Towards an Open Educational Resources Strategy for the Republic of Zambia

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COMMONWEALTH *of* LEARNING

The Commonwealth of Learning (COL) is an intergovernmental organisation created by Commonwealth Heads of Government to promote the development and sharing of open learning and distance education knowledge, resources and technologies.

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Executive Summary

Integrating the provision and use of open educational resources (OER) into the education sector within the Republic of Zambia has the potential to support the desired national educational transformation, promoting education access, equity, and affordable quality resources at all levels within the sector by using a variety of modes of provision. The development and implementation of a related strategy to take advantage of these affordances is essential to guide the country towards realising some of the potential benefits of OER practice throughout the public, private, grant-aided, and community school sectors working toward the "education for all" aspiration (GRZ, 2006).

This report provides context and purpose for the adoption of OER in the country and initiates a draft OER strategy for the Republic of Zambia. The introductory section presents the current education system in Zambia with reference to structure, access, equity and quality and identifies national-level education agencies. In support of OER integration, the second section explores the status of information and communication technologies (ICT) in education in Zambia, acknowledging national and international projects and initiatives, as well as the main associated ICT policies, objectives, and strategies. The third section focuses on the concept of OER and related licensing, its importance for Zambia, and some current OER initiatives in the country. The fourth section initiates a draft OER strategy in consultation with the Ministry of General Education of the Republic of Zambia.

The six supporting appendices provide more detailed information: Appendix A presents the status of ICT in education in Zambia using the UNESCO ICT in Education Indicators for sample Zambia institutions; Appendix B is a collated list of OER and related ICT projects in the Republic of Zambia; Appendix C is an analysis of data collected from an OER institutional analysis activity; Appendix D is an overview of open licences; Appendix E provides the list of references and data sources list for this report; and Appendix F presents a draft implementation plan for the OER strategy.

List of Acronyms and Abbreviations

CLCE	Charles Lwanga College of Education
COL	Commonwealth of Learning
CPD	continuing professional development
EBS	Educational Broadcasting Services
ECE	early childhood education
EMIS	education management information system
GRZ	Government of the Republic of Zambia
HEI	higher education institution
ICT	information and communication technologies
LMS	learning management system
MoCT	Ministry of Communications and Transport
MoGE	Ministry of General Education
MoHE	Ministry of Higher Education
MoNDP	Ministry of National Development Planning
NGEP	National General Education Policy
QA	quality assurance
TEVETA	Technical Education, Vocational and Entrepreneurship Training Authority
TVET	technical and vocational education and training
TVTC	Technical and Vocational Teachers College
ZACODE	Zambia College of Distance Education
ZICTA	Zambia Information and Communications Authority
ZNCU	Zambia National Commission for UNESCO

1. Introduction

1.1   About the Education System

In September 2015, the Education Ministry in Zambia was split into two separate ministries, namely the Ministry of General Education (MoGE) and the Ministry of Higher Education (MoHE). The structure of the education system also changed at this time from a 9-3-4 system to a 7-5-4 system now representing basic, secondary and tertiary education (MoGE, 2018, p. 1). The MoGE has seven directorates: Early Childhood Education, Human Resource and Administration, Planning and Information, Teacher Education and Specialised Services, Standards and Curriculum, Open and Distance Education, and the National Science Centre. The primary mandate of MoGE includes the oversight of early, primary and secondary education; special needs; curriculum standards and assessment; guidance and counselling; health and education; and adult literacy and continuing education (MoGE, 2018). The MoHE is a separate entity, although the two ministries work side-by-side in certain sectors, such as colleges of technical and vocational education and training (TVET). The MoHE mandate includes university education, vocational education and training, as well as science, technology and innovation (MoHE, 2019).

MoGE (2018, p. 58) reports that schools in Zambia are categorised into private, grant-aided, community and public schools of the Government of the Republic of Zambia (GRZ), with performance being best in private schools and lowest in GRZ schools. The percentage of pupils within each school type is reported as private (4%) and grant-aided (2%), with the GRZ and community schools accommodating the remaining 94% (MoGE, 2018, p. 58). It is therefore crucial that the current improvement strategies regarding education are prioritised so as to effect improvement in the public education sector.

Education practices in Zambia are guided by policies, plans, frameworks and related documents, including but not restricted to:

- National General Education Policy (NGEP) – Second Draft (MoGE, 2019b)
- Education and Skills Sector Plan 2017–2021 (MoGE & MoHE, 2019)
- Education Sector Analysis (MoGE, 2018)
- ICT Policy (2006)
- National Assessment Framework
- National Implementation Framework
- Zambia Education Curriculum Framework
- Teachers Curriculum Implementation Guide
- 7th National Development Plan 2017–2021 (MoNDP, 2017)
- Vision 2030 (GRZ, 2006)

According to MoGE (2018, p. 110), a major inhibiting factor to undertaking planned improvement is that the sector is under-resourced due to inflationary pressures since mid-2015, when the Zambian Kwacha depreciated. In addition, a lack of infrastructure inhibits the available space in primary schools. Despite primary education being free to all, children from lower-income households in rural areas are less likely to attend school than those in more affluent situations. MoGE (2018, p. 39) reports that this attendance declines even more sharply at the secondary level due to the limited number of places available, resulting in a reported pupil registration of only approximately 40%. The Ministry of National Development

Planning (MoNDP) states that "[a]ccording to the [2015] Living Conditions Monitoring Survey report, Zambia's Gini coefficient [which measures income inequality] now stands at 0.69, up from 0.60 in 2010; higher than that of Africa (0.43) and comparable to some of the continent's most unequal countries like South Africa, Namibia and Botswana" (2017, p. 110). This is borne out by maps and data from IndexMundi (2017), which compares access to education in African countries and shows Zambia as possessing a reasonable primary enrolment rate (89.04% – rated 21/50) but with startlingly large exclusion at the secondary level (19.68% – rated 51/53 of African countries).

With sub-Saharan Africa having the highest rates of education exclusion (UIS, 2019), education and skills development is one of three prioritised development outcomes in the GRZ 7th National Development Plan 2017–2021 (MoNDP, 2019, p. 116). The strategies to achieve this outcome are:

- Enhance access to quality, equitable and inclusive education
- Enhance access to skills training
- Enhance private sector participation
- Continually review curriculum
- Enhance the roles of science, technology and innovation

Looking towards aspirations of "education for all" in the Vision 2030 document (GRZ, 2006), the national development plan highlights good-quality education facilities, diversified curricula, and regional centres of excellence. This speaks to the current Zambia National Commission for UNESCO (ZNCU) initiative regarding ICT Centres of Excellence (UNESCO, 2019) at two Zambia colleges: Charles Lwanga College of Education (CLCE) and the Technical and Vocational Teachers College (TVTC). Identified challenges include ensuring job creation and socioeconomic transformation of the country through investment in education and training.

The current education levels (Figure 1) comprise various ECE offerings, primary school, secondary school and tertiary education, with adult literacy education spanning these levels.

Age

26	D
25	M	D
24	B4	M	D
23		B3	M	D
22			B2	M
21				B1
20						A3
19			B			A	A2

Adult Literacy

18–16	Senior Secondary School
15–14	Junior Secondary School
13–7	Primary School
6–5	Pre-school	Reception
4–3		Nursery
2–0	Day Care
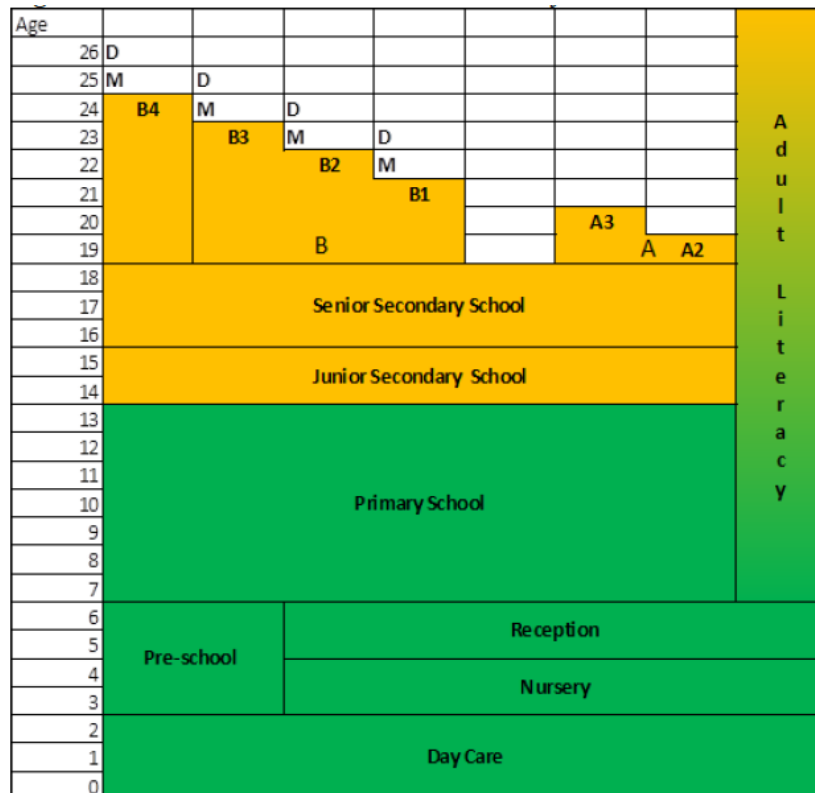
Figure 1. Current structure of Zambia's education system (Source: MoGE, 2018, p. 25). B1 is the three-year Bachelor's programme, B4 is the six-year programme, M is the master's programme and D stands for doctoral programmes.

