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A Comprehensive Study of Sri Lankan Higher Education in a Post-Pandemic Landscape.

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Abstract

This study investigates the effects of the switch to online instruction in higher education in Sri Lanka after the COVID-19 outbreak. The study examines different aspects of the move to online education using a mixed-methods methodology that combines quantitative analysis of student satisfaction surveys and qualitative analysis of educator interviews. Qualitative study highlights the difficulties educators have in adjusting to digital platforms, the methods they use to improve student learning outcomes, and the advantages and disadvantages they see in online learning. A quantitative analysis looks at how satisfied students are with their online learning experiences and identifies the main variables that affect their engagement and academic success.

For online education to be as effective as possible, the results highlight the necessity of continuous professional development for teachers, fair access to technology for students, and creative pedagogical strategies. In the context of post-pandemic higher education in Sri Lanka, the study adds to the body of literature by providing insights into the intricate interactions among technology, pedagogy, and social behaviors. Future study should focus on comparative evaluations of various online learning platforms, long-term studies to evaluate the effects of online learning, and examinations of challenges related to inclusion and digital equity.

Key words: Online learning, Higher education, COVID-19 pandemic, Digital technology integration, Student learning outcomes, Pedagogical strategies, Digital equity, Technological barriers

Chapter 1

"With an emphasis on SLIATE as a case study, Chapter 1 presents the research focus on digitization's effects on post-pandemic Sri Lankan higher education. It lists the research gaps, emphasizes the difficulties of making the switch to online learning, and lists the study's stakeholders. In general, the chapter lays the foundation for assessing academic performance results in relation to the integration of digital technologies."

1. Introduction

This thesis's main objective is to thoroughly examine how digitization, physical spaces, and temporal dynamics interact in Sri Lankan higher education in the context of the country's post-pandemic environment. Using a multidisciplinary approach that takes into account technological progress, physical infrastructure, and time, the study aims to give a more complete picture of the opportunities and challenges those educational institutions face, with a focus on the Sri Lanka Institute of Advanced Technological Education (SLIATE). The thesis investigates how SLIATE, a representative government institute with 19 branches and 13 higher national diplomas, has adapted to the changing educational landscape through a thorough case study analysis. In the end, the thesis hopes to make a significant contribution to strategic decision-making, provide useful solutions, shape future directions for higher education in Sri Lanka, and possibly act as a model for other academic institutions around the world adjusting to comparable challenges in the digital age.

1.1. Background

Regardless of the financial situation of the family, education is a critical component of modern society and a means of both personal and collective development. Parents want their children to do well in school, even if they cannot afford it. But the COVID-19 pandemic brought about what is likely the worst crisis in the history of education, forcing academic institutions all over the world to reevaluate and modify their teaching approaches. Regardless of individual preferences, academic institutions were forced to switch from traditional in-person education to virtual modes in order to comply with strict social distance regulations. More than 3 million students globally started taking online classes for higher education in 2012, and this trend has only gotten stronger over time, according to Razeet et al. (2019). The transition from traditional in-person learning to virtual learning has been primarily fueled by technological developments.

It's clear that technological advancements have had a significant impact on education, which has led college students to steadily switch to online study.

The widespread availability of the internet has completely transformed the way that education is delivered, making it possible to continuously disseminate knowledge without regard to time or location. Because of accessibility, learning has shifted from being centered around the user to being more flexible, allowing students to interact with the material whenever it's convenient for them. As a result, learning is now more customized to each student's preferences and unique learning style. Additionally, there is a favorable relationship between undergraduate students' academic achievement with online learning. The flexibility that comes with learning online allows students to make the most of their study schedules, which improves their productivity and achievement (Solc et, al. 2012).

Higher education has successfully incorporated cutting-edge digital technologies into its curricula in several developed countries. Resources are readily available, which makes it easier for educational institutions to adopt digital systems, and students frequently have the financial wherewithal to purchase the gadgets and tools they need. Developing nations, seeing the value of digital education, are likewise working to co2nvert traditional higher education classrooms to digital ones. However, because of a number of socioeconomic issues, this change presents substantial hurdles. Developing countries face challenges while implementing digital educational systems, in contrast to their industrialized counterparts. These issues arise because people need to be aware of the most recent developments in digital gadgets and their uses, in addition to taking into account financial and lifestyle limitations. Institutions in developing nations may find it difficult to fully utilize the potential benefits of digitalization, even if they embrace it completely (Gupta et al., 2020).

