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Forced and Unplanned Digital Transformation
of Education in Sri Lanka during Covid-19
Crisis: A Case Study

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Table of Contents

Abstract	3
Acknowledgements.....	5
1 Chapter 1 – Introduction.....	6
1.1 Background	6
1.2 What is digital transformation/digitalization?	7
1.3 What are the common challenges associated with Digital Transformation?	7
1.4 Digital transformation of education.....	9
1.5 Impact of Covid -19 Crisis	9
1.6 Motivation of the study.....	10
1.7 Problem Overview	10
1.8 Research problem.....	12
1.9 Delimitation.....	12
1.10 Disposition	13
2 Chapter 2 – Literature Review.....	14
2.1 Digital Transformation	15
2.2 Digital Transformation Challenges	16
2.3 Digital Transformation of Education.....	18
2.4 Digital transformation of Education in Sri Lanka	19
2.5 Digital Transformation in Education during COVID-19 in Sri Lanka	21
2.6 Technology Acceptance Model (TAM).....	22
3 Chapter 3 – Methodology	24
3.1 Research Approach	24
3.2 Data collection	26
3.3 Selection of respondents.....	28
3.4 Operationalization of the interview questions	30
3.5 Data analysis.....	30
3.6 Validity and reliability	31
3.7 The ethical aspects	32
4 Chapter 4 - Empirical Results.....	33
4.1 Background	33
5 Chapter 5- Results Analysis and Discussion	39
5.1 Discussion	44

<i>Theoretical Framework</i>	44
6 Chapter 6 –Conclusion	50
6.1 Conclusion.....	50
6.2 Limitations and suggestions for future research.....	51
6.3 Suggestions for future research	51
6.4 Implications.....	52
References.....	54
Appendix A: Questionnaire	62

List of Figures

Figure 1: Technology Acceptance Model.....	22
Figure 2: Comparison of primary and secondary data (Ajayi, 2017)	27
Figure 3: TAM based analysis of study results.....	39
Figure 4: Theoretical Framework	44
Figure 5: Covid -19 pandemic influenced TAM.....	47

List of Tables

Table 1 : Data collection	29
Table 2 : Content Analysis of results	40

Abstract

Digital transformation has been an important, popular and revolutionary topic for research for decades. Constant and rapid updating digital technologies and tools have mainly influenced the phenomenon of digital transformation to remain interesting and evolving while emphasizing the significant importance of other concepts related to digital transformation such as challenges and opportunities. However, when compared with the other industries/areas, digital transformation of education, has been a slow process; especially in the developing countries. When Covid-19 crisis hit the world, the importance of digitizing/digitalizing/digitally transforming businesses was highlighted more than ever and many organizations and institutes had no other option than accepting digitalization; including majority of educational institutes around the world.

This thesis aim to understand the challenges faced by a primary school located in a relatively rural area in Sri Lanka, when implementing digitalization of education within the school for the first time from 13th March 2020 till 17th August 2020, due to the impact of Covid-19 crisis influenced temporary closure of the school. To answer the research question of this study, data was collected qualitatively using semi-structured interviews from carefully chosen respondents. According to the collected data, it was emphasized that the main challenges faced by the school when digitalizing education involved: digital literacy, infrastructure, internet and other related services, traditional structure of education, and economy related issues. During the analysis of the case study built based on the empirical results, it is discussed how the identified challenges affects self-efficacy of users and how these challenges can be addressed in order to improve digitalization od education in Sri Lanka. When analysing results in compliance with the Technology Acceptance Model (TAM), it was interesting to see how Covid-19 pandemic has acted as a strong external variable to influence the traditional structure of TAM and its' components, causing perceived usefulness of technology to act solely as the primary factor that motivated technology acceptance by users in the study setting. The findings also leave it questionable whether if it is still required in the future to address the existing challenge of 'resistance' as one of the most important challenges related to digital transformation. This study also discusses how Covid-19 pandemic impacted on the pace of digital transformation globally that it has become a substantial experience to motivate digitalization of education in Sri Lanka and other developing countries.

The study suggests more extensive investigation on unheard digitalization stories in the developing world and highlights the importance of contributing more varied case studies to literature. This thesis also implies the relevant authorities of Sri Lanka to consider the findings provided in this research, when planning the digital roadmap for the country's education system and when restructuring the education system to improve the standard of education towards the development of country.

Key Words: Digital Transformation, Impact of Covid-19, Digital Transformation Challenges, Developing Countries, Education, Sri Lanka, Digitalization of Education, Technology Acceptance Model

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provide better education to children in the most rural
villages of Sri Lanka!*

1 Chapter 1 – Introduction

This chapter presents the background of the study, explains the motivation of the study and discuss the problem. Moreover, the research aim and main research question are presented.

1.1 Background

Many educational institutes, especially in the developing countries, have limited capabilities in terms of resources to meet the minimum requirements in order to digitalize education within the institute. Poor internet service, lack of infrastructure and lack of digital literacy of the teachers and parents are few of the main challenges faced in general whilst the effort of digitalization of education in these countries (Touray, Salminen and Mursu, 2013). Many countries have been planning digitalization of education among other services but it has always been a slow process due to many challenges.

Sri Lanka is a country with a high level of literacy and a well-established policy of completely free education for every child of age in between 6-18 in primary and secondary levels, and up to higher education (university) level (Mozelius, Hewagamage and Hansson, 2011).

However, Sri Lanka is also a country that has been facing numerous challenges in the process of digitalization of education. It was only in March 2021, that a Sri Lankan internet newspaper announced about an event where all major education relevant stakeholders came together to contribute their ideas in the process of formulation of a comprehensive digital education policy to create a digital roadmap to address objectives set by the national vision (Ministry of Education, 2021).

This study is aimed to discuss about how the impact of Covid-19 crisis influenced on the digital transformation of education of a single educational institute (a primary school) in Sri Lanka and identify what challenges were faced during the change. A case study is aimed to be built based on the findings of the research, which is then analysed and discussed in compliance with a relevant information system theory – TAM (Technology Acceptance Model) – the most widely used explanatory models to describe the individual acceptance and adoption of technology.

1.2 What is digital transformation/digitalization?

Digital Transformation (DT) is the use of information and digital technology to change the way businesses operate in order to generate more value and differentiate stakeholder experience (Vial, 2019). The advent and evolution of information and digital technologies has at times, changed the way organizations and institutions operate – leading to complete transformation. The definition of DT keeps updating with the evolution of the digital technology and DT of an organization is considered to be a never ending process.

DT takes different looks depending on the nature of the organization, processes, operations and many other factors. However, intended or unintended adoption and use of these technologies are transforming organizations and industries (Morakanyane et al., 2017) resulting digital transformation to become a significantly important and relevant subject of interest in information system research (Vial, 2019). The move from analogue to digital is called digitization and digitalization is the use of new technologies and digitized data to make a transformation. However digital transformation is much broader than digitization and digitalization as it involves not just technology but more elements in society such as culture and people (Tilson, Lyytinen and Sørensen, 2010).

“Therefore, we need to distinguish carefully digitizing—a technical process—from digitalization—a sociotechnical process of applying digitizing techniques to broader social and institutional contexts that render digital technologies infrastructural.”

There are several studies that demonstrate how the adoption and use of digital technologies impacted on organizations from different industry sectors to transform. There are 4 main inter-related domains of digital transformation – technology, data, process and organization (Thomas H. Davenport and Thomas C. Redman, 2020). To succeed in DT, all the domains should be well conceived. Digital-transformation has been rapidly growing over the years and more and more organizations tend to digitalize their operations and processes.

1.3 What are the common challenges associated with Digital Transformation?

Digital transformation of an organization is not an easy task. It requires a digital business platform that is driven by outcomes and enabled by technology to transform processes and business model. There are four main areas of digital transformation – technology, data, process and organizational change. Transformation of an organization is a massive procedure.

As the word "Transformation" says, "Trans" means taking something across and divide to something else, bridging a gap of some sort. And "formations" in this case can often be described as going from something analogue (or pre-digital) state, to a digital state (Nadkarni and Prügl, 2021). In other words, digitally transforming an organization means taking its processes and practices from an analogue state to a digital state.

Transforming an organization requires the need of transition from its current state to a desired future state and business strategies should comply with the transformation plan. Digital business transformation is seen as a set of 7 elements: business model, organizational structure, digital skills of employees, digitization (converting from analogue to digital) of business processes, IT infrastructure, digitization of products / services, digital channels for interaction with clients (Gerald C. Kane, 2015). It is important to identify the challenges associated with each element and overcome these challenges in order to successfully transform a business digitally. Majority of the digital transformation failures take place due to lack of preparations when executing the transformation: according to a study conducted by Everest Group in 2018, 73% of companies were not able to provide any business value from their digital transformation process and 78% failed to meet their business objectives while only 22% companies achieved their desired business results. Therefore it is crucial to overcome the challenges faced in the process of digital transformation prior to implementing the change within an organization.

1.4 Digital transformation of education

Digital transformation of education refers to the use of digital technologies, that involves the use of desktop computers, mobile devices, the internet, software applications, and other types of digital technology to conduct teachings to students of all ages in terms of events such as online teachings, tests, e-books, virtual mentoring and edutainment etc. (Digitalization in Education | Siemens, 2021).

There are several direct and indirect benefits of digitalized education (Livingstone, 2012). Improved efficiency, collaboration, engagement, creativity are some of the direct benefits while learning in a digitalized setting ultimately improve digital skills of the students and help them move with the technology preparing them for the future (Livingstone, 2012). However, DT in education is a slower process when compared with the other sectors. When it comes to challenges of DT as digitalization of education sector comparatively involve more obstacles and require more time and planning as DT of education is not just a digital technology enabled tool but also a living environment that opens up new opportunities such as ability for learning at any convenient time, continuation of education, etc. (Bilyalova, Salimova and Zelenina, 2020).

1.5 Impact of Covid -19 Crisis

Covid19 crisis made a huge impact on every human activity globally and many organizations and institutes were compelled to accept digitalizing all or some parts of the operations/processes (Iivari, Sharma and Ventä-Olkkonen, 2020). The pandemic situation forcefully impacted almost every traditional, manual process that involves social gathering to go digital in order to comply with safety measures, health regulations and pandemic influenced new rules and recommendations to prevent the spreading of the Covid-19 virus and to keep businesses going on to avoid organizational/institutional failure and this whole situation predominantly highlighted the importance of digitalization.

This sudden transformation resulted affected in many unplanned outcomes and was a hard move for organizations and institutes that had poor or no prior plans for digitalizing. Covid-19 crisis inclined lockdowns, new rules and recommendations and cautions that affected majority of the educational institutes around the world to close but the institutes which had pre-planned and were resourceful were able to continue education digitally without being interrupted by the pandemic. However, the educational institutes; especially in developing

countries such as Sri Lanka, were not ready to undergo a sudden digital transformation faced a catastrophic situation with the rise of the pandemic.

