General Article

Digital Learning in Primary Schools: Mauritius Making Great Strides in Early Education

Pawan Kumar Sharma
Ph.D. Student, Sam Higginbottom University, Allahabad, India,
Email: paw_kum@yahoo.com

Abstract

The landscape of teaching and learning has been evolving with the inception of technologically advanced solutions in education. Digital tools are playing a huge role in how to learn, teach, and share knowledge in classrooms. The adaptation of digital learning has become an integral part of modern education. The study aims to analyze the various initiatives undertaken by the Republic of Mauritius to encourage digital learning in primary education in the last 10 years. Policy documents and research papers concerning digital technology have been examined under the literature review to set the context. The Ministry of Education (MoE), through the latest reforms of "Nine Year Continuous Basic Education (NYCBE) Programme emphasises the importance of technology. Early digital learning is considered as a key focus area in transforming the country to future growth and development. Digital Education is encouraging the Mauritians to raise their standards and be on par with the developed countries. The success of these national initiatives in light of primary educational reform policy will encourage other mainland African countries to implement similar projects customized to their requirements.

Keywords: Early Digital Learning, ICT Integration, Technology enhanced Primary Education, Teaching and learning in Mauritius.

Introduction

"Education is the most powerful weapon which you can use to change the world "- Nelson Mandela

The Republic of Mauritius is a beautiful small island nation in Indian Ocean. The people of Mauritius are highly diverse in ethnicity, culture and faith due to historical connection from Asia, Africa and Europe. The country is categorized as "High" in the Human Development Index and more than 90 percent of the population is literate. Mauritius provides 11 years of free compulsory schooling with open access for all children aged between 5 to 16 years.

Digital learning in education generally means technology-based teaching and learning tools in schools. Technology plays an integral role in every aspect of our lives, changing how we access education, how we work, and how we engage in everyday transactions (World Bank, 2020). Moreover, the application of technologies in modern education is playing a crucial role to support teachers and students in innovative forms of learning. In particular, ICT (Information and Communication Technology) can enrich and transform education

through universal access to education, bridging learning divides, supporting the capacity building of teachers, enhancing the quality and relevance of learning, strengthening inclusion, and improving education administration and governance (UNESCO, 2015).

In view of the above, the Mauritius government knows that Education is a pillar of any country. Therefore, the present paper made an attempt to study various initiatives taken for integration of ICT and digital tools in the learning and teaching process of primary schools in Mauritius. There are 277 government primary schools with Gross Enrolment Ratio as 100 percent and the pupil to teacher ratio as 27.

The adoption of ICT in education is not a one time affair but a multi-year continuous process to fully support teaching and learning in a school environment. Digital learning tools provide necessary help and support for both teachers and students. These tools do not act as replacement for quality teachers but instead they are considered as an add-on supplement needed for better teaching and learning. Enabling quality primary education lays the foundation upon which the talents of a nation's youth can grow. Therefore, the Mauritius government is giving huge emphasis on early digital education programs.

Objectives of the Study

- To study major initiatives taken for enhancement of digital learning in primary schools
- To discuss and analyze the desired outcome of Digital Learning Projects at national level
- To discuss on limitation and future direction

Research Methodology

The information for this study has been collected through secondary sources. Multiple reports, documents available on Mauritius government websites, journals, news and publications have been referred in order to make an in-depth analysis. Considering objectives of the research, descriptive research design has been adopted to come to a conclusion.

Journey of Digital Education Initiatives in Primary Education Sector

ICT is making dynamic changes in our society as how people think, work and live. Countries across the world are integrating digital learning in curriculum that will prepare them for life after school. The MoE, Mauritius has been bringing changes in primary education to make their human resource competitive with new trends. This section provides a broad overview of major Digital Education initiatives and education reform taken up in primary education by the Mauritius Government. The digital initiatives can be divided into two era i.e. Pre and Post education reforms 2017 in 2017as country has launched major education reforms in 2017.

a. Digital Initiatives before Major Education reforms in Year 2017

b. Digital Initiatives after Major Education Reform in Year 2017

The MoE started embedding technology in the education system by equipping the schools with IT facilities and digital learning pedagogy in 2000. The wave of change began in 2002 with the recruitment and training of 220 ICT educators in primary education. By 2003, ICT had been integrated as a subject in the primary curriculum. The aim was to expose the young learners to modern technology and train educators to use digital tools in the classroom.

