OPEN LEARNING EXCHANGE

**Namibian Digital Education Library
Needs Assessment**

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Table of Contents

Acronyms

BES II	Basic Education Support II
BETD	Basic Education Teacher's Diploma
COL	Commonwealth of Learning
ETSIP	Education Training Sector Improvement Plan
GESCI	Global e-Schools Communities Initiatives
ICT	Information Communication Technology
IDRC	International Development Research Center
ILMM	Integrated Learning Mentoring Methodology
iNET	Initiative for Namibian Education Technology
MoE	Ministry of Education
MoU	Memorandum of Understanding
NAMCOL	Namibian College of Open Learning
NER	Net Enrollment Ratio
NETA	Namibian Technology Alliance
NETTS	Namibian Education Technology Service Support Centre
NIED	Namibian Institute of Educational Development
NOLNet	Namibian Open Learning Network Trust
NQA	Namibian Qualification Authority
NQF	Namibian Qualifications Framework
ODL	Open and Distance Learning
OER	Open Educational Resources
OLE	Open Learning Exchange
PoN-COLL	Polytechnic of Namibia Centre for Open and Life Long Learning
SIDA	Swedish International Development Agency
TRC	Teacher Resource Center
UNAM-CES	University of Namibia Centre for External Studies
USAID	United States Agency of International Development

INTRODUCTION

This study presents a needs analysis of the implementation of digital education library for Namibia as commissioned by the UNESCO Office in Windhoek. It attempts to briefly review Namibia's ICT and education policy, past key developments and initiatives employing ICTs in education, and the current ICT and education landscape. It goes on to characterize the learners, teachers, and the school environment in Namibia, current ICT and education environment with particular attention the technology available, institutional capacity to support technologies, complementary approaches currently being implemented, technological hosting requirements, e-readiness of schools, content availability and acquisition processes, and digital content creation capacity. Using this platform, it produces recommendations of implementation strategies and identifies key needs that are necessary to be development in order to support the implementation a digital education library in Namibia.

The terms of reference of this project have specified the needs analysis should provide the following:

- Identify current characteristics of teachers and learners, resources and connectivity common to Namibian school environments. This assessment will be based on existing data and interviews with stakeholders;
- Identify specific requirements for hosting the platform in Namibia and where to host print centers in the country;
- Identify priority areas of content and resource development taking into account copyright issues with direction from the National Institute for Educational Development (NIED) and through consultation with other stakeholders;
- Assess the existing capacity and capability in Namibian to digitize content and recommend a digitization strategy for materials identified as priority content and resource to be digitalized and migrated to the platform;
- Identify existing and planned initiatives in support of an improved education sector, including those aligned with the TECH/NA! Guide to ICTs in Education Implementation;
- Identify, with input from National Institute for Educational Development (NIED) and consultation with stakeholders, where best to pilot the library taking into account the accessibility to ICTs and the ability to support pilot areas, ensuring regions chosen are a good cross-section of Namibian school settings.

1   METHODOLOGY

This assessment was conducted over approximately a ten day period from the 23 February-8 March 2010. A survey/questionnaire (Appendix 1) was developed in six key information areas relevant to the project. These include:

1) ICTS and education landscape in Namibia;

2) Quantitative and qualitative data on school environment, education sector, and ICT integration;

3) Technology;

4) Content and Library Services;

5) Teacher Training;

6) Project Recommendations.

Prior to arrival in Namibia key stakeholders in the education sector were contacted to arrange meeting dates and times, confirm availability, and to provide background on purpose of the needs assessment. Survey questionnaires were sent via email to stakeholders in order for stakeholders to familiarize themselves with the necessary information areas.

In person consultations were conducted with the 21 stakeholders (Appendix 2). These were done both individually and in groups as related to organization bodies, working groups, and committees. During each interview, stakeholders were asked 1) about their familiarity of the project, 2) provided a brief overview of the proposed project, 3) asked about their role in ICTs and education in Namibia and any specific relevant expertise; 4) asked to provide information about specific activities they are involved in as they relate to the project; and 5) asked to designate their institutional proposed role in the project. Following, the Ministry of Education recommendations on the proposed project (resulting from the 25 January 2010 stakeholder meeting Appendix 3) were reviewed with the aim to gather more specific information surrounding implementation of those recommendations. Then, questions of survey relevant to stakeholders were reviewed, and stakeholders were asked to provide any specific related documentation that supports their answers (i.e., project reports, evaluations, contracts, implementation plans, and implementation progress reports). Finally, stakeholders were asked to provide input on other relevant questions important to the needs assessment. Stakeholders who were unable to meet in person were contacted via phone and email.

Limitations and Challenges Encountered

1) **Convening all stakeholders.** During the consultation period not all stakeholders were available to meet in person. For example, the NOLNET board was unable to convene and major representatives of NAMCOL were unavailable. Consultation with both has been mainly via email.

2) **Availability of Documentation of Projects, Programs, and Implementation Plans.** Reference to projects, plans, policies were made during consultations, but it was challenging to obtain these documents for reference either due to the fact that they were internal documents, not available, or not updated. Considerable quantitative data collection on progress of ICT implementation plans and programs had to be collected orally.

3) **Group interviews.** In some cases organizational bodies were interviewed together. This had positive aspects because it fueled discussion; however, it also posed a challenge because not all members of the group were as vocal as others, forgoing possible valuable contributions from different perspectives. Individual interviews helped to verify and build information between stakeholders.

2 NAMIBIA'S EDUCATION SECTOR

First a German Colony and later a territory of South Africa, Namibia won its independence in 1990. With its independence came the challenge of restructuring an education system that was crippled and fragmented. Under apartheid, Namibians were taught in Afrikaans, except in the Caprivi region by mostly unqualified teachers. The system was intended to disenfranchise and in some cases mis-educate the black majority. Apartheid left behind an education system with immense regional disparities in terms of physical and human resources, infrastructure, and education outcomes.[1]

2.1 Learners

Namibia's basic education system is divided into four phases: Lower Primary (Grades 1 - 4), Upper Primary (Grades 5 - 7), Junior Secondary (Grades 8 - 10) and Senior Secondary (Grades 11 and 12). According to the 2008 EMIS report, there are a total of 577,290 learners (585,002 according to 2009 EMIS data not yet published), 407,446 are enrolled in primary school, 163,879 are enrolled in secondary school, and 5,965 are enrolled in other schools (combined schools). (Table 1) Of the 577,290 learners in Namibia, 26,820 are enrolled in private schools with the remainder attending government schools. The Net enrollment Ratio (NER), the total number of learners enrolled in a set of grades divided by the number of age appropriate individuals in the total population, for grades 1-12 is 92.8%. However, this decreases considerably when only secondary school grades are considered (grade 8-12) to 54.5%. Namibia has achieved gender parity with 50.7% of female learners in Namibia schools (49.5% at the primary level and 53.8% at the secondary level). A major challenge in the Namibian education sector is the quality of education. Of the total learners enrolled in 2008, 96,706 were repeating a grade. There were no differences in percentages based on gender until after grade 5 when a greater number of females were required to repeat a grade than males. The entry requirements for Grade 11 in 2008 were 23 points and F or higher grading in English. Only forty-Nine percent of the 36,633 JSC 2008 candidates scored the required 23 points. While this is an increase of 1.4% compared to 2007, this result indicates that less than half of those learners enrolled pass grade 10.

Table 1: Namibia Learner Characteristics[2]

Learner Characteristics in 2008	# or % of learners
Total Learners	577,290
Primary learners	407,446
Secondary learners	163,879
Other Learners	5,965
NER grades 1-12	92.8%
NER grades 8-12	54.5%
% female learners	50.7%
% of enrolled learners repeating a grade	17%
% of students who pass grade 10	49%

2.2 Teachers

Currently there are a total of 20.830 teachers in Namibia with 12, 921 female and 7,909 male teachers. Of those teachers 13,853 teach at the primary level and 6,708 teach at the secondary level. A long term problem in the education sector in Namibia has been the lack of qualified teachers, partially a byproduct of the apartheid era where teachers were not required to have teaching qualifications or greater than grade 10 schooling. Namibia has four teacher training colleges and has an education program at the national university, the University of Namibia. They have also instituted a distance education program the Basic Education Teacher's Diploma (BETD) program to improve the qualifications of teachers. Namibia has made remarkable improvement in the qualifications of its teachers. In 2002, 45.2% of primary school teachers and 76.4% of secondary school teachers had teacher qualifications. By 2008, those percentages have increased to 71% and 90.1% at the primary and secondary levels respectively. However, currently 1,316 teachers employed in Namibia have less than a grade 12 certificate. 3,320 have at least grade 12 and up to two years of tertiary education, and the remaining 16,194 have greater than two years of tertiary education. In addition, 902 teachers have no teacher training despite their education level. Another challenge in the education sector is teacher attrition level. In 2008, 9.4% of teachers left their positions. Attrition rates are twice as high (18.1%) among those teachers who have no teacher training or qualifications.