1.6 Motivation of the study

The foremost motivation for the base of this study was fabricated due to the fact that education in developing countries is an important yet relatively unpopular area of study and understanding how digitalization in education is handled in these countries has the potential to provide insights to study general challenges and opportunities associated with digitalizing education. For further improvement of knowledge about digital transformation, and to create the theoretical framework for the study, an extensive literature review was required. When the unforeseen pandemic situation hit the world and made a huge impact on human kind and every organization and institution, the importance of digitalization was highlighted more than ever and majority of the challenges of digitalization had to be overcome by some means to face the pandemic situation. Organizations and institutions were compelled to accept digital technology to continue operations and individuals had to accept the digital change willingly or not. This global impact which affected almost every organization and institute in the world regardless of the scale motivated this study to take place. Education sector was selected as the study setting due to the significant change the education sector experienced during the pandemic situation. Sri Lanka (formerly known as Ceylon) was selected as the geographical base for the study to understand some of the common challenges of digitalization in developing countries.

Democratic Socialist Republic of Sri Lanka is a tropical island with an area of 65,610 square kilometres, located in South Asia. The country is a popular tourist destination due to many aspects such as nature, history, 'tea' and Buddhism. Due to being a former colony of Britain, the country's current education system, healthcare and many other sectors are highly influenced by the British system (Sri Lanka – an Overview, 2021). According to the department of statistics of Sri Lanka, as of June 2020, the country's literacy rate was 91.7% while computer literacy rate was at 32%.

1.7 Problem Overview

Digital transformation is defined to be an on-going phenomenon that no organization has been able to totally achieve still (Schwertner, 2017). It keeps growing, changing, presenting

different aspects and most importantly more exciting day by day. With effect of the pandemic situation, few articles have been presenting how Covid-19 crisis is influencing the phenomenon of digital transformation and its pace. Digital transformation which has always been a slow process in education, suddenly converted into a crucial focus from March 2020 due to the Covid-19 pandemic crisis (Bogdandy, Tamas and Toth, 2020) and since then, many studies have been conducted in relevance to the sudden digital transformation of education that took place during the pandemic. However, majority of the educational institutes in the world are still struggling to start moving along with digitalization, due to a vast number of challenges and this issue requires a high level of attention as education is one of the most important institutions in any country. Digital transformation of education has been a critical and major problem, especially in many developing countries. There are some articles such as, “Who gets to learn in a pandemic? Exploring the digital divide in remote learning during the COVID-19 pandemic in Nigeria” which scrutinizes the digital divide in access to remote learning as a result of the COVID-19 pandemic (Azubuike, Adegboye and Quadri, 2021) and investigate the challenges associated with the pandemic influenced forced digitalization in the developing countries. Sri Lanka also is one of the developing countries to undergo similar problematic situation when schools had to be temporarily closed to prevent the spread of the COVID-19 pandemic and education had to be conducted digitally during island and regional wide curfew situations for uninterrupted education (Lucas, 2020).

In Sri Lanka, some schools continued education digitally during the lockdown and some schools were completely closed as there was absolutely no way to continue education digitally. In this study, a qualitative investigation is conducted based on a Sri Lankan school that ‘attempted digitalization’ for the first time in March 2020 due to the influence of Covid-19 pandemic, and then a case study is built. The school was selected for the study considering the comparatively slow pace of digital transformation of the education sector in Sri Lanka prior to the pandemic and how this particular school was forced to adopt and use digital technologies in a very diminutive time to endure the pandemic situation and continue teachings uninterruptedly. In this study, the plan is to understand the ideas, opinions and emotions of the school management and teachers to build a case study about their experience in accepting and adapting to sudden digital transformation. The case study is discussed in compliance with the Technology Acceptance Model (TAM) - that helps model how users decide to whether accept and use a technology or not. TAM helps the analysis of the case study in terms of evaluating the preconditions for digital transformation and to discuss this

research's findings in relevance to information systems research and position this research in the existing theoretical framework.

The expectations of this study are: firstly to identify and understand the challenges experienced during digital transformation using the main research question to build a case study to evaluate the reality of how successful it was for the school to accept and undergo digital transformation by overcoming the challenges.

1.8 Research problem

To achieve the aim explained in the above sections, following main research question was formed as the base of the case study. The case study is built based on the selected single school which is a representative school from the Sri Lankan government education context.

What were the challenges faced by the school from 13th March – 17th August 2020, when experiencing unplanned and sudden digital transformation of education due to Covid-19 crisis?

The fabricated case study is then analysed in compliance with the **TAM** to understand how the associated users in the study setting accepted digital transformation of education.

1.9 Delimitation

The main limitation of this study is the scope. The scope of study had to be narrowed down to be based only on one selected regional school in Sri Lanka as it is hard to research into the whole education sector of the country. When selecting the school – an urban school from a certain level of standard had to be selected as many rural schools in Sri Lanka have no capability and resources to meet with the minimum requirements of digitalization. Interviewees were carefully chosen to get more accurate and reliable information for the study. The interviews were mainly conducted among principal and teachers to obtain relevant information representing the experiences, ideas and emotions of school administration, teachers, students and parents. Only few interview respondents were selected for the study as the school is a primary school and have classes only from grade 1 to 5 and all the students are of ages from 6 years to 10 years.

1.10 Disposition

This thesis begins with an introductory chapter that describes the research background, motivation of the study, problematization together with the aim and research questions. The second chapter presents an extensive literature review and discusses in detail about the previous research and relevant contribution to the field of research. Chapter three explains the methodology and research design of this study. The selected method of data collection is explained, and empirical data is presented, including the basic information about the interviewees. Chapter four presents the empirical results of the study including quotes and narratives. Chapter five follow an in-depth content analysis of the empirical results and findings are discussed in accordance with the selected theory - TAM. Last chapter concludes the study with a summarization of aim, findings, implications, limitations, and suggestions for future research.

2 Chapter 2 – Literature Review

The aim of conducting a comprehensive and extensive literature review was to map out the relevant terms of this study. Since the case study is built on and research question discusses about digital transformation, its challenges, digitalization of education and impact of the pandemic, it was required to define these terms and scenarios in detail to build the setting for the research question and to design the scope. The case study is aimed to be discussed, supported by all these relevant terms within the selected scope.

In this study, it was required to start with the main term relevant to this study – digital transformation, which also is the main area of interest that motivated this study. Scoping down to challenges in digital transformation and then to digitalization of education was motivated due to its higher relevance to the Covid-19 pandemic situation and its impact. The research targets the education in developing countries mainly as majority of the studies in existing literature have focused on digitalization of education from the perspective of developed countries. Since; ‘digital transformation of education in developing countries during the pandemic and its challenges’ is an enormous area to select as the scope of this research; a case study is conducted based on a selected regional school in Sri Lanka to discuss the relevant scenario in detail.

The literature review plays an important role in this study yet is accompanied by empirical study findings. All the articles referred in this study were retrieved mainly from Google Scholar and other journal databases such as SAGE journals, ScienceDirect, emerald insight, Academic Search, ResearchGate etc.

Considering the evolving nature of digital transformation with new technologies and the fast pace of digital transformation and its impact on globalization, a timeframe was created from 2010 to present when conducting the literature review on digital transformation related concepts and definitions. However, explanation of some standard concepts and term definitions were supported by researches that have carried out in history and before 2010.

2.1 Digital Transformation

Digital transformation (DT) has become an important topic of research due to its fast evolving and influencing nature. Some argue that digital transformation is not actually a valid term as it is not a transformation but an evolution because digital technology keep updating and changing continuously and there is no defined level for the endpoint or complete success level of digital transformation (Buest, 2021). During literature review it appeared that digital transformation is at times defined to be a social phenomenon (Stolterman et al., 2004) or at times a cultural evolution (Belk 2013; Pardo et al., 2014; Rogers et al., 2011; Pînzaru et al., 2012) and for companies as an evolution or creation of business model (Zhu et al., 2006 ; Rogers et al., 2011 ; Kohli et al., 2011 ; Liu, 2012 ; Gastaldi et al., 2012 ; Berman, 2012 ; Medina et al., 2013 ; Barland, 2013 ; Rothmann et al., 2014 ; Øiestad et al., 2014 ; Pardo et al., 2014). Bekkhus , 2016 defines digital transformation as the use of digital technologies to radically improve the company's performance. Another definition for DT is that, digital transformation as encompassing the digitization of sales and communication channels and the digitization of a firm's offerings (products and services), which replace or augment physical offerings; furthermore, digital transformation entails tactical and strategic business moves that are triggered by data-driven insights and the launch of digital business models that allow new ways of capturing value (Horlach et al., 2017). Matt et al., (2015) argues that digital transformation strategy is a blueprint that supports companies in governing the transformations that arise owing to the integration of digital technologies, as well as in their operations after a transformation. One of the definitions that emphasize the objectives of DT presented is that, new digital technologies are used in order to enable major business improvements in operations and markets such as enhancing customer experience, streamlining operations or creating new business models (Paavola et al., 2017)

However since the introduction of the first microprocessor, digitalization has been on a long journey that if we look back at the history, it is not the same face of digitalization that we see today when compared to the 80's. According to Vial, 2019 most of the definitions of DT have unclear terms, conflation between the concept and its impacts and lack of parsimony. It has not been an easy task to provide a concrete and permanent definition for digital transformation but, by taking into consideration its key aspects and involvement with the technology, the general idea of DT is defined as the adoption of digital technology to transform services or businesses, through replacing non-digital or manual processes with

digital processes or replacing older digital technology with newer digital technology (Vial, 2019). The impact of digital transformation is not just limited to individual businesses but affects every institutions if society such as public service, education, law, healthcare etc.

Digital technology, since mid-90s has been influencing organizations and industries to change the way they operate and directing them to undergo digital transformation. There are many interesting papers and research about digitalization that deal with different technological innovations such as mobile technologies, analytical solutions. During the last few decades many organizations and institutes have gone from traditional manual way of operations to digitalization to optimize efficiency, performance in order to 'do better'. The advantages and opportunities of digitalization have influenced this transformation. There are four main areas of digital transformation – technology, data, process and organization. These four areas are inter-related and for digital transformation success, all four domains should be well conceived. Thomas H. Davenport and Thomas C. Redman, 2020 have provided an interesting example to explain the inter-relation of the four domains; “Technology is the engine of digital transformation, data is the fuel, process is the guidance system, and organizational change capability is the landing gear”. Henriette et.al, in their paper ‘The shape of digital transformation’ explains about four aspects affected by digital transformation in an organization; which are, digital capabilities, business models, operational processes and user experience.

However, there are many different challenges that constrain organizations and institutes to undergo digital transformation, experience the benefits and explore new opportunities. In a study, Shahi, C. and Sinha, M. (2020) have clarified what it means for an organization to be digitally transformed, what different challenges they face during the journey of digital transformation and what their potential solutions are.