1.2 Access

ECE has progressed from having no registered public centres in 2004 to 1,849 public centres in 2016. MoGE (2018, p. 132) reported that by 2016, 29.8% of Grade 1 entrants had ECE experience, which is a huge stride forward, albeit with considerable further improvement necessary.

Factors affecting education access and retention include repetition of grades at the primary school level (7%); at the secondary level, repetition reportedly rises to 12% due to pressures at certain points — for example, the competition to progress from Grade 9 to Grade 10, and the shortage of places after the first two years of secondary education (MoGE, 2018, p. 33).

Despite the free primary education policy, and a reported enrolment of approximately 90% (2016), there are still 250,000 pupils out of school at this level, which is of great concern. Community schools are mostly at the primary level and provide 2,500 additional registered schools to primarily rural communities. (MoGE, 2019b, p. 12).

Youth and adult literacy education are provided via programmes, and there are 12 colleges of education (with an additional 130 private colleges). Almost all colleges of education have distance components, with issues related to adequate infrastructure, qualified lecturers, tuition and geographical location. Other open and distance learning providers include: the Zambia College of Distance Education (ZACODE) (print and online, secondary level), the Zambian Open University (purely distance, using the Moodle learning management system), and 15

public TVET colleges, catering for ages 14–20 years and providing a variety of modes of instruction.

MoHE universities in Zambia offer tertiary education at six public higher education institutions (HEIs), including the University of Zambia, and many more private institutions are currently operational. MoHE TVET institutions number 25 (MoHE, 2019).

1.3   Equity

Current strategies reported by MoGE (2018, p. 5) as addressing cost and gender inequity include provision of bursaries, a 50/50 gender enrolment policy (introduced in 2011) and re-entry to school for post-partum female pupils. Despite these incentives, the retention rate declines for females in the 13+ age group.

Special needs education is a largely disadvantaged sector, with additional funding required to provide customised infrastructure and materials. MoGE has a unit for special needs, and there is a national move towards integration rather than separation of learners with special education needs, with special needs resource centres now becoming available at regular schools. Officers at all levels (headquarters, district, school) are appointed and trained, and the colleges of education require that each trainee be introduced to special needs education as a matter of course. The American Institutes for Research USAID-funded ENGAGE project[1] (2007–2010) was undertaken in Zambia and two other countries to advance inclusive development assistance practices. However, full implementation of Zambia's policy intentions with respect to learners with special education needs is inhibited due to lack of resources.

The rural/urban divide is also acknowledged, and MoGE works towards providing each child with an equivalent schooling experience, regardless of location and mode of provision.

1.4   Quality

Quality is said to be a key focus area of MoGE, with policies in place and a Directorate for Standards and Curriculum guiding educational practices. Materials reviews are conducted internally and independently/externally. Training has reportedly already been provided in this directorate on the editing and development of OER. Various agencies related to quality assurance for both MoGE and MoHE are listed in Section 1.5, and there is a Zambia National Education Coalition, an alliance of civil society actors that promote and advocate education for all goals (ZANEC, 2017).

The World Bank in 2016 conducted a public expenditure review of the education sector and identified several challenges, which they sought to address in collaboration with GRZ and MoGE via the Zambia Education Enhancement Project. This project is structured around three components (MoGE, 2019c):

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[1] https://www.air.org/project/engage-project-pakistan-zambia-and-mexico

- Improving the Quality of Teaching and Learning
- Increasing Equitable Access to Secondary Education
- Enhancing Monitoring and Evaluation Capacity and Project Coordination

MoGE recently identified several current obstacles to good-quality teaching: "a possible shortage of pre-primary teachers qualified to teach at that level, weak pedagogical strategies employed by teachers, limited numbers of mathematics and science teachers at [the] secondary level and uncertainty about trained teacher availability for the new vocational pathway" (2018, p. 4). Language of instruction also plays a part in the quality of teaching and learning for both teachers and learners, as they may be forced to function in a language with which they are unfamiliar.

Zambia participates every seven years in the assessment conducted by the Southern and Eastern African Consortium for Monitoring Educational Quality, which tests Grade 6 pupils in 14 countries. MoGE (2018, p. 55) reports that the last assessment of this nature took place in 2013, when the mean reading scores and mathematics scores for Zambian pupils had improved since the previous assessment in 2007. Zambia's own national assessment system also carries out regular surveys (1999, 2003, 2006, 2008, 2013, 2016) of skills in Grade 5 and Grade 9 pupils (MoGE, 2018, p. 55). While the proportions of pupils attaining desirable performance standards were still low (2016), there was a marginal improvement upon the 2013 survey results.

1.5   National-Level Agencies in Education

According to MoGE (2008, p. 64), units under its jurisdiction include the Educational Broadcasting Services (EBS) and the National Science Centre, while MoGE also is responsible for five semi-autonomous agencies:

- Examinations Council of Zambia
- Teaching Council of Zambia
- Zambia Education Projects Implementation Unit
- Zambia Education Publishing House
- Zambia National Commission for UNESCO

MoHE oversees four science and technology service institutions, one research and development institution, and four support service institutions (MoHE, 2019):

- National Science and Technology Council
- National Technology Business Centre
- National Remote Sensing Centre
- National Biosafety Authority
- National Institute for Scientific and Industrial Research
- Zambia Qualifications Authority
- Higher Education Authority
- Higher Education Loans and Scholarships Board
- Technical Education, Vocational and Entrepreneurship Training Authority (TEVETA)

2. ICT in Education in the Republic of Zambia

MoGE (2019) states that insufficient investment in ICT in education is due to general under-resourcing of the education system. Most computers in schools either have been donated or are linked to a project. While educational institutions are happy to participate in externally funded projects, this is an area of serious concern, as sustainability may be an issue going forward. Rolling plans for renewing the ICT infrastructure should be developed as a matter of urgency to maintain the momentum created by donations and projects.

2.1   Status of ICT in Education

The goal of identifying global indicators for ICT in education has potential for widespread impact, given ICT's role in supporting educational reform and the specific intention to support the use, production and dissemination of OER. Working with OER effectively requires government attention to and investment in three areas: materials development/acquisition, staff development, and ICT infrastructure (COL, 2012). Using ICT indicators to support the harnessing of OER requires consideration in both these areas with respect to the following aspects (UIS, 2006): organisational (legalities and procedures), educational (description and evaluation), and informational (maintenance and provision).

In a situational analysis reported by MoGE (2019d, p. 124), the following are identified as strengths in the use of ICT in the Zambia education sector:

- A robust network exists linking all provisional education offices and other national bodies to headquarters.
- All public colleges of education have ICT infrastructure and connectively, as well as standard hardware and software.
- MoGE has a consolidated ICT Policy, a Strategic Vision, an Implementation Plan and ICT Usage Guidelines, along with qualified staff to address issues of access and the use and development of ICT in the provision of education and training.

In addition, MoGE reports a variety of educational modes of provision (2019d, p. 124):

- All provinces all have radio stations, and most households possess one radio set for interactive radio instruction (IRI). However, the IRI programme of the EBS was not extensively used.
- Satellite television is currently not fulfilling its educational potential, despite TVs being widely available in households.
- Personal computers (PCs) have become essential tools for work and communications.
- Mobile phone network providers cover about 88% of the population.
- WiMAX covers approximately 40% of the population.
- Internet service providers have increased coverage, speed and bandwidth.

ICT systems fall into two categories, with MoGE (2019d, p. 102) reporting that an education management information system (EMIS) system exists but has faced challenges such as high staff attrition and connectivity costs, inhibiting its sustainability. Other educational ICT systems include the use of a learning management system (LMS) and other web-based tools

such as TEVETA's new web-based TEVET information management system (MoGE & MoHE, 2017, p. 113).

MoGE (2019d, p. 102) also reports that quality remains a challenge for integrating ICT in education, with inhibiting factors such as high Internet connectivity costs and unreliable power supplies. In addition, there is reportedly no institution in the country that trains ICT teachers or lecturers and no curriculum for computer-related courses. There is low investment in ICT literacy, digital content, and eLearning, leading to inadequate skilled human resources.

