

Hacking the Spatial Limitations in Bridging Virtual and Traditional Teaching Methodologies in Sri Lanka

Manuela Nayantara Jeyaraj

Abstract—Having moved into the 21st century, it is way past being arguable that innovative technology needs to be incorporated into conventional classroom teaching. Though the Western world has found presumable success in achieving this, it is still a concept under battle in developing countries such as Sri Lanka. Reaching the acme of implementing interactive virtual learning within classrooms is a struggling idealistic fascination within the island. In order to overcome this problem, this study is set to reveal facts that limit the implementation of virtual, interactive learning within the school classrooms and provide hacks that could prove the augmented use of the Virtual World to enhance teaching and learning experiences. As each classroom moves along with the usage of technology to fulfill its functionalities, a few intense hacks provided will build the administrative onuses on a virtual system. These hacks may divulge barriers based on social conventions, financial boundaries, digital literacy, intellectual capacity of the staff, and highlight the impediments in introducing students to an interactive virtual learning environment and thereby provide the necessary actions or changes to be made to succeed and march along in creating an intellectual society built on virtual learning and lifestyle. This digital learning environment will be composed of multimedia presentations, trivia and pop quizzes conducted on a GUI, assessments conducted via a virtual system, records maintained on a database, etc. The ultimate objective of this study could enhance every child's basic learning environment; hence, diminishing the digital divide that exists in certain communities.

Keywords—Digital divide, digital learning, digitization, Sri Lanka, teaching methodologies.

I. INTRODUCTION

DIGITAL learning is a procedure that enables the acquisition of intellectual resources with the utilization of technology to claim control of time, space, direction and pace [1]. Learning has passed bounds and is no longer constrained to only the school environment. With the augmented thirst to obtain knowledge in order to survive in this community that has been based on an academic and intellectual framework, competition to be more vigilant of the materialized world and its every occurrence has become a process that goes throughout the year. Hence, it is not restricted by time. With the mobility of technology increased to greater extents, accessing Soft Knowledge Resources is possible on the go. This brings about a barrier breaker in having the learning experience shadowed within the walls of a classroom. Teaching is no longer a pedagogy decided by the teacher. Technology has brought about interactive teaching and learning methods that prove to extend the learners'

concentration span and interest to learn. Hence, the student is given full freedom to choose their path of learning. The conventional school classroom learning dictates its students to cope up with learning the materials being taught at the same pace and style. This is not an efficient or fair mode of learning since each student is different from the other. But innovative teaching and learning technologies have pierced techniques where students can learn in their own unique way either covering contents at an augmented rate or taking time to contemplate word by word. So it is without saying that, moving forth with digital learning in place of traditional one-way learning techniques, can bring about a more productive knowledge society.

This paper tends to elucidate the current state and level of digital teaching and learning in Sri Lankan government schools analyzing the restraints that exist in the introduction and implementation of Digital Learning and proposes some feasible solutions overcome this issue at present based on the scope and constraints identified within the Sri Lankan context.

II. ELUCIDATION OF DIGITAL LEARNING

A. Delineating Digital Learning

Digital Learning can be stated as augmented improvement to conventional learning techniques, where the application and utilization of modern technology aids in making intellectual resources accessible via proper guidelines [2].

B. Constituents

Digital Learning is an encapsulation of three major components that need to be well balanced and provided simultaneously for optimal results.

1. Rostrum

With the turn of the century, technology has seen an abundance of changes undergoing an entire cycle of evolution. Currently, the Internet is a dominant factor dictating the concept of technology due to the massive pool of materials being accumulated from various sources and the fact that all of these materials are accessible to users world-wide. But what needs to be crucially differentiated is that what is stated as the rostrum or stage of Digital Learning is merely an enabler where all these valuable intellectual resources are accumulated stored in order to make them accessible to those viewing it.