The existence of outdated information and communication technology (ICT) systems in many developing countries is a major factor contributing to the differences between developing and developed nations (Moussa & Moussa, 2009). As such, developing countries have numerous obstacles to overcome while attempting to digitize their higher education institutions, which calls for the reduction of a number of disadvantages. Underfunding of software, hardware, and learning materials, along with a lack of training opportunities, are some of the challenges developing nations face when they digitize their higher education systems (Bhuasir et al., 2012). Similar obstacles stand in the way of Sri Lanka's efforts to move to digital educational institutions as a developing nation. The use of digital education systems was not very high in Sri Lanka before the COVID-19 outbreak. The Open University of Sri Lanka only provided

open distance learning as its only kind of online education, according to research done by Hettiarachchi et al. (2021). According to Mailewa et al. (2020), there was also little use of digital education in the nation's schools and high schools. There are many obstacles in the way of developing countries like Sri Lanka's transition to digital higher education. To overcome these challenges, coordinated efforts are needed to address problems like insufficient funding, restricted access to technology, and the requirement for extensive training programs.

On 13th March 2020, the Sri Lankan government made the decision to close all schools and higher educational institutions in response to the COVID-19 pandemic (Ryotaro et, al., 2020). This marked a significant challenge for the Sri Lankan education system, as it lacked substantial experience with digitalized education, particularly in secondary and higher education settings. The predominant mode of education had traditionally been physical classrooms, thus necessitating a rapid transition to alternative methods. A key challenge encountered during this transition was the widespread lack of access to digital devices among students, coupled with limited familiarity with digital educational platforms. However, efforts to mitigate this challenge were made by various digital service providers in Sri Lanka, who offered free internet access to university servers during the pandemic period, until 17th August 2020 (Hayashi et al., 2020), (Ryotaro et, al., 2020). The goal of this program was to encourage and assist students in making the switch to online learning.

The Sri Lanka Institute of Advanced Technological Education (SLIATE), a prominent higher educational institution in the country, faced similar challenges. Despite having a fully digitalized Learning Management System (LMS) in place prior to the pandemic, SLIATE had not conducted any courses online before the onset of COVID-19. The institute operates across 19 branches and offers 13 undergraduate courses. Under the LMS system, all students and lecturers were registered, and course materials were uploaded for access. Moreover, a standardized curriculum was implemented across all branches, with common examination papers administered. However, there was a notable absence of a grading system within the LMS, with only a few lecturers utilizing it for continuous assessment purposes. SLIATE quickly made the switch from providing education through physical to digital means in reaction to the pandemic-caused shutdown. Making use of its already-existing digital infrastructure, the institute started offering courses exclusively online, guaranteeing that education would continue even in the face of disruptions caused by the pandemic.

1.2. Problem description

The COVID-19 epidemic has caused a paradigm change in education that has prompted educational institutions around the world, including those in Sri Lanka, to quickly switch from traditional on-campus education to online learning. According to Stem (2020), the internet has had a significant impact on postsecondary education, helping to facilitate this shift and having an ongoing effect. This paradigm-shifting change calls for a thorough analysis of the academic performance outcomes of higher education students in Sri Lanka, especially in the post-COVID-19 period. More specifically, it is imperative to assess which kind of education produces better results by contrasting the outcomes of traditional on-campus education with those of online education, taking into account variables like grades, exam scores, and retention rates. According to Ellapola (2022), digitalized education is important. It includes a variety of technological tools and gadgets that are used to offer teaching, such as computers, laptops, interactive televisions, audio-video equipment, tablets, and internet access. It is critical to comprehend how much digital technology is incorporated into the teaching process, which entails looking at the availability and use of digital tools, resources, and platforms in traditional and online learning environments. Furthermore, assessing how well these technologies improve student learning outcomes is crucial for making well-informed decisions about educational policy and practice.

It is critical to address the difficulties experienced in implementing digital education in Sri Lankan higher education. According to Jayasuriya et al. (2021), there are a number of important challenges that must be overcome, including a lack of finance, restricted access to technology, insufficient opportunities for educator training, and antiquated ICT infrastructure. Students from rural regions should be particularly concerned as they could not have access to the appropriate electronic gadgets, which could exacerbate already-existing inequities in educational opportunity. The COVID-19 pandemic's sudden shift to online learning creates a special case study opportunity, calling for an investigation of the effects of this change on student academic performance and the learning environment. Jayasuriya et al. (2021) underline that in order for educators to successfully incorporate technology into their teaching methods, they may also need extra support and training in e-learning pedagogy and the use of digital platforms. It's critical to comprehend how academic institutions, such as the Sri Lanka Institute of Advanced Technological Education (SLIATE), have responded to the pandemic's challenges in order to shape future educational strategies and policies. Important insights into efficient

teaching methods during emergencies can be obtained by looking at their preparedness, tactics, and experiences in switching from traditional to online learning.