In May 2019, site visits were made by Commonwealth of Learning (COL) to MoGE and three colleges to obtain specific sample data regarding the UNESCO ICT in Education Indicators (UIS, 2006) to verify the above. The Zambia Information and Communications Authority (ZICTA) provided the confirmatory data in Table 1. Figures for Zambia (Table 1) show evidence of relatively wide use of mobile technologies compared to fixed-line technologies, while the UNESCO ICT in Education Indicators (UIS, 2006) in Table 2 show that Zambia's current potential for using ICT in education is limited. This is of concern as ICTs are a crucial supporting mechanism for accessing, using and producing OER. Colleges that are well resourced in this area are generally involved in externally funded projects, some of which are mentioned in Section 2.2 and Appendix B. More detail on the ICT in Education indicators is available in Appendix A, which includes corresponding data for the three colleges visited: CLCE, ZACODE and TVTC. Each of these has been involved in externally funded ICT/OER projects and appears fully committed to making the most of the opportunities provided.

Table 1. Zambia profile – ICT data (ITU, 2018)

Various Statistics (Latest Data Available: 2018)		ZICTA[2]
Fixed-telephone subscriptions (%)	0.6	0.53 (2019)
Mobile-cellular subscriptions (%)	87.8	90.3 (2019)
Fixed (wired)-broadband subscriptions (%)	0.1	0.25 (2019)
Mobile-broadband subscriptions (%)	55.8	58.9 (2019)
Households with a computer (%)	8.8	7 (2015)
Households with Internet access at home (%)	16.6	4 (2015)
Individuals using the Internet (%)	27.8	9 (2015)

Sources: MoGE (2019) and ZICTA (2019)

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[2] Information provided by ZICTA: http://onlinesystems.zicta.zm:8585/statsfinal/

Table 2. MoGE core indicators for ICT in education for Zambia[3]

	UNESCO Basic Core Indicators for ICT in Education	Ratio or %
ED1	% of schools with electricity (by ISCED level 1–3)	29.7%
ED2	% of schools with radio set used for educational purposes (by ISCED level 0–4)	31.3%
ED3	% of schools with television set used for educational purposes (by ISCED level 0–4)	16.8%
ED4	Student-to-computer ratio (by ISCED level 0–4)	1:110
ED5	% of schools with basic telecommunication infrastructure or telephone access (by ISCED 1–3)	48.3%
ED6	% of schools with an Internet connection (by ISCED level 1–3)	10.8%
ED7	% of students who use the Internet at school (by ISCED level 0–4)	3.2%
Extended Core		%
ED8	% of students enrolled at the tertiary level in ICT-related fields, by gender (ISCED level 5-6)	MHE
ED9	% of ICT-qualified teachers in primary and secondary schools (of the total no. of teachers)	MHE

Source: Besnart Simunchembu (Department of Planning and Information, MoGE)

2.2 National and International Projects and Initiatives

Some ICT projects are in conjunction with OER projects; these are mentioned in Section 3.4 of this document and detailed in Appendix B. ICT-focused projects listed in MoGE (2019d, p. 102), UNESCO (2019a) and UNESCO (2019b) include:

- The iSchool[4] project: providing sustainable Internet connectivity, computers and learning materials that can help improve the quality of education service delivery.
- The Education Support Network (ESNet[5]): enhancing teachers' ICT skills and tools for digitally packaging hand-written materials and sharing them on electronic platforms.

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[3] The MoGE Planning Directorate provided the data for Table 2.

[4] http://ischool.zm/

[5] https://iicd.org/documents/ict-in-the-zambian-classroom-lessons-learned-from-the-education-support-network-project-esnet/

- Enhancing the Visual Presentation of Educational Content using ICTs (ENEDCO[6]): a collaboration between seven schools in the Copperbelt Province to develop the capacity of teachers to improve their visual presentation skills, produce and share improved teaching materials, and show how ICT can be integrated into the classroom. Funded by the International Institute for Communication and Development (IICD[7]).
- The Zambia Education Quality Improvement Project (EQUIP2[8]): The American Institutes for Research reviewed the continuous assessment component of this project, focusing on providing high-quality technical expertise in a wide range of areas prioritised by Zambia's then Ministry of Education.
- The Flemish Association for Development Cooperation and Technical Assistance (VVOB[9]): Zambia has partnered with VVOB in education projects, including in the ECE sector, community schools, and teacher training support (developing open content and exploring the use of social media).
- ZNCU: UNESCO–China-Funds-in-Trust (CFIT) information and communication technology in teacher training project (at the Lucia Counselling and Training Centre and TVTC).
- UNESCO: the development of a National ICT Competency Framework for teachers harnessing OER.
- COL: MoGE is also working with COL on developing an open/innovative schooling model. It has almost completed Phase 1 on developing curriculum-based digital OER using OER and will from September 2019 pilot the use of the resources in 20 centres to about 3,000 learners.

2.3 Main ICT Policies, Objectives and Strategies

Although the National Information and Communication Technology Policy (Ministry of Communications and Transport, 2006) appears to be the latest published version of a policy in the area of ICT, other related documents have been more recently updated, such as the section on ICT in education in *Education Sector Extended National Implement Framework III 2011–2016: Implementing the Revised Sixth National Development Plan* (MoGE, 2019). Policy-related work has also been initiated via projects such as the ICT Competency Framework for Teachers Harnessing Open Educational Resources (UNESCO, 2019b) mentioned above.

MoGE (2019d, p. 103) states that the focus of the GRZ ICT policy areas is to:

- facilitate the creation of centres of excellence for research in all aspects of ICT;
- take policy measures to facilitate and promote the integration of ICT within the entire education system, covering administration, teaching, learning and research;

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[6] https://iicd.org/documents/improving-visual-teaching-material-lessons-learned-from-enahncing-the-visual-presentation-of-eductional-content-enedco/

[7] https://iicd.org/

[8] https://www.air.org/project/zambia-education-quality-improvement-project-2-equip-2

[9] https://zambia.vvob.org/

- adopt and adapt NEPAD[10] eSchools and other initiatives to promote eLearning and e-Education as well as lifelong learning;
- strengthen science and technical education, laying the foundation for human resources and skills development in ICT; and
- invest *in R&D to develop the nation's scientific and industrial research capacity in* ICT.

The ICT in education objectives (MoGE, 2019d, p. 103) are to:

Promote and enhance ICT integration in education and provide a platform for governance services and synergies with other ministries and the private sector by undertaking:

- to deploy ICT at all levels of the education system to improve and expand access to education, training and research facilities;
- to equitably integrate ICT into the education system to improve the quality of education and training at all levels; and
- to strengthen administration and decision-making capacity through the deployment of EMISs and the use of ICT.

And finally, the ICT in Education Strategy Statement (MoGE, 2019d:103) states:

The Ministry shall adopt the following strategies during NIF III:

- Promote the development, deployment and utilisation of electronic-based distance education, training and learning systems in the Zambian educational system to complement and supplement residential education and training;
- Implement special schemes as well as policy measures and packages aimed at promoting the affordable acquisition of computers and other ICT products by students, trainers and educational institutions;
- Promote and facilitate the integration of computer skills into the teaching and learning process at primary, secondary and tertiary levels;
- Introduce programmes on teacher education in ICT at all training institutions in the country;
- Develop a national ICT curriculum and qualification system at primary, secondary and tertiary levels;
- Promote and facilitate the development and adoption of EMIS within the public and private educational institutions to improve the quality of managing educational delivery activities, operations and monitoring;
- Promote and facilitate the adoption of educational technologies and Internet access for all learners at all levels of the educational system in both public and private institutions; and
- Develop partnerships with the private sector and other stakeholders in the quest for increased ICT literacy.

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[10] The New Partnership for Africa's Development (NEPAD) is an economic development programme of the African Union: http://www.nepad.org/.

Some investigation needs to take place to ascertain the extent to which these intentions have been carried out, although some indication of progress is provided in the national Implementation Framework (NIF) III Extension Update (MoGE, 2019d, p. 104) as follows:

> The most significant development for ICT in Education is the incorporation of ICT being included as a compulsory subject in the new curriculum. This has resulted in a significant increase in the requirements for provision of computers to schools and is reflected in the adjusted target.

3. Open Educational Resources in the Republic of Zambia

3.1 Overview of OER

A follow-up study to the 2012 COL and UNESCO Survey on Governments' OER Policies investigated progress in Ghana and Zambia (Ngengebule & Nonyongo, 2013). While the response rate was low, the study confirmed there was still no OER policy in place in Zambia, despite activity by individuals and institutions within the OER movement through projects and programmes. The partnership between COL and the then Ministry of Education was highlighted by the respondents as being significant. The study reported that Zambian respondents had the following perceptions of OER's benefits:

> their government decided to be active in the OER movement to increase: open and flexible learning opportunities, efficiency and quality of learning resources, cost-efficiency and to explore the innovative potential of OER. They however mentioned that due to the digital divide in the country, many education institutions experienced the challenge of internet connectivity. (Ngengebule & Nonyongo, 2013)

In order to verify the experience of these reported pockets of educators engaging with OER, an OER institutional analysis activity was conducted with four cohorts within Zambia, comprising MoGE curriculum developers and writers, as well as staff from CLTC, ZACODE and TVTC. While many participants had some OER awareness as a result of previous interactions with COL and/or UNESCO, interventions had not always been followed through with action, and concepts were generally rusty. The OER institutional analysis activity was well-received by all four cohorts; it served to remind participants of the OER concept, and the guided group engagements around OER readiness were enthusiastic. The group exercise within each cohort comprised two sections: the first section explored current teaching and learning challenges, then made an explicit link to mitigating these using OER; the second section of the OER worksheet comprised several statements pertaining to each of six dimensions considered essential to assess the status of mainstreaming the use of OER: staff expertise; policy and procedure; quality assurance; infrastructure; culture and leadership; and investment. Responding groups within each cohort discussed and rated six statements per dimension on a scale from 5 (strongly agree) down to 1 (strongly disagree). A sample of qualitative data from the first section and quantitative data from the second section is provided in Appendix C.