2. Intellectual Accumulation

These intellectual accumulations are the most valuable constituent of the Digital Learning process as all knowledge content and intellectual gain is propagated from this point that

Manuela Nayantara Jeyaraj is with the Sri Lanka Institute of Information Technology (SLIIT), Sri Lanka (phone: 0094-77-3265306; e-mail: nayantara_94@yahoo.com).

acts as the source. These are no longer mere word documents or presentations. But they have incorporated a wide variety of technology based tools and techniques in order to retain the present generation's concentration and interest span.

3. Salient Key Guidelines

The Sri Lankan locale fears the introduction of Digital Learning into its routine due to the fallacy of the process being a replacement of jobs and lifestyle. But the reason to be presenting these *Salient Key Guidelines* as the third constituent of this timely process are the inaccuracy and unreliability all the materials available on technological rostrums such as the Internet. Hence this calls for an intermediary medium to direct the student in accessing appropriate reliable sources related to study materials via these technological platforms. This is where the teacher's role takes control in disseminating proper salient key guidelines.

C. Digital Learning Components Dependency

As demonstrated in Fig. 1, the lack of any one the three constituents will leave its beneficiaries and the progress of Digital Learning implementation at a loss.

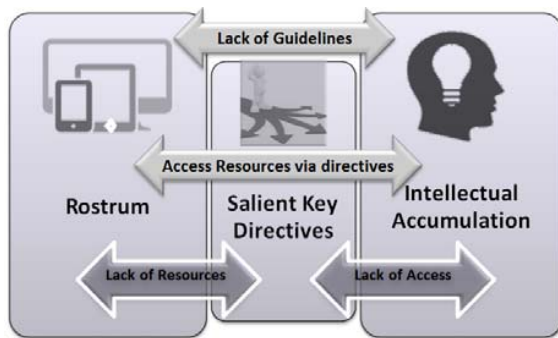


Fig. 1 Reliance of Digital Learning Constituents

There are several resources and materials available on technological rostrums such as the Internet. But with the lack of proper guidelines or salient key directives from the teachers, the students may tend to access inaccurate or out-of-date content which might prove to bring about an adverse learning experience.

Another scenario is where the teachers are potentially competent enough to provide guidelines to access technological resources and the students are capable in using these digital devices and networks. But there still exists a deficiency in related materials or minimalist intellectual accumulation to what is being searched.

The third and currently dictated situation in Sri Lanka is where there is an abundance of knowledge resources available on the Internet and digital devices. And the teachers meet the required qualifications in disseminating salient guidelines to students in directing them towards the proper content. But there is an inevitable state where students are not provided with equal access to the digital platforms or rostrums due to the lack of Internet access and digital devices. Hence, the most ideal and recommended matrix for the successful

implementation of digital learning in Sri Lanka should consider solutions that assure the access of knowledge content or the intellectual accumulations with the salient key guidelines provided by an intermediary.

III. TRADITIONAL VS. DIGITAL TEACHING-LEARNING METHODOLOGIES

Traditional Teaching methods have dominated classrooms for decades now. Though this has been the staple for teaching and learning, and has proven to be effective in the past, the present technology innovations seem to overwhelm students and their need for technology-based learning.

A. Traditional Teaching-Learning Methodologies

The current traditional learning techniques in Sri Lanka revolve around a teacher-centric classroom environment with the teacher being the major and only source of knowledge dissemination [3]. This textbook oriented learning constricts students to simply stick to what the teacher teaches and the text materials that they receive at the beginning of every academic year. Group discussions and academic arguments are therefore avoided since all the students are driven to learn the exact same concepts and additional searching and controversial findings are not seen in this mode of learning.

B. Digital Teaching-Learning Methodologies

This is a still non-existent, technology driven classroom where the teacher's role is a mere facilitator of knowledge and not the major source itself. Rather than learning theoretically, students are provided with the opportunity to learn concepts and their application in the real-world. A technology based teaching-learning experience also facilitates collaborative discussions on controversies and questionable statements as each student comes across different digital sources. This enables the "research and learn" method inducing radical learning from a very early stage itself. Also, more exposure to technology can ensure a student's sustainability in survival, as the world is becoming more technology dependent and daily tasks are being digitized by the second.