Table 2: Teacher Characteristics[2]

Teacher Characteristics in 2008	# or % of teachers
Total Teachers	20,830
Primary Teachers	13,853
Secondary Teachers	6,708
Female Teachers	12,921
Male Teachers	7,909
Teacher Qualifications	
<Grade 12	1,316
<Grade 12 + 2 year tertiary	3,320
> 2 years tertiary	16,194
No teacher training	902
Teachers no qualification PS	28.9%
Teachers no qualification SS	8.9%
National attrition rates	9.4%
Attrition rates of teachers w/no qualification	18.1%

2.3   School Facilities

There are a total of 1,672 schools in Namibia including: 1,039 primary schools, 445 combined schools, 178 secondary schools, and 10 other types of schools. Of those schools, 1,571 are government schools and 101 are private schools. School facilities vary greatly in Namibia. There are total of 19,460 rooms used for teaching purposes in Namibia. The vast majority of those rooms are permanent facilities (16,877); however approximately 2,460 teaching facility rooms remain either prefabricated constructions or traditional huts constructed by the schools. Eighty-one schools report using outdoor spaces, such as under a tree, for classrooms. Most of the schools are located in the Kavango Region. Namibian schools have a total of 637 libraries and 654 computer rooms. Currently, 53.9% of schools have electricity (770 schools remaining without electricity). Likewise, only 49.5% of schools have a land line phone. Seventy-six percent of schools have toilet facilities and 72% have a water supply.

Table 3: School Facilities in Namibia[2]

School Physical facilities	# of schools
No. of schools total	1,672
Primary	1,039
Secondary	178
Combined	445
Classrooms total	19,460
Schools reporting use of outdoor spaces for classes	81
Libraries	637
Computer rooms	654
Electricity	902
Phone	833
Water	1,209
Schools with student toilet facilities	1,276

3   ICT AND EDUCATION POLICY

Namibia is often cited as being well ahead of other African countries in terms of its utilization of ICTs, commitment to ICTs and education, clear policy formation around ICTs and education and even its ICTs infrastructure. Over the last decade, Namibia's ICT and education sector has moved from a donor driven model to one that is led by the Ministry of Education with input and active participation from civil society, donor, and private sector partners.

Namibia has a well developed body of policy instruments that recognize the importance of ICTs to the overall development of the nation. **Vision 2030**, Namibia's vision for the long term development of the country states as a primary goal "to improve the quality of life of the people of Namibia to the level of its counterparts in the developed world by 2030".[3] As envisioned by Vision 2030, Namibia has set the development goal of high quality education and training sector that prepares its learners to actively

participate in a global "knowledge based economy" and transforms Namibia into a technology-driven nation. Recognizing that to achieve the social and economic development envisioned in Vision 2030 considerable resources and attention must be paid to the improvement of the education sector, Namibia has devised a fifteen year (2006-2020) **Education Training Sector Improvement Plan (ETSIP)**. [4] The funding to be invested in the ETSIP plan is an estimated N$21.8 billion (USD$4 billion) with a commitment from the Namibian government to provide N$21.8 billion (USD$3.8 billion) and a need to identify N$2 billion (USD$349 million) from other donor and development partners. [5] The objectives of ETSIP include:

1) Strengthening the supply of middle to high level skilled labor;
2) Improving the quality, efficiency and effectiveness of general education;
3) Systematizing knowledge and innovation;
4) Improving the effectiveness and relevance of the tertiary education system, and
5) Strengthening the policy and legal framework for access to lifelong learning[4].

ETSIP focuses on nine key areas aimed at achieving these overall objectives. These include:

1) Early Childhood education and Pre-Primary education;
2) Improvement in the quality, equity, and relevance of basic education (primary and secondary education);
3) Reforming and expanding vocational education and training;
4) Strengthening tertiary education so as to ensure high quality standards, technical development of the workforce, and global competitiveness;
5) Stimulating and supporting the process of innovation;
6) Addressing the educational needs of learners of all ages through the support of adult and lifelong learning;
7) Integrating ICTs across the education sector;
8) Enhancing HIV/AIDS management and knowledge in the education sector;
9) Pursing a capacity development program to enhance institutional education management[4].

To support the better use of knowledge and technology in achieving these goals, Namibia development a national **ICT and education policy** in 1995.[6] Its aim is to guide the use ICTs to improve educational outcomes. This policy articulates why and how ICT should be accessed and utilized in education and has undergone several iterations in 2000 and 2003 to meet the changing demands and realities of the Namibian education sector, reflecting developments in pedagogy, research, technology and partnerships. This policy reflects the various priorities in the multiple education domains including primary and secondary schools, tertiary institutions, professional development, libraries and community centers, as well as those related to vocational training and special needs education. The policy objectives are to:

- Produce IT literate citizens;
- Produce citizens with the skills to work in knowledge-based economy;
- Leverage ICT to facilitate learning and teaching;
- Improve educational administration and management;
- Broaden access to education.

In addition, it describes classification levels of ICT integration into education in order to set and subsequently monitor specific ICT utilization.[6]

In order to ensure that the ICT and education policy would be achieved, Namibia's ICT division of the Ministry of Education, in partnership with sector wide education stakeholders, developed a comprehensive implementation strategy under the leadership of the **Tech/Na! initiative**. Learning from past ICT initiatives, Namibia recognized the need to avoid fragmented approaches to mainstreaming technology into the education systems such as creating schools with expensive equipment but no training or support, content without connectivity, or trained teachers but no infrastructure.[7] Tech/Na!'s mandate is to implement the policy objectives enumerated in the ICT and Education Policy in a coordinated step wise fashion. This comprehensive implementation plan identifies overall national objectives, priority areas, key components of implementation, activities to be carried out, assigns institutional roles, phase wise plans and progressive development levels, as well as specific timelines, and outputs or targets.[8] The main components are:

- Infrastructure readiness: e-readiness of learning institutions, hardware and software deployment, platform deployment, and to establish internet connectivity;
- Curriculum development: the development of national ICT literacy certification with agreed upon standards, curriculum, and training materials. The development of ICT curriculums for all grades. These should include ICT literacy, ICT integration, and ICT as an examinable subject;
- Content Availability: a standardized complete digital package of learning material requiring the identification of content, adaptation of existing content, localization of content, and finally the development of localized content;
- Training and usage support: focused on 3 areas: ICT literacy, ICT integration for educators, and ICT as an examinable subject;
- Maintenance and Technical Support of ICTS across the Education Sector
- Monitoring and Evaluation of ICTs.

Populations that were determined to have the most imminent need of knowledge in technology application due to their participation or nearness in the workforce were given priority. The priorities of implementation are as follows:

1) Pre-service and In-service Teacher Education: colleges of education, the NIED-BETD program, Teacher Resource Centers (TRCs);
2) Schools with Secondary Schools: combined schools, junior secondary schools, and senior secondary schools);
3) Vocational Education and Training Centers;
4) National, Regional and Community Libraries;
5) Community and Adult Education Institutions ;
6) Primary Schools.

Finally, the Tech/Na! Implementation Plan includes a detailed description of development of national infrastructure and activities, a management plan, and a financial plan.

Namibia has established a draft **Open and Distance Learning Policy (ODL)** recognizing that many of the education and development policies referred to ODL without defining or articulating its role.[9] The policy has been developed through a rigorous multi-stakeholder consultative process beginning with the 2005 National Conference on *Towards Education for All: The Critical Role of Open and Distance Learning in National Development* which identified the following education needs and characteristics that supported the development of ODL: 1) the need to provide flexible education opportunities to highly heterogeneous population; 2) the sparse population spread out over huge geographic distance; 3) the key importance of education and technological skills in meeting the demands of emergent global knowledge-based economy; 4) and the need to provide life-long learning opportunities. This conference led to the *Windhoek Declaration on Open and Distance Learning* which set the agenda for the future of ODL and Namibia. The government through the Ministry of Education asked for a development of a national ODL policy.

While the ODL policy is still under review, Namibia currently has several publicly funded ODL institutions including:

- Namibian College of Open Learning (NAMCOL);
- University of Namibia Centre for External Studies (UNAM-CES);
- The Polytechnic- Centre for Open and Life Long Learning (PoN-COLL);
- National Institute for Educational Development Basic Education Teacher's Diploma (NIED-BETD).

