the student for effective social functioning in his or her future employment environment (Yorke 2010:4).

Therefore, with a more structured framework, a commitment to the development of these basic concepts of capability and graduate attributes should be considered by HEIs to encourage the marketability and employability of their graduates produced. This implies that for many subject disciplines, a willingness must be encouraged for these subject-specific domains to rethink the taught curriculum, the teaching and learning outcomes and general pedagogy, as well as the methods of assessment (Yorke 2010:10). In addition, where professional bodies are involved, for example, health care and engineering, a built-in sustainable element of employability can also be considered (Yorke 2010:10).

From the discussion, one can clearly comprehend the collaboration or partnership between HEIs and workplaces that is needed (Thi Tuyet 2016:66). The practical manner in which the responsiveness of HEIs to the world of employment and the economy can be increased is thus vital to ESD. These authentic lessons from the marketplace to the teaching and learning curriculum of HEIs will enhance the skills desired by the employer in the workplace, which will, in turn, promote employability, thereby facilitating sustainable educational goals. All of these areas are essential in the transformation into a more sustainable future (Intergovernmental Panel on Climate Change 2014):

> The worth of education must now be measured against the standards of decency and human survival – the issues now looming so large before us in the twenty-first century. It is not education, but education of a certain kind, that will save us. (p. 4)

Higher education's challenges when educating sustainable development

It is evident from the comparison that HEIs seem to be lacking a holistic vision to achieve the UN's SDGs (Singh & Singh 2019:32). Many HEIs in Africa face challenges that require the intervention of national governments, development partners and other stakeholders (Mbithi et al. 2021:58). Furthermore, HEIs also require new investment paradigms to maximise students' acquiring skills to enable them to be ready for a work environment, which includes knowledge and attitudes to enable them to contribute effectively to the workforce (Mbithi et al. 2021:58). Education for sustainable development is seen as a basic move towards realising sustainability; however, the integration of these goals in higher education is poor (Foley 2021:52).

Implementing ESD is central to the achievement of sustainability. Therefore, in order to address SD, one must look at various aspects that can be regarded as barriers to ESD. Barriers to ESD are the dominant social paradigm that

underpins ESD barriers, the education itself or the traditional teaching or pedagogic norms of the various disciplines, challenging these rigid norms in order to promote interdisciplinarity, and lastly, unwillingness to change (Foley 2021:52–56).

☐ Dominant social paradigm that underpins education for sustainable development barriers

Under this section, cultural, environmental and community barriers are noted. Cultural differences that prevent good communication between HEIs and the job market are perceived as one of the major issues. Concern has also been expressed for some time about trends in the political approach that favours free-market capitalism, deregulation and reduction in government spending. This results in the subsequent treatment of higher education as only a commodity (commodification), threatening managerial targets to displace culture and environmental goals for excellent teaching (Suleman, Videira & Araújo 2021:10). Lastly, when exploring employers' perception of the barriers and facilitators of engagement, it has been found that there is a cultural disparity between business strategies and needs and the academic environment, creating major barriers that have a negative impact on ESD (Suleman et al. 2021:12).

☐ Education itself, or the traditional teaching or pedagogic norms of the various disciplines

As far back as 2012, it has been found that teacher traditions and methods are strongly linked to their various disciplines, resulting in barriers being encountered when initiating ESD in their teaching, as it seems that teachers are more inclined to revert to subject-based curricula, clearly erecting barriers to interdisciplinary work (Borg et al. 2012:204). Thus, some barriers seem to be structural in nature, as they are evident in the disciplinary-based curriculum relating to the higher education system (Suleman et al. 2021:5). The lack of flexibility and adaptability of pedagogical methods hinders providing up-to-date, suitable courses or curricula and restricts the response to requirements (Suleman et al. 2021:5).

☐ Promoting interdisciplinarity

'Policymakers, HEIs, and employers should understand that multiple solutions are required to reduce skill mismatch, shortages, and gaps, and all stakeholders are responsible for finding appropriate answers' (Suleman et al. 2021:13). These sentiments sum up the aspect of interdisciplinarity, linking it effectively to education itself and the silos in which HEIs' traditional teaching practices and pedagogic norms within the various disciplines function. Furthermore, each

role player has his or her own terminology, culture and language, which further inhibits cooperative working (Suleman et al. 2021:13). Thus, in the best interest of ESD, all efforts should be made to improve communication and interaction amongst everyone to promote the future employability of graduate students.

Unwillingness to change

Unwillingness to change forms an essential barrier, which needs communication for all stakeholders and the general promotion of the ideas and principles the ESD proposes to remove the barrier. A general, genuine buy-in from all parties is needed,

Educating for sustainable development in higher education institutions: Resolutions for barriers to overcome

Various aspects that can be considered in the HEI and workplace environment involving the employability of new graduates can circumvent barriers that occur. Resolutions such as promoting an understanding of the present environmental situation and the need to change the values, beliefs and attitudes of individuals seem to be the top priority. Secondly, employing soft skills promotes ESD and encourages employability by making new graduates more sought-after.

Promoting information and understanding through education for sustainable development for a better future

> ESD empowers learners to take informed decisions and responsible actions for environmental integrity, economic viability and a just society, for present and future generations, while respecting cultural diversity. It is about lifelong learning, and is an integral part of quality education. (UNESCO 2022:n.p.)

To ameliorate this situation, ESD systematically changes and facilitates the understanding of educational systems by galvanising sustainability within the minds, hearts and actions of future generations (Fekih Zguir, Dubis & Koç 2021:1). Education can thus play a crucial role in changing individuals' attitudes, behaviour and lifestyles through awareness, capacity-building and other means. Accordingly, believing in the power of education to 'reverse-engineer' and change the recurring environmental, social and economic challenges is the logical manner of proceeding in order to combat the barriers to ESD (Fekih Zguir et al. 2021:1). It is thus proposed that a reorientated educational response to these barriers is necessary to address the ongoing challenges.

Believing in the power of education, particularly in the developing world, should provide future generations with a deep sense of responsibility towards

their communities and empower them through leadership and independence to be able to go out into the world of work and be employed (Fekih Zguir et al. 2021:4). Therefore, a new generation of students must be encouraged in all areas of SD through education. Thus, there is growing recognition of the value of ESD for all learners and students, and emphasis is now placed on the unique role that universities play in the transformation of individuals, institutions and societies towards a more sustainable future (Price et al. 2021:1), which encourages the concept of better employability for new graduate students. As HEIs engage and even lead in several areas, such as education, research and community engagement (Price et al. 2021:1), they can play a pivotal role in promoting ESD and employability. From this position, they can easily change attitudes, beliefs and values by creating the unique leadership necessary for the transformation of societies (Price et al. 2021:1).

Employing soft skills that promote education for sustainable development encourages employability

The term 'soft skills' is used to describe people skills that cover, amongst other things, personality traits, habits, friendliness, optimism and the ability to deal with problems – in short, a high level of emotional intelligence (Korolyova, Voyakina & Zherebayeva 2021:3). Most soft skills are interconnected with one another and are usually present in tasks that individuals must perform or the relationships they have (Korolyova et al. 2021:9). Therefore, a student must learn to solve problems of SD and construct various scenarios for the future (Korolyova et al. 2021:9). Teaching strategies needed for teaching or improving a student's soft skill talents should include how to succeed in negotiations, give arguments, properly manage one's time and build effective communication with international partners (Korolyova et al. 2021:9). The initial starting point should be that HEIs should encourage their students to be future-directed global citizens, displaying traits such as compassion, unselfishness, empathy, tolerance and understanding (Fekih Zguir et al. 2021:6). Fekih Zguir et al. (2021:6) added additional competencies to this framework, such as intercultural skills (communication and collaboration), empathy and humanising the world, inquiry skills, collaborative solution building and humility. As these skills play a major role in an individual's personal and professional life, it is important that HEIs make a point of enabling students to acquire such skills by making these skills inherent in HEI teaching and learning strategies.

Reflections and recommendations

As the BRICS states are representatives of emerging economies and developing countries, the rise of BRICS has become a new development force in the world. However, unemployment and poverty in the BRICS countries have a severe impact on their attaining the SDGs. Therefore, HEIs must make sure that the

skills transferred must develop students for employability and that the courses that are presented are aligned with the needs of the 21st century. Higher education institutions are the gateways for graduates to their world of work and must prepare students by constantly adapting to changing ways and types of work so that graduates are not only effective and knowledgeable but also employable (Miller & Konstantinou 2022:11). The world of work needs different skills that HEIs need to consider; as demands on changing work roles increase, people's skill sets will also need to be adapted (World Economic Forum 2018:7). All of these aspects will add to graduate employability. In addition, the educational settings in the BRICS countries need to consider the development of institutions that will create individuals who can adapt to the changing world, thereby promoting employability (Aksarina et al. 2019):

> The main prerequisite for sustainable and active cultural and economic development, enhancing the competitiveness of the BRICS member countries, is the existence of a developed, efficient and productive educational system that forms mature and independent individuals, citizens of society and members of social groups, highly qualified specialists who are able to work successfully in changing conditions, in including in the conditions of complication of processes and results of cultural knowledge and socio-economic hierarchization. (p. 126)

Thus, by embedding the final goal of employability in HEI teaching and learning practices, students will be prepared for the changing world of work (Miller & Konstantinou 2022:11). Techniques that can be used include the blending of teaching methods, reflection and explicit skills development with authentic, problem-based assessment. All of these will assist in developing a student's employability skills – the ultimate goal (Miller & Konstantinou 2022:11).

If students can see the relevance of these approaches and link the teaching and learning efforts of HEIs to their future employability prospects, a major breakthrough will be experienced regarding ESD for all role players. On this note, it is recommended that HEIs reconsider their teaching and learning strategies and try to reorientate them towards the future and new generations by seriously considering ESD and the implication it has on our world and the planet.

Conclusion

The BRICS counties experience various challenges, with high unemployment and poverty rates seriously affecting the achievement of the sustainable goals of these countries. Education and higher education can be seen as an investment in the development of socio-economic circumstances. Furthermore, investing specifically in higher education can assist in obtaining sustainable goals in the BRICS countries. The demands of society necessitate students being equipped and prepared with new work skills and that applicable and appropriate teaching and learning in HEIs will transfer to employability.

The transformation of learning and teaching needs to be changed, as HEIs need to prepare students who face an uncertain future that awaits them after completing their formal degrees. Academic staff also need to consider the practices of real-world, applied, authentic teaching and learning experiences, which translate into professional work skills and make graduates more employable.

Chapter 8

Implications of the COVID-19 pandemic on Sustainable Development Goal 4: Quality higher education in the university sphere

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Introduction

The worldwide COVID-19 pandemic has had a severe effect on teaching, learning and quality at higher education intuitions. One of the aims of the SDG 4 is quality higher education. Social distancing, personal protective

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equipment, working from home and flattening the curve are some of the concepts of the so-called new normal. Physical contact sessions and formal examinations were no longer possible during the pandemic. Contact and distance students at HEIs faced a new way of adjusting to a new platform of working, and suddenly, they had to face circumstances that they were not used to. They had to refocus and plan more to cope with time management, connectivity and self-directed learning. This chapter focuses on our journey regarding quality teaching and learning and research, including students' experiences, in the new normal. This study will provide best practices for SDG 4, that is, quality teaching and learning for the higher education community, focusing on one of the most basic public services – quality education. Quality education at HEIs not only enlightens students but also empowers and enables them to contribute to the maximum extent possible to the socio-economic development of their communities after obtaining a good qualification.

The implications of the worldwide COVID-19 pandemic have had a huge impact on HEIs, especially those offering paper-based programmes via distance. The following information is given in the BEd Foundation Phase information booklet of NWU (2018):

> Distance learning refers to a delivery mode focusing on enhanced accessibility to education and training, limiting or eliminating barriers such as time, place and pace of learning. The North-West University (NWU) promotes open distance learning by allowing students to register for the modules of a programme either in January or in June. Technology-mediated instruction and examination opportunities are offered at various learning support centres nationally and internationally, providing student support to enhance the student learning experience. Students who study via distance education are still subject to specific admission requirements as determined by the Institutional Admissions Requirements Committee, fixed dates for the commencement of academic programmes, a minimum and maximum duration for the completion of their studies, and specific scheduled assessment opportunities. (p. 1)

Students studying via the distance paper-based mode at the NWU receive their first assignment with their study material at the beginning of the year and submit the assignment on the due date. This assessment is followed by an examination at an examination centre in southern Africa, supported by invigilators at the end of the semester. The normal procedure is set out as follows (North-West University 2018):

> Contact classes are mainly presented by means of interactive whiteboards at the LSCs [*learning support centres*] in southern Africa, supported by facilitators. Lecturers can also be contacted via email if the students have access to the Internet. All modules presented, using IWBs boards, are stored on the Internet for students to access at a later stage. Students are supported through a call centre, social media (Facebook) and telephonic or electronic contact with lecturers and facilitators. Examinations are written at several examination centres throughout southern Africa, but the NWU can request students to write a specific module (e.g. Computer Science) at the campus in Potchefstroom, where the Unit for Open Distance Learning (UODL) is situated. (p. 35)

However, because of the COVID-19 restrictions, students could not submit assignments at LSCs or write examination papers at examination centres. With the declaration of a National State of Disaster on 15 March 2020, all LSCs went into lockdown, and this meant that the academic calendar of 2020 needed adjustment (Department of Basic Education [DBE] 2020). As the majority of the sessions in 2020 at all LSCs were supposed to be facilitated by utilising interactive whiteboards, several changes had to be implemented in a very short time because of the strict COVID-19 restrictions. As a means of communication for the distance students, timetables and schedules (times and dates) for all sessions from 01 January 2020–31 November 2020 were included in the information booklet. An accredited facilitator is customarily used to present or explain lessons during whiteboard sessions for identified programmes on a specific date to assist students, but COVID-19 did not allow this procedure. Therefore, the 2020 interactive whiteboard sessions could not take place as usual, and students had to be informed of changes caused by the COVID-19 restrictions.

The COVID-19 pandemic had a severe impact on teaching, learning and quality at HEIs. One of the aims of SDG 4 is quality higher education. Therefore, students need to get quality education through HEIs to break the cycle of poverty and achieve economic growth, social inclusion and environmental protection. In this chapter, the authors focus on their journey of quality teaching and learning research in the new normal, including student experiences that promote lifelong learning opportunities for all. This chapter will provide best practices for SDG 4, that is, quality teaching and learning for the higher education community.

Concept clarification

Before proceeding further with this chapter, the authors will clarify the terminology used in the rest of the chapter.

Contact and distance students

Contact students are formally on campus, attending classes on-site. Distance students focus on accessibility to education and training, limiting or eliminating barriers such as time, place and pace of learning.

COVID-19

COVID-19 is defined as follows (Cennimo 2020):

> [*An*] illness caused by a novel coronavirus now called severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2; formerly called 2019-nCoV), which was first identified amid an outbreak of respiratory illness cases in Wuhan City, Hubei Province, China. It was initially reported to the WHO [*World Health Organization*] on December 31, 2019. On January 30, 2020, the WHO declared the COVID-19 outbreak a global health emergency. On March 11, 2020, the WHO declared COVID-19 a global pandemic, its first such designation since declaring H1N1 influenza a pandemic in 2009. (n.p.)

Formal examinations

Formal examinations are used to produce evidence of the set outcomes reached at the end of a module. Such an examination is an assessment that is set for a specific date and time. The examination papers are marked, and the marks are made available when the assessment process is completed and finalised.

Paper-based programmes

Paper-based programmes use paper rather than an electronic system to deliver the programme (Harrison 2017). Currently, the mode of delivery of the UODL is paper-based for three programmes, namely, the Advanced Certificate in Teaching (ACT), the Advanced Diploma in Education (ADE) and the Diploma in Grade R Teaching (Dipl Gr R). Classes are presented in English via interactive whiteboards. For each model, three contact sessions are scheduled during a semester or six for a year module. Although a computer is not a prerequisite, it will be to the benefit of the student, as assignments and portfolios need to be typed and students need the Internet to complete assignments and portfolios. The study material is available in hard-copy (paper-based), and interactive whiteboard classes are presented. These lessons can be attended at one of the many LSCs where computers with access to the Internet are available or may be downloaded from here.

Physical contact sessions

The concept of physical contact sessions refers to students attending contact classes for paper-based programmes at LSCs.