2.2 Digital Transformation Challenges

Generally any type of transformation is tough and challenging; it is even harder when it comes to digitalization although it looks like a simple task. It takes time, planning and a lot of resources to digitally transform an environment and digitalization and managing the transformation of businesses always involves new challenges (Andersson et al., 2018). Previous findings on digital transformation research have shown that technology is not the only complex part that must be solved for organizations to remain competitive in a digital world (Vial, 2019). Strategy (Bharadwaj et al., 2013, Matt et al., 2015), structure (Selander

and Jarvenpaa, 2016), processes (Carlo et al., 2012), and culture (Karimi and Walter, 2015) are required to be benefited by the capabilities to generate new paths for value creation (Svahn et al., 2017a). Therefore the challenges faced by organizations when undergoing digital transformation, can be generally addressed as the challenges associated with these areas -technology, strategy, structure, processes and culture.

Vial, 2019, explains that ‘Inertia’- tendency to remain unchanged, is one of the most significant barriers to digital transformation. Inertia is a technology related challenge state where existing resources and capabilities can act as a barrier which cannot easily be reconfigured (Islam et al., 2017; Svahn et al., 2017a). It is a problem identified in both research (Roecker et al., 2017, Töytäri et al., 2017) and practitioner (Westerman et al., 2011) literature.

According to 2016 Digital McKinsey survey, ‘culture’ has been identified as the most significant obstacle for digital transformation. Important structural and process changes are required in digitalization and in settings associated with strong culture; such as some South Asian countries; there is higher chances of resistance to the change caused by digitalization. This resistance is identified as a major barrier to digital transformation (Vial, 2019). Psychologically; resistance has been defined as happening on the behavioural, cognitive, emotional level or as a combination of all three levels (Piderit 2000). Undoubtedly, resistance to change can be named as one of the biggest and relevant phenomenon in the organizational development literature and database searches due to its high magnitude (Pardo del Val and Martínez Fuentes, 2003). Schmid et al. (2017) has argued resistance as a product of inertia rooted in everyday work that cannot be addressed simply by changing employee behaviour.

Other factors that may limit the process of digital transformation are factors such as experience, skills, training and knowledge, expectations of the technology and its use, power relations and existing technology (Cresswell & Sheik, 2013; Orlikowski, 2000).

Digital transformation has compelled government agencies and other public institutions to rethink the laws, regulations, and policies related to a wide range of issues including intellectual property rights, data privacy and security, consumer rights, worker skills and training, entrepreneurial financing and securities, incubator/accelerator programs, and regional/local economic development (e.g., Agrawal et al., 2014; Bruton et al., 2015; Greenstein et al., 2013; Goldfarb et al., 2014; Goldfarb and Tucker, 2012; Martin, 2018; Sorenson et al., 2016; Varian, 2018; Zysman and Kenney, 2018). Therefore the face of digital

transformation differs not just from organization to organization but also from one country to another.

2.3 Digital Transformation of Education

In the digital age, with globalization, when rapid developing changes and transformations are caused by digital technologies on structures of almost every area, it is not a possible task for education to remain unchanged by being insensitive to these developments and changes (Balyer and Öz, 2018). Taşkıran, 2017 addresses digital transformation in education as a result of the increasing use of technology in everyday life. One way of defining digital transformation of education is, various technological improvements made to integrate the use of technology in education and training, to facilitate learning for teachers and students, and to improve technological literacy (Arık, Arslan, Çakır & Kavak, 2016).

Pinchuk and Sokolyuk, 2018 explains the features included in the digital education environment as the use of digital technologies and tools, local communication network and open network resources for : presentation of educational information, independent use of open network resources directly in the classroom by a student, use of open network resources by a student in the process of independent learning activity, for use by a student educational resources, specially created by a teacher or for independent student learning activity.

Due to the growing and influencing nature of digital technologies, many multimedia and interactive educational products are elaborated today within the framework of education (Mhouthi, Erradi and Nasseh, 2021). Sonia, 2012 has argued that digital technologies improve the quality of teaching, learning and management in schools and help raise educational standards and also bring together traditionally separated educational technologies—books, writing, telephone, television, photography, databases, games and more. However, Sonia, 2012 has also emphasized the structural, strategic, cultural changes required to be embedded in the educational infrastructure, teacher training, curriculum structures and materials, classroom practices and assessment modes causing these digital changes to bring both opportunities and challenges to schools/ other educational institutes. In 2006, a pan-European survey of teachers of children in the fourth year of primary education (Eurydice, 2009, p. 207) had observed that,

“In comparison with the situation in 2001 ... the use of new technologies to teach reading at school has increased.... This increase is expected to speed up in

subsequent years, with the growth of specialised software and on-line materials intended specifically for teaching reading in primary education.”

Balyer and Öz, 2018 state that, the globalization has led producing knowledge to have great importance as well as to acquiring knowledge, which seems to be a relevant fact that influenced on digital transformation of education. Moreover, Balyer and Öz, (2018) also suggest that in order for digital transformation to take place in the context of educational management, executives in top management must have a vision of digital transformation.

However, developing countries seems to be falling behind in these issues when concepts such as the internet, big data, coding, artificial intelligence and other smart factories are evaluated by digitalization and objects called the fourth industrial revolution - Industry 4.0 (Parlak, 2017). Therefore the digitalized education in majority of the developing countries are still in the early phase of digital adoption, and as stated once by Balanskat et al., (2006), are characterised by patchy uncoordinated provision and use, some enhancement of the learning process, some development of e-learning, but no profound improvements in learning and teaching.

2.4 Digital transformation of Education in Sri Lanka

The education system in Sri Lanka is state funded and provides free education at all levels, including the university level; although only 6% of the students who sit the final school level examination are admitted to the universities. Schooling is compulsory for every child of age in between 6-13 and to date; there are 10,390 government schools in Sri Lanka (The Educational System of Sri Lanka, 2021).

However, the digital transformation of primary and secondary education in Sri Lanka is still in a very beginning phase, especially in the rural parts of the country and the country's national vision on digitalizing education is in the early planning stage (Ministry of Education, 2021). According to the ministry of education in Sri Lanka, the main obstacles for digitalizing school education are issues associated with connectivity, content and capacity gaps. Another reason according to Sri Lanka's current education minister is, the education system has not been updated for decades and although it is necessary to include computer technology, information technology and the knowledge of languages into Sri Lanka's education syllabuses, it has not received the adequate attention for a long time (“The

participation of entire country is needed for the digital platform of education reforms.” – The Minister of Education G.L. Peiris | MOE, 2021).

The lack of facilities and infrastructure is a main technological obstacle for digitalizing the entire school education system in Sri Lanka; as in many other developing countries, when it comes to the growth of digital technology, the difference in impact on urban regions and rural areas can be seen as an internal digital divide in Sri Lanka as well (Mozelius, Hewagamage and Hansson, 2011). The ‘urban-rural digital divide’ in Sri Lanka has resulted in computerization and internet facilities being mainly limited to the capital Colombo and its surrounding area on the west coast and major towns like Kandy and Galle (Mozelius, Hewagamage and Hansson, 2011) causing most rural areas in Sri Lanka to be relatively less privileged in terms of digital technology and it is challenging to develop a national digital education system that suits the whole country without improving the infrastructure and internet facilities as learning activities that could be run from a computer in the urban areas is not likely to work in the Sri Lankan countryside (Mozelius, Hewagamage and Hansson, 2011).

The Information and Communication Technology Agency (ICTA) is the main organization in Sri Lanka that carries out the initiatives by the Sri Lankan government for implementing information and communications technology within the country including education. According to ICTA, ease of use, smooth operation, reliability and security are considered as critical aspects when conducting on-line education in Sri Lanka (Information and Communication Technology Agency | ICTA, 2021). So far ICTA has been implementing many digital technology related projects as per government’s plans such as community driven *Telecentres* in rural areas of Sri Lanka– aiming to bridge the internal digital divide by providing infrastructure requirements in order to address the information and communication needs of rural areas and to promote digitalization and digital education. A Telecentre normally is equipped with 2-4 computers and a printer but any not every one of them has Internet access (Information and Communication Technology Agency | ICTA, 2021). As of today, ICTA also conducts different trainings to teachers on using digital tools for the purpose of education.

In addition to Sri Lankan government’s plans to digitalize education there are some other programs such as Commonwealth Digital Education Leadership Training in Action (C-DELTA) programme, which is a programme that was developed by University of Cape Town

(UCT), South Africa in collaboration with Commonwealth of Learning (COL) to promote digital education in countries like Sri Lanka. In 2018 a research project has been conducted by the Open University of Sri Lanka to promote the adoption of the C-DELTA programme to the teachers and students of a secondary school level in Sri Lanka. The research project has been able to reveal the challenges of inadequate ICT facilities, time constraints and limitation in English language competencies and how the programme and enhancing teachers' digital education leadership skills (Karunanayaka and Weerakoon, 2020). .

However, even though digitalization is a relatively new concept to the education sector in Sri Lanka, the COVID-19 pandemic forced the closure of educational institutes in Sri Lanka temporarily and this unexpected and sudden situation produced severe need to accept 'going digital' as an essential part of their lives (Lucas, 2020).

2.5 Digital Transformation in Education during COVID-19 in Sri Lanka

According to United Nations' Policy Brief about Education during COVID-19 and Beyond 2020, the temporary closure of educational institutions during the COVID-19) pandemic has suddenly transformed the global education setting in favour of distance learning. The impact of school closures is not only limited to students but affects teachers and families as well and also carry high social and economic costs for people across communities (Lucas, 2020). Among the main problems associated with education during the pandemic as explained by Lucas, 2020 are, interrupted learning, poor nutrition, confusion and stress for teachers, parents being unprepared for distance and home schooling, challenges in creating, maintaining, and improving distance learning, rise in dropout rates, challenges in measuring and validating learning and increased pressure on schools and school systems that remain open. Even though UNESCO has made 10 recommendations to overcome these challenges and plan distant learning solutions, it has still been a challenging task to carry out digitalized education in developing countries like Sri Lanka due to obstacles such as: lack of Students' access to the digital world, lack of Availability of technology, challenges with Use of technology and preparedness of teachers, lack of Access to effective online platforms and inefficient School practices for using digital devices effectively (Lucas, 2020).

According to an article published by Sunday Times newspaper of Sri Lanka on 07th February, 2021, as said by the ICT branch director of the ministry of education in Sri Lanka, only 30 percent of the student population in Sri Lanka have access, or can afford online learning. The article further explained that, in some rural areas of Sri Lanka, students have to locate an

elevated place, often on top of a rock or a hilltop, where there is enough internet service strength to attend online classes. According to a Sri Lankan researcher in online education- Dr. Yatigammana, digitalized education is a solution for Sri Lanka's education system as it is one of the best methods to reach out to areas where there are teacher shortages, pandemic situations, and it helps students to attend classes and learn from the best teachers from anywhere in the country, But the problem is the accessibility and affordability.' (70% of Lanka's students have no access to online study, 2021).