1. Computer Laboratory

The emphasis on integration of ICT in primary education of Mauritius dates back to 2006. National ICT Strategic Plan 2006 of GoM stated that IT would be taught in schools as a subject and integrated into teaching across the curriculum in primary schools (Shafika Isaacs, 2007). MOE made sustained efforts to improve the ICT infrastructure in primary schools from 2008 onwards. All primary schools had an ICT room with at least 10 computers, 2 printers and 1 scanner. Training sessions of the educators have been carried out to equip them to teach and make full use of the ICT. There were approximately 4,300 computers in all primary schools (Education Reforms in Action, 2013). The capacities of the ICT rooms were gradually increased in highly populated schools (Fig-1). The labs were also provided with internet facilities. Total of 22 primary school students were accessing one computer (Statistics Mauritius, 2017). This makes ICT penetration for pupils approximately 4.5 percent.

Fig-1: Computer Lab

Source: MoE, 2016

2. Sankore Project

MoE introduced the Sankore project in 2011. The project was a spinoff of the Franco-British summit. The leaders of France and the United Kingdom then decided to promote education in Africa through the provision of digital classroom equipment and digital resources to schools (Oojorah, 2011). Subsequently, Mauritius was chosen as the platform for the Franco-African countries with an objective to

provide an education for pupils for all through digital empowerment and use of innovative technologies. The project was launched in 2011 with the commissioning of interactive projectors and laptops in primary schools. The second and third phases of the project were implemented in 2012 and 2013, respectively. This has marked a new horizon in implementing technology in the Mauritian education system (Education Reform in Action 2008-2014) and laid the foundation for a digital culture. Key initiatives have been summarized as below:

a. The project covered Grade IV to Grade VI of all primary schools of Mauritius.

b. Mauritius Institute of Education (MIE) was responsible for the elaboration and digitization of educational contents.

c. Educators were trained on the use of ICT tools to enhance teaching and learning.

d. CT support officers were recruited to assist in the promotion of a digital culture in primary school.

3. Digital Youth Engagement Programme Project (DYEP)

The National Computer Board (NCB) operating under the aegis of Ministry of Technology, Communication and Innovation (MTCI) has been running various ICT initiatives at national level. In 2017, Mauritius Government announced DYEP which comprises an introductory course on coding to youngsters from Grade IV and Grade V. The learners were provided with a 15-hour training delivered in the Cyber Caravans, which would proceed to various primary schools around the island (IST-Africa, 2017). Each Cyber Caravan is equipped with 25 laptops, 2 Dashboard Display Screen, 18 tablets and broadband internet (NCB, 2018). The objective of introducing coding at an early age is to spark interest among young learners for STEM (Science, Technology, Engineering and Mathematics) subjects.

Over these years, MoE Mauritius made efforts to ensure that digital education becomes an important tool for teaching and learning in the classroom. However uptake of the ICT in the primary education encompasses number of issues, including access of computer hardware and software in primary education, provision of relevant digital learning content and limited options for educators for exploring innovative ideas for pupils

The MoE launched a comprehensive review of the education system in Mauritius in 2016-17. In order to raise the education standard and government introduced major reform through the Nine Year Continuous Basic Education (NYCBE) Programme. NYCBE blueprints was based on Sustainable Development Goal-4 (SDG-4: Quality Education) of the United Nations i.e. “Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all”. NYCBE highlights the development of 21st century competencies that reinforce the holistic education offered by the curriculum (MoE Mauritius, 2016). The use of digital education is an important part of NYCBE programme, to help learners acquire necessary skills required for a highly technological and information-based

economy. The salient points are:

1. The programme was based on six pillars of the reform i.e. Curricular Change, Innovative Pedagogies, Assessment, Continuous Professional Development, Conductive Learning Environment, and System Governance and Accountability.
2. It covers the new education structure in detail including Primary education from Grade 1 to 6 and Secondary School from Grade 7 to 9.
3. There are three curriculum stages, each representing a block of three years: Foundation Stage (Grades 1, 2 3), the Consolidation Stage (Grades 4, 5 6), and the Orientation Stage (Grades 7, 8, 9).