NAMCOL was established in 1997 through an Act of Parliament to provide opportunities to out of school youth and adults as well as professional and vocational training opportunities. They have developed a selection of grade 10 and 12 courses that are designed to be distance or blended classes to allow out of school learners to complete their secondary education. They have also developed several professional certificates including Education for Development, Local Government Studies, and the Commonwealth Diploma in Youth and Development.[10] As of 2007, there were 27,805 students enrolled in NAMCOL programs.[9] The UNAM-CES offers three distance education bachelor programs (education, business administration, and nursing science), seven diploma programs in Education; and two

certificate programs in HIV counseling and Midlevel Management.[9] In 2008, UNAM-CES has 1535 ODL students registered for the ODL program which is 18% of the UNAM student body population.[9]

Likewise the Polytechnic of Namibia offers six bachelor degrees, five national diplomas, and two certificate programs through open and distance courses. The Polytechnic also permits for full time students attending classes at the institution university to enroll in distance classes; thus, allowing for a greater degree of flexibility in students degree programs. In 2008, the Polytechnic of Namibia had 1853 students registered in ODL classes which constitute 21% of the entire student body. Lastly, NIED which is charged with curriculum reform and development for the formal education system, teacher training, and education research has implemented a Basic Education Teacher's Diploma distance education program. This allowed for currently employed teachers to upgrade their qualifications while continuing to teach. Teacher's were provided materials and were required to attend "vacation classes ". In 2007, there were 1620 enrolled in the program.[9]

4   MAPPING OF THE CURRENT ICT AND EDUCATION INITIATIVES

4.1   Current Governance Structures

These clear policy instruments have made a fundamental difference in how Namibia has been able to begin to exploit technical opportunities. Namibia has also developed clearly defined governance bodies in ICTs and education that have not only been pivotal to formation and revision of educational policies but also to the implementation of these policies. These structures have been responsible for ensuring that ICT activities align with MoE's overall education goals. The current ICT and education landscape is as depicted below **(Figure 1).** A more detailed explanation is given below of each structure below. Many of these structures have overlapping responsibilities and representatives from the various bodies sit on multi-stakeholder groups such as NOLNet and the ICT Steering Committee.
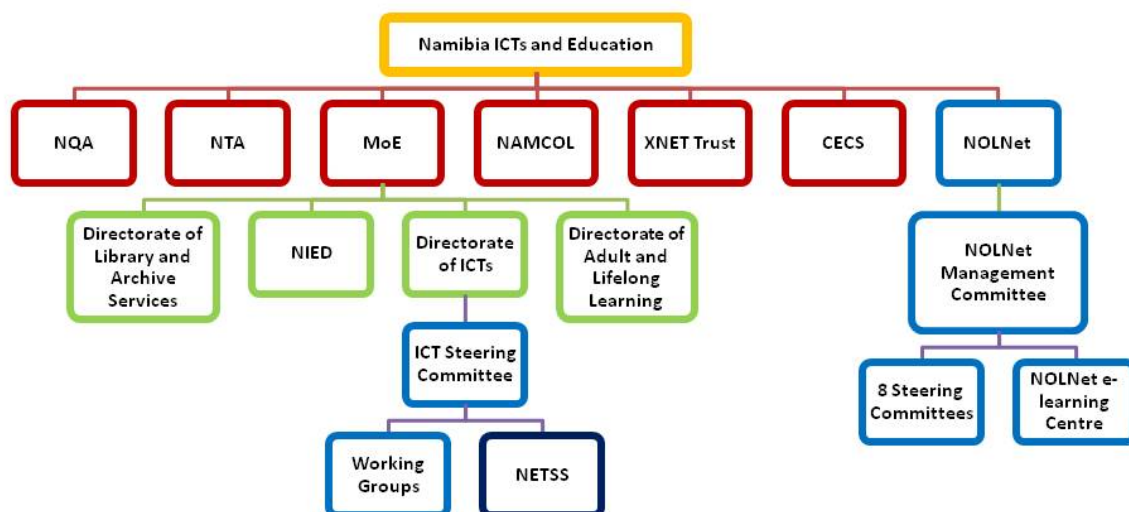

Figure 1. ICT and Education Governing Bodies.

ICT Steering Committee

The ICT Steering Committee is responsible for the overall management of ICT and education Tech/Na! Implementation Plan. Established in 2004 by the MoE, it creates a single consultative forum intended to promote collaboration between projects, organizations, and partners. Seven directorates of the Ministry of Education (MoE) participate in the ICTS in Education Steering Committee: Directorate of Adult Basic Education, Directorate of Education Programme Implementation, Directorate of Higher Learning, Directorate of General Services, Directorate of Science and Technology, and Directorate of Vocational Educational Training.[5] In addition, the committee's membership includes representation from the MoE regional offices, tertiary education partners, TRC network, civil society organizations, private sector partners, and donor and development organizations. The ICT steering committee is responsible for the overall management of the implementation plan, serving as a point of coordination for activities, providing input with regard to selection of new project and activities and where they should be employed, monitor and review project progress, facilitate procurement of technical assistance, and review policies as needed. Under the ICT steering committee is a coordination group and area working groups who implement the activities.

NOLNet (www.nolnet.edu.na)

In 2000, the Namibian Open Learning Network Trust (NOLNet) was established through a memorandum of understanding (MoU) with the permanent secretary of the MoE and the ODL institutions. Its mandate is to coordinate ODL activities and programmes and ensuring that the appropriate quality control mechanisms are in place. NOLNet is managed through an executive board consisting of directors of UNAM, the Polytechnic, the MoE Directorate of Adult Basic, NIED, and NAMCOL Education. In addition there is a management committee and area specific standing committees that implement ODL activity. Major achievements of NOLNet include the establishment of NOLNet multipurpose centers that have access to library resources, internet access, and computer hardware to assist in ODL.

NOLNet e-learning Center (www.elc.nolnet.edu.na)

In 2006, the NOLNet e-learning center was established under the auspices of NOLNet. It has had considerable support from InWEnt (Capacity Building International, Germany) in developing its e-learning training programs. Through this partnership InWEnt has trained 40 educational stakeholders in Namibia in e-Learning. The course included training on instructional design, content development, e-learning management, and support and tutoring of virtual learning communities (VLC). Its mandate is to manage and coordinate all e-learning activities. In addition to facilitating the coordination between various institutions, the e-learning center carries out capacity building, content development, quality insurance, infrastructure development to ensure sustainable and relevant e-learning.

NETSS Centre

The Namibian Education Technology Services and Support Centre (NETSS) was established after consultative process as part of Tech/Na! Implementation Plan. It is responsible for coordinating access to ICTs for education institutions in Namibia including sourcing of hardware, refurbishment, installation, and technological support. NETTS provides continuous on demand support for schools through its national center and toll free number, but also conducts a once a year maintenance for all schools (August/September.) to ensure that ICT hardware is working properly. The design of the NETSS centre is based on models of support established previously by SchoolNet Namibia and Microsoft Pathfinder projects.

Namibian Training Authority (http://www.nta.com.na/)

The Namibian Training Authority (NTA) provides services to increase the effectiveness and efficiency of vocational education and training in Namibia. It is undergoing a nation-wide standardization of vocational training curriculum and certification as well as supporting the expansion of training venues throughout the country.

NIED (**http://www.nied.edu.na/**)

Namibia Institute of Educational Development (NIED) is responsible for designing, developing and evaluating curricula for schools and teacher education, introducing approaches to teaching and learning, coordinating the development of instructional materials, conducting educational research, distributing teaching and learning resources and coordinating the development of pre-service and in-service teacher education programs.

Namibian Qualifications Authority (**http://www.namqa.org/**)

The Namibia Qualifications Authority (NQA) is a statutory body established by the Namibia Qualifications Authority Act No 29 of 1996.The NQA's mandate is ensure the quality education and training in Namibia through the development and management of a comprehensive and flexible National Qualifications Framework. Quality is also promoted by the NQA through the accreditation of education and training providers in Namibia and their courses. The ICT literacy certification currently used in Namibia was approved and vetted by the NQA.

NAMCOL (**http://www.namcol.com.na/**)

The Namibian College of Open Learning is a parastatal education institution created in 1997 to provide continuing education and learning opportunities for out of school youth and adults. It has developed distance education courses for grade 10 and grade 12 qualifications as well as several professional certification courses. NAMCOL is a leader in digital content creation in Namibia. In addition to participation in production of radio and video content for schools, digital content production in collaboration with UNESCO and the Commonwealth of Learning, NAMCOL has currently been contracted by the e-Learning Center under Tech/Na!/ETSIP implementation plan to produce twenty 30-minute interactive digital modules for grades 10 and 12 in the curriculum areas of mathematics, physical science, an English. NAMCOL has also put together a comprehensive multimedia strategy for the period of 2009-2011 which identifies strategies and partnerships in order to improve its capacity on the development of multimedia content.

CECS Namibia (**www.cecsnamibia.com.na**)

CECS Namibia is not-for-profit organization that provides training and support for teachers and communities in ICT literacy. Their primary focus is basic ICT skills.