2.6 Technology Acceptance Model (TAM)

TAM is the theory used when analyzing the results of this study.

Various theoretical models have been put forward to explore and explain factors that cause user acceptance, rejection and continuation of the use of technology (Venkatesh and Davis 2000).

The TAM, introduced in 1986, is one of the most widely investigated, influential and applied models in the information systems field in technology acceptance and it shows how users decide to accept technology (Lee et al. 2003).

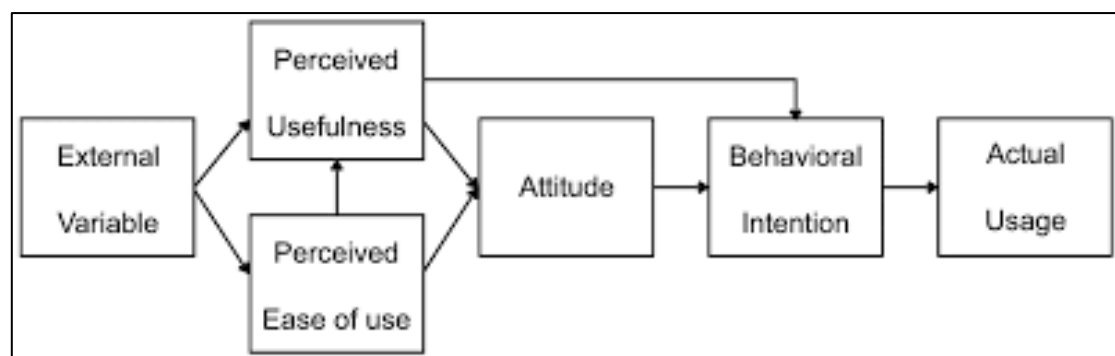


Figure 1: Technology Acceptance Model

TAM shows how two primary factors influence an individual's intention on accepting to use technology: perceived usefulness and perceived ease of use (Venkatesh and Davis 2000). These two factors - perceived usefulness and perceived ease of use influences on a person's attitude toward the intention of using technology, which ultimately leads towards actual use of the system (Lee et al. 2003). Perceived usefulness represents a person's individual feeling about the application of a certain technology to improve individual work performance, solve problems and be benefited while perceived ease of use measures a person's perception of how much effort the usage of the new technology requires or how easy it is to use the

technology (Lee et al. 2003). Both variables are influenced by diverse external variables, such as job relevance, subjective norm or output quality (Venkatesh and Davis, 2000) and lead to attitude and behavioural intention of the user leading to the end point – actual usage of technology

TAM in Education

Education has always been in a tensed situation in between two functions: education as a matter of assuring continuity and education as a matter of improving creativity and change. Within these functions, the phenomenal evolution of digital technology adds up more challenges to educational institutions (Scherer, Siddiq and Tondeur, 2019). Use of technology in education helps generate, collect, store, use and distribute knowledge and information (Spector, 2008) but the question arises when deciding the extent to which technology should be integrated in education (Scherer, Siddiq and Tondeur, 2019). The digital evolution has caused emerging educational technology usage in education during the recent years, but technology acceptance and usage continue being problematic for educational institutions (Berrett, Murphy, & Sullivan, 2012). The extent to which teachers adopt technology in their teaching practice has been in the focus of research for a long time and TAM provides a model to understand which factors might predict users' technology acceptance and adoption: yet, the role of certain key constructs and the importance of external variables contrast some existing beliefs about the TAM (Scherer, Siddiq and Tondeur, 2019).

3 Chapter 3 – Methodology

This chapter explains how the research was conducted and about the research method selection criteria. Moreover, this chapter explains how the empirical study was arranged, how respondents were selected, how data collection was conducted and how the collected data were analyzed.

3.1 Research Approach

Qualitative and quantitative approach

There are mainly two common approaches for research: qualitative and quantitative, and at times a combination of both - a mixed method (Williams, 2007). According to McCusker and Gunaydin ,2015, qualitative research methods generally generate words, rather than numbers, as data for analysis and is characterized by its aims, which relate to understanding some aspect of social life while quantitative methods aim to measure things statistically, for example in terms of percentage. Walle, 2015, explains the aim of a qualitative strategy as the profound phenomenon study using information gathering which is not limited to specific concepts but also focuses on explaining its features. McCusker and Gunaydin, 2015 argue that qualitative methods generally aim to understand the experiences and attitudes of selected participants and for researchers who are familiar with quantitative methods, qualitative research methods may seem imprecise.

Qualitative methods aim to answer questions in terms of ‘what’, ‘how’ or ‘why’ of a phenomenon while quantitative methods are generally answered in terms of ‘how many’ or ‘how much’ (McCusker and Gunaydin, 2015). The data collected using qualitative research method can be presented in visual or verbal form and can be collected via interviews, observation, and focus groups (Walle, 2015). However, numerous studies have been conducted utilizing both quantitative and qualitative methodologies and, in some instances, a combination, into the field of research on human services (McCusker and Gunaydin, 2015).

Considering the aim of the main research question of this study, which is to gain a thorough understanding about the digital transformation experience and challenges faced by the school during covid-19 crisis, qualitative research method was chosen as the research approach for this study. The main reasons for choosing the qualitative method is due to the nature of the research and to gain a deeper understanding of the case study , questions were required to be

asked in terms of ‘what’, ‘how’ and ‘why’ to gather comprehensive, reliable and accurate opinions and details.

Another motivation for selecting qualitative method is the ability to explore different aspects without being limited to a single theory or process and therefore allows comparison between theories and reality (Doz, 2011).

Thirdly, since the results of qualitative research are more descriptive than predictive (Stenbacka, 2001), it seemed more relevant when elaborating this case study which is only based on a single educational institute in Sri Lanka and not a widely discussed or researched topic.

Inductive approach

This study follows an inductive approach. The inductive approach as described by Thomas, (2006), is a systematic method for analyzing qualitative data mostly in a specific objectives evaluation guided analysis procedure. In the inductive approach, reasoning commences with observation of specific instances, and seeks to establish generalisations while in deductive approach it works the other way around when reasoning commences with generalisations (Hyde,2000). However, the general inductive approach is not the best analytic strategy for theory or model development; but it provides a simple, straightforward approach for growing findings in the context of focused evaluation questions (Thomas, 2006).

The main purpose of selecting inductive approach for this study is, it allows research findings to ‘emerge from the frequent, dominant, or significant themes inherent in raw data’, without being affected by the limitations of existing theories and structured methodologies (Thomas, 2006). This study is a case study with a very limited scope and therefore it is not aiming towards a numerical generalization but an analytical generalization which makes deductive approach non-applicable for the study. Since the aim is to elaborate a case study and contribute to the literature, inductive approach seemed more appropriate and applicable mostly due to the flexible and open minded features of inductive approach which allows adjustments during the study.

3.2 Data collection

Secondary data

Secondary data is the data that already exist; it can be large scale surveys or data collected as part of personal research and there is huge amount of secondary data available that is collected through the routine management information system and other surveys or research activities (Tripathy, 2013).

In this study, an extensive search was carried out to collect secondary data from many available and reliable sources that have been published by vivid media channels about different concepts associated with this research. The main intention was to collect more knowledge and facts on distinctive topics such as Sri Lanka, digital transformation in Sri Lanka and education system of Sri Lanka, from trustworthy sources such as newspapers, government websites and other reports, which are relevant to the study and associated with the research question. It was also meant to check if any previous research has been conducted on the selected research topic. Although the key concepts associated with the research, such as digital transformation, challenges in digital transformation, digitalization of education are widely discussed, the research question in this study was found unique and unavailable in the wide range of in-depth literature mainly due to the geographical scope and time - education in Sri Lanka during the Covid-19 pandemic.

Primary data

Primary data in a qualitative research approach are the data collected by researchers from the main targeted sources.

To distinguish between primary and secondary data Ajayi, (2017) presents the following table.

BASIS FOR COMPARISON	PRIMARY DATA	SECONDARY DATA
1 Meaning	Primary data refers to the first hand data gathered by the researcher himself.	Secondary data means data collected by someone else earlier.
2 Data	Real time data	Past data
3 Process	Very involved	Quick and easy
4 Source	Surveys, observations, experiments, questionnaire, personal interview etc.	Government publications, websites, books, journal articles, internal records etc.
5 Cost effectiveness	Expensive	Economical
6 Collection time	Long	Short
7 Specific	Always specific to the researcher's needs	May or may not be specific to the researcher's need.
8 Available	Crude form	Refined form
9 Accuracy and Reliability	More	Relatively less

Figure 2: Comparison of primary and secondary data (Ajayi, 2017)

According to Ajayi, (2017), primary data is original and unique and is directly collected by the researchers from sources through observations, surveys, questionnaires, case studies and interviews according to the aim of the research and study requirements. Out of these methods, Interviewing is considered to be a technique that can be used to gain a thorough understanding of a situation, underlying reasons and motivations for people's attitudes, preferences or behaviour (Ajayi, 2017).

Selected primary data collection method:

Semi structured interview is a flexible method of conducting interviews where we follow a structure for questions but the respondents are free to provide data beyond the structure as they want. It is a mixed method to get answers that are often broader and more detailed while maintaining a structure. In this research, considering the need of thorough understanding of the situation and the comments and opinions of the research respondents including their attitudes and emotions, within the research frame to elaborate a comprehensive, accurate and reliable case study, semi-structured interviews method was selected in order to collect primary data as effective as possible. In addition, with semi structured interview method, interviews can be done more interactively, and the questions are flexible and subject to variations according to the respondent's answer.

3.3 Selection of respondents

When selecting respondents for this study, the aim of the research, the scope of the research area which is a single school and main research question were given priority and therefore the respondents had to be chosen purposively considering the need of ‘understanding the real challenges faced by the school when initiating digital transformation of education during the pandemic’. Respondents were selected not randomly, but through purposive sampling - by contacting each respondent personally (digitally) (Walle, 2015) considering their relevance to the study which in this case was, those who actually conducted online teaching and experienced digital education for the first time. Another reason to select respondents through purposive sampling was to get a thorough understanding about more personalized experiences from their perspectives instead of collecting general/common opinions.

The sample size was decided while conducting the study in order to find the right sample size. Since the school has classes only from grade 1–5 (age 6-10), a big sample was not required for this study; the only requirement was to get detailed and quality answers representing the experience (of teachers and management) from each grade. By using this sampling technique, it was possible to get the necessary and relevant experience related responses while finding different responses based on each grade and representing the whole school experience.

Therefore the purposive sampling was conducted aiming one respondent (teacher) from each grade and one key respondent from the school administration (principal), to conduct 6 interviews in total. In the beginning of the study it was crucial to explain to the school administration (principal) about the research purpose and to get the administration’s support to select the willing respondents with certain level of understanding about the research background.

All the selected respondents have been working for several years in education service and all of them were selected for the study as they have certain level of understanding about the digital transformation and digitalized education from external sources. All the respondents personally experienced the ‘phenomenon of going digital’ for the first time during the Covid 19- pandemic, thus their responses are important, relevant and contribute higher value to the study.