IV. CURRENT STATUS OF DIGITIZATION IN SRI LANKAN GOVERNMENT SCHOOLS

Digital Learning in its entirety in Sri Lanka is only observable in university level. Currently, as far as government schools are concerned, technology is validated through only IT computer labs that are mainly used for the IT course curriculum.

A. Nenasala Telecentres

Telecentres, which are public outlets where the people can access the Internet for learning processes, were considered as a viable way to inject technology into the knowledge acquisition process [4]. Considering this, in 2005, the Sri Lankan Government moved forth with the Nenasala telecentres under the e-Sri Lanka initiative which was implemented by the ICT Agency of Sri Lanka [5]. At that time, these telecentres seemed to be quite the solution. But

with the advancement of technology and the availability of digital devices and the Internet at home, Nenasala telecentres are no longer in much use.

B. DEMP – Distance Education Modernization Process

This was launched in 2007 by the Open University of Sri Lanka to enhance digital learning among post graduate students. Back in 2007, due to the lack of available digital resources in every home in Sri Lanka, it seemed only possible to experiment this system among the postgraduates as the target group. At present, DEMP has become more of a daily part of university students, though it is not commonly known by term. But, since such systems were not identified and implemented among Sri Lankan government schools, they tend to still lay low on the entire Digital Learning concept.

C. Statistics of Government Schools and Computer Literacy in Sri Lanka

The Ministry of Education conducts an annual school census. Accordingly there are around 10,000 government schools around the island as of 2016, as shown in Table I.

Type of School	Number of		
	Schools	Students	Teachers
1AB	1,016	1,626,565	76,012
	9.9%	39%	33%
1C	1,805	1,034,743	60,001
	17.8%	25%	26%
Type 2	3,408	826,255	61,586
	33.6%	20%	27%
Type 3	3,933	65,767	35,004
	38.7%	16%	15%
Total	10,162	4,143,330	232,603
	100%	100%	100%

- 1AB - Schools having Advanced Level Science stream classes
- 1C - Schools having Advanced Level Arts and/or Commerce streams but no science stream
- Type 2 - Schools having classes only up to Grade 11
- Type 3 – Schools having classes only up to Grade 8

The high time to introduce technology into a child's learning process is as early as primary school [7]. Accordingly this qualifies all the above government schools. If inserting technology into a student's daily routine was not depended upon any other factors, all the students and teachers could be introduced to technology based teaching and learning easily. But, if we consider both parties' at present, introducing these stakeholders to technology also depends on their computer literacy.

The computer literacy rates based on various demographic statistics for the years 2014/15 are shown in Table II.

According to the Computer Literacy statistics, introducing digital learning to G.C.E O/L and A/L students is easier since they possess a require level of technology. But according to the age group statistics, 10–14 year olds also hold a

recommended rate of computer literacy. Hence, introductorily inserting digital learning principles in 1AB, 1C and Type 2 schools will be ideal at present.

Gender, Age group, Educational Attainment and Language Group	Computer Literacy Rate	
	2014	2015
Sri Lanka	24.9	27.1
By Gender		
Male	26.6	29.1
Female	23.3	25.3
By Age Group		
5 – 9	12.4	14.4
10 – 14	35.8	39.8
15 – 19	54.3	58.7
20 – 24	49.6	53.8
25 – 29	40.6	43.5
30 – 34	29.3	31.3
35 – 39	23.1	25.0
40 – 49	15.3	17.2
50 – 59	9.6	10.5
By Educational Attainment		
No Schooling	1.1	2.1
Below Grade 6	9.4	10.5
Grade 6-10	16.2	18.3
G. C. E. O/L	39.4	42.0
G. C. E. A/L or above	67.6	70.0
By Language Literacy		
English	30.3	33.1
Sinhala	24.3	26.9
Tamil	67.3	69.5

Considering the teaching community, which basically starts from the age group of 25–29 years and upwards, the computer literacy rate in the closer marginal groups, is higher and it diminishes as it increases. This shows that teachers need to be educated in order to disperse and facilitate knowledge by facilitating digital learning.