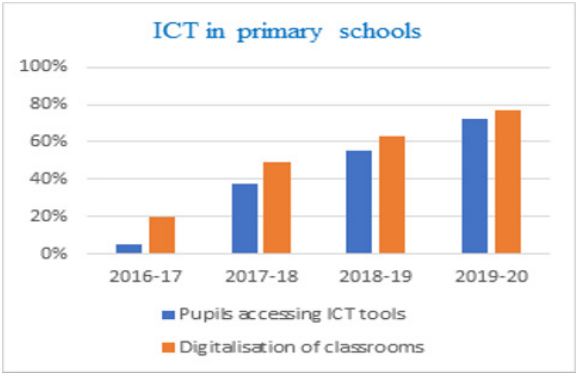
The NYCBE will ensure that all youth reach at least basic skills levels as per the international benchmark by 2030. To achieve this desired goal, the government rolled national level personalized learning initiatives in Primary education.

4. Early Digital Learning Program (EDLP)

EDLP is a flagship project of the Ministry of Education, Tertiary education, science and technology (MOETEST), Mauritius as a part of the innovative measure of NYCBE. The main aim of this program is to move from traditional classrooms to 21st century digital classrooms. The new era of personalized digital learning started in Mauritius through the EDLP Project. The project was rolled out in the year 2017-18 as a part of the bilateral relationship between Mauritius and Indian Government.

The project began with commissioning of high definition projectors in classroom, portable student device i.e. Tablet, Specialized charging card, Digital Content for all students in Grade I and Grade II (EDLP, 2019). Subsequent on receiving positive feedback the project was progressively extended to d Grade IV in 2019-20. The government has plans to cover Grade V and VI in coming years. Hence, each student will be empowered with student device i.e. Tablet as a part of personalized digital learning in all 277 primary schools of Mauritius. This will result in ICT penetration to all students (100 percent) in primary schools. The growth can be summarized as given in Fig-2.

Fig-2: Growth of personalized learning in Primary Schools



The main reasons for selection of Tablets in the education system are its usability and effectiveness. Tablets are easier for kids to use than Desktop PCs or Laptops. It uses a touch screen interface. Small Form factor (Shape and Size) similar to Books and makes it portable. Several applications and learning content are available for teaching and learning on Tablets (Michel Trucano, 2015).

5. Digitations of Content and Online Portal

The digitization of content with interactive features for primary education started in Mauritius since the inception of the Sankore project in 2011 (Oojorah, 2011). The CODL of MIE has been actively engaged in designing the digital curriculum. The digital content for primary grades with progressive updates were made available on the portal of MIE and in all the student devices of Grade I to IV. As in 2020, the digital contents were accessed publicly from http://mie.ac.mu/curriculum.html. MIE has been using the online Moodle learning platform in their teachers education since 2010 (Pudaruth, Moloo, Mantaye and Jannoo, 2010). It is an open source Learning Management System (LMS) to disseminate knowledge to educators. The Online content includes training sessions for primary educators in their capacity building. The platform is accessible http://miemoodle.southindia.cloudapp.azure.com/.

Classroom Management Software (CMS) with advanced features has been introduced in Grade IV to meet the present-day requirements. E-assessment, feedback on learner's console, online and offline access, and analytics form the basis of the software and its equivalent application.