Following table demonstrates what method and language were used to gather data, respondents' grade/position, interview date and time taken for interviews during data collection.

Table 1 : Data collection

Respondent	Method of data collection	Language/s	Date	Interview Time
R1 Principal	Semi structured interview survey with 10 open questions	Mainly Sinhalese with necessary relevant terms in English	2021-04-28	120 minutes
R2 Grade 1 Teacher	Semi structured interview survey with 10 open questions	Mainly Sinhalese with necessary relevant terms in English	2021-05-03	40 minutes
R3 Grade 2 Teacher	Semi structured interview survey with 10 open questions	Mainly Sinhalese with necessary relevant terms in English	2021-05-03	60 minutes
R4 Grade 3 Teacher	Semi structured interview survey with 10 open questions	Mainly Sinhalese with necessary relevant terms in English	2021-05-03	60 minutes
R5 Grade 4 Teacher	Semi structured interview survey with 10 open questions	Mainly Sinhalese with necessary relevant terms in English	2021-05-03	60 minutes
R6 Grade 5 Teacher	Semi structured interview survey with 10 open questions	Mainly Sinhalese with necessary relevant terms in English	2021-05-03	90 minutes

3.4 Operationalization of the interview questions

The 10 questions used in the semi structured interview were basically built in compliance with the theoretical framework. The questionnaire was built by using digital transformation as the main background. The aim was to start by understanding the existing knowledge and experiences of the respondents about the main background and then taking the respondents gradually from the background to the research question through the step by step questionnaire. The questionnaire also meant to understand the research question related aspects in terms of history, current background and assumed future state, from the responses.

Appendix A presents the 10 questions used in the semi structured interview and their intentions.

3.5 Data analysis

Data analysis is stated by Thorne, (2000) as the most complex and mysterious phase out of all the phases of a qualitative project. There are several methods for analysing data collected through a qualitative research method such as content analysis, narrative analysis, discourse analysis and grounded theory. Content analysis out of these methods, is one of the most commonly used methodologies to study phenomenon in qualitative research (Renz, Carrington and Badger, 2018). The purpose of content analysis on this study was intended to discover and measure the fundamental meanings of the collected data. According to Renz, Carrington and Badger, 2018, the advantages of a content analysis include: ability for the researcher to be “close” to the data, high reliability as it follows systematic procedures/steps, inexpensive implementation, and it does not require further direct interaction with study participants for analysis. Considering these advantages, a content analysis was conducted in order to analyse the empirical findings of this study and get significant insights through the analysis of data.

The qualitative approached data collection in this study – semi structured interviewing was conducted verbally, digitally and mainly in Sinhalese language, with the use of some necessarily relevant terms in English. Therefore when translating the collected data, it was crucial to secure the accuracy, exact meanings and emotions attached to them. During the literature review as well as when building the questionnaire for the study, the theoretical framework was used as a foundation. Therefore the same framework was used as the main setting during the data review process as well.

Content analysis is considered to be a powerful data reduction technique (Stemler, 2001). As per the recommendations of content analysis, in order to promote enhanced overview and for the security of information, the research material had to be divided into sections and also filtered (Kohlbacher, 2006) and also filtered while securely maintaining collected questionnaires and original data materials. Research question related empirical findings are presented in the next section.

3.6 Validity and reliability

According to Brink, 1993, Validity and reliability are key aspects of all research which can differentiate good research and poor research and can help assure fellow researchers to accept findings as credible and trustworthy. Validity and reliability in research are concerned with the truthfulness of collected data and in qualitative research this can be achieved the respondent validation technique. In this study the respondents were chosen carefully so that their true responses could be recorded with no influence from any external factors. The translation of data was done sensibly without causing any damage or changes to the original data. Bryman, 1989, stated that the researcher's knowledge and the interview predictions support the validity of data. The validity of data is important for the study as it assures the relevance to the study. The questionnaire in this study was therefore built in compliance with the existing literature and predicted data. This enabled the benefit of enhancing both the interview process as well as findings and provided truthful and valid responses, assuring validity and reliability.

The reliability of this research is directly connected to the utilizing secondary data through literature review and the comprehensive step-by-step clarification about the whole process of primary data collection. All the steps followed when conducting the collection of primary data are explained and the questionnaire with its motive is presented.

All the responses were translated and presented in their original form and all the clarifications the research are justified in accordance with the respondents' insights and valid literature.

3.7 *The ethical aspects*

Research ethics is considered to be one of the most argumentative areas in contemporary social science research (Wiles, 2013). It is an important and crucial aspect that has to be taken into consideration during the whole research process (Walle, 2015).

In this study, every concept and theoretical framework were constructed using valid, relevant and accurate literature by conserving integrity. All the sources used as reference in this study were taken from academically valid journal databases to prevent presenting false information and all the references are stated crediting to the original author to preserve authenticity of the sources.

When conducting the research using the semi-structures interview method, prior permission was obtained from the relevant authorities and respondents were chosen with suggestion and approval of the authority. The respondents were treated respectfully and were provided a free and flexible setting to participate in the study; as the interviews were conducted digitally and in between two time zones, the convenience for participation of the study without any difficulties had to be assured. The respondents were made aware about the research background and the intentions of the research. All of the respondents were contacted personally without intermediaries and the interviews were conducted in their native language and any terms used in English during the interview were explained in detail. The respondents were assured that no personal information will be disclosed when presenting their responses and therefore complete anonymity will be maintained when presenting the study results and the respondents' answers will be utilized for this research only.

During the interviews, the respondents were able to provide their answers freely without any force and had the opportunity to answer the questions in detail or not answer at all as per their wish. However, it was aimed to maintain the objectivity and truthfulness of data when conducting the interviews to ensure validity and reliability.

4 Chapter 4 - Empirical Results

This chapter presents the results from the qualitative study starting with a summarized description of the selected research setting (school). The description is presented based on the data gathered from the authorities during the first interview and the approval obtaining process prior to conducting the rest of the interviews. Due to the limited scale of respondents, the responses are divided into two sections and presented. First section presents the responses mainly collected from the school administration representative and the second section presents the other respondents' experience related to the research question according to the questionnaire. The respondents share their personal experience as well as their knowledge on the experience of other parties that got directly affected by the phenomenon discussed in the research. This chapter also focus on the background, history, present situation and future plans of the selected research setting in compliance with the research question.

In total 6 education professionals from the school participated in the study. Findings are presented based on assigned question numbers (Q1-Q10 in order to keep track of the responses and to maintain anonymity.

4.1 Background

The setting selected for this research is a well reputed urban school, yet located in a rural district in Sri Lanka - away from the capital. The school is a model primary school and has 50 classes for students from grade 1 to 5 (age 6-10) with 10 classes for each grade. Each class has 35 to 38 students. The school's digital technology infrastructure includes 10 computers that are being used mainly for the administration processes of the school such as admissions, student and employee records, wage records, exam results etc.

The school was selected as it is one of the government educational institutes that experienced digitalized education for the first time in March 2020 due to the consequences caused by Covid-10 pandemic.

Among the respondents of the study are 5 females and 1 male and all of them are in age range 30-40. Out of the 50 classes in the school, only 21 classes continued classes digitally during the pandemic influenced closure period of the school. The respondents were chosen from the

only 42% of the school that continued classes and teaching online and experienced digitalized education.

In the questionnaire, Q1 and Q4 focus on understanding the history and background while Q2 and Q3 focuses on initiating digitalization of education. Q5 and Q6 aim to find answers to the main research question and Q7 and Q8 discusses advantages and disadvantages experienced. Q9 and Q10 aim to understand the knowledge claimed during the digitalized education experience and future plans and preparation ideas of respondents in terms of their experience.

Respondent 1 (R1) represents the administration of school

The first interview was conducted with the main administrator of the school (principal). In addition to the presented questionnaire, this interview helped the study with data required to understand the background of the school as well as the base for selecting other respondents.

R1's response for Q1 and Q4 specified that the prior knowledge R1 as the main administrator of the school had about digitalization of education was very limited and R1 had no personal experience or training related to digitalized education. According to R1, the administration of the school 'never' expected education to go digital until the pandemic crisis took happened and when the school was closed for the first time according to government regulations in order to prevent the spread of the pandemic, the school still had no intention of digitalizing education. According to R1, the education system in Sri Lanka has always been the same; the only trainings the teachers have had were about changes and updates in terms of education. The education system is designed for physical classrooms. When the schools were closed, the only concern R1 and the teachers had faced was the limited time for completing the study syllabus for each grade assigned per year.

Q2 and Q3 are about what impacted the decision for digital transformation and how the school prepared for it. According to R1, the school has had no intention to digitize education even at the time of closure. When the pandemic situation started getting worse and the closure time was extended, it had occurred to the school that they have to take some actions to continue education despite the situation.

"We saw how some private educational institutes and higher educational institutes were using digital technology to continue education. We didn't want our students to be left behind and we had no choice other than 'attempt going digital'. Our biggest concern was the grade 5 students who have to face the 'scholarship exam' in August."

Grade 5 scholarship exam in Sri Lanka is one of the main exams and the first national level exam faced by students during their school time. It is an exam for students to get accepted to better and well reputed government schools for further studies. Since the school in this study has classes only from grade 1 to 5, grade 5 scholarship exam is very important for them. Therefore, after waiting for one month to see if schools will be opened and things would be back to normal, R1 along with the teachers have discussed and decided to conduct online education with available resources and capabilities. Once the decision was made, the class teachers have called parents to inform the decision.

R1's responses for Q5 and Q6 were found much interesting and relevant to the main research question of this study. According to R1, the main challenge the school faced when planned to initiate digitalized education, was the lack of digital literacy of the teachers.

“Some of our teachers do not have the knowledge to use a smart phone. They have never used a computer and do not have the ability to conduct teaching online.”

According to R1, only few of the younger teachers of age group 30-40 who have learnt basic computer skills through external courses, have the minimum knowledge required to conduct online education and it was not possible to convince most of the older teachers who have been in the education service for more than 15 years to change into a digital setting. It has been the main challenge the school faced and the main reason for only 42% of the school to initiate digitalization of the education. Only 3/10 classes from grade 1, 5/10 classes from grade 2, 4/10 classes from grade 3, 6/10 classes from grade 6 and 3/10 classes from grade 5 have conducted education using digital technology. These classes had continued online classes using 'Zoom' while the rest of the classes did not conduct any teachings online but sent assignments to students on 'WhatsApp' with the help of other teachers who had the knowledge to use smart phones.

“Although we planned and executed digitalized education as we had no other option, we knew it was not going to work. Even in the classes that conducted online teachings, many students were not able to participate as they did not have digital devices.”

“Some students have digital devices but they do not have internet connections due to location or economy issues.”

It has been a challenge for the school to address issues brought by teachers, students and parents regarding lack of resources such as computers, smart phones, infrastructure related problems and problems related to poor internet service.