Quality higher education

Mukwambo (2019) defined 'quality higher education' as the kind of education that gives students the knowledge and skills they need for employment. Quality education has wider benefits, as it develops individuals in ways that help develop society more broadly.

Unit for Open Distance Learning

The UODL of the NWU makes provision for broadcasting lectures to LSCs across South Africa and in Namibia. Academic staff from the three NWU campuses present these lectures, and students are urged to attend these broadcasts or download the lectures the following week, as these will assist students in navigating their studies with greater success. The UODL of the NWU is situated in Potchefstroom and delivers several distance programmes on behalf of the various faculties at a number of LSCs in southern Africa.

Implications of the COVID-19 pandemic

After receiving communication from the NWU Faculty of Education that there would be no examination sitting for 2020 but continuous assessment would be used, the academic manager for the Faculty of Education distance programmes raised various concerns to members of the UODL management and the Faculty of Education. The biggest concern was about the six paper-based distance programmes: the Advanced Certificate in Education (ACE) (phased out in the first semester of 2020); the Bachelor of Education (Honours) (BEd Hons Level 7) (phased out in the first semester of 2020); the National Professional Diploma in Education (NPDE) (phased out in the first semester of 2020); the ACT; the ADE; and the Dipl Gr R. For the students of these programmes, it was not a prerequisite to have access to WiFi or even own a computer. It was not difficult to give assessment tasks and take-home assessments on the electronic platform that the aligned programmes used, but we did not know the way forward for the paper-based distance programmes, as these students did not make use of an electronic device to submit assignments. The assessment of students who did paper-based programmes was usually done in a traditional way, meaning that the students had to produce evidence of the set outcomes reached at the end of a module or course by submitting a hard-copy assignment and writing an examination paper for each module, set for a specific date and time. These were marked by the lecturer, and marks were made available when the assessment process was completed and finalised (Criticos et al. 2012:121).

As a result of the COVID-19 restrictions, the students could not submit their hard-copy assignments, and we had to be innovative and think of ways to have access to these assignments (see Van Wyk 2017:274). The implications of the COVID-19 pandemic forced us to investigate various possibilities, such as creating an email address for assignments. This address could be used for paper-based students who preferred to make use of this opportunity. As the students submitted their assignments via email, these could be sent to the outside markers and lecturers. However, the lockdown restrictions continued, and we needed plans in place to help with the marking of these assignments as well. We also had to bear in mind that the use of technology would have a direct influence on the assessment of students (see Adachi, Hong-Meng Tai & Dawson 2018:1). Submitting assignments via email could be a risk if the assignments were not meticulously batched and controlled. Discussing the possibility of assignments sent via email to the assignment division, a second suggestion surfaced – that of submitting assignments on the web as an alternative to submitting them in hard-copy at the LSCs and writing an examination. It was decided that a webpage for assessment submission and download would be created for the submission of the first assignment and for the COVID-19 assessment that replaced the examination paper as a summative assessment. This extra examination assignment could be downloaded to have earlier access to the assessment, which was also sent by courier to each student.

☐ Creating an assessment submission and download page

In collaboration with the e-learning team at the UODL, an assessment submission and download page for paper-based programmes was created in close consultation with the NWU information technology team. Students who could make use of this platform were informed via a text message (SMS) and a document on how to submit and download assignments during this period (see next section on access to the web). After the academic manager's presentation to the e-learning division for its input and support, the UODL management decided to allow for the electronic submission of assignments submitted for paper-based programmes in consultation with the acting chief director of the Student Academic Life Cycle Administration and the UODL.

In light of the aforementioned, an enormous amount of correspondence with the directors of different academic and administrative divisions, as well as the programme leaders and all stakeholders at the UODL, went into the possibility of an online submission portal. The acting chief director of the Student Academic Life Cycle Administration and the UODL gave permission to go ahead as planned after consultation with the e-learning division and the assignment office. The academic manager also presented the outcome to the UODL management committee and the academic manager's line manager. From there, the academic manager reported back to the UODL management and the Faculty of Education and wrote a report each month on the participation and inclusion of all students, as the NWU followed a policy of 'no one will be left behind'.

All role players were consulted, including the acting chief director of the Student Academic Life Cycle Administration and the UODL, the acting director of the UODL, the e-learning division, assignments and examinations, study material and Takealot, the NPDE and BEd Hons Level 7 programme leader, the ACE programme leader, the school director of the NPDE and BEd Hons Level 7 and the school director of the ACE programme. In consultation with all of these role players, communication went out to state the plan of action for the programmes that were to be phased out as well as for the other three paper-based programmes in the Faculty of Education. This was an emergency procedure for the COVID-19 restrictions we faced. It had to address receiving the first assignments urgently, as students could not submit their assignments on the planned due date in April 2020 at the LSCs owing to aspects of the 'new normal' we had to deal with. These aspects included social distancing and personal protective equipment that had to be in place at the centres before students could hand in assignments, as we had the responsibility to work together to flatten the curve.

☐ Assessment template for paper-based programmes

The procedure decided on was strictly for the distance paper-based programmes of the UODL. All the dates communicated were subject to

change according to the gradual lifting of the various stages of the lockdown. The examination as a summative assessment had to be replaced by a COVID-19 assessment, and new ways had to be found to create and send these assessments to the paper-based students to enable them to do the assessment replacing the examination. Two colleagues at the Faculty of Education designed the assessment template for lecturers to complete the second assignment, referred to as the 'COVID-19 assignment first semester 2020', as the replacement for the examination. The special assessment opportunity served as a final assessment opportunity for the continuous assessment period of the first semester. The programme leaders of the different paper-based programmes were requested to look at the design of the modules in their programmes. Lecturers received a fill-in 'Module COVID-19 Assessment First Semester 2020 Form' to be completed per module. Note that some sections were for the students to complete when they submitted the assignment, while some sections had to be completed by the lecturer. The instructions for the form are provided in Figure 8.1.

A sample message was created for the programme leaders to send to the lecturers (see Figure 8.2).

The front page of the COVID-19 formative assignment is shown in Figure 8.3.

The completed assignment forms had to be e-mailed to the various programme assistants. The programme assistants checked all of the assignments that had been submitted, and the e-learning team contacted the assistants, explaining how they had to forward these to the e-learning team to post them on the web. The assignments were also loaded onto the examination platform to be printed, as the hard-copy assignments had to be sent to the paper-based students. Students in the ACE, ACT, ADE, BEd Hons Level 7, NPDE and Dipl Gr R programmes received everything in hard-copy to make

Please fill in at the top of the form:
The programme: ***BEd Hons NQF Level 7***
Module code (Replace XXX123 with your module code/s)
Your title, name and surname
Your e-mail address is crucial

Please note:
Your ***footer*** must also mention your module code (replace XXX123 with your module code).

When you name your document, please name it as follows:
Module code, followed by 'Covid-19 Assignment June 2020' (replace the XXX123 with your module code).

The rest of the instructions are on the form itself.
(On the bottom of page 1 where it states **'Lecturer completes this section'**, it refers to the insertion of marks by the lecturer or marker after the assignment/portfolio has been assessed.)

Source: Taken from the North-West University Unit for Distance Learning, published here with appropriate permissions provided.
Key: NQF, National Qualifications Framework.

FIGURE 8.1: Module COVID-19 Assessment First Semester 2020 Form.

Dear ***BEd Hons NQF Level 7*** Colleague
Please find attached a fill-in ***MODULE Covid-19 assignment FIRST SEMESTER 2020 Form*** to be completed ***per module*** in all programmes.
*Please **save** each of these by inserting your module code in the red **MODULE Covid-19 assignment FIRST SEMESTER 2020 Form**, i.e. **ONWB 624 Covid-19 assignment FIRST SEMESTER 2020 Form.***
The rest of the instructions are on the form itself.
*Your assignment **form must be completed by 30 April 2020** and **sent via e-mail to**.*
_____.

Source: Taken from the North-West University Unit for Distance Learning, published here with appropriate permissions provided.
Key: NQF, National Qualifications Framework.

FIGURE 8.2: Sample message for programme leaders to send to lecturers

sure that each student received the assignment and no student was left behind. Communication to paper-based students was in the form of letters that were placed on the web, and a link to access the letters was sent to the students. What the students experienced was important, and therefore, several SMS notifications were sent to the paper-based students to avoid confusion. The following are some of the example text messages to the students (NWU n.d.):

- 'Dear NWU student, students studying ACE, ACT, ADE, NPDE, old BEd Hons Level 7 and Dipl Gr R are not going to use e-Fundi for the time being. Communication will be sent regarding the submission of assignments and assessments. Visit distance.nwu.ac.za/coronavirus for important announcements. Kind regards, NWU-UODL'.
- 'Dear NWU distance student, because of the extension of the COVID-19 lockdown, no submission date for the submission of assignments is finalised yet. The NWU (UODL) will keep you updated on the dates and processes ahead with regard to assessments and teaching & learning. Kind regards, NWU-UODL, distance.nwu.ac.za/coronavirus'.
- 'Dear NWU distance student, because of the latest update from President Ramaphosa and the extension of the lockdown by two weeks owing to COVID-19, the NWU will send communication and keep you updated on further developments on the submission of assignments and the rest of the semester. Kind regards, NWU-UODL, distance.nwu.ac.za/coronavirus'. (n.p.)

Access to the Internet

The good news was that those students who did have access to the Internet were able to download and upload their assignments to help speed up the process. The academic manager contacted the head of the e-Learning Department, and after several discussions, the e-learning team created a COVID-19 formative assignment forms access and submission page for the

NWU®

LECTURERS PLEASE COMPLETE THIS SECTION: **Choose programme**

MODULE CODE
Lecturer title, name and surname
Email

Dear Faculty of Education Student / *Beste Fakulteit Opvoedkunde-student*

The NWU Management decided – due to the COVID-19 pandemic – that a **formative assignment** will replace the scheduled summative June 2020 examinations **for all electronic and paper-based first semester programmes**.

Students in the **phasing out ACE, BEdHons 7 and NPDE programmes**: this **formative assessment** opportunity is to keep to the dates as communicated to you on the phasing out of these programmes in June 2020.

Please answer the formative assignment according to instructions on page 3.

Die NWU-bestuur het – weens die COVID- 19-pandemie – besluit dat 'n formatiewe opdrag die geskeduleerde summatiewe Junie 2020-eksamens vir alle elektroniese en papiergebaseerde eerstesemesterprogramme sal vervang.

Studente in die uitfaserende ACE-, BEdHons 7- en NPDE-programme: die formatiewe assesserings-geleentheid is om by die datum te hou soos aan u gekommunikeer oor die uitfasering van hierdie programme in Junie 2020.

Beantwoord die formatiewe opdrag volgens die instruksies op bladsy 3.

STUDENT INFORMATION / STUDENTE-INLIGTING

Title, surname & initials / *Titel, van & voorletters*: _____

Student number / *nommer*:										
Cell phone / *Selfoon*:	0									

UODL Learner Support Center: _____

SUBMISSION DATE / *INHANDIGINGSDATUM*: Click or tap to enter a date.

SUBMISSION METHOD / **INHANDIGINGSMETODE:**	Hard copy *Harde kopie*		UODL access and submission page *UODL- toegang- en inhandigingsblad*	

FINAL MARK AWARDED / *FINALE PUNT TOEGEKEN*: % / 100

LECTURERS PLEASE COMPLETE THIS SECTION: Formative Assignment follows on p. 3

Source: Taken from the North-West University Unit for Distance Learning, published here with appropriate permissions provided.
Key: NWU, North-West University; ACE, Advanced Certificate in Education; NPDE, National Professional Diploma in Education.

FIGURE 8.3: Front page of the COVID-19 formative assignment.

UODL with a portal that had a drop-down menu that indicated 'Assignment 1 due date e.g. May 9' and 'COVID-19 Assignment due date e.g. June 13'.

The academic manager asked the programme assistants to send the e-learning team lists of the modules of the different programmes. They loaded all the modules for the different paper-based programmes. This was a huge breakthrough for the UODL. Our first submission was received on 05 May 2020 at 07:06 from an ACT student, and the last of 1 217 assignments received for the first day was at 23:59 from a Dipl Gr R student. The UODL received 2 548 assignments submitted before the due date for these assignments.

A summary of how the e-learning team envisioned the COVID-19 formative assignment form submission page would work is provided in Table 8.1.

The e-learning team received all the module assignments for the paper-based programmes and was able to test the page before launching it.

Students experienced the new normal differently. For some who were more technologically adept, it was easy to adjust to the new methods. For those students who were more paper-based-driven, a document was compiled with clear, step-by-step guidelines to follow. Figure 8.4 indicates the steps that were created for paper-based distance students to access the information on the web. The document was sent to all paper-based students, especially those

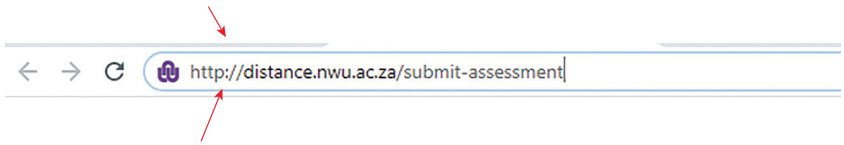
TABLE 8.1: Unit for Open Distance Learning Assignment/Portfolio Access and Submission page.

Criteria	COVID-19 formative assignment form access and submission page
Overall setup	Students visited a direct link. On this web page, there will be a section to access the COVID-19 formative assignment form and a section to submit the completed COVID-19 formative assignment form online. Technical instructions will also be reflected on the page on accessing COVID-19 formative assignment forms and uploading the completed documents.
Accessing the COVID-19 formative assignment	There will be a link on the page to a folder reflecting all the COVID-19 formative assignment forms, sorted according to programme and module code. Students open or view their respective modules to complete their COVID-19 formative assignments.
Submission of the completed COVID-19 formative assignment form	Students will use the upload function on the web page to submit their completed COVID-19 formative assignment forms. Information such as their names, email addresses, contact numbers, student numbers, module codes, programme and identity numbers will have to be filled in by the student before submitting the assignment. A drop-down menu will be used with pre-set information for the module code and programmes so that students do not provide incorrect information. The system will not allow them to submit if all the information is not provided.
Accessing the submitted COVID-19 formative assignment form	The submitted documents will be housed on an NWU database, and submissions will be sent to the respective UODL delegate or division via a Microsoft Excel spreadsheet with links to the submitted COVID-19 formative assignment forms.
Queries	There should be a contact email on the web page for students that experience problems with accessing COVID-19 formative assignment forms or submissions.

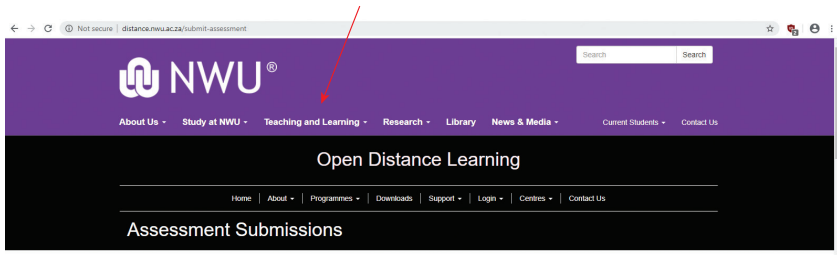
Source: Authors' own work.
Key: COVID-19, coronavirus disease 2019; NWU, North-West University; UODL, Unit for Open Distance Learning.

Copy the link and paste it:
http://distance.nwu.ac.za/submit-assessment

You will see the following:



Click on it and the following page will open.



You need to scroll down to 'Upload completed assessment'.