V. RESTRAINTS IN DIGITIZING THE TEACHING-LEARNING EXPERIENCE

A. Financial Constraint

The success rate and full implementation of Digital Learning methodologies in Sri Lanka dictate mandated equal access to technological platforms and rostrums for each and every student. Currently in Sri Lankan Government Schools, the administration tends to direct major allocations to straightforward budgetary funding for academic purchases. Digital Learning is being considered as a process and not a resource in itself; hence, it is being neglected annually. Even in considering the administration being in favour of allocating financial aid towards Digital Learning implementation in their schools, this requires a huge sum of financial assistance calling for the aid of external sources' funding.

B. Lack of Equivalent Access to the Internet

The age of the Internet is coherent with the age of

unhindered knowledge gain. The availability of a large accumulation of knowledge resources from a variety of sources of the Internet permits the user to reap intellectual benefits. But due to the lack of Internet access in some rural areas around the island, the concept of providing equal access to digital learning for all students in Sri Lanka is still a conceptual theory.

C. Negligible Computer Literacy in Teachers

Without the proper guidance and directive instruction, students may be misled to refer to unreliable knowledge sources. Having concluded that, the role of the teachers is considered to be vital in directing students to access technological devices and resources in order to acquire knowledge. But due to the computer knowledge deficiency observed in teachers in Sri Lankan government schools, the students are being penalized from being drawn under the digital learning criteria.

D. Community Misconceptions

The community holds avid misconceptions that over exposing children to technology at an early stage might tend to misdirect them. Though this is true to a certain point, what needs to be stressed in the Digital Learning context is that instructional guidelines are provided by teachers in order to properly guide students to access appropriate materials and security level authentications can be set to ensure that students are able to access only learning materials. Also, teachers tend to fear the fact that technology might be replacing them and ultimately jeopardize their careers.

VI. ADVERSE FACTORS BROUGHT ABOUT DUE TO THE ABSENCE OF DIGITAL LEARNING

A. Digital Divide

Digital divide is the gap between those who have access to technology rendered information and those who do not possess such access [9]. And as a viable solution to the digital divide, introducing technology in learning procedures in schools can be presented. Hence, not permitting Digital Learning to penetrate government school environments in Sri Lanka merely increases the still existent gap or split caused by the digital divide in the country.

B. Hindering National Development

Sri Lanka is a small island with the highest literacy rate of 92.63% in all of South Asia and this rate is higher than expected for a still developing country as reported by UNESCO [10]. Though Sri Lanka has such a remarkable literacy rate, the reason that it is still being categorized as a developing country is the fact that these intellectual persons are not yet digitally advanced, and hence, are unable to contribute to national development via technological resource handling.

C. Global Disconnectivity

Technology and the Internet in particular are now playing an important role in connecting the globe under one network.

This connectivity enables communication, resource and knowledge sharing, information updates and economic stability. Not being able to be a part of this global network via the Internet due to the fact that one is not digitally literate or facilitated can penalize that individual, and ultimately his community, from reaping the equal benefits that the network has to offer both informatively and materialistically.

VII. PLAUSIBLE SOLUTIONS IN DIGITIZING CONVENTIONAL CLASSROOM LEARNING

A. Provisions for Financial Backing

Since the government and the school administration cannot fund the entire school community and its students with devices, students can be advised to bring their own devices. However, there are students who cannot afford access to technology.

Drafting loan schemes and funding for such selected students under conditions and regulations, can aid them in purchasing their own device to facilitate them in obtain equal opportunity to digitally learn course materials.

B. Device Accessibility via BYOD (Bring Your Own Device)

Providing each and every student with their own technological device might be considered as expensive or not feasible at the moment by the government as well the administration.