“There were times when 3 students from the same family had to attend online classes but they all had only one smart phone to share. The parents could not afford to buy more digital devices so the 3 students had to take turns to attend classes”

R1 also expressed feelings of frustration all the teachers, students and parents experienced when 58% of the school’s students could not be provided digitalized education and the division caused by it to disrupt the concept of equality in education of Sri Lanka.

R1’s responses highlighted the fact that, there is a significant influence of the country’s economic state on digitalization of education. According to R1, their overall experience in this situation was a ‘disaster’. When asked about the good and bad aspects of digital transformation of education, the response was;

“During this time, we have heard and seen many success stories of digitalized education. But in our case, the only advantage was the experience itself. We experienced something we never expected and learnt a lot from it. Thanks to the effort of the teachers, we were able to complete some components of the syllabus during this time but everything else turned out to be very inefficient as we were not ready, the students were not ready and the country’s education system was not ready.”

However R1, as the main administrator of the school, expressed his pleasure about the fact that, the school as an organization, tried some solution and although it turned out to be much of a challenge than planned, the school is pleased about the initiative.

About the lessons learnt and future preparation, R1’s response was that, ‘the pandemic situation convinced most of the teachers and parents to understand the importance of moving with the digital technology and adapting to it, all our teachers need now are resources, skills and practice’. The school is planning to improve the digital literacy of the teachers using the available and accessible sources and expect the government to develop infrastructure, provide trainings and restructure the education system suitable for a digitalized education setting.

R2-R6 represents the teachers of the school from grade 1 to grade 5

Respondents 2-6 were the selected teachers that took part in the study. The importance of the responses collected from these respondents is that they did not only share their personal experience but also explained other teachers', students' and parents' ideas and thoughts in related to the digitalized education experience during the pandemic.

All the respondents – teachers, responses to Q1 and Q4 stated they had some prior knowledge about digitalization and digitalization of education. But they have only gained this knowledge through external sources such as computer skill related courses. During the study it was founded that, another reason impacted on their improved digital knowledge comparative to the other teachers is the everyday use of digital technology such as smart digital devices, social media, email etc.

“We have participated in numerous seminars, workshops, trainings but all of those were intended to train and develop us to become better teachers and to improve the quality of education. Nothing prepared us to be better teachers in a digital setting.”

These responses for Q1 and Q4 specified that although the teachers had some knowledge about digitalization prior to the pandemic situation, they had no experience directly related to digitalized education. There have been no prior plans or preparations to digitally transform education and the school's first digitalization experience was an unexpected and a forced change.

Despite their prior knowledge, all the respondents explained in their responses to Q2 and Q3, that they faced a very challenging situation when the school decided to continue education digitally.

“All of a sudden, we were told to do something we have never done before and never were trained to. And the most frustrating part was some of the most experienced teachers who have much more years of experience in teaching than us, were not able to participate in digitalized education environment.”

The respondents specified that they had to restructure lessons to teach via 'Zoom' in a digital classroom and create separate assignments to send to students via 'WhatsApp', in a very limited time.

The responses provided during the interviews with R2-R6 explained more challenges involved with the effort of digitalizing education in Sri Lanka. In addition to the digital literacy and infrastructure problems mentioned by R1's response, R2 specified that it was not possible to continue digitalized education for grade 1 students for a long time as the students did not interact in the classroom and concentrate on lessons and therefore online teaching for grade 1 students had to be stopped immediately as soon as it was initiated. Majority of the respondents said that sending assignments via 'WhatsApp' strategy worked to a certain extent but online classes via 'Zoom' was not a successful method. According to R3, the hard part in a digital classroom is not teaching the lessons online but understanding digital devices and tools to connect to the class and explaining students/parents about the devices and tools to start the class.

One of the responses provided by R5 was;

"The students these days are digitally advanced than us. Their digital literacy is well updated. But they are not used to digitalization of education."

This response was further explained by R5 and R6 highlighting one of the major complaints received by parents; apart from the lack of digital resources and infrastructure problems. According to R5, most of the students in the age group 6-10 are addicted to digital devices for the sole purpose of entertainment such as mobile phone games, cartoons etc. Therefore in countries like Sri Lanka, digital technology is mostly seen as an enemy by parents. R5 further clarified that there were times the parents requested to stop conducting classes online as the students, when they get to use the smart devices to participate in the online classrooms, misuse the devices to fulfil their entertainment desires during the time of studies.

However according to all the respondents R2-R6, the responses for Q7 and Q8 were as same as the responses collected from R1; they only found the experience and completing 'some' teachings digitally to be a good aspects in this situation and everything else turned out to be not effective as planned when initiating digitalization of education.

The responses for Q9 and Q10 were also same for all the respondents as R1 is the responsible representative for the plans and future preparations of the school. However R3 specified the need of requesting the government to provide digital education training and facilities for all the government school teachers as it is now obvious that the future of education depends on digitalization and it is important for the students to get used to it.

5 Chapter 5- Results Analysis and Discussion

In this chapter, the major findings revealed from analysing the empirical results are analysed and presented to build a case study based on the main research question and the case study is further discussed in the discussion section in compliance with the selected information systems theory – Technology Acceptance Model, and presented..

Technology Acceptance Model – TAM

When analysing the results of this study in compliance with the Technology Acceptance Model, it was clear that the impact of Covid-19 crisis, the useful aspects of digital transformation and the critical need for continuing education without being interrupted, acted as the main external variables to create a background for digital technology acceptance. These external variables influenced the users – school management, to consider the two primary factors of technology acceptance: usefulness of digital education and ease of use- which in this case is mainly digital literacy of users.

However, according to the results of the study, it was emphasized how the teachers and management of the school had to exclusively consider the usefulness of accepting technology under the circumstances regardless of the extreme difficulties and challenges they faced in relevance to ease of use. Therefore the attitudes and intentions of the users were positively influenced only by the usefulness of technology when the school decided to accept digitalization of education while ease of use mainly influenced negativity; causing perceived usefulness from the traditional TAM to act as the only primary factor that motivated technology acceptance in this case.

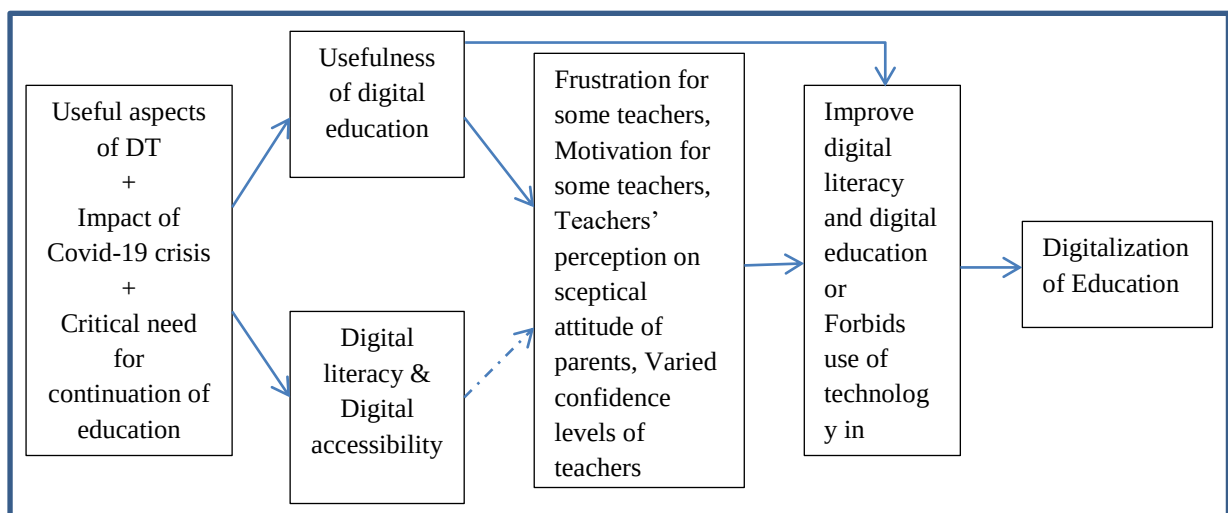


Figure 3: TAM based analysis of study results

Following content analysis is presented based on the empirical results. The abstract findings are discussed comprehensively in the discussion section of this chapter.

Table 2 : Content Analysis of results

Example quotes	Instances of finding	Abstract Finding
<i>“Some of our teachers do not have the knowledge to use a smart phone. They have never used a computer and do not have the ability to conduct teaching online.”</i>	Lack of digital literacy	Finding 1 – The main challenges identified in relevance to the main research question.
<i>“Although we planned and executed digitalized education as we had no other option, we knew it was not going to work. Even in the classes that conducted online teachings, many students were not able to participate.”</i>	Poor technological infrastructure	
<i>“Some students have digital devices but they do not have internet connections due to location or economy issues.”</i>	Poor internet and other essential services	
<i>“We have participated in numerous seminars, workshops, trainings but all of those were intended to train and develop us to become better teachers and to improve the quality of education. Nothing prepared us to be better teachers in a digital setting.”</i>	Traditional and manual structure of Education	
<i>“There were times when 3 students from the same family had to attend online classes but they all had only one smart phone to share. The parents could not afford to buy more digital devices so the 3 students had to take turns to attend classes”</i>	Economy related issues	

<i>“Although we planned and executed digitalized education as we had no other option, we knew it was not going to work”</i>	The challenges faced by users caused lack of self-efficacy and negativity in user attitude.	Finding 2 – Lack of digital self-efficacy caused by challenges related to lack of digital literacy, poor technological infrastructure, poor internet and other services, traditional/manual structure of education and economy related issues, negatively influence the acceptance of digital technology in education.
	The complexity faced by users caused negativity in their attitudes and intentions about accepting digitalization.	Finding 3 – Perceived ease of use directly and significantly influence on user attitudes and intentions.
<i>“We saw how some private educational institutes and higher educational institutes were using digital technology to continue education. We didn’t want our students to be left behind and we had no choice other than attempt going digital.”</i>	The pandemic’s influence caused users to consider only the usefulness factor when accepting technology.	Finding 4 – Perceived usefulness can act as a single agent to influence users’ attitudes and behavioural intentions positively for accepting technology.

<i>‘the pandemic situation convinced most of the teachers and parents to understand the importance of moving with the digital technology and adapting to it, all our teachers need now are resources, skills and practice’.</i>	Successful technology acceptance is driven by both usefulness and ease of use factors.	Finding 5 – For a successful technology acceptance both perceived usefulness and perceived ease of use are required.
<i>“Although we planned and executed digitalized education as we had no other option, we knew it was not going to work”</i> <i>“.. We didn’t want our students to be left behind and we had no choice other than attempt going digital.”</i>	The users accepted digitalization despite their negative attitudes and intentions.	Finding 6 – Covid-19 pandemic caused an exception, where users’ attitudes and behavioural intentions do not necessarily require being positive for accepting technology.
	Covid-19 pandemic impact was a strong external variable that directly influenced technology acceptance.	Finding 7 – Covid 19 – pandemic is a significant example to show that, stronger ‘external variables’ can directly influence technology acceptance primarily due to perceived usefulness and therefore challenge applicability of the traditional TAM in every technology acceptance scenario.