3.2 Why OER Are Important for the Republic of Zambia

The Republic of Zambia education system is largely homogenous in that curricula are standardised across the primary and secondary sectors, and also across the public and grant-aided colleges of education. Public HEIs are more independent with respect to curricula, as are the private institutions across all educational sectors. Grant-aided schools/colleges are largely owned privately by individuals, faith-based organisations, or NGOs. Nevertheless, it appears they are required to adhere to the standard curricula.

This standardisation of curricula is an important factor for the development and provision of OER in Zambia, as it means that the outputs of government- and donor-funded OER

initiatives will be widely applicable across schools, HEIs and colleges, making it increasingly cost effective to embark on OER materials development projects. Some private and community schools are not examination centres, and these students are required to undertake their examinations in public schools (MoGE, 2018, p. 58). Again, this is possible because of the standardised curricula practiced across sectors.

OER has the potential to address many of the issues highlighted in the documents analysing the current status of education in Zambia (MoGE, 2018) supporting educational transformation (COL, 2012). These potential benefits include:

- increasing availability of high-quality, relevant and need-targeted learning materials;
- reducing the cost of accessing educational materials;
- allowing the adaptation of materials and possibly contributing to enabling learners to be active participants in educational processes;
- achieving collaborative partnerships of people working in communities of practice, preferably across and within institutions; and
- contributing to capacity building in African HEIs by providing educators with access, at low or no cost, to the tools and content required to produce high-quality educational materials.

3.3   Institutions Using OER

Institutions engaged in developing OER are mentioned in Appendices A and B. While several OER development has been engaged in my several persons from various institutions, such as the University of Zambia (AVU STEM courses) and the TESSA project, it is not clear whether these courses and resources are being used, and it is recommended that some follow-up on this be performed by the associated ministries. The current ZACODE Notesmaster project is promising, as there is a direct link between developers and providers of the courses in the four secondary-level subject areas of mathematics, natural sciences, social sciences, and English. Unfortunately, no project documentation or URLs were provided to establish further information.

The University of Zambia has also developed an open access repository for theses and dissertations. This initiative has been well received, and the prospect of extending this repository to encompass wider open resources in Zambia is being mooted. Site visits to ZACODE, TVTC and CLTC confirmed that these three institutions are currently involved in projects that encompass ICT support for open resources. An exploration of the current thinking around OER was conducted at these three institutions as well as with a MoGE group comprising curriculum developers and writers. This information is contained in Appendix C.

3.4   OER Projects in Zambia

A list of OER projects in Zambia was compiled by the consultant, although it should not be considered exhaustive. A desktop search for Zambia OER projects was conducted ahead of the site visit and an initial list compiled. Subsequently, each group that was convened during the visit was requested to check the list and provide further information regarding awareness of and involvement in OER projects and to annotate in which projects the group had been involved.

The final list of Zambia OER projects (Appendix B) largely comprises externally initiated and funded projects — for example, TESSA, AVU, iACT, ICT4Schools, ZACODE Notesmaster and many initiatives supported by COL. It became evident that there is a lack of understanding around projects that involve both ICT and OER, where the local partners described the ICT component but were not necessarily aware of the OER component — for example, the current Zambia National Commission for UNESCO CIFT project involving the establishment of ICT Centres of Excellence. Involvement of local partners is indicated per person for each project listed in Appendix B. However, a number of individuals tended to be involved in multiple projects, so experience may be concentrated rather than wide. While only a relatively small sample of people were consulted about involvement, it is nevertheless clear that some expertise is being built in the area of developing and using OER, but momentum needs to be maintained, as OER knowledge tends to dissipate when there are long periods between engagement.

4. Draft OER Strategy for the Republic of Zambia

Effective harnessing of OER requires that governments and education institutions invest systematically and sustainably in programme, course and materials development/acquisition (COL, 2012) and associated provision. This investment in OER requires a national strategy if it is to be effective in transforming education to achieve increased national access and equity, good-quality resources, and improved educational practices. This should later lead to either a national OER policy or the integration of OER policy statements within existing related national policies.

Therefore, this strategy has been prepared for the purpose of formally integrating all aspects of OER for teaching, learning and research in the Zambian education sector. While some previous and current initiatives have prompted the ad hoc integration of OER, this strategy is being formulated to enhance the systemic development and expansion of OER use to achieve the potential benefits outlined in Sections 3.1 and 3.2. MoGE and MoHE have acknowledged the potential OER has for expanding equal opportunities to access quality education and contribute in a significant way towards increased participation to lifelong opportunities and realise the aspiration of "education for all" as contained within the Vision 2030 document (GRZ, 2006).

4.1   Mission, Vision and Goals

This OER strategy document serves to realise and support the respective vision and mission statements of MoGE (2019a): "Quality lifelong Education for all, which is accessible, inclusive and relevant to individuals, national and global needs and value systems" and "To Enable and provide an Education System that will meet the needs of Zambia and [its] people."

The OER strategy acknowledges the national education context and the role of ICT in education to facilitate the production, storage, access, use and distribution of OER as fundamental to teaching and learning. The strategy aims to guide the effective development and implementation of teaching and learning to enhance learner centeredness, making effective and efficient use of all resources while maintaining the quality standards required. In addition, the document intends to formalise the following related activity goals:

- Identify human and other resources to support divisions and offices in developing OER content for teaching and learning;
- Define collaborations within and outside the education sector and intend to allow access to learning resources;
- Ensure OER are consistently applied throughout and in any mode of study across the education sector, in line with related policies and other documents; and
- Provide guidelines to ensure that learning and teaching are conducted with all the adequate resources and systems in place.

The goals of formalising the incorporation of OER practices are: to provide educators and learners with learning materials that reside in the public domain; to release publicly funded educational materials with an open licence to create sustainable academic resources for students, faculty and staff; and to provide opportunities for professional growth of district

employees involved in these activities. The expected strategic outcomes of the OER strategy are as follows:

> **Strategic Outcome 1:** All curriculum and learning materials supported with public funds released as OER with an appropriate open licence.
>
> **Strategic Outcome 2:** Students and teachers adopt 21st-century learning skills to become lifelong learners through the use of OER.
>
> **Strategic Outcome 3:** Enhance the competencies of teachers, principals and education administrators in the use of OER.
>
> **Strategic Outcome 4:** Enhance the use of ICT for teaching and learning.
>
> **Strategic Outcome 5:** Improve the quality of teaching and learning in Zambia through the use of OER.

4.2   Definitions and Scope

"Open Educational Resources (OER) are teaching, learning and research materials in any medium — digital or otherwise — that reside in the public domain or have been released under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions" (UNESCO, 2019c).

"Open access (OA) means free access to information and unrestricted use of electronic resources for everyone. Any kind of digital content can be OA, from texts and data to software, audio, video, and multi-media" (UNESCO, 2019d).

"A Digital Repository is a mechanism for managing and storing digital content" (RSP, 2019).

This strategy document seeks to strengthen commitment to OER in the education sector in Zambia. The strategy will apply to all education levels and sectors in the Republic of Zambia and related ministries, including education institutions, agencies and services falling under MoGE and MoHE. The private and grant-funded institutions and community schools are also encouraged to be guided by this strategy in order to improve and align their educational practices.

The OER strategy is integral to the work of all staff responsible for promoting the quality of teaching and learning in Zambia. The strategy is also integral to programme development and the implementation of eLearning. This encompasses the national eLearning programmes and content being in line with the following guiding principles:

- Academic integrity and excellence — ensure quality and excellence in eLearning as well as continuous curriculum innovation and adherence to the higher education authority, the national qualifications authority, the teaching council, and regulations governing the provision of general education.
- Relevance — ensure the relevance of teaching and learning in line with the needs of the national curriculum.
- Responsiveness — be responsive to both societal and national developmental needs.

4.3   Intellectual Property Rights and Licensing

MoGE and MoHE should refer to the related GRZ IPR policies governing the production and use of educational materials. Necessary points of alignment should be noted as well as any existing policies that need amendments.