BYOD is a system that is famously followed in all universities and higher educational institutes where students are permitted to bring in their own devices such as laptops, tablets or smartphones for study purposes. Hence, considering the financial and social feasibility of this suggestion, school students can be requested to bring their own devices to access course materials and related resources. Their access can be monitored under supervision.

C. Web Based Assessments

One way to get the student locale interested in harnessing the Internet for learning activities is to provide them with assignments that require browsing the web and assessing results via online tests. This also has the advantage of reducing the teachers' workload as they are not required to manually correct and grade tests of each and every student. Instead, they can supervise students in the classrooms while they are taking these online tests and an automated process can grade their results.

D. One Laptop per Child System

Under this program, initiatives to provide the identified target group of students based on the scope demographics such as the type of school and target students with laptops or devices can be taken with the aid of external source's assistance.

E. Automated Libraries

Currently libraries are seen as a source of knowledge from the past. A way to get students involved in accessing library resources in the school environment is by automating the

school libraries.

This will pave way for the quicker access of materials and easy maintenance of records if considered from the library management's focal point.

F. Structure to Educate Teachers

As identified, the teachers in Sri Lankan Government schools are not up to par when considering their computer literacy. Hence, a proper framework needs to be defined in order to educate the teacher locale beforehand. Therefore, implementing the Information and Communication Technology - Competency Framework for Teachers (ICT - CFT), which was defined by UNESCO, will aid in steering the teachers towards guiding the students in a technological environment.

G. Embark on Academic Social Networking Sites

The phrase "Social Networking sites" is at most times immediately understood to refer to entertainment hubs such as Facebook and Twitter. But, considering the student community, introducing them to academic social networks will aid them in having peer-based conversations on subject materials and have controversial academic discussions that lead to a research-based learning experience; this tends to increase their radical learning scope. Some such academic social networks are Docsity [11], StudyBlue [12], Chegg [13], Lynda [14], Sophia [15], KhanAcademy [16], etc.

H. Legislative Regulation on Digital Learning

The base platform on which digital learning is defined in Sri Lanka does not have a strong hold on legislative regulations in this regard.

Hence, drafting firm rules and regulations that could ensure the successful and viable implementation of Digital Learning in Sri Lanka will legally bind the Sri Lankan government schools to adhere to and follow through with Digital Learning as an integral part of their routine teaching-learning experience.

VIII. CONCLUSION

The present generation is moving at an unhindered pace with the advancement and explosion of the digital age. Retaining their attention span in conventional classroom learning has transformed into more of a challenge. Technology is being sought after in each and every activity that a student embarks upon. Hence, in order to captivate and induce a student's learning capabilities in Sri Lankan classroom, Digital Learning should be considered as a viable implementation. But, there exists several constraints ranging from financial to social bases in doing so. Hence, this paper proposes some plausible solutions in bridging traditional and Digital Learning in Sri Lankan classrooms based on the constituents of digital learning, the scope suitable to inject the process of digitization and the constraints that presently exist and impede this digitization.

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Manuela N. Jeyaraj (M'15). This author became a member of World Academy of Science, Engineering and Technology in 2015. The author was born in Sri Lanka in 1994-10-05. Following the Biological Science stream for the Advanced Levels, the author then pursued onto Software Engineering for the undergraduate phase of the higher studies. This author's degree which reads as 'Bachelor of Science (Hons.) in information technology specializing in software engineering' is offered by the author's affiliated university which is the Sri Lankan Institute of Information Technology (SLIIT). The author has been a 3- time consecutive Dean's List Student and a multiple full scholarships winner in recognition of her academic performance. The author has her researches published in high impact journals and is a recipient of Best Paper awards for her researches as well.

During her academic course, she was accepted as a Complex Event Processing Developer, for her internship that commenced in May of 2016, at WSO2, an Open Source technology company providing service oriented architecture (SOA) middleware.

Ms. Jeyaraj became a Member of World Academy of Science, Engineering and Technology in 2015 and is also a member of IEEE and the British Computer Society (BCS), the Chartered Institute for IT.