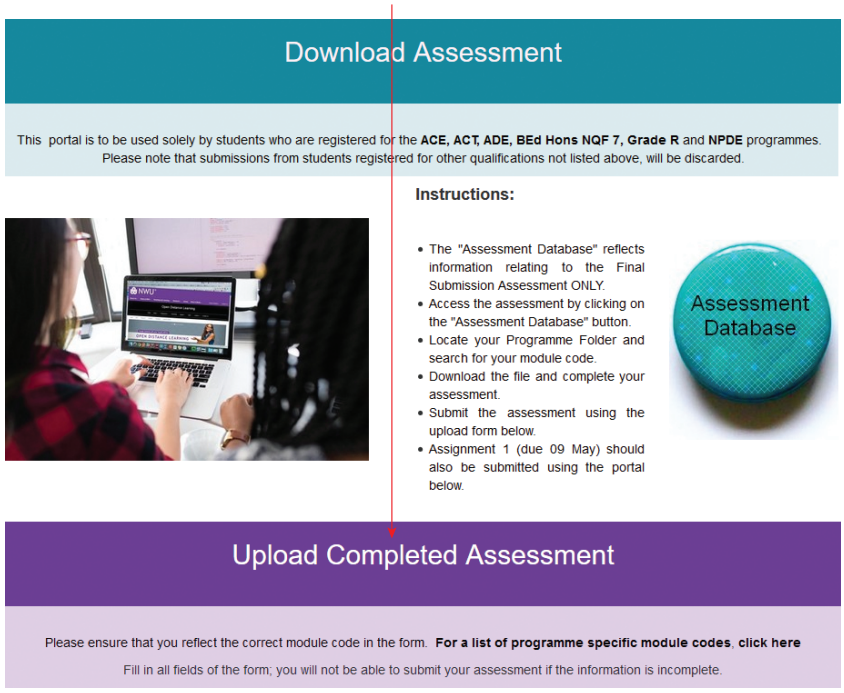
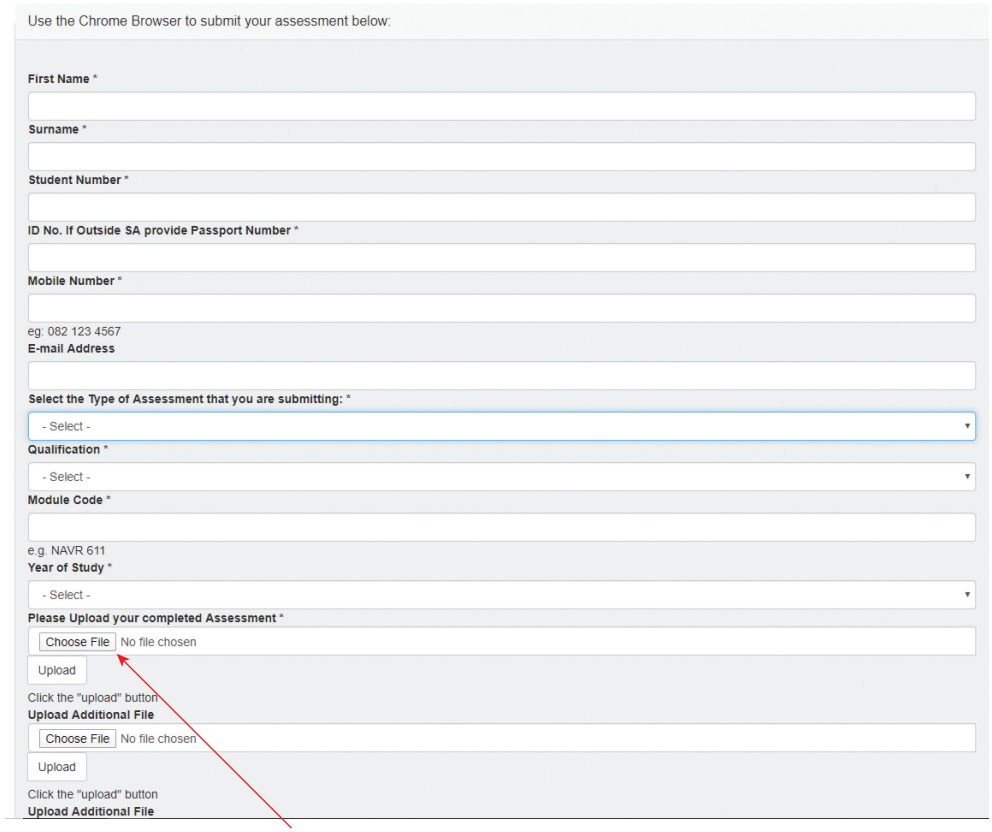


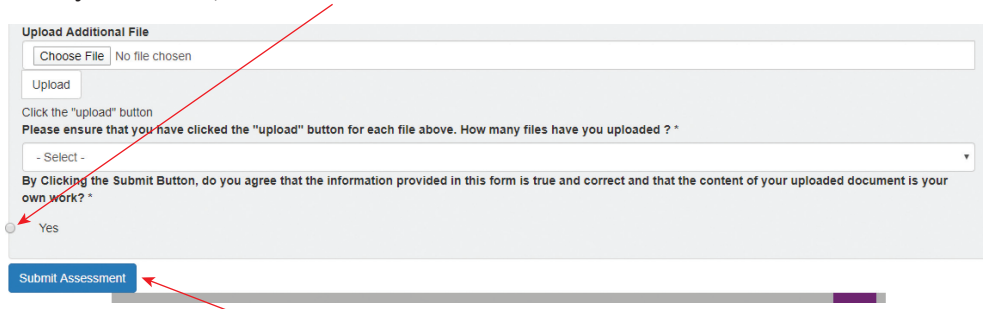
Figure 8.4 continues on the next page →

You will see the page below and need to fill in all the requested fields.



Upload your assignment here.

When you are done, click on 'Yes'.



And now you click on 'Submit'.

Source: Screenshots taken from the North-West University Unit for Distance Learning, published here with appropriate permissions provided.
Key: NWU, North-West University.

FIGURE 8.4: Document to assist students with uploading and downloading assignments.

who contacted the UODL and said that they were not accustomed to making use of this kind of technology.

Operational timeframes

Although the electronic assignment and submission page was active for distance students to make use of, there were still students in need of a hard-copy final assessment, as they had no access to the Internet or no WiFi or mobile data to make use of the electronic platform. The hard-copy assessments were meant for those students who could not complete their assessment obligations because of circumstances owing to the state of disaster. New assessments had to be set for all of the students. This special assessment opportunity served as the final assessment opportunity for the continuous assessment period of the first semester. The same protocol applied to the second semester.

Printing, packing and distribution of COVID-19 formative assessments

Hard-copy assessment material had to be sent to the UODL paper-based students. Lecturers were informed that they had to have the COVID-19 formative assignment forms ready by the end of April 2020, as printing had to commence from the beginning of May 2020. Picking and packing were done at the on-campus printing facility by NWU staff. These COVID-19 formative assessment packages had to be ready to send before the middle of May 2020 and then sent to the students to make sure nobody was left behind. The packages were sent via courier to the students' addresses and not to the UODL LSCs. The UODL students who were enrolled in the paper-based programmes received these packages by the end of May 2020. Unit for Open Distance Learning students who had to submit hard-copy assessments had to submit these by mid-June 2020. The submission of the assessments could be performed at the UODL learning support centre or on the UODL Assignment/ Portfolio Access and Submission page.

Hard-copy assignments were returned via courier to the UODL to be sent for marking. The UODL and Student Academic Life Cycle Administration put processes in place to manage the received assignments for marking by the respective UODL markers. Lecturers had to submit all marks by the second week in July 2020 to the person responsible for capturing the marks. A text message was sent to all the paper-based students to comfort those students who were not able to submit their assignments electronically. Further communication was sent to students who could not upload their assignments online, reminding them to check the link (distance.nwu.ac.za/coronavirus) for

important announcements. They were informed when and where they had to drop off their hard copies after the reopening of schools later that month. The UODL had to seek special permission for students to submit their assignments at LSCs, as under the COVID-19 restrictions, it could not force LSCs to be open, nor could it force students to travel.

Going live for those students who were able to submit electronically, uploading assignments could be done in any format. They had to follow the steps on the web to submit the assignments. The link 'http://distance.nwu.ac.za/submit-assessment' under 'Upload Completed Assessment to Submit' was sent to all paper-based students to start the submission of their first assignments as soon as they were done. For May, the web page was data-free. Thereafter, the programme assistants uploaded the COVID-19 assessments (replacement of the examination paper) on the same web page, using a link that the e-learning team had sent to them. Another SMS was sent to the paper-based students later in the month, informing them that they could then download the COVID-19 final (examination) assessments.

☐ Going live

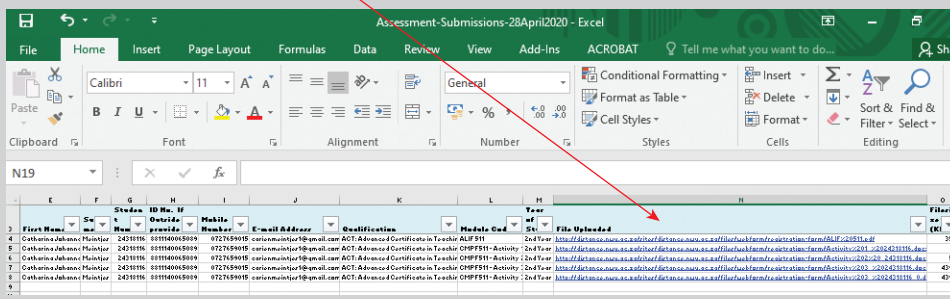
The submission page for the paper-based programmes for the first assignment that was due in May 2020 on the web page was activated and live for students that could submit their assignments on the web. The programme leaders sent information to the lecturers in their programmes, informing them what the web page looked like and what the process of marking the assignments would be. A marked assignment was sent as an example to the lecturers. One of the distance lecturers tested the system and gave guidelines on the process that worked best for her for other lecturers to use as step-by-step guidance for lecturers and outside markers. This is not electronic marking such as some lecturers make use of in the aligned programmes using the electronic platform of the NWU called e-Fundi. This was merely a way to assist the markers in the new normal that we were facing. The programme leaders and subject groups discussed this example, and if the markers had a more effective way to mark their assignments, they could use their method. After the marking was finalised, the marker filled in the marks on the spreadsheet and sent the Excel form to the assignment office to capture the marks on the system. Figure 8.5 explains the receipt and marking of the COVID-19 assessments.

☐ Submission on the electronic portal

The student experience was a high priority; therefore, hard copies of the COVID-19 assessments were sent to the paper-based students, and the final COVID-19 assignments were loaded in the middle of May for the students to access. They were able to submit the final assessments on the electronic portal with a drop-down menu indicating the first and second assignments (COVID-19).

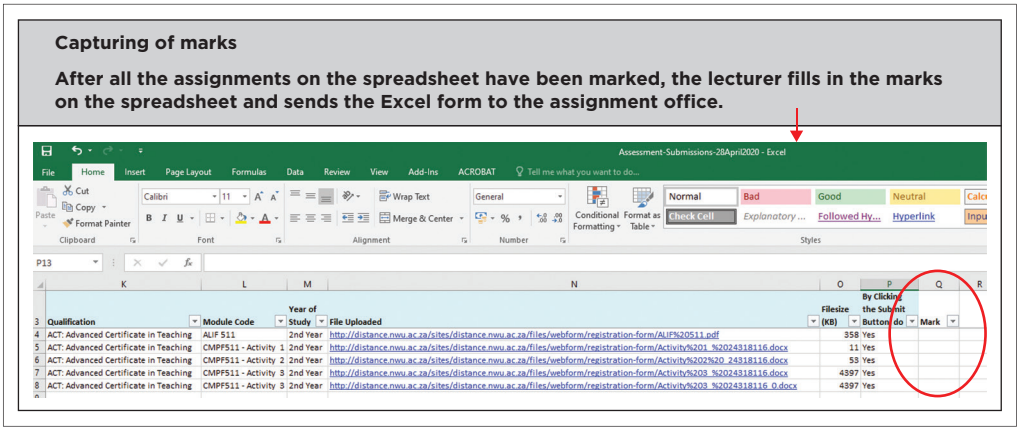
Electronic receipt of NPDE, ACE, BEd Hons Level 7, ACT, ADE and Dipl Gr R assignments and marking thereof

Click on the link, and as soon as the document opens, create a file for the module you mark, e.g. ALIF 511, and save all the assignments in it. Save it as a PDF document. Use the student number, name and surname.



In the Word document click on 'insert'.	Right-click on 'Symbol'. Click on √. Highlight √ in **red** and change the font size to 20 pt. Copy √ and then go to the student's saved PDF document. On the right hand of the PDF document, **right-click** on the arrow at the **top of the ribbon**. Click on **'Show edit tools'**. On the right hand of the document in the box is the font on top of the page. Just below it is the colour box; click on the black box and select **red**. Paste √ and mark the question now.
To indicate the marks of the question	Click on the page where you want to show the mark for the question. Shape a block by moving the cursor to form a block. Type in the mark and change the colour to **red** if it is not.
If there is no rubric on the last or front page of the assignment	Type in the question numbers and marks next to it and provide the final mark. Save the changes to the document and type '%' in the name list. On the cover page, type marker number/date/marker's name and surname (signature) and %.

Figure 8.5 continues on the next page →



Source: Screenshots taken from the North-West University Unit for Distance Learning, published here with appropriate permissions provided.
Key: ACE, Advanced Certificate in Education; ACT, Advanced Certificate in Teaching; ADE, Advanced Diploma in Education; BEd Hons, Bachelor of Education (Honours); Dipl Gr R, Diploma in Grade R Teaching; NPDE, National Professional Diploma in Education; PDF, portable document format.

FIGURE 8.5: Correspondence on the electronic receipt of assignments and marking thereof.

The lecturers in the paper-based programmes were also informed to draw up a COVID-19 formative assignment on a generic form created by two lecturers in the Faculty of Education and the academic manager of the UODL. The UODL requested the lecturers to submit the COVID-19 formative assignment to the programme assistants for each paper-based programme. The e-learning team informed the lecturers how to post the assignments on Google Docs. The team then accessed the different COVID-19 formative assignments per programme to place on the web. The information technology department of the NWU communicated with the staff and provided training on submitting the same COVID-19 assessment (replacement of the examination) on the platform they had created for the printing and distribution of the COVID-19 assessment through the office of the director of Student Academic Life Cycle Administration, Potchefstroom Campus.

These assignments followed the standard procedure that was followed in 2018 and 2019 for the NPDE, ACE and BEd Hons Level 7 students. As in the past, they received an SMS to inform them to visit the web to access the new assignment, as they had done previously, because these programmes were in the final stage of being phased out. As mentioned earlier, the e-learning team indicated that these students would be able to submit their assignments on the electronic portal with a drop-down menu for the COVID-19 formative assessment. The same arrangements for submission were followed for Assignment 1. The assignment office indicated that there would be enough time to mark the assignments and process the marks for release in August 2020. The ACT, ADE and Dipl Gr R programmes were addressed in the same way as

mentioned earlier, but the UODL had alternatives in place. Those who did not have access to the Internet received the COVID-19 formative assignment in hard-copy. Students received an SMS with the link to the COVID-19 formative assignment web page to download the assessment and submit it again.

In light of this, we also had to communicate with our lecturers and outside markers on the assignments received through the web page. A document was compiled to assist the lecturers who were used to marking only hard-copy assignments, informing them of the way forward. Now they had to download and mark assignments on a different platform (see Figure 8.5). In collaboration with the assignment office, the academic manager communicated information through the programme leaders to the lecturers and outside markers to avoid confusion, as according to the strict COVID-19 lockdown restrictions, nobody was allowed on campus for meetings. Urgent meetings had to take place virtually. Lecturers were informed of the following points:

- The marking process would not be the same as the electronic marking of the BEd and Postgraduate Certificate in Education (PGCE) assignments, but the lecturers and their respective outside markers should decide together on the best way to mark the PDFs that were submitted online and distributed for marking. The marking tool of Acrobat provides a relatively easy way to manage these online submissions.
- Lecturers or markers who were used to paper-based marking and did not want to use the PDF or Acrobat functions for marking were welcome to design an alternative method for marking.
- It was the prerogative of the lecturer and their markers to decide which platform would best suit them for the marking process. The quality lay with the faculty, and the management relied on the integrity of each lecturer and marker to take responsibility for managing the assessment strategies and the quality thereof. The management trusted that each marker would strive to deliver a quality assessment.
- Lecturers received an assignment list on an Excel spreadsheet from the assignment office. The lecturers then had to reply to the assignment office, saying to whom the assignment or portfolio should be sent for marking (whether to the lecturer or outside markers). The lecturers had to arrange with outside markers regarding the methods to be used for marking.
- If there were outside markers who could not mark the online submissions, a note was made so that they would only receive assignments submitted in hard-copy once the lockdown level allowed centres to open for this purpose.
- After the assignments or portfolios had been marked, only the mark was inserted in the last column of the Excel spreadsheet, and the Excel spreadsheet was returned to the assignment office so that the mark could be captured. An example of a marked assignment was attached in support of the instructions.

- All marked assessments had to be stored with proof of marking on the documents themselves, in a file, on a USB or external device for future reference or moderation, if required.
- Proof of consistent, reliable and ethical assessment that reflected the mark needed to be kept.