Strategies:

- All teaching, learning and research materials developed with public funds and/or other sources of funding, including donor agencies and development partners, shall be released with an appropriate open licence and made available online in editable digital formats.
- All teaching, learning and research resources shall be openly licensed when the copyright of the work is held by publicly funded institutions.
- Teaching, learning and research resources shall be openly licensed when created by a grantee or contractor receiving public funds.
- The preferred open licences are the most current versions of the Creative Commons Attribution (CC BY), Creative Commons Attribution-ShareAlike (CC BY-SA), Creative Commons Attribution-NonCommercial (CC BY-NC) and Creative Commons-NonCommercial-ShareAlike (CC BY-NC-SA) licences. (See Appendix D for detailed explanations.)
- Agencies of the government will reserve their right to license their copyrighted work using the most current version of the CC BY-ND and/or CC BY-NC-ND licence under the following conditions:
  - o Where any derivative would affect the reputation of the agency or the integrity and authenticity of the work (CC BY-ND is suggested).
  - o Where the derivative or otherwise commercial circulation of the work would adversely affect the agency's operation and economic viability.
  - o Exceptions: The OER recommended licences shall not apply to any work if releasing the work under an open licence would be:
    - contrary to any existing regulation, legislation, court order, or specific GRZ policy;
    - constitute a breach of contract or lead to disclosure of a trade secret; and/or
    - prevent the patenting of an invention.

4.4   Curriculum Design and Material Development

Curriculum designers and material developers shall be trained and subsequently guided and supported to have a thorough understanding of licensing and permissions concerning the retention, reuse, revision, remixing and redistribution of OER. Adopting the new practice of using OER will also prompt these practitioners to review and enhance their own practice in this field.

Strategic Outcome 1: All curriculum and learning materials supported with public funds released as OER with an appropriate open licence.

Target: By 2021, 50% of learning materials up to senior secondary level shall be available as OER.

Strategies:

- All new curriculum design and related materials development shall be undertaken using and producing OER and shall be published under a Creative Commons licence and made freely available in a suitable national repository.
- Existing copyright materials will be phased out or converted to OER and published under a Creative Commons licence. This includes revised editions of textbooks previously produced and prescribed by contracted Zambian educators for use in the education sector.
- Local and regional materials will be prioritised when developing and/or adapting OER for reuse and publishing.
- Funded internal and external educational project collaborations will stipulate that all resources developed will be published as OER.

4.5   Teaching and Learning

The integration of OER in the teaching and learning environment is an opportunity to review teaching and learning practices in order to improve learning outcomes. OER has the potential to promote active learning, interactivity and student-centred teaching and learning.

Strategic Outcome 2: Students and teachers adopt 21st-century learning skills to become lifelong learners through the use of OER.

Targets: (1) By 2021, all learners up to senior secondary level use OER in STEM subjects. (2) By 2021, all teachers use OER in their pedagogic practices.

Strategies:

Educators shall be encouraged to use OER to:

- review and improve their teaching and learning practices;
- update the curricula and resources by integrating and contextualising openly available materials;
- prepare materials to accommodate students or contexts with special needs; and
- share their OER materials with other educators through recommended national and international platforms.

Students shall be oriented towards the appropriate use of OER and guided to:

- explore additional resources beyond their curriculum to develop self-directed learning abilities;
- become content producers rather than solely content consumers; and
- share their OER materials with other students and educators through recommended national and international platforms.

4.6   Capacity Building

Capacity building will be at the heart of successful OER strategy implementation. In order to include all stakeholders, this will take various forms, including but not limited to: raising awareness of OER and the existence of this strategy; cross-institutional OER sharing activities and opportunities; and training seminars and workshops around specific topics and competencies relating to effective OER practices.

Strategic Outcome 3: Enhance the competencies of teachers, principals and education administrators in the use of OER.

Targets: By 2021, all teachers, principals and ministry officials in education receive at least one training experience in OER.

Strategies:

- All capacity building shall be in direct alignment with the GRZ Vision of "education for all";
- Those personnel already trained through OER projects at both national and international levels shall be called upon to act as champions and in some cases trainers within capacity-building programmes;
- Both online and face-to-face workshop methods shall be used to provide training on OER. Existing free online courses on OER shall be promoted to speed the facility-building process;
- OER themes for capacity building will be identified, and programmes designed, developed, supported and provided to personnel in stakeholder institutions and agencies;
- Education institutions shall integrate OER awareness and related strategies/policies to clarify the rights and responsibilities of their staff to use, develop and share educational materials with open licences; and
- Individuals developing and/or integrating quality OER in their teaching and learning shall be appropriately acknowledged and rewarded either institutionally, regionally or nationally.

4.7   Infrastructure and Connectivity

There are several projects in Zambia aimed at improving the education ICT infrastructure in the country. Upgrading the ICT infrastructure for teaching and learning as well as continuous maintenance of the system in operation are key to the use and creation of OER.

Strategic Outcome 4: Enhance the use of ICT for teaching and learning.

Targets: (1) By 2021, 100% of schools with ICT infrastructure actively engaged in OER. (2) By 2021, a central repository of OER is maintained and supported by the Ministry of General Education.

Strategies:

In line with the ICT in Education Strategy Statement (MoGE, 2019d, p. 103) in "Section 2.3: Main ICT Policies, Objectives and Strategies," the following strategies shall be promoted:

- An environment of opening access to ICT infrastructure, Internet connectivity and related technologies shall be cultivated to facilitate access to and redistribution of openly licensed teaching, learning and research resources;
- All OER shall be released in open, non-proprietary digital formats even if they are not provided in these formats to the end-user due to lack of Internet connectivity;
- In the event that a proprietary format is used, the source file in its final version along with the relevant application programme interfaces shall be made available to facilitate reuse; and
- Guidelines for the development, storage of and access to digital resources shall be established.

4.8   Quality Assurance

Improving the quality of teaching and learning is the overall goal of introducing new ways of teaching and learning. The use of OER in teaching and learning brings in the dimension of openness in the process and is considered to improve quality. Making learning materials available online increases the responsibility of the creator to prepare quality materials. However, open practices may pose risks to institutional reputation if quality is not maintained. There are already many quality assurance (QA) models for OER available for adoption and for contextualisation within the existing education QA policy, processes and procedures in GRZ.

Strategic Outcome 5: Quality of teaching and learning in Zambia improved through the use of OER.

Targets: (1) By 2021, a quality assurance mechanism for OER is in place. (2) All materials released through the national OER repository undergo the QA process.

Strategies:

- Available guidelines for assuring the quality of OER shall be appropriately contextualised, and a mechanism for review and approval (including peer review and user ratings) of OER shall be developed and adhered to for all levels;
- The review of OER shall include quality content, pedagogy and media/presentation; and
- Regulatory agencies shall encourage and acknowledge the appropriate adaptation of OER in their criteria for programme accreditation.

4.9   Implementation Strategy

There are a number of projects and initiatives on OER in different institutions in GRZ. Personnel from these institutions and agencies shall be co-opted as champions for the implementation of the OER Strategy.

- MoGE and MoHE shall convene a working group to inform and confirm the OER Strategy and assign sector and functional responsibilities to relevant parties to ensure support for the OER Strategy implementation plan;
- The working group will be led by high-level education decision makers along with legal experts (intellectual property rights and copyright), curriculum design and materials development experts (resources), teaching and learning practitioners,

trainers, quality assurance experts, library professional (repository), ICT infrastructure professionals, and planning and project management experts;

- This working group shall be responsible for the monitoring and evaluation of the OER Strategy and will meet regularly to review progress and adjust to changing circumstances; and
- The working group in collaboration with MoGE and MoHE shall facilitate advocacy and awareness-building programmes and support research on OER.

4.10 Institutional Arrangements

All education institutions and related service organisations at all levels (ECE, primary, secondary, tertiary, and continuing education) in all public, private, grant-aided or community sectors:

- shall take active steps to familiarise themselves with this OER Strategy;
- shall be required to adhere to the OER Strategy or ensure alignment of their own institutional OER policy/strategy with the national OER Strategy;
- shall review existing policies to include open licensing provision, especially in their copyright and intellectual property rights policies;
- that already have developed open repositories should ensure these are made available widely to share teaching, learning and research materials on the Web;
- shall encourage and facilitate the reuse, revision and remixing of existing openly licensed materials in their teaching and learning by educators and students/learners; and
- shall encourage the development of contextualised and customised materials reflecting their context and environment.

Appendix A: Status of ICT in Education – Republic of Zambia Data

(i) Introduction

The goal of identifying global indicators for ICT in education has potential for widespread impact, as shown in Figure A-1 (Song, 2009). Our context is the area of educational reform, and the specific intention to support the use, production and dissemination of OER. According to COL (2012), working with OER effectively requires government attention to and investment in three areas: materials development/acquisition, staff development, and ICT infrastructure. According to UIS (2006), using ICT indicators to support the harnessing of OER necessitates consideration in both these areas with respect to the following aspects: organisational (legalities and procedures), educational (description and evaluation), and informational (maintenance and provision).