<i>“During this time, we have heard and seen many success stories of digitalized education. But in our case, the only advantage was the experience itself. We experienced something we never expected and learnt a lot from it. Thanks to the effort of the teachers, we were able to complete some components of the syllabus during this time but everything else turned out to be very inefficient as we were not ready, the students were not ready and the country’s education system was not ready.”</i> <i>‘the pandemic situation convinced most of the teachers and parents to understand the importance of moving with the digital technology and adapting to it, all our teachers need now are resources, skills and practice’.</i>	Users are ready to accept digitalization if the existing challenges are addressed to bring solutions.	Finding 8 – Improving the infrastructure, internet services and other digital technology related facilities of the country will significantly and positively influence users’ acceptance of digitalized education.
	The users are aware of the usefulness factor in technology acceptance. The perceived ease of use is the factor that needs to be addressed by bringing solutions to the existing challenges.	Finding 9 – The Covid – 19 pandemic has the potential to significantly and positively influence on acceptance and improvement in digitalization of education in Sri Lanka and other developing countries.
<i>“During this time, we have heard and seen many success stories of digitalized education. But in our case, the only advantage was the experience itself. We experienced something we never expected and learnt a lot from it.”</i>	The users did not resist changing from traditional and manual setting to a digital setting no matter how challenging it was.	Finding 10 – Will ‘Resistance to Change’ be a real challenge for digitalization in the future that requires enormous attention?

5.1 Discussion

The main interest area of this thesis was exploring how digitalization of education in Sri Lanka was handled under the impact of Covid-19 pandemic influenced digital transformation. To narrow down the scope, education in Sri Lanka was chosen and a case study was built based on a well reputed school in one of the major town yet located in a rural area of Sri Lanka.

Theoretical Framework

To find relevant literature, to approach the topic of the study and to place the constructed case study in the existing research setting, zooming-in to the focus research area strategy was followed. The stage - digital transformation was built initially and the relevant ‘term-blocks’ were kept on the stage to build a framework for both study and literature review.

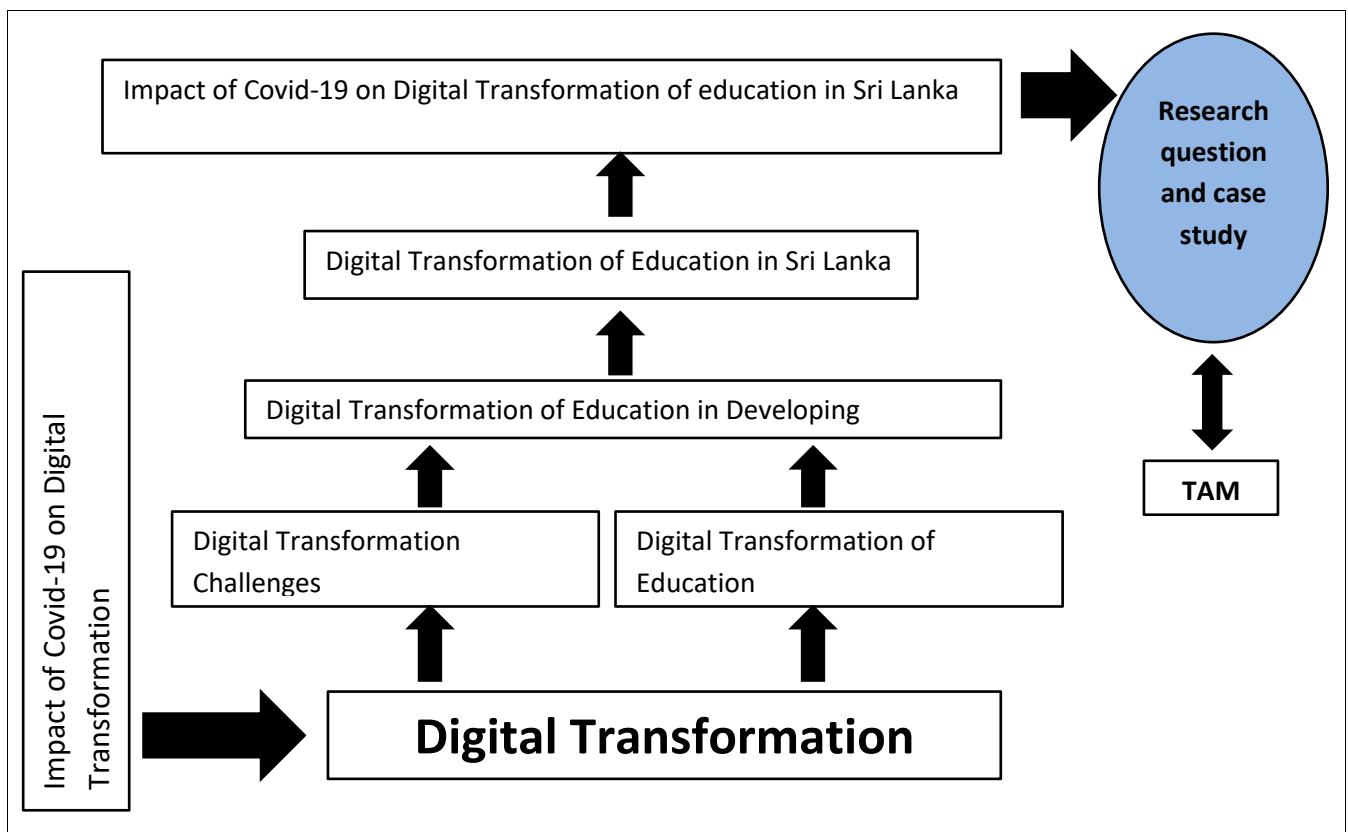


Figure 4: Theoretical Framework

Research findings discussed in this section were established based on the content analysis of the empirical results presented previously and the TAM based analysis of the case study.

Finding 1- The main challenges identified in relevance to the main research question.

When analysing the findings mainly associated with the main research question, it could be seen that there are few main challenges that the school faced and have to be addressed in order to successfully implement digitalization of education in the school setting.

1. Lack of digital literacy – lack of knowledge of teachers and management related to the use of digital devices such as computers and smart phones and other digital related tools, methods and software such as Zoom, WhatsApp and email.
2. Poor technological infrastructure – lack of essential hardware, software and physical networking facilities.
3. Poor internet and other essential services for digitalization.
4. Traditional and manual structure of Education
5. Economy related issues that prevent people from having access to digital technology such as lack of affordability in purchasing digital devices or getting an internet connection.

Finding 2 – Lack of digital self-efficacy caused by challenges related to lack of digital literacy, poor technological infrastructure, poor internet and other services, traditional/manual structure of education and economy related issues, negatively influence the acceptance of digital technology in education.

The issues faced by the users – teachers and management directly impacted negatively when accepting technology. Based on the results, it could be seen that the challenges caused lack of self-efficacy for users and maximized the effort required for using the technology. This caused negativity in user attitude and behavioural intention leading to inefficient actual use of technology. However by addressing the challenges and taking initiatives to improve the digital self-efficacy of users, positive and significant influence can be made on overall technology acceptance.

Finding 3 – Perceived ease of use directly and significantly influence on user attitudes and intentions.

In the respondents' answers' it was clearly mentioned that the effort they had to put in order to use the technology was very high that they found the use of technology always challenging and extremely hard. The challenges and obstacles the school faced, have negatively influenced on the perceived ease of use which directly influenced on users feelings and attitudes and behavioural intentions negatively, which made them hesitant about usefulness and the actual use technology even though they were aware about the positive usefulness of accepting technology.

Finding 4 – Perceived usefulness can act as a single agent to influence users' attitudes and behavioural intentions positively for accepting technology.

In this study, it can be seen that Covid -19 pandemic caused perceived usefulness to act as a single agent to influence users' attitude to accept technology. In the traditional TAM, both perceived usefulness and perceived ease of use are considered as major impacts on user attitude and behavioural intention. However it can be seen that the pandemic situation forced users to accept technology solely influenced by considering the perceived usefulness as it has been incredibly difficult for every user to work in a digitalized setting where perceived ease of use was mostly non-existent and lead to frustration of users.

Finding 5 – For a successful technology acceptance both perceived usefulness and perceived ease of use are required.

However, even though the pandemic situation caused perceived usefulness to act as a single agent to impact on technology acceptance, this study shows that although the users accepted technology considering its usefulness, lack of perceived ease of use due to various factors, caused the digital transformation of education within the school to be unsuccessful. Therefore it can be seen that both variables – usefulness as well as ease of use are essential for a successful technology acceptance.

Finding 6 – Covid-19 pandemic caused an exception, where users’ attitudes and behavioural intentions do not necessarily require being positive for accepting technology.

The results of study revealed that the users involved in this situation had to accept digitalization despite their negative attitude towards it. The users had no other option but adapt to a digitized educational setting and they had to ignore their negative attitudes and intentions. Simply, there was no chance for ‘resistance’.

Finding 7 – Covid 19 – pandemic is a significant example to show that, stronger ‘external variables’ can directly influence technology acceptance primarily due to perceived usefulness and therefore challenge applicability of the traditional TAM in every technology acceptance scenario.

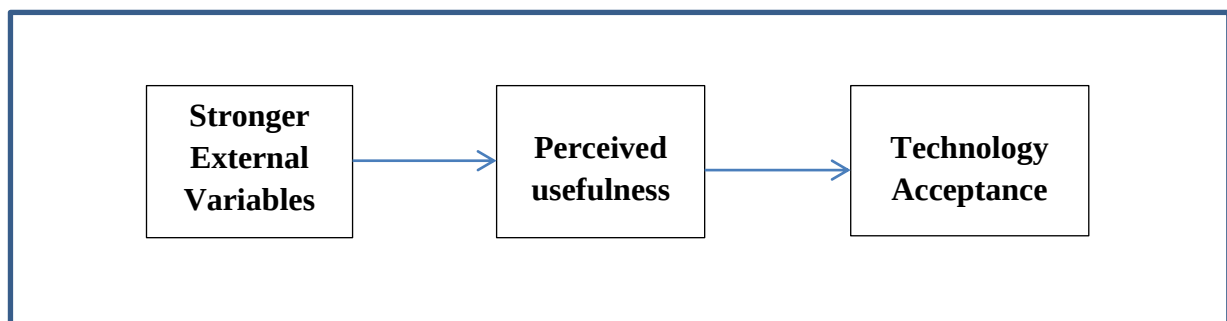


Figure 5: Covid -19 pandemic influenced TAM

Covid-19 acted as a very strong external variable that left no choice but convinced users around the world to accept digital technology. Many individuals were forced to start using technology without any training period or a smooth period of transition from traditional setting to digital. There for the Covid-19 impact seems that it is challenging the traditional TAM to eliminate the applicability of perceived ease of use - one of the two primary factors, which influence users’ attitudes and intentions of accepting technology. When perceived ease of use is eliminated the model is left only with one primary factor – perceived usefulness which is then considered the sole factor that drives people towards technology adoption. In this analysis, it could be proven that, when users find complexity in technology, their attitudes are mainly negative about technology adoption, yet they have no option but to accept it as it is their only choice. When usefulness is considered the only matter, acceptance is considered only choice and ease of use factor is eliminated, the attitudes/intentions of users do not have much of an influence towards the end result. The above figure shows the reality

of how Covid-19- being a strong external variable, challenged the traditional TAM by eliminating its core variables – perceived ease of use, user attitudes and user intentions.