The academic manager requested the lecturers and markers to complete the marking sheet or rubric with feedback, either electronically or in hard-copy, for each assessment and keep these for later reference. The assignment office indicated to the lecturers that if the lecturers or markers had received Excel spreadsheets without a column to capture marks, they had to add one column on the right.

Some students sent assignments directly to lecturers via email, and the lecturers had to send these assignments or portfolios to the assignment office. It was of the utmost importance that the assignment office kept track of submissions and marking, for when students had queries, their assignments had to be found or accessed. Lecturers were requested to support student self-regulation by guiding them to upload their assignments rather than accepting assessments that had been sent to them via email. Online submissions may be the way of the future, and students needed to get acquainted with the process, as a total of 61 329 assessment submissions were received. A breakdown of the assessment submissions received is presented in Table 8.2.

The online assessment portal (http://distance.nwu.ac.za/submit-assessment) was officially closed on 06 July 2020 and was only used as an urgent measure to assist students in submitting assignments under severe COVID-19 restrictions. Monthly reports were sent to the UODL and faculty management on this process, and these were submitted to the vice-chancellor of the NWU as well.

TABLE 8.2: Assessment submissions received.

Criteria	Submissions	No. received
Assessment	Assignment 1	32 021
	COVID-19 assessments	29 308
	Total submissions	61 329
Programme breakdown	ACE	371
	ACT	11 353
	ADE	3 564
	BEd Hons	673
	Dipl Gr R	42 377
	NPDE	2 991

Source: Authors' own work.
Key: ACE, Advanced Certificate in Education; ACT, Advanced Certificate in Teaching; ADE, Advanced Diploma in Education; BEd Hons, Bachelor of Education (Honours); Dipl Gr R, Diploma in Grade R Teaching; NPDE, National Professional Diploma in Education.

Lessons learnt from this experience

Some lecturers use both modes of delivery for distance students. A lecturer can teach in the aligned programmes as well as the paper-based programmes, and therefore, they needed to know that there were different measures and dates for the paper-based and the aligned programmes. The new normal created some frustration, as the download process of assignments was time-consuming and extra data were required to download the assignments. When lecturers and markers received assignments of modules that they were not responsible for, the arrangement with the assignment office was that they had to return these to the assignment office and indicate on the Excel spreadsheet that the assignment was not for their module. Some of the links could not be opened, and the assignment office requested the lecturers and markers to indicate it on the Excel spreadsheet for the assignment office to create a new link for markers to access the assignment. At first, we allowed students to submit their assignments in any format, but we will guide them in the next round on specific measures to be taken.

For those students who still could not manage to submit their assignments online, the due date for the first assignment was postponed according to the COVID-19 restrictions. The UODL tried to accommodate the students in the paper-based programmes in many ways. The students had the opportunity to submit hard copies of their first assignment and the COVID-19 assessment by hand at the LSCs in the provided post boxes. They were only allowed to drop off their assignments and go. To ensure that no student was left behind, a final arrangement was made for submission in the middle of July.

Additional assessment opportunity

In consultation with the deputy dean and the directors involved in these paper-based programmes, the academic manager requested, after considering the A-rule for paper-based programmes, permission for an additional assessment opportunity in the three paper-based programmes (ACT, ADE and Dipl Gr R) for the first and second semester of 2020, as the other programmes were phased out. The paper-based programmes are different from all of the aligned programmes (BEd, BEd Hons Level 8 and PGCE) that implement continuous assessment successfully, making use of the e-Fundi platform. Multiple assessment opportunities were given for the aligned programmes to successfully take part in the continuous assessment modality.

The paper-based programmes do not make use of an electronic platform for communication and assessment, and hard copies are sent to the students of these programmes. Study material and tutorial letters, including the first assignment, are sent to students when they are registered. Paper-based programmes make use of a second annual intake as well, not only at the

beginning of the year. Attending any form of interactive whiteboard class is not compulsory, and students do not need to go to the LSCs. The COVID-19 restrictions that South Africans faced during the lockdown withheld even those students who wanted to attend these classes at the LSCs.

The logistic flow of the paper-based programmes makes it possible to send only the study material (including the first assignment) at the beginning of the semester and then the examination paper at the end of the semester to the examination centres. Facing the pandemic and the restrictions by which we had to abide, the examination paper was replaced by a final assignment that had to be sent to the students individually through the office of the director of the Student Academic Life Cycle Administration, Potchefstroom Campus, and not to LSCs. The ACT, ADE and Dipl Gr R programmes are registered and accredited under national legislation and regulation that requires that fair assessment should be done.

The UODL needed evidence of opportunities for re-assessment, and the turnaround time for the return of assignments in the first semester did not allow for continuous assessment to be put in place during the first semester or the second semester. To be fair to these paper-based students, the academic manager recommended approval for them to be granted an additional assessment opportunity for the first semester and the second semester. Logistically, the first-semester additional assessment opportunity took place in the second semester of 2020.

Individual students who were granted an additional assessment opportunity after the finalisation of marks were identified by the information technology team of the NWU, and the list was sent to the UODL to present to the director's office. These students received the additional assessment in hard-copy in the second semester. They had the opportunity to submit their additional assessments on the same date that the final assignments for the paper-based programmes for the second semester were due in November 2020.

The response of the Teaching and Learning Committee of the Faculty of Education to the request to approve the additional assessment opportunity for the three paper-based programmes was positive. Consequently, an additional assessment opportunity was granted to paper-based students who had not completed their modules successfully in the first semester.

Second-semester distance programmes

The second semester continued with continuous assessment and online teaching as set in the first semester. For the paper-based programmes, with the COVID-19 restrictions on Level 1, the UODL went back to the standard

procedure of hard-copy assignment submissions at LSCs, following the COVID-19 regulations at all centres.

As some lecturers were teaching in both modes of delivery for distance students, they had to know that for the aligned programmes, the second semester commenced before that of the paper-based programmes. For the BEd, BEd Hons and PGCE programmes, the following was decided regarding interactive whiteboard sessions and video recordings during the second semester:

- The set timetable for interactive whiteboard sessions for the second semester would not be followed.
- The second semester was aligned with the first semester.
- Lecturers could record all their lectures (whiteboard sessions, i.e. PowerPoint voice-overs) at home and upload them on the video platform Panopto. They could also make use of the whiteboard media rooms on campus at the UODL but had to arrange this before their arrival.
- In the absence of the interactive whiteboard session timetable, students might be more inclined to feel uncertain, especially during the ongoing pandemic. Therefore, instead of the timetable, lecturers had to draw up a semester programme that indicated when they would upload lecture recordings and assignment due dates. This benefited both the lecturers and the students.
- Lecturers had to remember that the NWU followed a continuous assessment instructional design (i.e. there would be no summative examination).
- Although the exact dates were uncertain, the second semester would end much later. It would be safe to plan module content to be spread out by the end of November.
- Lecturers had to inform their students as soon as possible of the new path the second semester had taken.
- They also had to add an announcement on the e-Fundi sites for distance students to inform them when the second semester would start and that the timetable for the interactive whiteboard sessions would not be followed.

The second semester for the paper-based programmes stayed as indicated in the information booklets for the different programmes. The second semester of 2020 for all paper-based UODL programmes commenced as indicated in the information booklets. The second semester of the ACT and Dipl Gr R programmes started in July 2020, and the first interactive whiteboard sessions for ADE for the second semester started in August 2020.

The lecturers of the ACT, ADE and Dipl Gr R programmes:

- had to continue with the timetable for the interactive whiteboard sessions
- could make the recordings in their own time
- could make the recordings from their home and upload them onto Panopto

- could also make the recordings from the offices of the UODL, but then they had to arrange it beforehand with the e-learning team responsible for assisting with the recordings
- had to upload the recordings for the students in line with the dates on the timetable.

Conclusion

In conclusion, the focus of this chapter was to document lessons learnt from the decision to follow the continuous assessment route with distance paper-based students who did not have access to WiFi, data or online engagements at the NWU. Following the interruption of academic work by the global COVID-19 pandemic for the submission of assignments and the replacement for sit-down examinations, a new normal was generated. As there are limited research findings on the influence of COVID-19 and the implications of the pandemic for SDG 4 (quality higher education in the university sphere), we shared in this chapter the experience that we had throughout the lockdown period in South Africa. The global pandemic led to the decision of the UODL management of the NWU to create an online assignment or portfolio access and submission page. Amongst other things, the support services included the UODL and faculty management teams, the information technology department of the NWU, the UODL e-learning team, programme leaders, lecturers, students and the assignment office, which were all deployed online. The UODL regularly communicated via text messages with all of the distance students. A link was sent via SMS for the students to access the information, informing them of the submission of assignments and guiding them on the process of downloading the final assessment through the online Assignment/ Portfolio Access and Submission page. The way forward will be to explore the possibility of adjusting and suggest that the paper-based programmes get on board to deploy online learning during and beyond circumstances such as a pandemic. In this chapter, we discussed the implications caused by several challenges owing to the COVID-19 restrictions. Finally, the clear roles of the leadership of the UODL and the faculty to manage online submissions for the paper-based programmes will create room for student progress to lessen perceptions that paper-based students will not be able to succeed or to continue to make use of an online assignment or portfolio access and submission page such as the NWU's electronic platform e-Fundi. It also aims to provide equal access to teaching and learning and to eliminate gender and wealth disparities with the aim of achieving universal access to quality higher education.

Chapter 9

Transforming early childhood education student-teacher assessment for sustainable development through portfolios in higher education institutions to support BRICS countries

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Introduction

In times of constant change globally, higher education institutions (HEIs) need to investigate sustainable ways of teaching, learning and assessment to narrow the gap between theory and practice. In creating a justifiable learning environment for early childhood development (ECD), student-teachers' use of portfolios as evidence of professional development was investigated. The chapter reports on both paper-based portfolios and e-portfolios because of the diverse profile of early childhood education students. Furthermore, the support needed from the lecturer in the successful completion of portfolios is highlighted.

In the literature, there are many definitions and interpretations available for sustainable development (SD). In these changing times we are experiencing globally, it is important to investigate new and innovative ways of SD and assessment in HEIs. Transforming early childhood education student-teacher assessment in HEIs through portfolios will ensure that development will still take place and meet the needs of the current situation even though circumstances may change.

Little research is available on the use of portfolios in HEIs within the BRICS countries. Therefore, this chapter will contribute to the body of knowledge on the use of e-portfolios as an assessment tool while working towards quality education. Hence, the information gathered in this chapter to investigate the possibilities of transforming early childhood education student-teacher assessment for SD through portfolios in HEIs can be used to support all of the BRICS countries to ensure quality education.

Technological development forms part of the economic dimension of the SD goals (Wu et al. 2018). Technology is seen as a powerful tool that enables students to control their own learning and gives them access to more information than a mentor or the person teaching them could give them. According to Adachi, Tai and Dawson (2018), the use of technology has a direct influence on the assessment of student-teachers. The following are questions we can ask ourselves as lecturers in the 21st century: what does the use of technology in assessment mean for lecturers teaching student-teachers in the BRICS countries through the means of paper-based programmes in HEIs? Where and how should we adapt to the changing circumstances to ensure SD in HEIs?

As ECD lecturers who are used to paper-based portfolios completed by student-teachers as an assessment tool in an HEI environment, we face various challenges during assessment, especially when we have to ensure similar outcomes within the assessment process while times are changing. Therefore, we must think differently about assessment but also stay on track with what the current global trends are in terms of the use of technology during assessment in HEIs, while still ensuring that quality assessment takes place.

Teaching, learning and assessment cannot be separated from one another, and the assessment of knowledge, skills, attitudes and values needs to be well

integrated (South African Qualification Authority 2005:18). Assessment should serve as a tool to assist students in determining the progress they make within their own learning process. According to the South African Qualifications Authority (2014:11), the type of assessment given to student-teachers is related to the qualification and the curriculum of which it is part, and assessment criteria are developed before the learning process starts to address the projected outcomes.

Higher education institutions also use portfolios as evidence for professional development, reflecting a student's understanding of theory and practice and bringing them together. A portfolio may consist of various forms of evidence showcasing a student's personal skills, experiences, accomplishments and growth over time. One of the aims of this chapter was to gain insight into the use of portfolios, whether paper-based or electronic (e-portfolios), as an assessment tool in HEIs that can be of great value to ECD student-teachers to bring theory and practice together when working with young children in diverse contexts of learning. A discourse on the use of portfolios as assessment tools is provided in this chapter with the aim to support lecturers at HEIs to ensure SD in the BRICS countries and globally. Next, the main concepts used in this chapter are clarified.

Concept clarification

Assessment

Assessment refers to a process in which different strategies are used to determine whether specific outcomes have been mastered within a qualification or part-qualification to form an opinion about a learner's achievement. The process of assessment includes gathering information and artefacts to showcase that learning outcomes have been reached (South African Qualifications Authority 2014:4).

Sustainable development

Sustainable development is 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (UNESCO 2021). Therefore, SD guides the current global transition in finding innovative ways of assessment to meet the needs of assessment in HEIs, while ensuring that quality teaching and learning take place.

Portfolio

A portfolio is a collection of a person's work and contains meaningful supporting documents and artefacts to showcase his or her achievements towards specific outcomes. Portfolios can be seen as an assessment tool

guiding quality education by collecting evidence over time to ensure specific outcomes are reached (Pandya, Slemming & Saloojee 2017:78). Artefacts are objects made by a person to compile evidence towards a particular goal (Harrison 2019:33). Compiling artefacts as part of students' evidence can demonstrate their understanding, knowledge and skills related to the outcomes that should be reached (Van Wyk 2017:276). For the purpose of this chapter, the term 'artefacts' refers to the supporting material made by student-teachers and compiled within a portfolio of evidence.

Higher education institution

An HEI is a university that offers accredited qualifications to train and qualify students in various disciplines (Sewagegn & Diale 2020).

BRICS countries

The acronym 'BRICS' refers to the countries Brazil, Russia, India, China and South Africa, which formed a fairly new international organisation that collaborates on many levels across various fields, including quality education. These countries work collaboratively to improve education and ensure quality education (De Beer & Wolhuter 2020). For the purpose of this chapter, the idea of transforming early childhood education student-teacher assessment for SD through portfolios in HEIs was explored to support the BRICS countries while trying to keep up with constant change globally.

Early childhood development

The South African Department of Basic Education (DBE) (2020) defines 'early childhood development' as a comprehensive approach to programmes and policies for children from birth to nine-years-old with the active participation of their parents and caregivers. The purpose of ECD is to protect the right of children to develop their full cognitive, emotional, social and physical potential.

Early childhood education

Early childhood education refers to different educational strategies used by practitioners or teachers working with children from birth up to nine-years-old. In some countries, it only includes children up to eight-years-old. Early childhood education is seen as a crucial part of ECD (Taylor, Neethling & Seleti 2020:61–101).

Student-teacher

For the purpose of this chapter, the term 'student-teacher' refers to a person enrolled at an HEI, studying to become a teacher.

Portfolios as an assessment tool in higher education institutions

According to Lam (2018:1), the use of portfolios as an assessment tool is not a new way of assessing. Portfolios have been used for decades, starting in subject disciplines such as arts, architecture, photography, fashion design, journalism and teaching. Lam (2018:2) further explained that the word 'portfolio' originates from the Italian word *portafoglio*. Generally, 'portfolio' refers to loose papers, notes, artefacts, pictures, pamphlets or documents that people carry with them in a flexible carrier bag (Merriam-Webster 2020). In other words, a portfolio is a collection of one's work and contains meaningful supporting documents and artefacts to showcase a person's achievements towards specific outcomes.

A portfolio, whether paper-based or electronic, is a tool or instrument to assess a student's knowledge, skills and growth over time. The use of portfolios is a way of combining formative and summative assessment in a logical and workable manner to assist students in showcasing their knowledge and skills included in the specific module outcomes of a particular qualification that should be reached at a particular time in the learning process. A portfolio is a collection of evidence affirming a student's progress, including personal and professional development, through critical analysis and reflection. Portfolios assist students in bringing theory and practice together in a reflective process over time, encouraging them to take responsibility for their own learning (Pandya et al. 2017:78; Van Wyk 2017:274). Using portfolios as an assessment tool enhances teaching and learning in the higher education environment and provides the opportunity for experiences to be turned into learning. Portfolio assessment can serve various purposes and may include diverse learning requirements for a diverse group of students (Carl & Strydom 2017:1; Lam 2020:1). According to Pandya et al. (2017):

> Portfolios are an underutilised assessment and self-development tool in postgraduate training. They allow students to self-assess their attainment of personal learning needs, professional growth and competency achievement and provide faculty with useful feedback on curriculum content, educational activities and competency attainment. (p. 78)

In HEIs, different types of portfolios can be implemented as assessment tools, depending on the outcomes that should be reached. The different types of portfolios are progress portfolios, working portfolios and showcase portfolios. Whereas the progress portfolio is partly formative and minimally summative, the working portfolio is mainly formative and the showcase portfolio is mainly summative. The three types of portfolios are compared in Table 9.1. The lecturer should investigate the purpose of the assessment and choose which portfolio type will be most suitable as an assessment tool to reach the applicable learning outcomes.