XNET Trust

XNET Trust established EduNet in 2003. EduNet negotiates bandwidth on behalf of Namibian Education Institutions, relying on aggregation of demand and negotiating for volume discounts to obtain cheaper bandwidth for educational institutions. EduNet has entered into negotiations with Telecom and Mobile Telecommunications Limited (MTC). In 2006, Telecom pledged an in-kind contribution of N$13.5 million for a five year period towards Xnet's objectives. Telecom has already provided discounted services towards SchoolNet's objectives since December 2001 which has made provision for flat rate dial-up services for up to 150 schools where WLAN technology is not yet available. In 2008, MTC pledged N$20 000 and 500,000 Mbps towards the Xnet Development Alliance. The 500,000 Mbps will allow Xnet to connect 41 institutions, each with a 1Mbps 3G package similar to that of MTC's 3G 1000 lite product. In addition, Xnet will be able to offer the package at N$200, half the commercial price, to its beneficiaries. In return, Xnet will earn an additional income per month, which it can use to offset its overheads.

4.2   Past Initiatives and Partnerships

As Namibia has developed strong policy and institutional bodies to guide ICT and education implementation, the country has undertaken numerous initiatives to implement the goals. Each of these initiatives have contributed to the countries overall knowledge of what works. Some of the most notable **past** initiatives and partnerships include:

SchoolNet

SchoolNet Namibia, a not-for-profit organization, was established in 2000 in order to provide sustainable, affordable open source technology solutions and internet access to educational institutions. SchoolNet received the majority of its funding from SIDA, USAID, and IDRC. SchoolNet was responsible for the deployment of refurbished computers and local servers to schools along with setting up internet access, providing technical support, and training services. SchoolNet was also instrumental in establishment of the XNet Development Trust in partnership with Telecom Namibia in 2003 to provide affordable bandwidth and in turn internet access to educational institutions. This partnership resulted in a standard flat rate 24 internet access of USD$25/month for schools. There was also a provision to subsidize schools who could not afford internet access. As of 2007, SchoolNet had successfully reached 350 schools (Isaacs, 2007). In addition, SchoolNet was a proponent of open source content and had developed a comic book and weekly one page newspaper called *Hai Ti!*, under the creative commons license. The goal of this comic was to popularize the use of technology in education. SchoolNet was dissolved in 2009. Existing initiatives have borrowed SchoolNet's model of scaling and delivering technology in schools as well as their focus on open source solutions. Other lessons learned include that sustainability and use require a significant focus on training along with infrastructure deployment. Moreover, in the SchoolNet project teachers were viewed largely as beneficiaries instead of participants hindering the sustainability of the project[11].

Microsoft Pathfinder

Microsoft and the Ministry of Education signed a Memorandum of Understanding to implement the Pathfinder project in 2005. The initiative aims to bridge the digital divide using Microsoft's nine point model of ICT in education. The model includes access, training, technical support, standards, innovative software, digital content, research, telecom and power and policy development. The project is was part of Microsoft's broader technology and education initiative known as Partners in Learning. This initiative was plagued by the tensions between open source and proprietary solutions existing in Namibia.

NETA

The Namibian Technology Alliance (NETA) was established to support the training component of the Microsoft Pathfinder and SchoolNet projects. Supported by USAID and the American Federation of Teachers Educational Foundation, NETA provided training of teachers in thirteen primary schools where deployments occurred. This included ICT literacy training for teachers, training in creating ICT integrated lesson plans, and the provision of educational software LearnThings and Encarta.

Multichoice

In 2007, Multichoice implemented a video integration program. Multichoice provided satellite equipment to schools along with access to educational programming channels such as the Discovery Channel, the History Channel, and CNN. Schools with Televisions and a satellite dish could access the channels for free and Multichoice donated VCRs to record educational programming. WorldTeach volunteers provided training on equipment use and curriculum integration. No outcome evaluation of this initiative was conducted.

NAMCOL Education Radio Project

In 2004, a MoU was signed between NAMCOL and the MoE to implement an Education Radio Project aimed at enhancing relevant education radio programming in Namibia. As a result of this project, a recording studio has been constructed on NAMCOL's campus with digital recording equipment. Three members of NAMCOL staff have been trained to use the equipment (Mowes, 2008). A group of Ministry of Education staff have been trained on the production of educational radio programming. This included two one week trainings in 2005 and 2007 and a refresher course in 2006. This training was sponsored by the Commonwealth of Learning (COL). Those trained have scripted and piloted programming in 2007.

GESCI

The Global eSchools and Communities Initiative (GESCI) was founded by the UN ICT Task Force. GESCI works at the local, national, and international level to support developing countries. In Namibia, GESCI served as a strategic advisor to the Ministry of Education and supported the development of the ICT for education policy, the Tech/Na! implementation plan and launch. GESCI also worked with NIED and the ICT Steering Committee Content Working Group to develop a digital content assessment tool, supported curriculum development for the foundation level ICT literacy and ICT for Educators courses and supported the development of the NETSS centre.

eIFL.net and Koha Foundation (http://plip.eifl.net/eifl-foss/greenstone)

Namibia participated in Southern Africa Greenstone pilot project along with nine other countries in the region. eIFL.net's mission is to enable sustainable access to high quality digital information for libraries and developing countries, and countries in transition.

Learnlink and iNET

LearnLink and the Initiative for Namibian Educational Technology (iNET) utilized the Harvard University Graduate School of Education's WIDE World online professional development program to provide online professional development in curriculum and instruction for all instructors at Namibia's teachers colleges. In a 2005 evaluation of the program, 70 instructors from Namibia's four teachers colleges had participated in the program, but none of those teachers actively employed what they had learned in the program post-training.

BES II

From 1995-2005, the Basic Education Support II (BES II) program was implemented in Namibia through USAID to improve educational management capacity of teachers, teacher educators, and school leaders. Inspectors used an automated spreadsheet tool along with video to assess teachers and analyze instructional practices. Results reported from this initiative were as follows: 65% of teachers participating showed improved use of learner-centered practices; 53% of teachers demonstrated more effective use of continuous assessment techniques; 83% of schools participating began implementing activities from their School Development Plans; 100% of Circuit Support Teams showed increase capacity to support teachers, principals, and parents in school improvement; and 82% of participating schools held regular site based teacher workgroup sessions to improve instructional practice (Burns, 2006).

Many of these were either time bound projects implemented in partnership with donors and development partners and have since completed or have been transformed into other institutions and projects.

4.3   Current Initiatives and Partnerships

Over the last decade, Namibia's ICT and education sector has evolved to include both both civil society and private initiatives under the coordination of the Ministry of Education. Building on experiences and lessons learned from past projects, current initiatives are guided by the Tech/Na! Implementation Plan and approved firstly through the ICT Steering Committee and NOLNet governing bodies and implemented through the various working groups under NOLNet and ICT Steering Committee Working Groups as well as NIED and NAMCOL.

Commonwealth of Learning

The Commonwealth of Learning (COL) is currently working with NIED and NAMCOL to develop digital open education resources. Under this partnership, five NIED and NAMCOL staff have been trained through a three week intensive training course on digital content development using flash and Adobe systems. In addition, the COL is working with NAMCOL on digital content creation for grade 10 and 12 in geography, English, physical science, entrepreneurship, and accounting subject areas.

Mindset (http://www.mindset.co.za/learn/home)

Mindset is a Mindset provided training support to NAMCOL on production of e-learning content. As a result of the training, NAMCOL has introduced 16 video lessons, developed through a multimedia capacity building program. The videos, for students in Grades 10 and 12, cover lessons in mathematics, English, physical science and accounting. The video lessons are available to learners and the general public. Broadcast of the lessons began end of August 2009 on Namibian national television. The videos are also available at learning centers across Namibia, NAMCOL bookshops, and the COL and NAMCOL websites.

UNESCO

UNESCO in partnership with NAMCOL has developed e-learning content for JSC and NSSC levels. These include web-based textbook/study guides in the subject areas of geography, life science, and English. These are available on CD.

ICDL

The Ministry of Education has contracted with the International Computer Drivers License (ICDL) to provide ICT literacy training to educators. This ICDL course is conducted over an 8 week period, 2 weeks focus on basic computer literacy followed by 6 weeks of computer skills including file management, word processing, spreadsheets, database, presentations and internet and email.

The Knowledge Network (http://www.knowledgenetwork.co.za)

The Ministry of Education signed a five year MoU with the Knowledge Network South Africa in 2010. Knowledge Network will be responsible for training teachers on IT integration into the curriculum. They will work with the schools that have been deployed by NETSS. The Knowledge Network will be implementing their Integrated Learning and Mentoring Methodology (ILMM) which develops information technology skills through curriculum based projects and activities. The System includes 32-36 lessons per a grade year for pre-school through grade 12. Namibia's training program will focus on grades 3-9. Each lesson includes a lesson plan, skills assessment and project that can be conducted within a 30-50 minute time period. The ILMM training also includes a 20 hour training session for educators.