In this working document, we begin by examining and verifying the high-level country ICT and education data obtained for Zambia from the sources indicated, and then focus on establishing the country-wide data (from MoGE) for the UNESCO ICT in Education Indicators. We then elicit specific ICT indicator data from three sample Zambian colleges.
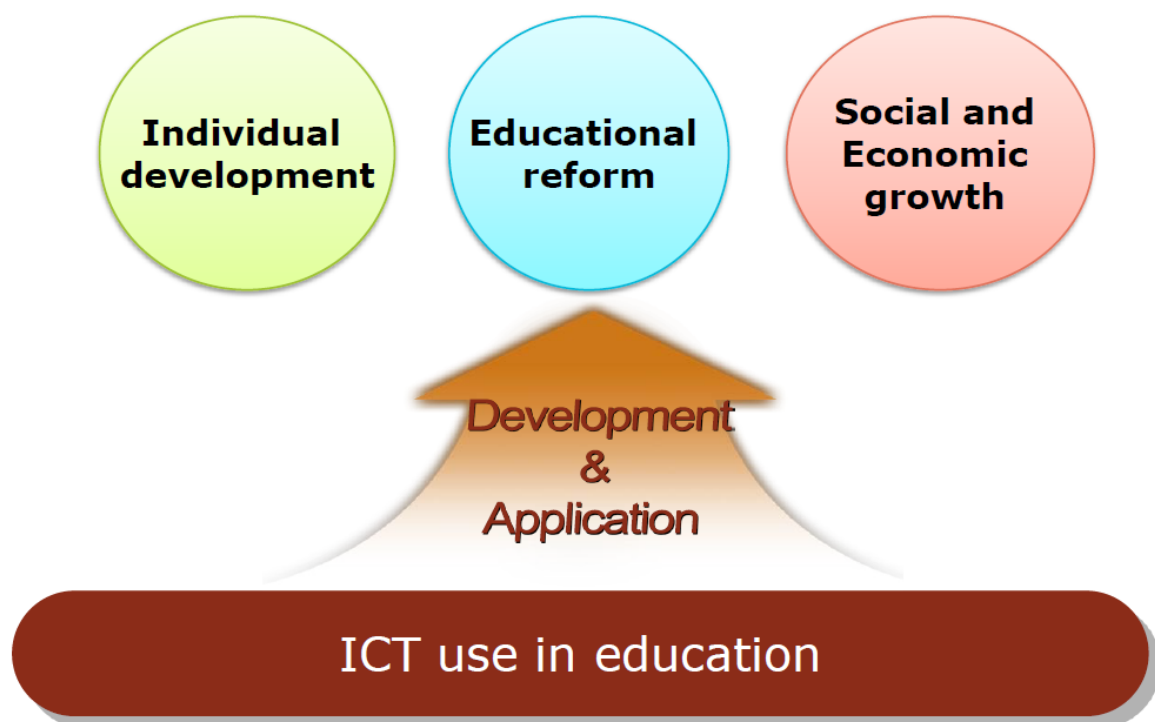

Figure A-1. Goals of global indicators for ICT in education (Song, 2009).

(ii) Country Context

Table A-1. Zambia profile – ICT data (ITU, 2018)

Various Statistics (Latest Data Available: 2018)		Confirmed[11] / Correct
Fixed-telephone subscriptions (%)	0.6	0.53 (2019)
Mobile-cellular subscriptions (%)	87.8	90.3 (2019)
Fixed (wired)-broadband subscriptions (%)	0.1	0.25 (2019)
Mobile-broadband subscriptions (%)	55.8	58.9 (2019)
Households with a computer (%)	8.8	7 (2015)
Households with Internet access at home (%)	16.6	4 (2015)
Individuals using the Internet (%)	27.8	9 (2015)

Sources: ITU (2018) and ZICTA (2019)

Table A-2. Zambia profile – education and literacy – ICT data (UIS, 2018)

Various Statistics (Latest Data Available: 2018[12])		Confirmed / Correct
School-age population by edu level – pre-primary	2,151,098	CORRECT
Gross enrolment ratio (GER) – pre-primary (2016)	F – 7.91% M – 7.36%	
School-age population by edu level – primary	3,363,211	3,339,245
Gross enrolment ratio (GER) – primary (2017)	F – 100.89% M – 98.68%	F – 104.1% M – 100.8%
School-age population by edu level – secondary	2,065,655	CORRECT
Gross enrolment ratio (GER) – secondary	No data?	F – 44.1% M – 47.6%
School-age population by edu level – tertiary	1,504,183	MHE
Gross enrolment ratio (GER) – tertiary (2012)	F – 3.47% M – 4.56%	MHE

Source: Besnart Simunchembu (Department of Planning and Information, MoGE)

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[11] Guided to the ZICTA website to verify this information: http://onlinesystems.zicta.zm:8585/statsfinal/.

[12] MoGE (2018), Educational Sector Analysis, "Table 1.1: Achievements against NIF 2015 Targets."

(iii) Objectives of Indicators (Song, 2009)

- To monitor and assess the levels of ICT use in education
  - the output and impact of education
  - financial and human resources invested in education
  - access to education, participation and progression
- to provide customised support in educational excellence
- to provide eLearning consultancy guidelines
- to co-build educational sustainability and wellness

(iv) Core Indicators for ICT in Education

Table A-3. MoGE core indicators for ICT in education for Zambia

UNESCO Basic Core Indicators for ICT in Education (UIS, 2006)		Yes/No, ratio or %
ED1	% of schools with electricity (by ISCED[13] level 1–3)	29.7%
ED2	% of schools with radio set used for educational purposes (by ISCED level 0–4)	31.3%
ED3	% of schools with television set used for educational purposes (by ISCED level 0–4)	16.8%
ED4	Student to computer ratio (by ISCED level 0–4)	1:110
ED5	% of schools with basic telecommunication infrastructure or telephone access (by ISCED 1–3)	48.3%
ED6	% of schools with an Internet connection (by ISCED level 1–3)	10.8%
ED7	% of students who use the Internet at school (by ISCED level 0–4)	3.2%
Extended Core		%
ED8	% of students enrolled by gender at the tertiary level in ICT-related fields (ISCED level 5–6)	MHE
ED9	% of ICT-qualified teachers in primary and secondary schools (of the total no. of teachers)	MHE

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[13] International Standard Classification of Education (2011), http://uis.unesco.org/sites/default/files/documents/international-standard-classification-of-education-isced-2011-en.pdf.

(v) College Sample Statistics[14]

A1: Charles Lwanga College of Education (ISCED level 4)

- Student population: 507
- Academic staff: 38
- Additional population information: all students are boarders

Table A-4. CLCE core indicators for ICT in education

UNESCO Basic Core indicators for ICT in Education (UIS, 2006)		Yes/No, ratio, or %
ED1	Electricity	Yes
ED2	Radio set used for educational purposes	Yes
ED3	Television set used for educational purposes	No
ED4	Student to computer ratio	1:10
ED5	Basic telecommunication infrastructure or telephone access	Yes
ED6	Internet connection	Yes
ED7	% of students who use the Internet	100
Extended Core		%
ED8	% of students enrolled in ICT-related fields of study, by gender	39
ED9	% of ICT-qualified teachers at CLCE (of the total no. of teachers)	5.3

CLCE additional notes:

- Institutional website? **Yes**
- Institutional online LMS? **Yes, Moodle**
- Use of digital textbooks? **Yes**
- Other: **student information system, 87" smart board, server computers, optic-fibre Internet**

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[14] Further data on these three colleges are in MoGE (2018, p. 75), "Table 5.2. Colleges of education student teacher enrolment 2016."

A2: Zambia College for Distance Education (ISCED level 3/4?)

- Student population: 946
- Academic staff: 15
- Additional population information: 26 total staffing

Table A-5. ZACODE core indicators for ICT in education

UNESCO Basic Core Indicators for ICT in Education (UIS, 2006)		Yes/No, ratio, or %
ED1	Electricity	Yes
ED2	Radio set used for educational purposes	No
ED3	Television set used for educational purposes	No
ED4	Student-to-computer ratio	21:10
ED5	Basic telecommunication infrastructure or telephone access	No
ED6	Internet connection	50
ED7	% of students who use the Internet	0
Extended Core		%
ED8	% of students enrolled in ICT-related fields of study, by gender	66% F; 34% M
ED9	% of ICT-qualified teachers at ZACODE (of the total no. of teachers)	20%

ZACODE additional notes:

- Institutional website? **Not yet**
- Institutional online LMS? **Staff trained but not available**
- Use of digital textbooks? **Yes**
- Other: **Digitising of textbooks continues**

A3: Technical and Vocational Teachers College (ISCED level 4)

- Student population: 3,987 (1,518 full-time and 3,469 part-time)
- Academic staff: 42, plus associates and 16 part-time lecturers
- Additional student population information: females: 1,959; males: 2,028

Table A-6. TVTC core indicators for ICT in education

UNESCO Basic Core Indicators for ICT in Education (UIS, 2006)		Yes/No, ratio, or %
ED1	Electricity	Yes (also backup generator)
ED2	Radio set used for educational purposes	No
ED3	Television set used for educational purposes	No
ED4	Student-to-computer ratio	1:10
ED5	Basic telecommunication infrastructure or telephone access	Yes
ED6	Internet connection	Yes
ED7	% of students who use the Internet	65%
Extended Core		%
ED8	% of students enrolled by gender in ICT-related fields of study	40%
ED9	% of ICT-qualified teachers at LTBC (of the total no. of teachers)	50%

TVTC additional notes:

- Institutional website? **Yes: http://www.tvtc.ac.zm/, plus Facebook, Twitter, LinkedIn and Instagram**
- Institutional online LMS? **Yes, Moodle**
- Use of digital textbooks? **Yes, 50%**
- Other:
  - TVTC has partnered with COL since 2010.
  - The main focus has been sensitising teachers on the use of technology to enhance teaching and learning.
  - Open, distance and flexible learning has been developed, and TVTC now has a fully functioning ODFL department.
  - All the courses have been placed on the Moodle platform.