TABLE 9.1: Comparing the three types of portfolios.

Progress portfolio	Working portfolio	Showcase portfolio
Progress portfolios are used to monitor student-teachers' growth and are aimed at collecting evidence that reveals the students' improvement in the learning process over time. The evidence in the progress portfolio can be flexible and open-ended. The evidence may include quizzes, final draft assignments, examination papers and continuous reflections.	Working portfolios are used to monitor students' attempts to reach the outcomes at hand and are an indication of how the learning outcomes have been reached over time. These portfolios are mainly used for formative assessment but can also include summative assessment. The evidence in the portfolio includes all artefacts, including drafts and feedback received by the lecturer.	Showcase portfolios are used to exhibit the students' best work over time. The evidence in the showcase portfolio includes all documentation that reveals students' best work. Students need to decide on what to include in this portfolio to reveal how well they have reached the learning outcomes. In this way, students can manage the process of keeping a portfolio and reflect on their own work.

Source: Adapted from Lam (2019:74).

According to Van Wyk (2017:274), creative and innovative strategies are introduced in HEIs, nationally as well as globally, to prepare student-teachers for the 'classroom of the future' and to record reflections on the learning experiences of the student-teacher. The baseline findings of the report of the Project for Inclusive Early Childhood Care and Education (Harrison 2017:49–50) have found it to be clear that the use of portfolios in teacher education programmes enhances teaching practice. A portfolio gives all students the opportunity and time to purposefully compile evidence of their learning (Orland-Barak 2005:27; Van Wyk 2017:275). Furthermore, compiling a portfolio over time gives them the opportunity to identify their own strengths and weaknesses (Mapundu & Masara 2016:200; Van Wyk 2017:274). Thus, they are given the opportunity to reflect on their own learning and progress, show their strengths and improve their weaknesses (Orland-Barak 2005:25–27; Van Wyk 2017:274–280). Moreover, using portfolios as an assessment tool gives student-teachers the opportunity to demonstrate their own knowledge and skills as professionals by compiling products they have developed in practice. Compiling a portfolio is a student-centred activity in which students can choose the artefacts they would like to include to showcase their learning, including their reflections on the process (Paulson & Campbell 2018:3; University of Waterloo 2020).

A portfolio is used as an assessment tool to monitor student-teachers' progress made in a specific module or course. It reflects their efforts in reaching the outcomes of the course or module and motivates them to take responsibility for their own learning. Another benefit of using portfolios as a tool of assessment is that it enhances student-teachers' critical thinking skills, as it gives them the opportunity to reflect on and improve their own work. Moreover, portfolios create opportunities to support student-teachers in forming connections between theory and practice. It is important that clear assessment criteria should be drawn up for the assessment of portfolios in HEIs (Van Wyk 2017:283).

Guidelines for portfolios as an assessment tool in higher education institutions

In higher education, different forms of assessment are used to meet the needs of the present situation and ensure SD. The different types of assessment include formative and summative assessments. Different types of assessment can refer to various activities, depending on the outcomes that should be reached in a specific programme or module (Nel & Neethling 2020:24). Formative assessment is seen as 'stepping stones' or a set of activities that lead to reaching an outcome, while summative assessment takes the form of assignments or examinations, usually at the end of a module or set of work, that have to be completed as set out in the outcomes (Open Educational Resources Africa 2020).

Open Educational Resources Africa (2020) suggested that when thinking about assessment, we should attempt to realise that the focus and importance of assessment must be meaningful learning in context and that students need support and feedback to ensure that meaningful learning does take place. It is important that all formative and summative assessments are accompanied by a tool or instrument, such as a rubric, checklist, memorandum or, alternatively, any form of guideline to assist students in understanding what is expected of them and to improve their own work where necessary.

Rubrics

Globally, students' experiences of general concerns with regard to feedback given on assessment tasks in HEIs have been documented. The main concerns students have are fairness, transparency and consistency in the feedback provided to them (Cockett & Jackson 2018:8). To be able to overcome these concerns, Cockett and Jackson (2018:8) proposed that rubrics should be used to ensure fairness, transparency and consistency in the marking of student-teachers' portfolios as an assessment tool. A rubric can be used to eliminate various challenges or uncertainty and keep personal touches within each student-teacher's portfolio, no matter what the circumstances are in which they have compiled their portfolios (Lam 2020:1; University of Waterloo 2020).

A rubric is an evaluation tool that guides the scoring of work compiled and measures the teaching and learning outcomes against a set of criteria. These criteria are specific to the course, programme or module and can be adapted for different training courses, programmes or modules for student-teachers. A rubric also includes summative evaluation and assists student-teachers in self-assessment. It is important to use a rubric to score the competency of the portfolio, and in this way, fairness, transparency and consistency are ensured (Cockett & Jackson 2018:8; Lam 2018:49).

Box 9.1 is an example of a holistic rubric for scoring a portfolio in an HEI. The example gives an indication of the levels of competency and phrases that

BOX 9.1: Example of a holistic rubric for assessment of a portfolio.

Level 5: Outstanding or advanced portfolio
The student-teacher has competently achieved the expected criteria. The portfolio is well organised, with insightful ideas. The student-teacher displays extensive knowledge of the topic. Reflection on learning in the discipline is of advanced quality and includes a mixture of various related outcomes and activities. The student-teacher has made an outstanding effort in the integration of different learning types. The student-teacher's insight into the use of resources for broadening one's professional skills is comprehensive. The student-teacher's knowledge of the use of technology is at a high level. The student-teacher links the purpose of the instruction to the larger curriculum. The student-teacher explains strategies that may be used clearly, including scaffolding and connecting different areas of learning. The student-teacher's spoken and written language is exceptional. The student-teacher's use of academic vocabulary is accurate and serves to enhance student understanding.
Level 4: Good-quality portfolio or above-average portfolio
The student-teacher has adequately achieved the expected criteria. The documenting is exceptionally purposeful, and the activities are highly organised. Reflection on learning in the subject area is of good quality and consists of a combination of outcomes and activities. The student-teacher has made an adequate effort in the integration of different learning types. The student-teacher displays an awareness of resources to use and improve one's professional skills. The student-teacher displays adequate knowledge of the use of technology. The student-teacher's explanation of content is structured, clear, accurate and connected to learners' knowledge and experience. The student-teacher's spoken and written language is clear and correct. The student-teacher's use of academic vocabulary is correct.
Level 3: Average-quality or proficient portfolio
The student-teacher has achieved the expected criteria to some extent. The documenting is moderate, somewhat purposeful and slightly organised. Average reflection on learning in a speciality has been done, consisting of a mixture of outcomes and activities. The student-teacher has made little effort in the integration of different learning types. The student-teacher shows some awareness of resources to use and improve one's professional skills. The student-teacher displays average knowledge of the use of technology. The student-teacher's explanation of content contains minor errors. Some content is clear, and some content is connected with learners' knowledge and experience. The student-teacher's spoken and written language is clear but limited. The student-teacher shows some correct use of academic vocabulary.
Level 2: Below-average or basic portfolio
The student-teacher has achieved minimal expected outcomes. The documenting has been done on a small scale and has hardly been organised. The student-teacher displays basic essential knowledge that is important for student learning of new content knowledge. Little reflection on important learning in the subject area has been done and consists of a combination of outcomes and activities. The student-teacher has made no effort in the integration of different learning types. The student-teacher shows little awareness of resources to use and improve one's professional skills. The student-teacher displays inadequate knowledge of the use of technology. The student-teacher's clarification of content contains some mistakes and is not clear or accurate. Minor connections are made with learners' knowledge and experience. The student-teacher's spoken and written language is rarely clear or correct. The student-teacher's use of academic vocabulary is limited.
Level 1: Inadequate or unsatisfactory
The student-teacher was unable to achieve the expected criteria. The documenting is of low quality, purposeless and not organised. The student-teacher shows no understanding of important knowledge for mastering new content knowledge. The outcomes represent low expectations for students and a lack of flexibility. The outcomes do not reflect important learning in the area of specialisation; they are stated as activities and not as outcomes for learning. The student-teacher is unaware of resources to use and improve one's professional skills. The student-teacher displays no knowledge of the use of technology. The student-teacher's clarification of content contains major mistakes. The student-teacher's spoken and written language is inappropriate. The student-teacher does not contribute to the correct use of academic vocabulary.

Source: Adapted from Danielson (2013:1–109) and Lam (2018:47).

can be used in a rubric. The rubric can be adapted for various types of student-teacher portfolios, depending on the learning outcomes that must be reached. The phrases used can also be adapted for different types of portfolios, depending on the focus of the portfolio.

Cockett and Jackson (2018:9) indicated that involving students and lecturers in the development of a rubric can contribute to the successful implementation of the rubric. Consistent feedback from student-teachers' mentors or peers can motivate them to engage with their peers and mentors to reflect on the learning process without uncertainties in completing a portfolio according to the outcomes that should be reached at the end of the module, programme or course. Providing feedback to students is essential and can guide progress and improve skills and confidence in the learning process of student-teachers (Costello & Crane 2013:217; University of Waterloo 2020). Technology creates various opportunities for instant feedback and can assist student-teachers in improving their own teaching and learning processes.

Online assessment

In a changing world, online learning is expanding and meeting the needs of the present situation. E-assessment is also growing rapidly and becoming a critical tool for SD in education, specifically for assessment in HEIs (Costello & Crane 2013:217). Nel and Neethling (2020:24) stated that researchers have found that higher-order thinking, self-directed learning and interactive learning are motivated in online assessment. Student-teachers are encouraged to engage in their own learning process within a relevant context and contribute to student-teachers becoming lifelong learners (Nel & Neethling 2020:24). Because of this reason, e-portfolios can be an opportunity for assessment in HEIs.

Assessment using technology to create e-portfolios allows student-teachers to investigate real-life situations and gain knowledge beyond the textbook, preparing them for real classroom situations. Student-teachers are also guided in the process of developing problem-solving skills in and for practice (Costello & Crane 2013:217; Nel & Neethling 2020:24). Student-teachers should have clear guidelines on what is expected of them and what or how they will be assessed to successfully complete a portfolio that will contribute to their successful completion of a module or course (University of Waterloo 2020).

Theory on portfolios (paper-based and electronic) as an assessment tool

According to Kruger, De Witt and Janse van Rensburg (2015:160), a portfolio can be seen as a golden opportunity to understand teaching through the

study of practice, thereby closing the gap between the theory of teaching and actual teaching in the classroom. Portfolios are a way of generating and documenting learning and supporting student-teachers in the construction of their own knowledge and skills. Constructing knowledge is embedded in the learning theory known as 'socioconstructivism' and supports the thinking of students to learn better when they construct their own knowledge (Lam 2018:1; University of Waterloo 2020). According to Lam (2018:15), when referring to the use of portfolios as an assessment tool, socioconstructivism involves portfolio strategies such as the collection of evidence, reflection on one's own work, self-assessment, selection, evaluation, context productivity, student-centredness and student development over time.

Self-assessment can not only be an individual assessment activity but also be part of a portfolio. Furthermore, reflection on one's own learning helps students to connect and make meaning from various diverse learning experiences and construct their own knowledge (Kuh et al. 2018:19). When students are provided with opportunities to bring theory and practice together or, in other words, to apply their own knowledge and the skills they have learnt, the 'road to reflection is paved' (Carl & Strydom 2017:1). Reflection emphasises awareness of the importance of lifelong learning and that student-teachers realise how significant lifelong learning is in the world, work and the community (Carl & Strydom 2017:1). Self-assessment and reflection provide an opportunity for active involvement in the planning, selection and completion of assessments other than students taking a test (Lam 2018:17).

Because of potential opportunities that arise from the use of reflective approaches to learn from reflective practice and develop one's own theories, reflection in the training of preservice and in-service teachers is motivated. These reflective practices also inspire student-teachers to become agents of change and create opportunities for them to not only improve their critical thinking and problem-solving skills but also fulfil their passion through a transformative learning process over time (Carl & Strydom 2017:2; Van Wyk 2017:281). Therefore, the use of portfolios as an assessment tool should be guided by different assessment principles, which include validity, reliability, authenticity and practicality. These principles can be challenging for lecturers and may promote SD by making students more socially responsible, critical and sensitive towards different assessment principles. The assessment principles are as follows (Lam 2019:31–35; Meeus, Van Petegem & Engels 2009:401):

- The *validity* of the assessment is sufficiently high, as the process and results are evaluated using a portfolio as an assessment tool.
- *Reliability* is ensured in portfolios because consistent feedback is provided and guided by the rubrics that are used to assess the portfolios.
- *Authenticity* is high, as the assessment includes real-life situations upon which the activities in a portfolio are based.

- The *practicality* of a portfolio as an assessment tool can be a challenge, as this increases the marking load of lecturers.
- The *impact* principle refers to feedback that will have an impact on the teaching and learning process.

The portfolio should be learner-centred, which in this case refers to the student-teacher and should represent the socioconstructivist paradigm. Student-teachers should have adequate time, opportunities, feedback and inspiration to improve their own work, close the gap between theory and practice and transform their own learning while embracing creativity and diversity (Omar 2020:32).

Feedback

Feedback is seen as an integral part of assessment and SD in HEIs. Various forms of feedback, which could include verbal, written and online feedback, should be provided to student-teachers to guide them through the learning process. These forms of feedback, which include (amongst other things) formative feedback, should have a positive impact on the teaching and learning process and afford students the opportunity to improve their own work (Evans 2013:72; Lam 2019:59). Summative feedback is guided by a specific rubric that is focused on a specific task or set of outcomes. It can be provided at a later stage when students have already improved their work and are focused on a specific task or outcome. Formal feedback is included in assignments that have been handed in or may involve formal discussions, whereas informal feedback can take place in the classroom or on an online platform through discussions. Internal feedback means that students are doing self-assessment and reflecting on their own work, which are vital components in the compilation of a portfolio, either paper-based or electronic (Costello & Crane 2013:219).

What can be included in a portfolio (paper-based or electronic)?

To give lecturers or assessors a background of individual student-teachers' specific portfolios, they can request that each student-teacher add a cover letter to his or her portfolio before submitting it for assessment or feedback. A cover letter may include a short list of what the portfolio consists of, including an explanatory paragraph on specific pieces of evidence selected to add to the portfolio. The following can also be included in a portfolio:

- The student-teacher's personal narrative.
- The student-teacher's teaching philosophy.
- Personal information of the student-teacher, including qualifications and training.

- Self-assessment.
- Peer assessment.
- Observation sheets.
- Reflection sheets.
- Assessment sheets of the student-teacher in practice, assessed by a mentor.
- Assignments.
- Rubrics.
- Teaching and learning activities with supporting material.
- Artefacts.
- Any other evidence that has contributed to the learning process of the student-teacher.

Van Wyk (2017:279) found that using portfolios as an assessment tool provides informative information on student-teachers' professional development and growth over time, teaching methods and practice, and their career path in terms of completing an education programme at an HEI. Therefore, it is clear that portfolios support development, regardless of the needs of the current situation, the circumstances and the changes taking place.

Guidelines for the student-teacher when developing a portfolio (paper-based or electronic)

The following guidelines should be adhered to by student-teachers when compiling portfolios:

- Read the instructions and make sure you know what is expected of you.
- Ask the lecturer for assistance if you are uncertain about what to do.
- Start as soon as you receive the guidelines.
- Stick to templates that are provided.
- Follow the rubric that is provided.
- Plan your portfolio and make sure the outcomes are reached.
- Evaluate your own work.
- Ask a peer to evaluate or read your work.
- Reflect on your own learning process from the beginning.

Portfolios can be in the format of a hard-copy, better known as a paper-based portfolio, or in electronic format, better known as an e-portfolio (University of Waterloo 2020).