6. Internet Connectivity, SchoolNet Project

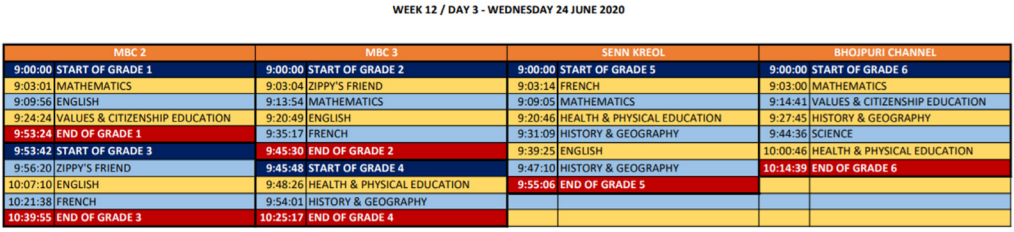
The high speed internet ensured that all students and educators could access educational resources through the World Wide Web including resources available at the websites of MIE and MGI. In 2017, through the SchoolNet project GOM planned to provide high speed connectivity to primary schools. By mid 2019, all primary schools were made available with high speed broadband internet connectivity of 10 Mbps.

7. Digital Learning Initiatives during COVID-19

Despite multiple projects being implemented for digital learning, the COVID-19 pandemic revealed vulnerabilities of the system in particular for primary education. Technical tools and supports were not readily available when students were confined to their home due nationwide lockdown.

To mitigate the challenges in facilitating remote learning, the MoE set up numerous educational programmes on television channels of Mauritius Broadcasting Corporation (MBC) for primary and other students in mid 2020 (MoE, 2020), a sample of the schedule can be seen in fig-3.

Fig-3: MBC Broadcasting Schedule for Students of Primary Schools



WEEK 12 / DAY 3 - WEDNESDAY 24 JUNE 2020

MBC 2		MBC 3		SENN KREOL		BHOJPURI CHANNEL	
9:00:00	START OF GRADE 1	9:00:00	START OF GRADE 2	9:00:00	START OF GRADE 5	9:00:00	START OF GRADE 6
9:03:01	MATHEMATICS	9:03:04	ZIPPY'S FRIEND	9:03:14	FRENCH	9:03:00	MATHEMATICS
9:09:56	ENGLISH	9:13:54	MATHEMATICS	9:09:05	MATHEMATICS	9:14:41	VALUES & CITIZENSHIP EDUCATION
9:24:24	VALUES & CITIZENSHIP EDUCATION	9:20:49	ENGLISH	9:20:46	HEALTH & PHYSICAL EDUCATION	9:27:45	HISTORY & GEOGRAPHY
9:53:24	END OF GRADE 1	9:35:17	FRENCH	9:31:09	HISTORY & GEOGRAPHY	9:44:36	SCIENCE
9:53:42	START OF GRADE 3	9:45:30	END OF GRADE 2	9:39:25	ENGLISH	10:00:46	HEALTH & PHYSICAL EDUCATION
9:56:20	ZIPPY'S FRIEND	9:45:48	START OF GRADE 4	9:47:10	HISTORY & GEOGRAPHY	10:14:39	END OF GRADE 6
10:07:10	ENGLISH	9:48:26	HEALTH & PHYSICAL EDUCATION	9:55:06	END OF GRADE 5		
10:21:38	FRENCH	9:54:01	HISTORY & GEOGRAPHY				
10:39:55	END OF GRADE 3	10:25:17	END OF GRADE 4				

Source: MoE, 2020

Live and at times recorded lessons were broadcast for all subjects at different intervals. The programmes were uninterruptedly broadcasted. These multimedia videos were available online to educators and learners.

Discussions

Several studies have been conducted to concur that "use of Digital learning captures student attention and keeps them actively engaged in the lessons". It is important to focus on building the ecosystem in which teaching and learning can happen in a digital mode. The MoE, Mauritius has been investing on large scale national level digital education projects in the last 10 years. To measure the effectiveness of these projects is certainly a complex task. A high level measurement of effectiveness has been tabulated based on the three key parameters for each project and summarized in the table below