Appendix B: OER Projects, Republic of Zambia

This list of OER projects has some overlap with ICT in education projects. It was compiled by researching Zambia OER projects mentioned on the Web as well as projects mentioned in MoGE documents provided to the consultant, and by requesting information from personnel during the May 2019 site visit, when participants were asked with which projects they had been involved.

1. OER4Schools: (3 staff members)
   - Three phases: 2009–2014
   - http://www.educ.cam.ac.uk/centres/archive/cce/initiatives/projects/oer4schools/
   - http://oer.educ.cam.ac.uk/wiki/OER4Schools/Zambia
   - http://oer.educ.cam.ac.uk/wiki/OER4Schools

2. TESSA: (4 staff members)
   - 2005–2019
   - http://www.tessafrica.net/
   - TESSA Zambia courses:
     http://www.open.edu/openlearncreate/course/view.php?id=2047
   - Paper: "OER's in Sub-Saharan Africa – An appropriate response to the challenge of education for all? The TESSA experience in Zambia" (2011)
     https://oerknowledgecloud.org/content/oer%E2%80%99s-sub-saharan-africa-%E2%80%93-appropriate-response-challenge-education-all-tessa-experience-zam

3. Ministry of Education (NISTCOL): (1 staff member)
   - Primary Teacher's Diploma by Distance Learning, Module 3: Numeracy (revised edition, 2011)
   - Modules 3, 4 and 5 — published as OER (2012) via Saide
   - https://www.oerafrica.org/resource/primary-teachers-diploma-distance-learning-ptddl-module-three-numeracy

4. iAct in Zambia – Roger Federer Foundation (1 staff member)
   - http://iact.info/
   - Implementing partners: ROCS and Saide
   - Interactive teaching and learning course
   - Structure and content available on the website
   - All resources on website – no licensing apparent, but openly available

5. Zambia College of Distance Education (18 staff members)
   - Notesmaster Project with COL
   - Materials for secondary education – Grades 8–12 (face-to-face and distance)
   - 4 Areas: natural science, English, social science and mathematics

6. University of Zambia OER Activities
   - African Virtual University STEM materials development (3 staff members)
   - OER Repository in Higher Education (School of Education)

7. ICT in Education Policy (1 staff member)
   ▪ Most recent policy obtained is dated 2006 and does not contain any mention of OER.

8. ICT Competencies Framework (ZNCU)
   ▪ Charles Lwanga Teachers College & Technical and Vocational Teachers College
   ▪ Includes some OER awareness as reported by the Zambia UNESCO Commissioner

9. Zambian Open University (2 staff members)
   ▪ Repository of resources (modules and course guidelines)
   ▪ Use of Moodle platform

10. CHIMA Fund-in-Trust Project (3 staff members)
    ▪ ICT in education; OER as well?

11. SchoolNet Zambia (1 staff member)
    ▪ ICT in education; OER

12. VVOB (Flemish Association for Development Cooperation and Technical Assistance
    ▪ Draft eLearning strategy (2 staff members)
    ▪ OER project outputs
    ▪ Several education projects listed on the VVOB15 website

13. Mulungushi University & University of Zambia
    ▪ Moodle and Astria
    ▪ OER project

14. COL Projects: https://www.col.org/member-countries/zambia
    ▪ COL Zambian partners: (12 staff members)
        o Copperbelt University
        o Ministry of General Education
        o Ministry of Higher Education
        o Technical and Vocational Teachers College
        o University of Zambia
        o Zambia Agricultural Research Institute
    ▪ Open/Innovative Schooling initiative: (6 staff members)
        o https://www.col.org/programmes/open-schooling
        o Since 2017 – Ministry of Education, Zambia
    ▪ Technical and Vocational Skills Development: (4 staff members)
        o https://www.col.org/programmes/technical-and-vocational-skills-development
        o INVEST Africa initiative (20 Zambian institutions)
            · https://www.col.org/programmes/technical-and-vocational-skills-development/invest-africa
            · http://oasis.col.org/handle/11599/589
        o Draft National TVET ODL Learning Policy Guidelines & Flexible Development Guidelines

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[15] https://zambia.vvob.org/

Appendix C: OER Institutional Analysis

These data were obtained from an exercise undertaken with 4 cohorts of educators as mentioned in Section 3.1 (MoGE Group of Curriculum Developers and Writers and Teachers, Technical and Vocational Teachers College, Zambia College of Distance Education, and Charles Lwanga College of Education). The OER Institutional Analysis worksheet is available at http://tiny.cc/OER-Inst_Analysis.

This exercise and related data should be considered a snapshot of individual / institutional perceptions rather than as an in-depth investigation of OER integration progress in Zambia. The data will be most useful to the individual institutions in guiding their way forward with integrating OER, and to the MoGE in implementing their OER strategy under development.

The group exercise within each cohort comprised two sections. The first section explored current teaching and learning challenges experienced and making an explicit link to mitigating these using OER. Sub-sections included Defining your Current teaching and Learning Challenge, and a related Needs Analysis, and Institutional Leadership for a conducive environment to achieve OER integration. A sample of collated responses are provided in Table C-1 and should prove to be useful in the strategy implementation.

Table C-1. Sample responses from OER Institutional Analysis Worksheet

Your Current Teaching and Learning Challenge	What aspects of the challenge could be mitigated by OER?
Inadequate/limited teaching and learning materials & learner book ratio (x9)	Developing and producing OER content in all subjects
	Funding for production of OER and ICT equipment
Unavailable and/or inaccessible resources	Reduced costs of purchasing conventional teaching and learning resources
	Enable accessibility to resources without the presence of teachers
Lack of online library	Unlimited access to OER; digitisation can provide multiple simultaneous access
	Increased accessibility to learner materials
	By helping to develop OER and making them available for free under a CC licence
High illiteracy levels in ICT skills (x2)	Use of solar panels to power rural schools and connect school to the national grid
Inadequate (lack of) ICT tools/infrastructure (x8)	Provide ICT teacher training
Lack of power, connectivity in rural schools (x7)	Introduce ICT course in all public teacher training institutions

Your Current Teaching and Learning Challenge	What aspects of the challenge could be mitigated by OER?
	Teach out to the out-of-school population
	Provide sufficient skills training and Internet connectivity in order to use OER
Inadequate skilled manpower (x3)	Facilitate CPD meetings in the zones
Inadequate CPD meetings due to geographical locations, poor transport and comms	Upskilling/reskilling of teachers and other personnel
	Capacity building for content developers
Teacher–pupil ratio very high	Train and deploy more teachers on alternate modes of provision, e.g., using OER
Poverty: off-campus learners are disadvantaged	
Insufficient time to prepare for teaching and learning	
Lack of financial resources (x2)	Direct funding to ZACODE; reduce costs of accessing education materials; accessibility using an off-line gadget

The second section concerned the calculation of an OER Maturity Index and comprised several statements pertaining to each of six dimensions considered essential to assess the status of mainstreaming the use of OER: Staff Expertise; Policy and Procedure; Quality Assurance; Infrastructure; Culture and Leadership; and Investment. Responding groups within each cohort discussed and rated six statements per dimension on a scale from 5 (strongly agree) to 1 (strongly disagree). In general, the scores along the six dimensions will differ depending on department or immediacy of engagement with learning resources generally and OER in particular. The index should be used more than once and by multiple stakeholders as a stimulus to dialogue in the ministry and/or institution regarding the next steps needed to mainstream the use of OER.

Initial analysis of the rating section (Table C-2) indicated that the Infrastructure dimension was generally considered to be unsatisfactory, with the exception of one cohort, who are known to have recently experienced a major infrastructure upgrade within a funded project. The lowest overall average scores were on Infrastructure and Policy and Procedures, of which the latter is not surprising considering these guiding documents have not yet been developed. The highest ratings were for Quality Assurance and Culture and Leadership, which augers well for the integration of OER going forward. Perceptions of staff expertise were uneven across the cohorts. The groups were also asked to prioritise the dimensions, with a rating of 1 denoting the highest priority down to 6 meaning the lowest priority. Each group had varied perceptions of priority for the dimensions, and a trend was not identified.