What is a paper-based portfolio?

A paper-based portfolio consists of printed or written documents, including reflections and artefacts created by the student-teacher (Harrison 2019:50).

These written or printed documents and artefacts are compiled as evidence of the outcomes reached within a particular module, programme or course. A paper-based portfolio also reflects a student's best work in bringing practice and theory together. Feedback takes time, as the paper-based portfolio should be submitted for marking at the HEI, after which it has to follow an administrative route before reaching the marker. The marker will then give written comments as feedback in the portfolio, usually using a rubric. After this, the portfolio is physically returned to follow the administrative route again before it is returned to the student. As markers, we can advise that students should follow the rubric and use the templates provided when compiling a portfolio so that the marker can easily find the information that needs to be assessed. Students should number their portfolios if they have used more than one file. They should also keep a copy in case the paper-based portfolio is lost.

Working as paper-based lecturers, we are used to paper-based portfolios; therefore, we need to rethink and reroute our assessment strategies or tools on how to assess and ensure the successful evaluation of our students in these changing times and to ensure that SD is promoted. It is also important to rethink the way we guide our students on what is expected of them to submit as evidence of learning. Thinking of new and innovative ways of completing a portfolio, we know it is as challenging for lecturers as it is for students.

What is an e-portfolio?

E-portfolios are globally seen as an evidence-based strategy to support the learning of student-teachers through the use of technology, and they are slowly being introduced in teacher education programmes offered at HEIs around the world (Van Wyk 2017:274). E-portfolios are an electronic version or record of work completed to showcase a student's development of knowledge and skills over time to reach the outcomes set out in the specific module, programme or course (Paulson & Campbell 2018:1; Van Wyk 2017:274). The use of e-portfolios as an assessment tool is an innovative way of assessing and promoting SD in HEIs and supports lecturers in assessing student learning in diverse contexts, even in changing times.

An e-portfolio can consist of any evidence showcasing a student's growth and learning over time and may include personal information on the student, work experience, photographs, posters, essays, activities, pictures, collages, and so forth, completed by the student and submitted for marking via an electronic platform (Carl & Strydom 2017:2; Paulson & Campbell 2018:1). It is seen as a product that consists of a collection of evolving multimedia artefacts, reflections and a digital 'story' of the student's journey. An e-portfolio is not merely the use of a technological platform but also a process

of integrative learning and of deepened reflections (Kuh et al. 2018:16). E-portfolios can be used to showcase the reflective learning and professional development and skills gained in a selected timeframe, including all the evidence demonstrating what has been learnt during the learning process (Carl & Strydom 2017:2; Van Wyk 2017:274). According to the University of Waterloo (2020):

> Making and sharing an e-portfolio with others is somewhat like telling a story: the story of one's own learning journey. (n.p.)

Advantages of e-portfolios

Paulsen et al. (2018:13) are of the opinion that e-portfolios provide reliable information for teaching and learning, and using e-portfolios in HEIs provides opportunities for summative as well as formative assessment. This also creates more opportunities to track learning outcomes and obtain feedback from mentors. E-portfolios are a rich resource to achieve the desired outcomes of a module, programme or course over time. Moreover, e-portfolios create opportunities for student-teachers to make connections amongst different parts of the curriculum while they are gaining knowledge of and skills in self-improvement to become lifelong learners in the 21st century (Miller & Morgaine 2009:8–12; Paulson & Campbell 2018:13). Creating portfolios affords student-teachers the opportunity to take ownership of their own learning process, as reflection takes time, must be thought through and is important for successful learning.

E-portfolios are easily accessible for student-teachers as well as lecturers, and feedback is immediately available on a computer, mobile phone, tablet or any other electronic device. This enables student-teachers to complete and submit their portfolios wherever they may find themselves (Van Wyk 2017:275). In this way, barriers to the teaching and learning process experienced at HEIs regarding time and distance can be bridged. This gives student-teachers time to improve according to feedback available to them and also allows them to collect their own and best work, because any student would want to create the best e-portfolio possible (Van Staden 2016:2; Van Wyk 2017:283).

The availability and accessibility of e-portfolios help the lecturer or assessor to track and document students' growth over a period. No paper is used or printed, which ensures a greener and cheaper way of assessment. The portfolio cannot be damaged or lost but remains available to student-teachers as well as lecturers and can be used at a later stage. The e-portfolio can also serve as a resource in the classroom, even after assessment has taken place at the HEI. Moreover, the e-portfolio can be used as an online resource for the student-teacher to expand and create new material or ideas that he or she can use over and over again at a later stage to ensure best practice (Paulson & Campbell 2018:13; Van Wyk 2017:275). Furthermore, when entering practice,

student-teachers can share their portfolios with other teachers. By sharing portfolios, teachers can learn from one another and improve their own practice. Portfolios can also be used as guiding working documents. They can be improved over time and provide the teacher (who was once a student-teacher) with numerous practical resources.

Disadvantages of e-portfolios

A major disadvantage of using e-portfolios as an assessment tool is that students are required to have knowledge of and skills in the use of modern technology to accomplish the task at hand. Some students have little experience with technology and are not confident in using technology. From our experience as lecturers working with students from diverse backgrounds, including rural areas in South Africa, Internet connectivity is not always easily accessible to students living in some remote areas. Barriers such as limited Internet accessibility can lead to students struggling to complete the task at hand. In effect, it may take these students longer to compile e-portfolios than paper-based portfolios, as they can compile paper-based portfolios in the convenience of their own homes. The ability to use modern technology can also be a major challenge; therefore, compiling online e-portfolios may leave student-teachers very nervous and reluctant to showcase their true potential (Paulson & Campbell 2018:14).

Support to students in compiling an e-portfolio

It is essential that lecturers understand their students and their context to know what level of support they should give their students, whether the assessment is done through a paper-based portfolio or an e-portfolio. To ensure effective learning while using a portfolio as an assessment tool, it is crucial for lecturers to support students in the transition from paper-based portfolios to the compilation of e-portfolios, especially because this is a very unfamiliar and new method of assessment for both student-teachers and lecturers. Lecturers should compile clear guidelines on what is expected of their students, whether it is a paper-based portfolio or an e-portfolio. It is important that lecturers realise that the support they give their students in completing an e-portfolio will contribute to the successful completion thereof.

Students should be provided with guidelines, checklists and rubrics so that they will know how they should compile a portfolio, keeping in mind what the assessor will pay attention to when marking the portfolio. Compiling a short written or visual step-by-step tutorial can assist the students in how to log in and navigate their way through the online platform. The tutorial should also include guidelines on how and where they should upload their e-portfolio

work. Not all students are technologically strong, and therefore, it is important to guide and support them through the process to ensure that effective learning takes place and students do not experience fear of technology, which in turn may lead to the unsuccessful completion of an e-portfolio.

Creating supporting videos and posting these on an e-platform or group can eliminate students struggling unnecessarily and having questions about the content and creation of e-portfolios. Clear rubrics on what will be assessed can guide the students and assist lecturers in constructive and timeous feedback. Furthermore, it is important to inform students that they need the Internet and a device such as a computer to be able to successfully complete an e-portfolio. To be able to support students, it would be valuable for lecturers to create their own portfolio, not only to share it with the students as an example but also to better understand the challenges with regard to compiling it (University of Waterloo 2020). Understanding the challenges that students experience will help lecturers to provide better support to their students, whether academically or technologically.

By including various stakeholders within the HEI to establish challenges regarding the use of e-portfolios, collaborative problem-solving can take place to overcome these challenges. Accordingly, more and better-streamlined opportunities can be created to use e-portfolios successfully as an assessment tool in HEI, specifically for student-teachers (Paulson & Campbell 2018).

Practical guidelines to guide lecturers in supporting student-teachers in compiling e-portfolios include the following (University of Waterloo 2020; Van Wyk 2017:279–283):

- Step-by-step instructions on what is expected of the student-teacher when compiling an e-portfolio should be provided.
- The lecturer should scaffold learning and guide the students to start small and build a portfolio as they grow.
- The lecturer should create his or her own portfolio with the students.
- The lecturer should provide relevant practical examples.
- The lecturer should understand software, including online assessment tools and the technology used, to be able to assist students when they experience technological difficulties.
- Planning should be clearly communicated to the students.
- All relevant information regarding the compilation and submission of portfolios should be clearly communicated to the students and should include an assessment tool such as a rubric.
- Activities should be thought through, applicable to practice and have a direct impact on the students' learning experiences.
- Continuous, positive assistance and feedback from lecturers will motivate the successful completion of e-portfolios.
- The lecturer should give constructive feedback on the students' work and try not to make negative comments.

- The lecturer must give clear guidelines on how to improve the students' lessons submitted for assessment.
- The lecturer should communicate his or her availability to the students for assistance to avoid setbacks.
- The portfolio should be divided into smaller assessment activities so that the students do not feel overwhelmed while completing their portfolios.
- Electronic or face-to-face groups should be created for students to support one another and assist one another in eliminating difficulties in compiling their e-portfolios.
- Students should be guided in sharing ideas with one another.
- Students should be encouraged to add artefacts that they will be able to use when entering a position at a school.

To guide student-teachers in reflecting on practice, they should keep reflective journals. For this reflective journal, guiding questions such as the following should be posed:

- What does your environment look like?
- Do you work in a stimulating environment where learning can take place? What is your opinion on barriers that could hinder the learning process?
- Do you have previous experience in the current context, or is this your first time?
- Do you have any other work experience that can contribute to your experience in the ECD field?
- Do you have a mentor in practice?
- Does your mentor have a qualification? If 'yes', which qualification?
- Reflect on the context of the school (number of classrooms or playrooms, practitioner-to-learner ratio, type of school, e.g., registered early childhood education centre).
- What are the strengths and weaknesses of the school, environment, community, student-teacher or teacher?
- What is the role of the teacher or the student-teacher?
- What are the barriers in and regarding the school environment, community, learners or parents?

Furthermore, student-teachers should reflect on their own professional development in practice. They can do this by completing the following tasks and answering the questions:

- Write a short paragraph on what you did every day.
- Name aspects that you experienced as positive.
- Name challenges you experienced and why they are seen as challenges.
- What did you do to address the challenges that were experienced?
- What would you do differently if you were in the same situation again?
- Name the support provided by the mentor in practice.
- Did you receive any feedback from your mentor? Did you find the feedback supportive and helpful in improving your own work?

- Tell your story about what you have learnt.

Reflection on developing the portfolio can include direct questions and tasks, such as the following that should be completed by the student-teacher:

- Write a paragraph on what you, as a student-teacher, have learnt about yourself while creating and developing your portfolio.
- Have you gained knowledge and skills from the colleagues you worked with?
- What would you want to accomplish with the portfolio that was developed?
- Explain the transition to the use of e-portfolios. If relevant, include positive experiences as well as challenges.

The portfolio will be a guiding resource and will help student-teachers in reflecting on previous as well as current practices, helping them grow in practice. It will showcase the student-teachers' abilities and talents and will assist them in their journey to becoming the best teachers they can be (Friedman 2012; Kruger et al. 2015).

Using e-portfolios as an assessment instrument in higher education institutions for early childhood education student-teachers

As previously mentioned, transforming early childhood education student-teacher assessment in HEIs through portfolios ensures that the needs of the current situation are met and development is still taking place even though circumstances have changed. Portfolios are a way of closing the gap between knowledge and practice as student-teachers learn to plan, present, collect, compile and reflect on their own teaching and learning process. They further learn to create a learning environment and set personal goals and objectives that they must achieve over time while developing a portfolio (Van Wyk 2017:280). Van Wyk (2017:279–280) was of the opinion that by using an e-portfolio as an assessment tool in teacher training programmes at HEIs, student-teachers' professional identity is strengthened, as knowledge and practice are brought together through reflective practice, both inside and outside the classroom. Portfolios are used to create opportunities for students to continuously reflect on their own work and make an informed choice on what evidence they want to include in their portfolios. These artefacts represent the knowledge and skills they have gained, in practice and theory, and are seen as a tool to showcase the student-teachers' performance in a new, innovative way to ensure SD in higher education. Portfolios provide the opportunity for student-teachers to take part in their own learning process by engaging them in continuous reflection (Kruger et al. 2015:156). Portfolios provide a structure that allows students to map their educational journey and

TABLE 9.2: Comparison of a paper-based portfolio and an e-portfolio.

Paper-based portfolio	E-portfolio
Available in hard-copy	Electronically available
Paper is used to compile the portfolio	Technology, such as computers, tablets, phones, etc., is used to make the portfolio available; no paper is used
Feedback takes a long time	Feedback immediately available
Turnover time between submission and improvements is long	Turnover time between submission and improvements is short
Cannot be stored at the HEI	Easy to store electronically
Cannot be accessed at any time and place	Access any time, any place
Cannot easily be shared and updated	Easy to share and update
Paper-based artefacts	Artefacts can include various multimedia and hyperlinks
Provides the opportunity for reflective practice on paper	Provides the opportunity for reflective practice with the use of technology
Provides the opportunity for collaborative learning through face-to-face learning	Provides the opportunity for collaborative learning through e-platforms

Source: Authors' own work.
Key: HEI, higher education institution.

integrate the diverse and often fragmented experiences thereof. Reflective assignments can play an important part in helping students construct such maps (Hutchings 2018:13).

The portfolio as an assessment tool creates possibilities for student-teachers to (Orland-Barak 2005:28; Pandya et al. 2017:79; Van Staden 2016:1):

- find strengths and weaknesses in their own knowledge, skills and performance
- be actively involved in their own learning process
- promote informal and accidental learning
- develop competence awareness
- actively promote reflective practice
- support learning inside and outside the classroom
- promote current and future learning
- create opportunities to identify gaps in the curriculum
- gather information in the portfolio that could guide further learning and assist student-teachers in the application of theory in professional practice.

Table 9.2 is an interpretation of this information comparing a paper-based portfolio and an e-portfolio.

Conclusion

Assessing student-teachers in the traditional way means that the students will have to produce evidence of the set outcomes reached at the end of a module or course. Traditionally, this is done using a formal examination as an assessment tool, which is set for a specific date and time and marked by the lecturer, with the marks made available when the assessment process is completed and finalised (Criticos et al. 2012:121). In the 21st century, innovative

ways of assessment should be explored to accommodate all student-teachers, whether they are technologically driven or their environment does not allow them to be technologically driven. We should think differently about assessment and realise that learning takes place over time. Assessment should be a continuous process that promotes SD and includes reflective learning and constructive feedback. The use of portfolios as an assessment tool will change the means and processes of knowledge production in the assessment process and can be the solution to problems by accommodating diverse backgrounds as found within higher education institutions (HEIs) in the BRICS countries.

Portfolios as an assessment tool can be evidence of a student-teacher's journey through a sustainable learning process while completing a module, programme or course in a diverse HEI, whether paper-based or electronic. In the new normal, remote students will have the choice to compile either an e-portfolio or a paper-based portfolio, depending on the changing context and their specific circumstances. Making a mind shift about using technology can make it possible for students to control their own learning. It will give them access to quick or even immediate feedback on their own work and learning that have taken place in and around the classroom and have been compiled in an e-portfolio. This, in turn, will give students the opportunity to improve their work before submitting the final product. This is in contrast to paper-based portfolios, which take time to send to the higher education institution (HEI), where they must follow an administrative process to be assessed and may leave the student without time to improve on suggestions made by the lecturer. Consequently, the transformation of assessment in HEIs through portfolios, in but not limited to the BRICS countries, ensures that SD takes place and that the needs of the present situation for the early childhood education student-teacher are met.

Chapter 10

The private university sector – disregarded partner for the attainment of sustainable development goals: Insights from the BRICS countries

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Introduction

While approximately one-third of the 25 000 universities worldwide are private universities, the value of this sector in attaining the commendable goals of sustainable development (SD) has thus far been overlooked. The BRICS countries display an interesting variety of private sector universities – from South Africa, with its minuscule private higher education sector, to Brazil, where (corresponding to the situation in Latin America as a continent) two-thirds of university enrolments are in the private university sector. The threefold aim of this chapter objective is, firstly, to determine the role or potential of the

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private university sector as a special subsector of the higher education landscape in furthering the sustainable development goals (SDGs). Secondly, the objective of the chapter is to determine the promise of private universities in pursuing and realising the SDGs in the BRICS consortium of countries. Thirdly, being part of a book written from the South African vantage point, the purpose of the chapter is to determine what the BRICS partners can learn from one another and, in particular, what South Africa can learn from the other BRICS countries with respect to the value of private higher education in the realisation of the SDGs. The chapter concludes that, drawing from the experiences of the other BRICS countries, there is huge scope to create space for private universities in South Africa to broaden access to higher education and to be a force in pursuing the SDGs. In doing so, South Africa can benefit from the BRICS experience. The BRICS experience with private universities cautions, firstly, that the two foundation principles in the establishment and operation of private universities (namely, excellence and autonomy) should not be forsaken. Secondly, a fine balance should be struck between freedom (avoiding unfettered, absolute or too much freedom, which would allow for excellence to be negated) and quality control (avoiding a stifling, dispiriting managerial regime and a culture of surface compliance).