Peace corps, WorldTeach and IFESH

Peace Corps, WorldTeach, and IFESH continue to support the MoE through the deployment of volunteer teachers and trainers. WorldTeach has been particularly involved in assisting with the piloting of ICT projects at schools.

Rossing Foundation (http://www.rossing.com/rossing_foundation.htm)

The Rossing Foundation's aim is to improve the quality of teaching and learning through effective teachers in English as the foundation of education, as well as through the development of skills in reading, mathematics, science, and Information and communications technology. As part of its strategic focus, the Foundation established three Educational Centers in Arandis, Swakopmund and Ondangwa. These centers focus on the effective teaching and learning of English, the development of skills in Mathematics, Science, Libraries, and ICT. During 2008, the centers provided 9,798 learners with educational subject related opportunities. The Foundation's Whole School Development Programme consists of the following interventions: a school-based teacher support program and after-school development opportunities in Mathematics, Science, Reading, English and ICT reached 5,201 girls and 4,597 boys. The Rossing Foundation recently introduced e-content training programs at their community centers called "Master-Maths" and "Master-Science".

5   Assessment of Education Digital Library

5.1   Objectives and Justification

The ICT Steering Committee outlines the educational objectives of incorporating ICTs into education as follows:

1) Improved learning, teaching, and overall academic performance of learners and teachers;
2) Increased the number of learners and teachers with ICT skills;
3) Increased access to educational resources and services;
4) Improve and promote communication and collaboration between learners in Namibia and their peers in country and internationally;
5) Improve enthusiasm/motivation of learners and teachers[12].

The implementation of an educational digital library will contribute to the achievement of these goals. By utilizing a digital library, teachers, learners, community members and parents will have increased quantity and accessibility of quality learner centered, self-learning, and multi-media educational resources to effectively improve both teaching and learning. Teachers will have access to learner centered resources. By using ICTs in learning, Learners and teachers will also have the opportunity to improve their ICT skills. A digital library, through its web 2.0 functionalities, will promote collaboration between teachers. A digital library platform, with its content creation and modification tools, can increase the production of home language and localized materials by educators.

5.2   National Priorities and Policies

The Information and Adult Lifelong Learning component of ETSIP explicitly documents the need for a digital library. Component three of the ETSIP plan's goal is to "Improve and strengthen equitable access to information and learning resources". N$63.4 million is budgeted for this component. The first part of this component is the e-library program aimed at increasing the infrastructure and internet connectivity of community libraries in response to the need of better equipped basic information and study centers. The other part of this component (section 33) addresses equal access to nationally crucial information through digital content creation and management".[4] This includes the development of electronic resources, the expertise to manage these resources, and the development of a digital collections structure and platform. Section 35 of this document stresses the need to digitize local resources and develop a dissemination method "to support study, teaching, career development, legal practices, and legal rights".[4]

ICT for Education Policy names as a key component of priority ICT services the creation of a digital library. It states that a digital library "will be the channel for every education consumer to retrieve the knowledge needed".[6]

The Tech/Na! Implementation Plan has five key components with seven deployment areas. The five key components include: infrastructure readiness and platform deployment, curriculum development, content availability, maintenance and technical support, and monitoring and evaluation. The seven deployment areas include: national activities, teacher training activities (UNAM, pre and in service training and teacher resource centers), secondary schools, vocational education and training institutes, and national regional and community libraries. In each of these seven deployment areas under content availability component, the Tech/Na! implementation plan stipulates that "access to e-learning content packages included as part of the deployment to all schools should be ensured".[8] To date this activity has yet to be fully realized. A digital library platform will assist in achieving this goal.

A part of the **e-learning Center mandate** is "to develop solutions to improve access to appropriate technologies for learners and other clients; design and create training programmes for clients of the digital platform; and acquire relevant e-learning material in support of local e-learning courses."[8] To date, the e-learning center has begun to develop strategies and policies around content acquisition and evaluation, carried out training in digital content creation, as well as contracted for the creation of relevant digital content.[13] However, content is not readily available or accessible to the general public including learners and teachers. The e-learning platform Chisimba is being used to store content, but it is password protected. Furthermore, the existing content such as that created by NAMCOL, the Learnthings content and contented created with UNESCO in conjunction with NAMCOL is not available on this platform. The Chisimba platform has not been modified in such as way to make content readily organized or categorized based on curricula or topic area.

5.3   Educational Priorities and Challenges

As described in the *Namibia's Education Sector* section of this report, there are several challenges in the Namibian education sector that would be supported by the implementation of a digital library platform. First, there is a critical need to improve the quality of education. Quality of education can be improved, in part, by the distribution of quality educational resources that encourage learner centered activities and self-learning. Currently, there are a shortage of textbooks and other educational resources in schools. Furthermore, Namibian textbooks are under strict copyright laws that make production cost prohibitive and the supply chain distribution sluggish. This prevents the adequate distribution of resources to learners and teachers as well as the modification of these resources. Identification and creation of Open Educational Resources (OER) will eliminate this impediment and create greater equitable distribution and access to resources. Additionally, teachers require more support to develop appropriate teaching methods and materials. A digital library will improve teaching outcomes by assisting with classroom management, lesson preparation, and facilitating collaboration among teachers and education stakeholders.

5.4   Other Considerations

There are several other considerations that support the implementation of a digital library system. First, there is a recognized need to support open source solutions as well as open education resources. Proprietary solutions have been an impediment in Namibia to the development of ICT solutions. Expensive licensing contracts for both proprietary operating systems such as Microsoft and other proprietary software have hampered the deployments of technological hardware and the development of interactive digital content. Secondly, locally developed digital content has begun to be created in Namibia. However, due to a lack of unified platform, it is not readily accessible by users including educators and students. In addition, there is no method to organize this content in accordance with the curriculum which also poses a barrier to its utilization.

Finally, there are several strong complementary approaches and initiatives being employed currently in Namibia which would suggest appropriate timing to the implementation of such a platform. These include: the NETSS deployments of hardware and internet access to schools, libraries, and other educational institutions, the training of teachers with both the ICDL (ICT literacy skills) and the Knowledge Network ICT integration methodology for educators, the production of digital content by NAMCOL. NAMCOL notes in its 2009-2011 multimedia strategy document that "NAMCOL needs to consider the creation of usable interfaces that organize and provide intuitive access to the content for users utilizing multiple (often competing) computing platforms. Important in this (and indeed for any content distribution) is the generation and management of descriptive metadata. It is thus suggested that NAMCOL investigate the use of an appropriate Content Management System for digital multimedia content".

6   CURRENT TECHNOLOGY

This section describes the current progress of infrastructure development and hardware deployment of the Tech/Na! implementation plan, provides a comparison of the digital platform options existing in Namibia, and describes the technological capacity to support the creation of a digital education library.

According to the World Economic Forum Global Information Technology Report (2008-2009), Namibia ranks 92nd out of 134 economies using the networked readiness index (NRI) which measure the degree of preparation of nation of participate and benefit from ICT developments.[14] Table 4 provides a snapshot of Namibia's ICT infrastructure.

Table 4: Namibia's ICT Infrastructure[15]

Indicator	Unit	Provider
Total population	2.1 million	
Fixed line subscribers	140,000 (2009)	
Mobile subscribers	1.052 million (2008)	
Internet users	113,500 (2008)	
Television broadcast stations	2 (2007)	
Radio stations	AM 2; FM 39; shortwave 4 (2001)	
Mobile providers	2 (2010)	MTC and LEO
Internet providers	6 (2006)	UUNET Namibia; Africa on-line; Mweb; IWAY; NamibNet; Cyberhost
Bandwidth	2 (2006)	Telecom (2 mb up and 6 mb down via satellite); UUNET (4mb fibre link to South Africa)

6.1   Tech/Na! NETSS ICT Deployments

The Tech/Na! deployment plan prioritizes secondary schools followed by combined schools (those with junior secondary grades). Deployment is based on e-readiness of schools as determined from an e-readiness survey (Appendix 4) as well as on percentage of secondary learners in each region. For example, those regions with larger secondary populations of learners will receive proportionally larger # of deployments until the entire population of schools in Namibia is deployed with hardware and internet connectivity. Deployment consists of at least 10 computers, a server, and setting up the infrastructure for internet access. As part of deployment teachers are trained with International Computer Driving License Program in basic ICT literacy skills. As of 2009, 241 secondary schools were deployed of a total of 623 secondary and combined schools.[16] Figure 2 shows the percentage of in schools with hardware deployment by region under the Tech/Na! implementation plan as of 2009. To date, 39% of all schools have been deployed.
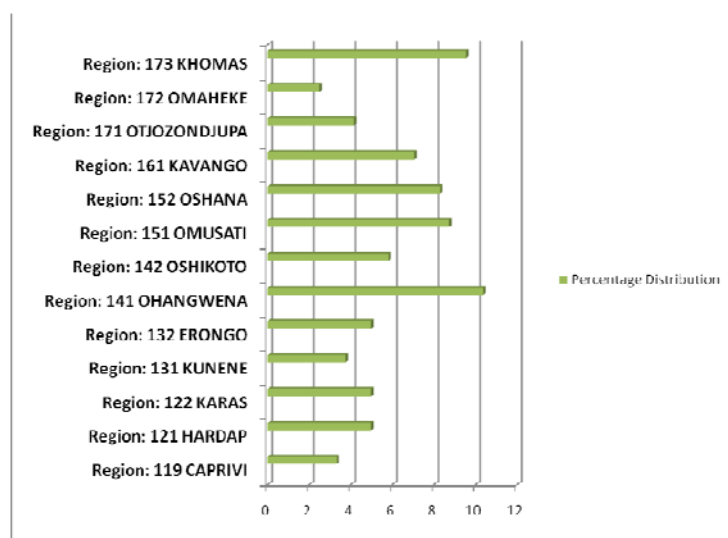
Figure 2: The percentage of schools deployed for each of the 13 regions in Namibia.[16]