Finding 8 – Improving the infrastructure, internet services and other digital technology related facilities of the country will significantly and positively influence users’ acceptance of digitalized education.

The lack of internet services and poor digital infrastructure has caused the users to feel frustrated about digitalizing. Unless for the Covid-19 pandemic situation, it is a challenging task to convince the users to accept digital technology due to their resistance to change and accept digital technology. However now that the users have a clear understanding and experience about the importance of moving forward in the digital era and accept digitalization as a part of their lives, it is the perfect time to develop the digital infrastructure and other services to encourage digitalization and technology acceptance.

Finding 9 – Covid – 19 pandemic has the potential to significantly and positively influence on acceptance and improvement in digitalization of education in Sri Lanka and other developing countries.

As explained in finding 8, the pandemic situation is an experience to the whole world that convinced everyone about the importance of digitalization, including the developing countries. Sri Lanka, being a country that always was limited to traditional classroom education system for decades, now plans to make structural changes in education to match up with the digital world. The digitalization of education in Sri Lanka, which was always a slow process, is now actually implemented in many educational institutes along with a heap of challenges, even though there were no proper preparations for it.

Finding 10 – Will ‘Resistance to Change’ be a real challenge for digitalization in the future that requires enormous attention?

When analysing the results of this study, it was impressive to see that majority of the users are ready to accept digital technology. Everyone from teachers to students to parents considered digitalization of education to be the ‘only way’ that helps continuing education without interruption. The teachers who have been in the service for decades yet never have used a computer or a smart phone were happy to get training and learn about new technologies associated with digitalization of education. The parents, despite the financial

issues, understood the importance of their children being part of digital education as they see it as the future. When looking at the vague amount of previous studies and literature about resistance to change problem in digitalization and the high level of priority given on finding solutions for the problem, now the question arises whether if ‘resistance to change’ is a real problem that requires much attention and research effort to be addressed. If a primary school in Sri Lanka, with so many challenges around with almost no facilities and with none to little level of digital literacy level, is ready to accept digitalization despite the challenges, it is questionable whether if ‘resistance to change’ can still be accepted as a valid challenge for digitalization.

6 Chapter 6 –Conclusion

This chapter concludes the study and discusses the limitations and suggestions for the future research are discussed.

6.1 Conclusion

The findings from this research revealed the major challenges associated with digitalization of education in Sri Lanka and analysing the case study in compliance with TAM helped prove how traditional technology acceptance theories have been challenged by the influence of Covid-19. However, this research being conducted in a very limited scope – a single school in Sri Lanka, limits the applicability of findings of this research to establish theories in general. But still this research's findings can possibly provide insights to overcome the challenges when developing a digital roadmap for education in Sri Lanka and encourage further research in the area; specifically digitalization of education in developing countries.

The aim of this research was to understand the common digital transformation related challenges faced by the selected school when implementing digitalized education for the first time in March 2020 with no prior planning or preparations, during Covid-19 pandemic. To find answers for this question, a qualitative research was conducted using the semi-structured interview method and 6 respondents were selected to answer a questionnaire of 10 questions. The results of the study emphasized the challenges faced by the school when conducting teachings in a digital setting, which were mainly related to the poor level of digital literacy, poor technology infrastructure, lack of internet and other services, traditional/manual educational structure of Sri Lanka that has not been updated to suit a digitalized setting and the country's economy related issues that prevent people from having access to digital technology. Based on the data collected from the research, a case study was built as a sample representative of education of Sri Lanka. The case study was then analysed in compliance with the traditional Technology Acceptance Model to establish findings. In addition to the major findings related to the challenges and traditional TAM, a Covid-19 influenced TAM version was constructed and presented. The findings revealed the challenges the school faced when accepting digitalization of education, how it affected lack of self-efficacy of the users and what can be done to overcome these challenges. It is also explained in findings, how Covid -19 influenced traditional TAM, and how it's components - perceived usefulness, perceived ease of use, user attitudes and behavioural intentions are influenced differently in

this case study both due to the impact of Covid-19 pandemic and the challenges in the study setting. The analysis and discussion of this study, also presents how Covid-19 pandemic has impacted on the pace of global digital transformation and how this experience can prompt the digital transformation of education in Sri Lanka and other developing countries. This case study also questions the recognition required in the future for the ‘challenge of resistance’ in digital transformation in comparison with the presented case study.

6.2 *Limitations and suggestions for future research*

This study has a number of limitations. The main limitation is the low sample size limited to 6 respondents which might influence the results of the study for a certain extent. To narrow down the scope, the case study was built on a single educational institute from the primary level education and therefore cannot be generalised to understand and evaluate impact of Covid-19 pandemic on the whole education system of Sri Lanka.

Although digital transformation, challenges it involves and digital transformation of different organizations/industries have been major research topics for a long time, the impact of Covid-19 on digitalization is an unexpected and a new phenomenon it is yet to be studied further and is questionable. Especially while carrying out this study, the pandemic situation was constantly changing as well as many research associated factors such as government regulations, peoples’ attitudes and behaviours, country’s economy etc. Therefore the results of this study and the findings are only valid and limited to the time mentioned in the research question.

Moreover, due to the nature of semi-structured interviewing, the answers provide by the respondents might have been influenced by their emotions, attitudes, environment and other factors. Yet, the results are believed to be accurate and reliable as the respondents were carefully chosen in order to assure the quality of data.

6.3 *Suggestions for future research*

This research topic was found incredibly interesting and relevant due to its technological aspect, social aspect and also due to the chosen geographical location. Digitalization/digital transformation/digitization has become a crucial phenomenon in the current world and people

were suddenly convinced to accept it as a part of their everyday lives. Therefore the concepts seem to have a promising future in research and needs constant updating and exploring.

Moreover, while working on this thesis, it was found very stimulating and important, how majority of the digitalization related studies are based on developed countries and the lack of research work related to the digitalization in developing countries, especially with impact of Covid-19 crisis. There are many digitalization related interesting questions that can be researched on, based on different sectors/industries/geographical locations in the developing countries that lacks attention and can reveal completely different and relatively interesting data and information for the benefit of research.

It also seems that with the evolutionary nature of digital transformation and the impact of Covid-19 crisis, the existing challenges related to digital transformation might also change. There is high potential for coming across new challenges as well as the ignorance of existing challenges that were previously considered important.

This thesis is just one case study that focused on a single educational institute in Sri Lanka. There are enormous numbers of educational and other institutes around the world that have interesting digitalization related stories; especially after the pandemic. Therefore more case studies of different aspects can be considered highly valuable for the future of information systems research.

6.4 Implications

Administrative implications

With this study, the objective was to explore and understand the real challenges commonly faced by government schools in Sri Lanka when moving towards digitalization of education. The findings of this study have the potential to provide insights to current and future relevant authorities of Sri Lankan education system and technology sectors to consider when developing the digital roadmap for re-structuring and implementing digital education in Sri Lanka. The study is believed to have generated adequate motivations for further acknowledgement and implementations. The main reason to select a school from a certain remote area of Sri Lanka for this study is mainly due to the lack of attention these areas receive when it comes to digitalization due to the digital divide in between urban and rural areas. The intention was to emphasize the fact that digital education is a crucial requirement

for every school in the country and therefore should be addressed in terms of equality despite geographical locations or digital divide. Digital technology in education in the current digital era should be considered crucially important and should be prioritized in development plans by the country's administration as it greatly impacts the future of the country. This study shows how schools are ready to accept digitalization in education if the associated challenges are addressed properly to provide solutions and improve digital education setting of the country.

Theoretical implications

The theorized framework of this research tries to establish a connection between different information systems related concepts such as digital transformation, its challenges, digitalization of education, digitalization in developing countries, effect of Covid-19 on digitalization and technology acceptance theories. This study demonstrates the fundamental effects of the connection of these topics and places a new case study in the existing theoretical framework to extend the current literature on the main research area - digital transformation, in order to make a valuable contribution to the academic world. The study also proves how Covid-19 challenges existing technology acceptance theories and open up a new wing in the current information systems research setting for extended IS theories.

Societal implications

This research is aimed to help the society – especially in the developing countries, to gain a deeper understanding of the importance of digitalization and moving with the technology as well as to convince the individuals of the possibility of digitizing education. The importance of updating education system and improving digital literacy are highlighted to convince necessity of accepting the future. The study also suggests restructuring the education system to suit digitalization, however without causing any harm to its core values such as teacher-student connection, standards and ethics. Digitalization of education possibly is a solution to address many other challenges associated with education in the developing countries such as educator shortages, space problems, access to resources and other facility related problems.

Furthermore, this research could possibly influence the restructuring and growth of education and social standards of Sri Lanka and other developing countries allowing for holistic benefits for globalization and towards development.

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Appendix A: Questionnaire

	Question	Intention and relevance to theoretical framework
Q1	What did you know about digital education before Covid-19 pandemic?	Understanding the background and history about the respondents' knowledge about digital transformation and previous digital education knowledge and experience.
Q2	What initiated the decision for digital education?	Understanding the time and cause of initiating digital education and understand the respondents' ideas about the impact of Covid-19 pandemic.
Q3	How long it took to prepare for digital education?	Understanding about the time taken for planning a sudden digitalization process and how the pandemic situation impacted on the pace of digital transformation.
Q4	Were there any plans for digital education before the pandemic situation?	Understanding background and readiness related to digital education and prior knowledge on digital transformation of education.
Q5	What were the challenges faced when starting and continuing digital education?	Understanding challenges faced by the management, teachers, students and parents during sudden digitalization to understand general challenges in digital transformation of education.
Q6	How did you convince or prepare teachers/students/parents/management about digital education?	Understanding about overcoming the challenges in digital transformation related to cultural and structural change caused due to digitalization.
Q7	What was good?	Understanding the benefits and opportunities of digital transformation of education.

Q8	What was bad?	Understanding the negative effects and challenges of digital transformation of education.
Q9	What are the lessons learnt?	Understanding the expectations, emotions, experience, opportunities related to digital transformation of education.
Q10	Are there any future preparation plans?	Understanding the willingness for accepting digitalization of education and how the challenges in digital transformation can be minimized.