This chapter surveys the BRICS experience with the private university sector and concludes with the motivated argument that this is a sector that all nations, including South Africa, should value in pursuit of the SDGs.

This chapter explores the potential value of the private university sector in pursuing the SDGs in the BRICS countries. In the years and decades after 1990, the private university sector has been the fastest expanding sector in the higher education landscape worldwide (Tremblay, Lalancette & Roseveare 2012:4). Within a volume considering the value of universities in the pursuit of the SDGs, this then prompts the question as to the role or potential role of the private university sector. The first part of the chapter offers a general assessment of the potential role of the private university sector in the global higher education landscape as an instrument for achieving the SDGs. The second part of the chapter narrows the focus down to the BRICS countries. The third part of the chapter attempts to extract what the BRICS countries and South Africa in particular can learn from one another in this regard.

The rise of the present kaleidoscope of private universities in the world

The definition of a university proffered earlier in this book, namely, 'an autonomous institution for the advancement of several branches of advanced learning', will be used as a working definition of a university. The first question for the theme of this chapter is as follows: what exactly is a private university? For any teacher of comparative and international education wishing to

demonstrate the resilience of (national) context in shaping education systems, even in the face of the compelling forces of globalisation and the isomorphism or neo-institutionalism associated with (or ascribed to) it, there can hardly be a better example than that of the private university. There is no universal definition of a private university (see Marginson 2018). In attempting to derive such a definition, Liu (2020:275–276) concluded that what qualifies as a private university depends upon the legal framework of a country, and this varies from country to country. In a national context, what distinguishes a private university from a public (or national, state, provincial or municipal) university is that its relations (e.g. regulations or funding) with the government are fewer. Yet, in many jurisdictions, private universities may qualify for tax breaks, student loans and grants, and financial support from the government. A private university may also find itself subject to government regulations – which can even be (as will be clear later in this chapter) a raft of regulations more stifling than that to which public universities are subject. Within the BRICS countries too, legal definitions of private universities and the accommodations of these within national higher education systems differ substantially (see Carnoy et al. 2014).

The keyword 'autonomous' in the definition has been a hallmark of a university right from the beginning of (what many, especially Eurocentric, scholars depict as) the first universities, such as the University of Bologna in 1088. Nevertheless, and notwithstanding the charters guaranteeing such autonomy from interference from secular or ecclesiastical authorities, these universities have for a long time operated, at least to some extent, as gears in the national projects of governments (see Duggan 1916). The Humboldt University of Berlin, a direction-giving institution for the subsequent development of universities, not only in the Western sphere but globally as well, was founded in 1809 by the King of Prussia, Frederick William III, and opened in 1810 in the wake of the defeat Prussia had suffered at the hands of Napoleonic France in the Battle of Jena in 1806, with the motivation to serve as an intellectual bastion in the reconstruction or rebuilding of Prussia as a strong state (see Krüger 1960). Similarly, the *grand écoles* as the pinnacle of the higher education system in France up to today were begun by Napoleon as a means to set up higher education institutions (HEIs) of excellence geared for functions (providing a ready-made top layer of civil servants for a nation-state taking form) that the universities were not geared for (see Gumbel 2013).

Similarly, the Indian Institutes of Technology, as elite HEIs in India, were created to develop the economy for a strong state in the decades after the attainment of independence (see Rajguru 2003). Thus, as the strong and omnipotent nation-state arose during the 19th and the first three-quarters of the 20th century as the key feature on the global political map, the public university has concomitantly developed as a buttress for the nation-state. In most of the countries of sub-Saharan Africa, the first university was called into

being at the time of independence (around 1960), and until 1990, the typical pattern in sub-Saharan Africa was one country, one university. Needless to say, the sole university was a public, national university (see Sherman 1990).

The changing world since 1990 has created a societal matrix favourable for the growth of private universities. These changes include the economic upswing, the neoliberal economic revolution (see eds. Springer, Birch & MacLeavy 2016), the fading of the erstwhile powerful nation-state (see Davidson & Rees-Mogg 1993) and the affirmation of the autonomy of civil society. Indeed, one of the aspects of the global higher education revolution was the growth of the private university sector as part of the differentiation of institutional types and the receding funding of universities by the state. By 2017, the private university sector had become the most rapidly expanding university sector in the world (eds. Altbach, Reisberg & De Wit 2017:9). By 2018, private HEIs catered for 30% of all enrolments in higher education worldwide (Levy 2018).

Recently, UNESCO has begun to include in its database the percentage of higher education students enrolled in private institutions (see UNESCO 2020). The data for many countries are posted, although the data are still far too incomplete to calculate globally aggregated figures.

Given the divergence of the legal frameworks and societal contextual configurations in which the private higher education sector operates in various jurisdictions, higher education is far from a homogenous sector. Altbach, Reisberg and Rumbley (2009:82) distinguished between the following four categories, although these categories overlap: elite and semi-elite, identity, demand-absorbing and for-profit higher education.

The geographical distribution of the private higher education sector across the globe is very uneven as well. In Western Europe, where the private higher education sector was slow to take off, percentages of tertiary enrolments in the private sector range from low, such as 1% in the case of Denmark, to 70.5% in the case of the jurisdiction of Monaco (UNESCO 2020). Japan and the United States of America (USA) have a long history of private higher education supply. In the USA, 11% of postgraduate students are enrolled in the for-profit private sector, up from 3% at the beginning of the millennium (eds. Altbach et al. 2017:9). In Japan, the public sector covers less than 35% of all higher education enrolments. In Latin America, public universities have dominated the higher education landscape from the time of independence at the beginning of the 19th century to well into the 20th century. Recently, the private sector forcefully took off, and currently, almost half of all enrolments are in the private sector. Unlike the USA, where the elite institutions are private, in Latin America, the leading HEIs are public. In some countries in Asia, such as South Korea, Taiwan and the Philippines, the Japanese model has been followed, and private institutions now are the home for 80% plus of higher education enrolments.

It was in sub-Saharan Africa, however, that an explosive growth of private HEIs occurred in the years after 1990, when a combination of the neoliberal economic revolution (brought on by a situation where many governments were forced to sign structural adjustment programmes with the World Bank or International Monetary Fund to get out of sovereign bankruptcy, meaning the state had to cede its monopoly on many things, including higher education), democratisation, swift economic growth and rapid population growth (and a very young population profile) spelt an end to the post-independence pattern of 'one country, one university', which, as explained earlier, had held sway for about three decades. For example, in Ghana, private universities were only allowed as from 1993. Currently, there are ten public universities and 68 private universities in Ghana (Afeti 2017:47).

Many arguments can be tabled both for and against private universities. Arguments for them include that private institutions enlarge access to higher education for more people, relieve the government from a substantial financial burden, serve particular interest groups in society yearning for a university to look after their interests, can respond faster to changing contextual exigencies, tend to be more efficient and efficacious than public institutions, the private sector is faster to identify and respond to gaps in the market and the existence of such institutions gives the people freedom of choice (see Friedman & Friedman 1980). Arguments against private universities include that private institutions may easily promote unequal access to higher education, they may tend to supply a biased education and they may foster a culture of elitism and individualism (see Schubert 2016). These arguments for and against are heavily laden with ideological overtones. However, the point this author wishes to make, writing as a scholar from the vantage point of comparative and international education, is that the pros and cons of private HEIs should be weighed up against each other, as they exist and function within the higher education and societal contextual ecology of a particular jurisdiction (national state). In view of the value of the BRICS grouping as the societal laboratory of the world, as motivated in the third chapter of the book, the role of the private university in promoting the SDGs in each of the BRICS countries will now be investigated.

Brazil

Societal context

Covering 8.516 million square kilometres, Brazil is, after Russia, Canada, China and the USA, the fifth largest country in the world. The population of Brazil totals 212.6 million (2020), making it the sixth most populous country in the world, after China, India, the USA, Indonesia and Pakistan (Worldometers 2020). It has a mild positive population growth of 0.72% per year, and the median age of 33-years-old gives it a young population profile (in comparison,

the median ages of the population of Germany, Italy and Japan are 46-, 47- and 48-years-old, respectively) (Worldometers 2020). Brazil has an annual per capita gross national income of US$9130, making it, in terms of the classification of the World Bank (2020), an upper-middle-income country. Unemployment is high and rising, from 7.9% adult male and 10.9% adult female unemployment in 2000 to 12.9% adult male and 14.02% adult female unemployment in 2018 (World Bank 2020).

Brazil is of particular importance in the project to maintain the Earth's ecosystem, given that a large part of the natural equatorial forests of the Earth is in Brazil (see Milhorance 2021). Furthermore, the biodiversity contained in these tropical forests is of incalculable value. The widespread fires threatening both are serious and have developed into a point of international tension (see Anon. 2020). Brazil's Earth overshoot day is 31 July (i.e. the day in the year when the people of the country have extracted more resources than the Earth can naturally replenish in one year) (Earth Overshoot Day 2020). If the situation is concerning and noteworthy from the ecological side of the SDG vision, on the development side of these goals, the same verdict can be made.

As said, Brazil is an upper-middle-income country. A total of 4.4% of the population, or 9.35 million people, survive on less than US$1.90 per day (international poverty line) (World Bank 2020). Inequality is a big problem: Brazil's Gini coefficient of 53.3 is the eighth highest in the world (Indexmundi 2020).

Higher education

Higher education expansion is taking place in Brazil at a breathtaking pace. Higher education enrolments stand at 8.74 million (2019, latest available figures at the time of writing), up from 6.12 million a decade earlier in 2009 (UNESCO 2020). The global higher education revolution as from 1990 has also hit Brazil in full force. The gross higher education enrolment ratio has risen from 16.08% in 1990 to 46.45% in 2015 (OurWorldinData 2020).

In their survey of the Brazilian higher education landscape, Balbachevsky and Sampaio (2017) portrayed a picture of the over 2000 public universities as being fossilised or trapped in the past when they were called into being. These institutions have a heavy focus on teaching (see Gavioli & Mourão 2019), rely on traditional teaching methods and an overloaded curriculum, and find it difficult to accommodate and successfully handle the influx of students from new constituencies, such as students from poor families who are now, *inter alia*, as part of affirmative action policies, entering through the portals of universities in ever larger numbers.

Private higher education

Private universities in Brazil came on the scene only in the 1960s, amidst a bout of rapid increase in the demand for higher education. The private institutions filled the niche to supply this rapidly growing demand. At the end of the 1970s, postsecondary education in Brazil had become a highly diverse sector and a strongly stratified system: a public tuition-free network of universities on top and a large, poor-quality, fee-paying private university tier at the bottom (Balbachevsky & Sampaio 2017:132). The role of the private sector, coming to service, especially for the poor, was even more intensified when, in 2004, the new government of Lula da Silva launched the University for All programme that gave tax incentives to private universities for supplying tuition-free education to students from low-income households. Much of the advantage, however, was wiped out by the *vestibular* examination, which is the entrance requirement for university study (see Kussuda 2016:2). Public universities account for only 12.5% of all undergraduate enrolments at Brazilian universities (Balbachevsky & Sampaio 2017:133). However, 83% of postgraduate enrolments are in the public sector – the elite sector of Brazilian higher education (see Kussuda 2016:2) – where most of the research takes place as well.

According to Kussuda (2016), the whole way in which the private-public-aspect higher education system in Brazil operates is that students from affluent families tend to attend prestigious federal and state public universities, while students from poor households are concentrated in private institutions offering lower-quality education. On the contrary, Fioreze and McCowan's (2018) research demonstrated how these private universities of the non-profit type in Brazil, created to serve their immediate communities, have succeeded in becoming a positive force in such communities. The value of this link that these private institutions have managed to form with the immediate community is underscored by the fact that Brazil has a historically developed culture, dating from its independence in the early 19th century, which saw the adoption of Napoleonic tradition, whereby what is public service is associated with the (central) state, there to serve the interests of the state, detached from civil society (Fioreze & McCowan 2018:378).

Brazil's private universities vis-à-vis the sustainable development goals

The Brazilian experience testifies to the contribution a private university sector can make towards bringing higher education to more people – the less affluent sector of the population in particular. The institutions of this sector can also be in better symbiosis with the local community than the centrally

directed and orientated public institutions. However, the experience of Brazil also reveals the caveat of quantitative expansion being compromised by quality and equality (in the latter, the absence of any attention to alleviating the role of high-stakes entrance examinations and the fact that a two-tier system of higher education has developed).

Russia

Societal context

Covering 17.1 million square kilometres, Russia is the world's largest national state. Despite this huge tract of land, the Earth overshoot day of Russia stands on 25 April, which is even worse than that of Brazil (Earth Overshoot Day 2020). Being the scene of a democratisation process since 1990, as the erstwhile ringleader of the bloc opposing Western democracy, makes the country even more noteworthy on the international scene. Russia has an annual per capita gross national income of US$11 260 (up from US$2 260 in 1998), making it an upper-middle-income country. The democratisation process commencing in 1990 coincided with an embrace of the principles of a free-market economy (see Galeotti 2020:170). This produced its share of discontent. By 2000, unemployment was 10.68% for men and 10.14% for females. This has gone down to reach 4.9% in the case of men and 4.8% in the case of females in 2018 (World Bank 2020).

Higher education

Even before 1990, as a result of Soviet state building and centrally commanded economic growth plans, Russia had experienced several spurts of a massive expansion of higher education. In 1917, at the commencement of the Soviet experiment, it already had over a hundred institutions of higher education, with a combined enrolment of about 135,000. At the outset of the new dispensation, in 1990, Russia had 5.2 million higher education enrolments (UNESCO 2020). This grew to 9.4 million in 2008 (indeed, after Canada and Israel, Russia became the third country where over 50% of adults held a tertiary education qualification), whence it declined again to the current 5.8 million (2018 figure) (UNESCO 2020). The reasons for this atypical growth curve are beyond the scope of this chapter, although it can be mentioned that the negative population growth rate (currently - 0.11 per annum) and the ageing of the population pyramid may go some way in explaining it, as can the introduction of the Unified State Entrance Examination in 2009, which is obligatory for all secondary school final-year students. (Prior to 2009, every university could set its own entrance examination.) One of the problems of the state sector is that, even after 30 years, it still proves unwieldy, slow to change, under the dictates of central government and unable to respond rapidly to the market (Yudkevitch 2017).

Private universities

The sprout of private universities in Russia after 1990 should be seen in the light of the lingering tradition of an inertia-characterised central state-directed public university sector. Also, in the free political and economic space since 1990, the demand for higher education has risen, and the government is no longer in a position to cap enrolments (Yudkevitch 2017). In the labour market, there was a demand for the education of new professions (lawyers, managers, etc.) that the historically developed state universities could not supply. Private HEIs in Russia arose spontaneously after 1990, and the legal basis was formulated in 2010 with the *Federal Higher Education Act* (*Federal'nyi Zakon*) (Geroimenko, Kliucharev & Morgan 2012:79). Some private institutions go through the state quality control and accreditation process and issue state-certified degrees. Indeed, some of the private institutions are elite and prestigious universities, but these are far from typical (Geroimenko et al. 2012; Yudkevitch 2017). By 2015, there were 896 HEIs in Russia, including 530 state and 366 private institutions (Yudkevitch 2017:114). The post-1990 state of affairs has allowed for a large number of private institutions to offer inferior-quality education and indiscriminately issue degrees (see Shattock et al. 2004). In line with the decreasing higher education enrolments, the percentage of students studying in private institutions has also declined – from 13.7% of all tertiary enrolments in 2014 to 9.1% of all tertiary enrolments in 2019 (UNESCO 2020). In the unfolding context, the value of tertiary education qualifications has decreased, even that of a doctorate, more so in the growing mismatch between education output and labour demand. Half of the graduates in Russia work in fields they did not study for (Geroimenko et al. 2012). These factors may very well explain a great part of the decrease in enrolments and the decrease in interest in private higher education – both evident in the past decade.