Currently, all Teacher Resource Centers (34) have been deployed with hardware and internet access (see Table 5). All 51 NOLNet centers have been deployed with hardware, internet access, and other learning materials (Table 5). NOLNet centers were established under NOLNet's ODL mandate to provide communities with areas of distance and self study.[17] These usually include ICT resources and library services. Of the 60 community libraries existing in Namibia 5 have already been deployed in addition to 2 resource centers. These include libraries in Katima Mulilo, Rundu, Okahao, Oshikati, and Otapi and the American Cultural Center in Keetmanshoop as well as the Greenwell Matongo community center in Katatura, Windhoek. The equipment provided includes 3-10 computers, 1 printer, and 1 server. Three more libraries will deployed in April in Eehana, Mariental, Khorixas and 8 others have completed the necessary renovations of infrastructure to prepare for deployment including the

Windhoek Public Library and libraries in Gochas, Otjwarongo, Karasburg, Luderitz, Mukwe, Omuthia, Omaruru, and Swakopmund. Librarians or the library assistants employed at these libraries receive five weeks of ICDL training as part of the deployment.

Table 5. Education Institutions ICT Deployments 2009

Institution	Number	Number Deployed	Resources
Secondary and Combined Schools	623	241	10+ computers, 1 printer, 1 server, internet access
Teacher Resource Centers	34	34	variable
Teachers Colleges	4	4	variable
Community Libraries	60	3	3-10 computers, 1 server, 1 printer
Other Community Centers		2	GreenWell Matongo Windhoek (23 computers, 1 server, internet access, 1 staff member; American Cultural Center in Keetmanshoop
NOLNet Centers	*51*	51	NOLNet centers are also community libraries, TRCS, and CLDCs
Schools deployed by SchoolNet		350	

Source: MoE, Directorate of Library and Archives Services, Directorate of ICTs

In addition, to the hardware deployments, initial deployments are accompanied by ICDL training. To date, 1,267 people have participated in the ICDL training. These candidates for the degree are derived from schools, TRCs, libraries, colleges of education lecturers, college of education students, UNAM, region offices, and youth centers. In order to obtain the certificate, a student must receive above a 60% pass on the evaluation. The pass rates and completion rates have been variable between educational institutions.

There continues to be challenges to both the deployments and ICDL training. The NETSS Center currently has a staff capacity of only five. This will increase to twelve this year. This makes it difficult to continue to maintain schools previously deployed while deploying hardware to new schools. There are logistical challenges to maintenance including: geographic distances, the costs to deploy teams, and the lack of transport to support deployment and maintenance trips. Rural schools are often difficult to reach during rainy seasons. In 2010, there are only two ICDL testers. In order to train at 33 sites per a school term, there needs to be at least one additional tester.

6.2   Comparison of Digital library and e-learning Systems

Currently, there are several digital archiving and e-learning management systems being utilized in Namibia. These include: Greenstone Digital Library Software, D-space database software, Chisimba Kewl NextGen e-learning platform. For the most part, these systems are used by tertiary institutions such as UNAM and the Polytechnic of Namibia. However, the e-learning Center is currently using Chisimba as the e-learning platform database. In all cases, these platforms are used for only basic functionality such as to store and search for documents and would require considerable development to produce the necessary functionality required to create a user friendly digital library platform. Table 6 below compares these platforms in terms of **existing** functionality, system characteristics, and current uses and support in Namibia. This table is intended to provide a comparison of current functionality of platforms being employed in Namibia instead of system capability. These systems have further development opportunities and functionality that is not being utilized currently in Namibia. This chart does not reflect this opportunities to further development this systems. Table 7 provides a comparison of **potential** functionality of the Greenstone and Chisimba systems as well as the addition of another potential platform, the OLE platform. It should be noted that the OLE platform is currently under development and not being used in Namibia. This chart reflects its current ,as is, installable capability without further modification.

There are currently two main servers used to store educational content. The NOLNet/MoE server runs on Linux, and it is to be maintained through the EduNet ISP. Currently, the maintenance of this server is outsourced to ASTGijima data center at telecom. However, it will be shortly moved to MoE. NIED maintains two servers. These are housed at NIED and run on a windows platform.

Table 6. A Comparison of Existing Digital Platforms Functionality in Namibia

Characteristic/Feature	Existing Digital Platforms in Namibia		
	Chisimba	**Greenstone**	**D-space**
Existing System Functionality*			
store documents	X	X	X
keyword search		X	X
browse/filters		X	
edit documents within browser			
personal library and collections			
password protected controls	X		
user content creation tool within system			
upload files easily user			
upload files easily administrator	X	X	X
multiple file type supported	X	X	X
web 2.0 functions	X		
viewing documents within browser			
site translation tool	X	X	X
System Characteristics			
easily installable via cd	X	X	X
Install in a virtual machine			
interoperability	X	X	X
adapatable metadata system; can use DUBLIN Core System	X	X	X
open source	X	X	
community of users	X	X	X
tutorials and guides existing	X	X	
user interface customizable	X	X	X
customizable functionality- can be further developed	X	X	
Use and Support			
existing systems in Namibia	elc NOLnet e-learning platform UNAM e-learning platform polytechnic e-learning platform	UNAM HIV/AIDS database, past examination papers, publications, dissertations, prospectuses, and pamphlets	limited use as database UNAM
capacity to support development locally	AVOIR	training at UNAM South African Greenstone Network Polytechnic support	

Table 7. A Comparison of Potential Functionality of Digital Platforms

Characteristic/Feature	Potential Platforms Namibia		
	OLE Platform	**Chisimba**	**Greenstone**
Potential Functionality			
store documents	X	X	X
keyword search	X	X	X
browse/filters	X		X
edit documents within browser	X		
personal library and collections	X	X	
password protected controls	X	X	
user content creation tool within system	X	X	
upload files easily user	X		
upload files easily administrator	X	X	X
multiple file type supported	X	X	X
web 2.0 functions	X	X	
viewing documents within browser			
site translation tool		X	X
System Characteristics			
easily installable via cd		X	X
Install in a virtual machine	X		
interoperability	X	X	X
adaptable metadata system; can use DUBLIN Core System	X	X	X
open source	X	X	X
community of users	X	X	X
tutorials and guides existing		X	X
user interface customizable	X	X	X
customizable functionality- can be further developed	X	X	X

6.3   Capacity to Support and Developed Digital Systems

There is limited software development capacity to support the further development of existing systems or the maintenance and upgrading of current systems. The institution which most fully utilizes digital library systems is the UNAM library. Only the basic functionality of Greenstone is employed which has allowed the archiving/storing documents, keyword searches, and browsing by set criteria of UNAM publications, dissertations, a Namibia HIV database, UNAM prospectuses, past exam papers, and pamphlets from the WWWISIS database. [18]

In 2007-2008, Namibia through the University of Namibia participated in a Greenstone Pilot Project in Southern Africa coordinated by eIFL.net and the Koha Foundation. As part of this project, ten participants from Namibian information centers in Windhoek received basic Greenstone training. Eight of those trained went onto receive advanced Greenstone training in a one week workshop. Outputs of this project in Namibia included:

1) the development of a Greenstone Advisory Group
2) SA Greenstone discussion list created by UNAM for participants in the project;
3) a survey was carried out by UNAM to obtain pictures of the state of digital libraries in Southern Africa; and
4) a website was set up[1] to provide information about the pilot project as a whole.[19]

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[1] http://www.sagreenstone.unam.na

None of the websites or advisory groups are currently active and the results of the survey are not readily available. In interviews with UNAM library staff, it was noted that the person/persons who had the expertise to modify and develop Greenstone functionality are no longer employed by the library. The post at UNAM has been vacant for nearly two years. It is unclear who participated in the training workshops and where they are currently employed.