Table C-2. OER maturity index activity – data by cohort

Group Size		Expertise (of Staff)	Policy & Procedure	Quality Assurance	Infrastructure	Culture & Leadership	Investment	Total by Group	Average by Group		Prioritised Dimensions by Cohort					
											Expertise	Pol&Proc	QA	Infrastr	Cult&Lead	Invest
7	MoGE - 01	2.83	3.67	3.83	2.40	3.17	3.17	19.07	3.18		5	1	6	2	4	3
6	MoGE - 02	4.83	4.83	3.00	3.00	3.17	2.00	20.83	3.47		3	1	6	2	5	4
5	MoGE - 03	1.67	2.50	3.67	1.50	3.50	3.00	15.83	2.64		2	1	4	6	3	5
5	MoGE - 04	2.00	2.00	3.17	2.67	3.00	2.50	15.33	2.56		1	2	6	4	5	3
23	Total MoGE	11.33	13.00	13.67	9.57	12.83	10.67	71.07	11.84	Total	11.00	5.00	22.00	14.00	17.00	15.00
By dimension	Av MoGE	2.83	3.25	3.42	2.39	3.21	2.67	17.77	2.96	Average	2.75	1.25	5.50	3.50	4.25	3.75
3	TVTC - 01	3.00	3.50	3.00	3.33	3.33	3.83	20.00	3.33		2	3	4	5	1	6
3	TVTC - 02	2.83	2.17	2.83	4.33	3.33	3.17	18.67	3.11		data not provided					
6	Total TVTC	5.83	5.67	5.83	7.67	6.67	7.00	38.67	6.44	Total	2.00	3.00	4.00	5.00	1.00	6.00
By dimension	Av TVTC	2.92	2.83	2.92	3.83	3.33	3.50	19.33	3.22	Average	2.00	3.00	4.00	5.00	1.00	6.00
2	ZACODE - 01	3.50	2.33	3.17	2.67	3.33	3.50	18.50	3.08		4	6	3	2	5	1
3	ZACODE - 02	3.83	2.67	3.67	2.33	3.50	2.67	18.67	3.11		2	4	5	6	3	1
3	ZACODE - 03	3.50	3.00	1.83	2.00	3.50	2.00	15.83	2.64		4	1	6	2	5	3
4	ZACODE - 04	2.83	1.00	1.00	1.00	2.50	1.33	9.67	1.61		6	1	2	5	3	4
12	Total ZACODE	13.67	9.00	9.67	8.00	12.83	9.50	62.67	10.44	Total	16.00	12.00	16.00	15.00	16.00	9.00
By dimension	Av ZACODE	3.42	2.25	2.42	2.00	3.21	2.38	15.67	2.61	Average	4.00	3.00	4.00	3.75	4.00	2.25
5	CLCE - 01	3.20	2.00	4.20	3.17	3.83	4.33	20.73	3.46		4	5	6	1	3	2
5	CLCE - 02	1.83	2.33	2.83	2.17	2.67	3.00	14.83	2.47		5	1	6	2	4	3
5	CLCE - 03	3.00	3.33	4.17	2.67	4.17	3.00	20.33	3.39		3	4	5	6	2	1
4	CLCE - 04	2.00	2.50	3.33	2.17	4.67	3.83	18.50	3.08		3	1	6	2	5	4
19	Total ZACODE	10.03	10.17	14.53	10.17	15.33	14.17	74.40	12.40	Total	15.00	11.00	23.00	11.00	14.00	10.00
By dimension	Av ZACODE	2.51	2.54	3.63	2.54	3.83	3.54	18.60	3.10	Average	3.75	2.75	5.75	2.75	3.50	2.50
Overall average / dimension		2.92	2.72	3.10	2.69	3.40	3.02		2.97							

Appendix D: Overview of Open Licences

When considering open licences, it is useful to remember that these are legal tools that make use of existing copyright laws. Currently, the Creative Commons (CC)[16] open licences are the most commonly used to publish OER and are therefore described in some detail below (COL, 2012).

The CC copyright licences and tools forge a balance inside the traditional "all rights reserved" setting that copyright law creates. These tools give everyone from individual creators to large companies and institutions a simple, standardised way to grant copyright permissions for the use of their creative work. Resource creators are using the CC licences to make available a digital resource pool that can be copied, distributed, edited, remixed and built upon, all within the boundaries of copyright law (Creative Commons, 2019).

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- *Legal code:* the legal fine print that ensure the licence is recognised in a court of law.
- *Human Readable (Commons Deed):* this is a user-friendly, plain-language version of the licence summarising and expressing some of the most important terms and conditions, with supporting icons (see Table D-2).
- *Digital code:* a machine-readable version of the licence in a format that software systems (e.g., search engines) can understand

Creative Commons licences require licensees to get permission to do any of the things with a work that the law reserves exclusively to a licensor and that the license does not expressly allow. Licensees must credit the licensor, keep copyright notices intact on all copies of the work, and link to the licence from copies of the work. Licensees cannot use technological measures to restrict access to the work by others (Creative Commons, 2019).

The creators of a resource proceed by selecting a combination of conditions (Table D-1) that they wish to apply to their work, and these conditions may be combined to form a number of key licences (Table D-2) granting permissions to an OER user.

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[16] https://www.creativecommons.org

**Table D-1. Licence Conditions (from Creative Commons, 2019)**

Attribution (BY)	Share Alike (SA)	Non-Commercial (NC)	No Derivative Works (ND)
You let others copy, distribute, display, and perform your copyrighted work — and derivative works based upon it — but only if they give credit the way you request.	You allow others to distribute derivative works only under a license identical to the licence that governs your work.	You let others copy, distribute, display, and perform your work — and derivative works based upon it — but for non-commercial purposes only.	You let others copy, distribute, display, and perform only verbatim copies of your work, not derivative works based upon it.

Table D-2. Key Creative Commons (CC) Licences (Creative Commons, 2019)

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Attribution Share Alike CC BY-SA	This licence lets others remix, tweak, and build upon your work even for commercial reasons, as long as they credit you and license their new creations under the identical terms. This licence is often compared to open source software licences. All new works based on yours will carry the same licence, so any derivatives will also allow commercial use.
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Attribution Non-Commercial Share Alike CC BY-NC-SA	This licence lets others remix, tweak, and build upon your work non-commercially, as long as they credit you and license their new creations under the identical terms. Others can download and redistribute your work just like the BY-NC-ND licence, but they can also translate, make remixes, and produce new stories based on your work. All new work based on yours will carry the same licence, so any derivatives will also be non-commercial in nature.
Attribution Non-Commercial No Derivatives CC BY-NC-ND	This licence is the most restrictive of our six main licences, allowing redistribution. This licence is often called the "free advertising" licence because it allows others to download your works and share them with others as long as they mention you

Appendix E: References and Data Sources

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Appendix F: Draft Implementation Plan for the OER Strategy

Table F-1 sets out the implementation plan for the OER Strategy for the Republic of Zambia. This should be incorporated as an amendment in the next revision of the *Education Sector Extended National Implementation Framework III 2011–2016: Implementing the Revised Sixth National Development Plan* (MoGE, 2019c). Timeline and target to be added during the national consultation.

Table F-1. Strategy Development Tracker

Strategic Action	Specific (Suggested) Activities	Targets	Responsibilities	Resources	Timeline
Approval of the draft OER strategy	• Review and organise a national consultation on the draft strategy. • Approve the OER strategy. • Notify the working group to implement the OER strategy.		MoGE, MoHE	COL support for national consultation.	
Establish a national OER repository	• Explore the current University of Zambia repository and its suitability for expansion or duplication. • Assign a team to develop a plan for the establishment of a national repository. • Implement the plan according to the determined scope, time and available funds.		MoGE, MoHE, University of Zambia	Technical support of COL for OER repository.	
Integrate OER into curriculum design and materials development	• Systematically review existing curricula and identify pilot projects. • Conduct training for materials development using OER.		Standards and Curriculum Directorate	Required for review of curricula and training on OER.	
Improve the quality of teaching and learning using OER	• Collate information from previous and current OER projects (e.g., lessons learned). • Develop/adapt QA guidelines based on existing frameworks. • Develop courses/OER in select priority areas.		Standards and Curriculum Directorate		

Strategic Action	Specific (Suggested) Activities	Targets	Responsibilities	Resources	Timeline
Build OER stakeholder capacity	• Develop annual training plan for capacity building of teachers in OER.		Directorate of Human Resources and Administration		
Improve ICT infrastructure and connectivity to support OER	• Source or assess current infrastructure suitable for supporting OER integration. • Identify areas for improvement to be enhanced when possible.		Planning Directorate		

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