Table-1: Key parameters of digital education project

Initiatives	Main objectives	Project Phase	Measurement of effectiveness		
			Usage of tools	Difficulty level	Learning outcomes
Computer Laboratory	ICT introduction	At maturity & declining	Occasionally	Difficult	Moderate
Sonkore Project	Digital interactive	At maturity & declining	Occasionally	Ease of Use	Moderate
DYEP	Coding	At maturity & declining	Regular	Ease of Use	Marginal
EDLP	Personalised learning	Growth	Regular	Ease of Use	Significant
Digitations of Content, MIE	Audio 7 video content	Growth	Regular	Ease of Use	Significant
SchoolNet	Internet connectivity	Growth	Regular	Ease of Use	Significant

COVID-19 initiatives	Remote learning from home	At maturity	Regular	Difficult	Modetrate

The various inferences that can be drawn are:

1. EDLP and Internet connectivity (SchoolNet) initiatives are the most influential projects taken up for digital learning in primary schools.

2. ICT labs and Sankore projects have been implemented 10 years back and their influence is not comparable to the current scenario.

3. The initiatives taken during COVID-19 pandemic may not be as influential as others as per our defined parameters. However its significance is relatively higher due to the short term quick response generated during emergencies.

The policy maker's decision to bring personalized learning into early childhood is making students digital savvy. EDLP has played a pivotal role in reforming the basic education of the Republic of Mauritius and subsequent socio-economic development. This project is meeting three out of six basic pillars of NYCBE i.e. Innovative Pedagogies, Assessment and Learning Environment.

Finally, the integration of ICT in the classroom is increasing the competency of the country's education system. This improves their world ranking of national education and produces a future ready workforce. In order to enhance the use of ICT in the classroom, the government needs to improve and change the teachers' belief about the integration of ICT in the classroom. Teachers play a key role in making any of the new policies to be implemented efficiently and successfully. Teachers should have good skills and knowledge in using ICT to improve their teaching methods that will meet the demand of 21st century teaching skills.

Summary, Limitation and Future Research

Mauritius government has remarkably scaled up digital learning infrastructure in recent years with implementation of high impact projects. The present paper made an attempt to study various initiatives taken for integration of Digital Tools in learning and teaching process in primary schools of Mauritius. The education system is going through a rapid transformation due to which, the children of this generation are not limited to traditional textbooks. Their thirst for knowledge cannot be quenched using the age – old methodologies and pedagogies. Their hunger for ever increasing information can be satisfied by the use of the digital tools and internet in the form of e-learning, digital textbooks, interactive animation videos and integrating the ICT in the classroom room. The traditional classrooms are getting transformed to "Next Generation SMART Classrooms". The Mauritius government is focusing on grooming the young generation and investing in digital learning. The primary schools have been upgraded with national level digital initiatives such as Computer Labs (Cyber Caravan), Smart

Projector based learning (Sonkore) and personalized learning using tablets (EDLP).This Investment in education makes their human resources well equipped to meet the demand of the digital economy.

The nascent EDLP Project has stood out as one of the most impactful projects in meeting the mission of reform agenda in Mauritius. It may have far reaching implications with its potential growth in coming years. Today by incorporating digital technology in primary education, Mauritius can be termed as torch bearer, shining star among African countries

These national initiatives have limitations which should be ratified to fully utilize the technology resources deployed in the schools. The issue ranges for educational change management, Infrastructure maintenance,educational courseware development and teachers training. The Mauritius Government has to bring changes in online content, e-books, platforms for assessment, and curriculum. Educators and master trainers need to be trained thoroughly and frequently. The EDLP project should be extended to Grade 5 and 6 to maintain the continuity and ICT penetration almost 100 percent in primary schools.

It is worth mentioning that in spite of numerous steps, the year 2020 exposed that teaching and learning in Mauritius has been impacted due to Covid-19 pandemic. It leads to 'learning losses for many months. Therefore, the digital infrastructure needs to be redefined for making it immune to similar threats in future.

This study can further be expanded to explore the factors that are affecting the effective usage of the recently implemented national projects like EDLP, Internet connectivity in primary schools. This will help in analyzing the impact of digital learning initiatives in Mauritius from users' perspective using quantitative data. This will give a better view of the success rate of government policies and programs.

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