Both UNAM and The Polytechnic of Namibia along with the NOLNet e-Learning Centre have developed e-learning platforms using Kewl.NextGen. UNAM and The Polytechnic have committees which are responsible for the management of the e-learning systems. In the case of UNAM, they have developed a five person e-Learning Committee who are responsible for:

- To investigate the different technology enhanced learning methods available for both on and off campus students and promote these methods to the academic community;
- To train lecturers on the use of ICT for teaching and learning;
- To maintain, support and encourage the adoption of the Managed Learning Environment;
- To identify factors and devise methods to overcome the limited use of ICT and technology effectively;
- To ensure that courses follow the workflow;
- Encourage research that critically analyzes the working methods of eLearning;
- Monitor and evaluate eLearning at UNAM.[20]

Weteach learning solutions (http://weteach.com.na/), a relatively new, private company based in Walvis Bay, was the only resource identified currently existing in Namibia that has the expertise in Drupal systems modification and development. Additionally, they have a focus on e-learning systems. The company is, however, only in its second year and does not have example projects readily available.

7   CONTENT

This section describes the availability of existing open content and interactive digital content that may be included in the library, the content assessment tools and processes existing, and the existing capacity around content creation.

 In order for a digital library to be useful, content has to be made available. This requires the use of existing content, the identification of Open Education Resources that can be modified with minimal effort to fit the Namibia local content, and the creation of new content. A goal of the Tech/Na! implementation plan is the creation of a collection of digital content to meet and support educational needs. However, there is acknowledgement while interactive digital content is highly desirable, there is also a need for printed materials as well to reach those learners and teachers who do not yet have in school access to computers and the internet. In addition, there is desire to actively engage in content creation.

7.1   Content Inventory

The existing textbooks, learner activity books, and evaluations used in Namibia schools have restrictive copyrights that would not enable these materials to be included in an open digital library. There is a possibility to negotiate for copyright restrictions with the various textbook publishers, but at the time of consultation, it was the expressed view of stakeholders consulted that the cost and time involved in such negotiations would make this approach prohibitive. Table 8 is a list of digital and open content that is available for inclusion in the library as well as few recommendations of Open Educational Resources (OER) that can be evaluated for inclusion in a digital library. The content available is only at the secondary level, primarily grade 10 and 12. Digital content has been developed in identified priority areas that are considered "difficult" to teach or that lack quality resources and/or qualified teachers. These include life sciences, physical science, and mathematics. While none of these resources constitute full courses, they provide a good foundation onto which to begin to map and create full courses. Resources range from digital texts, teacher lessons, interactive digital content, and text content with assessments.

7.2 Content Assessment

Currently, there is a system for digital content assessment in place in Namibia. A digital content assessment tool was created by NIED in conjunction with GESCI (Appendix 5). This tool was used in the identification and decision of adopting the LearnThings digital content. NIED is responsible for the evaluation of content and the Namibian Qualifications Authority must approve any outside course that is used for certification in Namibia. NIED expressed an interest in the identification and modification of Open Education Resources- both interactive digital content and paper based content that can be stored in digital forms and distributed in a paper format.

Table 8: Digital and Open Content Inventory Namibia

Subject	GRADE	FORMAT	TYPE	# of lessons/activities	Copyright	Localized
CONTENT AVAILABLE						
Maths	10	digital interactive	30 minute module	3	OPEN	YES
Physical science	10	digital interactive	30 minute module	3	OPEN	YES
English	10	digital interactive	30 minute module	3	OPEN	YES
math	12	digital interactive	30 minute module	4	OPEN	YES
Physical science1	12	digital interactive	30 minute module	4	OPEN	YES
English	12	digital interactive	30 minute module	3	OPEN	YES
Accounting	10,12	digital			OPEN	YES
Physical Science	10,12	digital			OPEN	YES
Entrepeneurship	10,12	digital			OPEN	YES
learn things-English	grade 8-12	digital interactive	lessons and activities		MoU agreement	YES
learnthings- Maths	grade 8-12	digital interactive	lessons and activities		MoU agreement	YES
learn things-science	grades 8-12	digital interactive	lessons and activities		MoU agreement	YES
UNESCO-NAMCOL geography	JSC, NSSC	digital interactive	interactive textbook+ activities	1	OPEN	YES
UNESCO-NAMCOL life science	JSC, NSSC	digital interactive	interactive textbook+ activities	1	OPEN	YES
UNESCO-NAMCOL-English	JSC, NSSC	digital interactive	interactive textbook+ activities	1	OPEN	YES
syllabi	ALL	digital	word documents;pdf	all	OPEN	YES
teacher training guides	ALL	digital	word documents;pdf	all	OPEN	YES
ICT curriculum	all	digital	word documents;pdf	all	OPEN	YES
NAMCOL radio and video content	unknown	digital	audio, video files			YES
NAMCOL study guides-all subjects	grade 10, 12	paper	Paper	grade 10, 12	OPEN	YES
POSSIBLE CONTENT						
Knowledge Network content	K-12	digital interactive		32-36/grade	MoU agreement	NO
Mindset content	various	digital interactive		various	OPEN	NO
Siyavula	k-12	digital	printable pdf	all	OPEN	NO

7.3 Content Creation Capacity

NIED and NAMCOL both have past experience and present capacity in content creation and modification. NIED is responsible for developing the national curriculum and subject syllabi and thus has the most relevant expertise regarding subject related content development, standards, and teacher training and teacher resources. NAMCOL's focus has been on creating materials and programs for out

of school youth and lifelong learning. Both NIED and NAMCOL have been involved in digital content creation projects (described in detail in the *Current initiatives and Partnerships* section above). NIED is currently working with the Commonwealth of learning on e-content creation for grades 10 and 12 in the subject areas of accounting, entrepreneurship, English and physical science. In consultation with NIED stakeholders, it was noted while several NIED staff have trained in using software to develop digital content, the software used was proprietary. Thus, the expense of software licenses was prohibitive to further developing and utilizing those skills on an institutional level. NAMCOL has the most experience in multimedia content development. They have been involved with the Commonwealth of Learning, Mindset, and UNESCO in developing interactive digital media content. Content developed includes computer based modules, radio content, and video content. Because of their mandate to further ODL, they have actively sought to develop these skills. Recently, they developed 2009-2011 multimedia strategy which assessed their current strengths and weaknesses and future goals and strategies specifically in the development and distribution of multimedia content.[21]

The NOLNet e-learning centre was developed to serve as the national hub of e-learning in Namibia. While they have not been involved actively in content creation, they have expertise in e-learning training and e-content development. They have developed e-learning training program that includes a 20 week course in the following subjects:

1) instructional design;
2) content development;
3) e-learning technology;
4) e-learning management and
5) tutoring for e-learning communities.[13]

8   RECOMMENDATIONS

Given the above analysis of the current context in Namibia and consultation with stakeholders, at this time, Namibia is well positioned to undertake the digital education library project. By developing this library, Namibia has the opportunity to become a model for e-learning in the SADC region. The following sections provide recommendations in project management and implementation, technology development, content development, and funding.

Project Management and Implementation

Research into OER has shown that leadership, commitment and understanding of the open source and open educational resources movements, and institutional governing bodies, and explicit policy development are crucial for implementing and sustaining an OER approach. Both national policies as well as education sector implementation plans (the Tech/Na! implementation plan and ETSIP plan) reviewed above clearly support the integration of ICTs into the education sector, the creation of a digital content repository, and the creation of locally relevant digital content. Namibia is in the process of developing and Open and Distance Learning Policy to guide the introduction of OER approach at the university level and for out of school training.

It is recommended that this policy be expanded to include primary and secondary levels of education. Because the challenges and opportunities are different at the basic education level than the tertiary level and non-formal education, this policy will need to consider needs specific to primary and secondary school. A coordinate policy should be first grounded in the identified needs of the education sector, taking into account not only content and technological infrastructure development but also addressing intellectual property rights and pedagogical approaches to teaching are necessary in order to fully guide and OER approach.

Strong governance bodies and institutional bodies currently exist in Namibia to guide the implementation of an OER approach.   Each of these bodies has clearly defined roles and responsibilities. Namibia has developed a comprehensive and collaborative system that requires participation and input from sections of the education sector. In its attempt to promote collaboration in decision making, it has developed several multi-stakeholder committees to guide the implementation of technology in education such as NOLNet and the ICT Steering Committee. This has led to coordinate approach of the implementation of policies and programs in education.

Table 9 summarizes the proposed roles and responsibilities of these institutions for the digital library project based on recommendations from stakeholders and drawing on their mandates and strengths and weaknesses. It is recommended that the overall management of this project would be guided by the MoE, specifically the Division of Library Services in conjunction with the ICT Steering Committee. It is recommended that the operations of this project be managed by the NOLNet e-Learning Center. The e-Learning Center maintains a centralized server intended for e-content storage, has the capacity to maintain and upload content to such as system, and has the capacity to guide e-content development training. NIED will hold the primary responsibility for identifying and developing the course structure of the digital library, content creation areas, and play a role in content development. NAMCOL has the greatest capacity, both in terms of know-how and human resources, to develop digital content. NAMCOL has led the majority of the digital content production projects in Namibia to date; therefore, NAMCOL should also play a significant operation role in content repackaging and development.