Russia's private universities vis-à-vis the sustainable development goals

The problems in the way of private higher education universities in Russia in serving the realisation of the SDGs are similar to those of Brazil, namely, that while the institutions did play their part in quantitative enlargement, many of them played an adverse role on the quality side. The mismatch between education and work also works against the pursuance of the SDGs.

India

Societal context

With a population totalling 1.38 billion (2020), India is the second most populous country in the world and is set to overtake China as the most

populous country by 2027 (United Nations Department of Economic and Social Affairs 2019:7). Unlike Russia, but even more than Brazil, India has a young population profile, with the median age of the population at 28.4-years-old. Covering 3.3 million square kilometres, India is the seventh largest country in the world. Although no Earth overshoot day data for India are available, evidence of the population pressure taking its toll on environmental degradation is not hard to find (see Palanichamy 2019).

India has a per capita gross national product of US$2 134, making it a lower-middle-income country (World Bank 2020). After attaining independence in 1947, for the first few decades, India was slow to get out of the starting blocks of economic development. The government under Mohanda Singh, as from 2004, liberalised the economy, and the country entered a rapid growth phase under his administration (2004–2014), which continued under the rule of his successor, Narendra Modi, from 2014. Although registering an impressive annual economic growth of 4% in 2019 (pre-COVID-19), the country is plagued by widespread poverty, as 22.11% of the population survive on less than US$1.90 per day (international poverty line) (World Bank 2020).

Higher education

India has a complex, fragmented higher education landscape. At the top of the pyramid are the 23 institutes of technology and 19 institutes of management – institutional types offering advanced education of a vocational-technical bent, created in the time after independence as part of the centrally directed modernisation drive of the government. Global higher education, with its ballooning of enrolments as a signature feature, has also manifested itself in full force in India. Enrolments have swollen from 3.6 million in 1990, to 9.4 million in 2000, to 20.7 million in 2010, to 35.1 million in 2019 (UNESCO 2019). India has the largest university in the world, the Indira Gandhi Open University, established in 1985 and now with over four million students. Having overtaken the USA some years ago, India (which now has twice the number of higher education students than the USA) has become, in terms of enrolment, the second largest higher education system in the world after China (see UNESCO 2019). Two problems besetting higher education in India are the low and declining quality of education offered (see Tilak 2019) and graduate unemployment. While the higher education system churns out five million graduates annually, the labour market can only absorb two million (Agarwal 2017).

Private higher education

One of the key features of the higher education landscape of India is the mushrooming of private universities over the past 25 years (Agarwal 2017:74–79). In the 1980s, there was virtually no private HEI in India (Angom

2015:92; Tilak 2019). In the context of the liberalisation of the economy of India, the private higher education sector got off the ground (Angom 2015:92). In 1990, only 6% of higher education enrolments were in the private sector; by 2015, it had grown to 36% (Agarwal 2017:74). By 2018, India had 233 private universities, compared to 345 state-funded universities (Tiwari & Singhal 2018). Private higher education in India is still being adversely affected by an ambiguous political or policy context (Agarwal 2017) and complicated legal environment and exigencies (see Powar 2015). Skirting around the multitude of quality control bodies, this is one reason (in the private as much as in the public university sector) why quality cannot be guaranteed (Tilak 2019). Tilak (2019) drew attention to the fact that for all its massive size and wide range of institutions, India could thus far not succeed in establishing a world-class university (at least as measured in the university rankings).

India's private universities vis-à-vis the sustainable development goals

The high rate of graduate unemployment is looming as a neutralising factor that private HEIs can play in India's pursuance of the SDGs. The lack of a clear policy context, proper quality control and appropriate accountability measures (to be distinguished from meaningless managerialism and the mere culture of surface compliance spawned by such managerialism), which has a negative impact on the quality of private higher education, of course also has implications for private universities serving as a vehicle towards the attainment of the SDGs. The unpalatable result of such a situation can be that private universities easily become cheap and corrupt 'education basars', as Bok (2003) described them, a description Tilak (2019:62) applied to the situation in India. Modern-age credentialism – Dore's (1976) 'diploma disease' or what Harrison (1980) called the 'paper chase' – is undesirable in the best of contexts; however, when taking place in a context of both dubious or outright substandard education and graduate unemployability, it is that much more objectionable.

China

Societal context

In terms of the two poles which the SDGs are attempting to straddle, namely, the environment and the development of society, China occupies an important place in the world, having the world's fourth largest country (9.6 million square kilometres [km^2]) and its most populous (1.44 billion, according to 2020 figures). Its meteoric rise to economic superpower has been nothing less than miraculous. China is the only country in the world that could manage to attain an average annual economic growth rate of over 8% for the past three decades

(which is more than even Singapore, which clocked up an average of 7% per year). It should be remembered that the socio-political convulsions in the 1950s, 1960s and 1970s resulted in the economic destruction of the country and the deaths, not only from political violence but also from famine, of tens of millions of people (see Fourie 2021:149–151), but China has developed rapidly from this very low base, from a low-income country to becoming a lower-middle-income country in 2008, and in the short space of four years, graduating to the group of upper-middle-income countries in 2012. This rapid development has attracted criticism for the lack of care regarding environmental degradation in the process. Indeed, the 2020 Earth overshoot day of China is 13 June (Earth Overshoot Day 2020).

Higher education

China's economic surge over the past 40 years has been matched by an equally impressive higher education expansion. From a virtual nil base, higher education was severely impacted during the decade of the Cultural Revolution (1966–1976), as well as by other socio-political convulsions during the decades preceding the Cultural Revolution. Higher education was then vigorously rebuilt, so much so that by 2010, China had become the largest higher education system in the world in terms of student enrolments (see Ryan 2019). By 2017, producing 70 000 doctorates, it had also overtaken the USA to become the country with the largest number of doctorates produced per year. The expansion took place in tandem with and as part of the economic modernisation and development drive from 1978.

Private higher education

China has had a long tradition of private universities, but after the takeover of the Communist Party in 1949, all private institutions were closed down. The establishment of private higher education, or *Minban* universities, was allowed as from the 1980s and was encouraged by the government after 1992 to respond to pressure in terms of enrolment (Wang 2017:65). In March 1982, for the first time in 36 years since the closure of private higher education in mainland China, the Zhonghua Zhehui University opened its doors in Beijing, the national capital of China. In the same year, the National People's Congress, the national legislative power in China, promulgated a new constitution, stipulating that the state encourages collective economic organisations, governmental enterprises and other social groups to initiate and administer various kinds of legal educational activities (Mok 2009). Apart from their role in absorbing enrolment pressure, private sector universities were also set up in the context of the need for vocational-orientated higher education to serve the needs of the labour market in a rapidly growing and developing economy (Wang 2017:65–67).

The *Private Education Promotion Law* (*Minban Jiaoyu Cujinfa*) was promulgated in 2002 to regulate the private higher education sector. Private HEIs now cater for 14.4% of all higher education enrolments in China (UNESCO 2020). In 2018, more than 6.28 million full-time students pursued higher education in 746 private universities in China (Minister of Education, China 2018, as cited by Liu 2020:275). Part of the private higher education sector is the setting up of branch campuses by overseas universities (see Wang 2017:67–68). In setting up such branch campuses, the overseas university is expected to do so in partnership with a domestic university.

Private higher education and the sustainable development goals

While the private sector has played its part in opening opportunities for participation in higher education in the context of the rapidly growing socio-economic demand in China over the past 40 years, it has also not been without its hiccups. There has been a high incidence of institutions shutting down because of cashflow problems or because of clashing with the law (see Li 2012). About 500 private HEIs were closed down between 2000 and 2009 for a variety of reasons, ranging from violations of laws to financial difficulties (Yan & Lin 2010). There is the same problem as in India of many private HEIs offering an inferior type of education (Mok 2009:43). Also, within the political context of China, problems of limited autonomy and frequently changing legal parameters of freedom for private universities abound, preventing universities from fulfilling their mission (see Li 2012:754). Mok (2009:44–46) reported tension between government and private institutions in China. Internet censorship in China and the way it stifles free access to and the free flow of information (see Durkin 2020; Wang 2020) obviously have seriously adverse implications for any university.

South Africa

Societal context

Of the five BRICS countries, South Africa has the swiftest population growth rate, not only because of natural growth but also from a steady stream of immigrants. Rendering the situation especially problematic is that a large part of this is a stream of unchecked illegal immigrants. South Africa has an equally pressing need for economic growth and the creation of employment. With only 42% of the adults in the country working, the Centre for Development and Enterprise (2020) correctly typified the situation as the gravest unemployment crisis in the world. The rampant population growth and widespread poverty take their toll in terms of pressure placed on the environment. While South Africa's 2020 Earth Overshoot Day was standing

on 13 July (Earth Overshoot Day 2020), better than that of China and Russia, it is still a serious cause for concern. The backlog regarding the attainment of the SDGs is big, and in the context of the population pressure and environmental degradation, it is persistently threatening to get bigger.

Higher education

While in 1994, the higher education participation rate in South Africa was very high compared to elsewhere in Africa, sub-Saharan Africa in particular, the 14% gross higher education enrolment ratio of the time was, even at that stage, low for an upper-middle-income country. The new government of (since) 1994 listed one of its priorities in education as expanding access to education and attending to the quality of education and the equalisation of education opportunities. Since 1994, remarkable progress has been made regarding the expansion of higher education. Higher education enrolments have swollen from 495,555 in 1994 to 1,116,017 in 2017 (latest available figures) (UNESCO 2020). However, compared to other upper-middle-income countries, the gross tertiary enrolment ratio of South Africa of 19.66% (OurWorldinData 2020) is extremely low. Compare this figure to that of Argentina (79.99%), Brazil (46.45%) and Malaysia (29.7%) (OurWorldinData 2020). This relatively low enrolment ratio is, however, far from the only challenge facing the higher education sector in South Africa.

The number of young South Africans qualifying for university study as per matriculation examination (secondary school termination cum university entrance examinations in the South African education system) and the demand for a place at university are much higher than what is available in the public sector HEIs, making the development of private universities seem like an attractive and meaningful option. A particular problem evident in South African higher education is that for the past 30 years, managerialism – meaning a double layer of managerialism, one from the government and a second from institutional management – has descended on academe, with an extremely stifling effect on the academic project and a very dispiriting effect on the academic profession (see Habib & Patel 2020; White, Carvalho & Riordan 2011). Private institutions, with the private sector in the economy claiming to be less strapped by bureaucratic encumbrances than public sector institutions, here too seems to be an attractive option regarding the excising of at least one layer of this bureaucracy, namely, institutional bureaucracy.

Private higher education

In 1997, the South African government promulgated the new *Higher Education Act 101 of 1997*. Chapter 7 of this act makes provision for the existence of private institutions of higher education in South Africa (Republic of South Africa

1997). Such institutions need to be registered with the Registrar of Higher Education (Republic of South Africa 1997). However, since 1994, the development of the private sector in higher education, absent before this date, has been excruciatingly slow. By 2018 (latest available figures), only 7.8% of all tertiary education enrolments in South Africa were in the private higher education sector (UNESCO 2020). In its latest *Register of Private Higher Education Institutions in South Africa* at the time of writing (16 November 2020), the DHET (Republic of South Africa 2020) lists 98 private HEIs. Three remarks are apt, however. In the first place, the enrolment figures of most of these institutions are very small. Each of these institutions offers a very limited number of programmes. Furthermore, these institutions are not allowed to offer advanced programmes, that is, at MA and PhD levels. Also, they are not allowed to use the word 'university' in their names, which is a further inhibiting factor in their development, branding and prestige (see Douglas 2016).

Private higher education and the realisation of the sustainable development goals

The development of the private higher education sector is imperative in light of the gaping, threatening, growing distance in South Africa between the reality and vision articulated by means of the SDGs and the fact that the public higher education sector is obviously too small to play its full part. However, the private higher education sector has not grown to a sufficient size to fully play its role. This growth can probably now be explained by a lack of social demand – the demand for higher education in South Africa is large, far more than what the public universities can supply, but its development is strained by bureaucratic encumbrances and legal complexities (see South African Legal Information Institute 2019) and even outright hostility to the development of a private sector and (in the case of the for-profit higher education sector) against the general policy uncertainty and socio-political factors militating against investment in South Africa. These adverse factors may also well be part of the explanation for these institutions not visibly playing a part in the realisation of the SDGs.

Conclusion

The particular societal, contextual ecology of the global higher education revolution has resulted in the growth of a vibrant private higher education sector in large parts of the world in the past 30 years. This sector has proved its mettle in catching up with the huge and growing demand for higher education. If the *Times Higher Education Impact Rankings* are anything to go by, some of these private HEIs have also risen to the occasion to play their part in the pursuit of the SDGs. In the BRICS countries, as a laboratory case for

the global community, the private university sector has, especially in recent decades, come to the fore in varying degrees in these five countries. Some of these universities have made it to the list of exemplary universities in pursuing the SDGs, again if the *Times Higher Education Impact Rankings* are anything to go by. Of the BRICS countries, South Africa has the weakest developed private higher education sector. Drawing from the experience of the other BRICS countries, it can be stated that there is huge scope to create space for private universities in South Africa, to broaden access to higher education and to be a force in pursuing the SDGs. In doing so, South Africa can benefit from the BRICS experience. The BRICS experience with private universities cautions, firstly, that the two foundation principles in the establishment and operation of private universities (namely, excellence and autonomy) should not be forsaken. Secondly, a fine balance should be struck between freedom (avoiding unfettered, absolute or too much freedom, which will allow for excellence to be negated) and quality control (avoiding a stifling, dispiriting managerial regime and a culture of surface compliance).

In its recently released *Sustainable Development Goals Report 2020*, the United Nations Department of Economic and Social Affairs (2020:3) comes to the conclusion that 'the world is not on track to achieve the global Goals by 2030'. On the analogy of the universities of the world showing their adaptability in and value of times of societal crises with the recent outbreak of the COVID-19 pandemic, O'Malley (2020) argued that it is now compellingly necessary that the universities of the globe come into the formula of the quest for the SDGs. Here the special role of the private sector, with its claim to be more quickly responsive to change and to the needs of its clientele, comes into play. It should then also be remembered that the global university sector is also accused of displaying northern hegemony and promoting the interests of the Global North (see ed. Stead 2021). In South Africa, this is evident in the current public and scholarly discourse on the decolonisation of higher education. The 'decolonisation' of education is a very difficult and imprecise concept, susceptible to many different interpretations. Prominent South African academic Jansen (2017:156–163) presented six different interpretations, but if it means 'encounters with entangled knowledge' with roots in various contexts, appreciatively but critically interrogating and synthesising these, it can be a force of enrichment of academe. The BRICS countries, with their special place in the global order, can play a valuable part in such an exercise, not least the private sector in South African higher education, taking heed of the lessons from the development of a private higher education sector in the other BRICS countries and putting a decolonised education project to the service of humanity in its pursuit of the SDGs.

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This book is long overdue. Higher education exists within society and serves society as a whole, and societal challenges drive education. The attainment of sustainable development goals (SDGs) (which reflect societal needs) requires a concerted effort, especially the contribution of higher education. The role that BRICS countries are playing in this regard is commended as captured herein. This book extensively describes how much universities in BRICS countries have achieved in a short period of time in improving 'access' and 'equity' as key universal principles in education in attaining the SDGs of the United Nations. The notion that education, especially higher education, is meant for the elite is dispelled in this book. The book illustrates that BRICS governments and their higher education are an important vehicle in the attainment of the global SDGs. Higher education institutions from many countries, including developed countries, can learn so much from what is documented in this book.

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Most countries, developed and developing, are member states of the UN. Resolutions taken by the UN affect all member states, including the millennium development goals (MDGs) of 2000. Millennium development goals were aimed at halving extreme poverty rates, to halt the spread of HIV and AIDS and providing universal primary education, all by the target date of 2015. They form a blueprint agreed to by all the world's countries and all the world's leading development institutions. Millennium development goal 2 was to achieve universal primary education. In 2016, the UN member states introduced sustainable development goals in which SDG 4 is to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. *Education for sustainable development in BRICS: Zoom on higher education* is considering the involvement of higher education in the implementation of SDGs in BRICS member states. In order for countries to play their roles in the implementation of SDGs, education plays a very important role. The book aims to find out whether BRICS countries are involved in the implementation of SDGs, especially SDG 4.

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