Table 9. Stakeholders' Roles and Responsibilities

Stakeholder	Role	Responsibilities
Ministry of Education (Directorate of Library Services and Directorate of ICTs) NOLNet	-Project oversight and planning	-Convening stakeholders, project coordination and ensuring project outcomes are complementary to existing initiatives and plans
NOLNet e-Learning Center	-Project Management -Training -Maintenance and Technical Support -Monitoring and Evaluation	-overall management of implementation of the project -maintenance and technical support of content server and platform -upload content onto platform - design structure for training of teachers and librarians for project deployment -Devise an M & E plan
NETSS (as directed by the Directorate of ICTs)	-Infrastructure Support/training	- to continue to implement Tech/Na! technology deployment plan to install hardware and internet at schools and libraries; infrastructure support, deployment and installation of library; training support
NIED	-Curriculum Development -Content provision	-to develop course structure for library, inventory of resources, determine content development priorities; digitizing existing resources, new content approval; content development and content acquisition
NAMCOL	-Content repackaging	-repackage digital content based on curriculum guidelines -develop new digital content

Pilot Project Implementation Recommendations
The digital content available is primarily in secondary level subjects. Technology deployment to schools has also focused on secondary and combined schools to date. Given these two findings, it is recommended that both content development and deployment of a digital library be focused on secondary schools. Content development should be focused on defining course structure, adding existing content to this course structure, and identifying gaps where content needs to be created with the goal of creating full courses in priority subject areas. In addition to secondary schools, the MoE is working to deploy community centers, libraries, TRCs, and NOLNet centers with computer hardware, internet connectivity, and training of staff. In this way, teachers who currently do not have access to the internet or computer hardware at their schools can still access materials. Community members, parents, and students can access these materials outside of the school setting. A digital library pilot program should also include these institutions and teacher training colleges to begin to train teachers in utilizing this resource and content development. Furthermore, TRCs and NOLNet centers should serve as print centers for schools to print digital resources in areas where computer access is not yet feasible. A pilot program should also include the establishment of model classrooms to demonstrate effective use of the digital library. One possibility is that once the library is established that its deployment and training be coordinate with the knowledge network deployment on ICT curriculum integration training. Incentives should be established to encourage content creation by teachers. For example, national content creation contest could be carried out. Library deployment should include training with content creation tools.

Technology
The deployment of hardware and internet by the NETSS centre has made significant progress. TRCs, teacher training institutions, and NOLNet centers all currently have access to computer hardware and the internet. Thirty-nine percent (39%) of secondary and combined schools have been deployed and the library deployment initiative is well under way.

The technological capacity both in terms of creating and maintaining a digital platform and digital content creation is under developed in Namibia. While Namibia has begun to experiment with digital platform development and use, the lack of consensus on which system to employ has hampered the use of these platforms. Even within institutions, such as UNAM, multiple platforms are used and are not integrated. As part of the feasibility study, a comparison showed the differences in existing and potential functionality of digital platforms alternatives and repository software systems. None of these platforms are being used to the full software capacity. An ideal digital platform would not only serve as a repository for open content, but also have content creation tools, and web 2.0 collaboration tools (blogs, RSS feeds, ratings/comments). The Chisimba software has multiple collaboration and content development tools, but these functionalities are not being used. Greenstone, on the hand, serves mainly as a digital library repository. However, it is better supported in country with a community of users and with several individuals with experience and training in Namibia. It is recommended that Namibia move forward with the development of a unified digital education platform. A significant assessment that compares the costs of upgrading and improving existing platforms versus implementing a new platform should be undertaken. Another proposed platform option is the OLE platform (whose current functionality is also shown Table 7). Assessments should include both software development and capacity building costs. Appendix 6 shows the estimated costs of developing and modifying the OLE platform to meet Namibia's specifications. A unified platform should focus on interoperability with other systems and functionality that takes into account current use cases and future use cases and functionality.

There is knowledge of and support for utilizing open solutions in Namibia's education sector. Technology implementation has been impeded in Namibia by the conflict between open source and proprietary solutions, most notably, between SchoolNet and Microsoft in supporting computers and servers to schools. In addition, proprietary software also had a negative impact on local digital content development because NIED could not afford the licenses for the content production software. This experience has greatly informed the education sector's knowledge of the challenges of proprietary solutions. It is recommended that any further technology employed should be open source.

Content
An inventory of content (Table 8) shows that the majority of digital content available is at the secondary school level. Because both content availability and hardware availability is primarily focused on the secondary school level, it is recommended that a digital library development would continue this focus in the first phase with the intended goal to develop full digital course materials for grades 8-12. The e-learning content training expertise exists to support this project through the e-Learning center in Namibia. NAMCOL has an excellent track record of digital content development and much can be learned from their experiences. It is recommended that both NIED and NAMCOL have further support in developing digital content and additional human resources focused on digital content creation. NIED will play a significant role in identifying existing content, organizing content into useful course structures, and evaluating and modifying identified open education resources to fit Namibian curricula.

Funding
There are 3 major components to this project: technology development and training, content identification and digital content development, and deployment and training to educational institutions. A major constraining factor in the implementation of this project is the capacity to support and develop the digital platform. Currently, no initiatives under way or organizations within Namibia can support this without significant investment of outside resources and expertise.

The second components, content identification and digital content development are currently being undertaken in Namibia. Projects by NAMCOL have led to the availability of body of digital content at the secondary level to be included in the library. Additionally, the MoE has recently signed an MOU with LearnThings to use their interactive digital content covering grades 8-12. The e-Learning Center has been established to support e-content development. ETSIP money should be designated for this purposes to begin to fill in the content gaps to create full courses for grades 8-12 at the secondary level.

Another possible funding source is the Millennium Challenge Corporation. The Namibian government signed a US$304.5 million compact to reduce poverty and accelerate economic growth.[22] They currently have a designated project for textbook procurement and distribution.[23] Other previous funding sources of similar projects include the Commonwealth of Learning, the International Development Research Center, and Koha Foundation.

The final component the deployment and training associated with the use of digital library project can be linked with several complementary initiatives. First, Tech/Na! is progressively ensuring access to computers and the internet for schools and educational institutions. Thus, the funding to support the deployment of hardware will not be included in this project. Second, as part of the deployment teachers and educational administrations are being trained in ICT literacy skills through the ICDL program. In addition, the MoE signed a five year MoU with Knowledge Network to train teachers on ICT integration into the curriculum. The training structure is a series of activities that require and utilize ICTs and are guided by curriculum lesson plans. The deployment of the library can be linked to the overall deployment and the Knowledge Network training structures to avoid parallel or duplication of resources. Thus, the Ministry of Education will be a significant funding source through complementary approaches.

9 CONCLUSION

The purpose of this assessment was to determine 1) Will the creation of digital education library address challenges of education quality in Namibia? 2) Does this approach complement existing approaches and policies? and 3) What is the feasibility and readiness to begin implementing this approach?

The creation of the digital education library will have a significant impact on the realization of education goals of increasing quality of education and the acquisition of 21st knowledge based skills for Namibian learners. It is consistent with the national vision and policies and is compatible with education sector implementation plans. This project is consistent with designated education purposes and current practice. Considerable resources have been devoted to the ICT and education sector with the intent on hardware deployment, training/ICT literacy, digital content creation, and ICT integration into teaching and learning. However, it has been noted by many stakeholders that a barrier to using these resources is that there is no one unified system to deploy and access these resources.

As realized by the recommendations produced from education stakeholders in the 25 January 2010 meeting as well as consultations as part of the needs assessment, this project has overall acceptance and support by stakeholders. In addition, it will contribute to the improvement of equity in the education system by providing access to quality resources to areas and schools where they were previously inaccessible.

In light of the prevailing contextual conditions, the educational environment, and the readiness to implement new strategies, this project ranks high as far as enabling factors that promote readiness for implementation. The existence of several complementary projects, strong governance structures bodies, detailed policy instruments, and the specific institutions with e-learning mandates further increases the ability for Namibia to successful implement this project.

Namibia has devoted significant resources to the long term planning associated with the education and training sector. There is significant political will to support the effective integration of ICT into the education sector and a long term planning document, the Tech/Na! implementation plan, with specified activities, out come indicators, and a financial plan all associated with ICT integration into the educational sector. This all will contribute considerably to the overall sustainability of the project. However, significant funding gaps exist in technological development and training as well as to support the human resources for content creation.

10 ACKNOWLEDGEMENTS

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