The overall goal of this research is to present a thorough knowledge of the academic performance outcomes of students in post-COVID-19 Sri Lankan higher education, taking into account the differences between traditional on-campus and online learning environments. The study aims to determine the elements influencing student learning outcomes and provide guidance for future educational policies and practices in Sri Lanka by evaluating the impact of digital technology integration levels on instructional procedures.

Identification of Knowledge Gap

Despite the wealth of literature on online learning in Sri Lankan higher education, there remains a knowledge gap regarding the theoretical framework that underpins the adoption and implementation of online learning practices. While existing studies offer valuable insights into practical challenges and strategies, there is limited exploration of the theoretical foundations that inform educators' practices and shape students' learning experiences in online environments. Specifically, there is a need to examine how theoretical concepts, such as Schatzki's theory of social practices, can enhance our understanding of the dynamics of online learning in the Sri Lankan context. By addressing this gap, the current research aims to contribute to a more comprehensive understanding of the socio-technical aspects of online learning and inform effective strategies for its implementation in Sri Lankan higher education institutions.

Contribution to Knowledge Gap

In the discussion section, the research articulates its contribution to the identified knowledge gap by applying Schatzki's theory of social practices to analyze the empirical findings. By elucidating the interplay between practical knowledge, teleoaffective structures, material arrangements, and social interactions in the context of online learning, the study offers theoretical insights that complement existing empirical research. Specifically, it demonstrates how educators' practical knowledge and institutional structures influence the adoption and integration of online learning technologies, thereby shaping students' learning experiences and outcomes. Through this theoretical lens, the research enhances our understanding of the complex socio-technical dynamics of online learning in Sri Lankan higher education and provides valuable implications for policy and practice.

1.3. Purpose of research question

In order to evaluate academic performance outcomes between traditional on-campus education and online education under COVID-19, this research will examine and analyze student outcomes in higher education in Sri Lanka. This research attempts to evaluate the effects on learning and performance of students of different degrees of digital technology integration in the setting of Sri Lankan higher education.

The research question

How do the academic performance outcomes of students differ between traditional on-campus education and online education in Sri Lankan higher education post-COVID-19, considering the impact of various digital technology integration levels in instructional processes?

Overall, this research aims to contribute to a deeper understanding of the comparative effectiveness of traditional on-campus education versus online education in Sri Lankan higher education post-COVID-19, with a focus on the role and impact of digital technology integration in instructional processes on student academic performance outcomes.

1.4. Research boundaries

The study primarily examines how higher education establishments in Sri Lanka handled the COVID-19 pandemic. It doesn't cover other nations or areas. Academic performance results in higher education, including undergraduate and potentially graduate degrees, are the main focus of the research. It stays away from discussing elementary or secondary schooling. The research is restricted to the post-COVID-19 era, which started in 2020 when the pandemic had a major effect on educational systems all across the world. It does not go beyond the COVID-19 era, though it may take into account data and developments up to this point.

In the research, online learning options used during the epidemic are contrasted with conventional on-campus instruction. It does not address other forms of education, however it may examine differences in online learning, such as totally online versus hybrid models. The study evaluates the effects of integrating digital technology into teaching procedures on the academic performance results of students. It may take into account different digital tools, resources, and platforms utilized in the delivery of online learning, but it doesn't look at more general technological problems unrelated to learning.

With a particular case study on the Sri Lanka Institute of Advanced Technological Education (SLIATE), the research mainly focuses on higher education establishments in Sri Lanka. It might also take into account other establishments, but only in the framework of Sri Lanka's higher education system. The study primarily focuses on the implications of these socioeconomic obstacles for educational attainment; while acknowledging the difficulties that developing nations such as Sri Lanka confront in implementing digital education. It doesn't go into great detail into larger socioeconomic problems or how they affect education.

1.5. Stakeholders

The following parties are involved in this study on academic performance results in post-COVID-19 higher education in Sri Lanka, with an emphasis on the effects of digital technology integration, Since the research directly affects students' educational experiences, outcomes, and learning settings, students are the main stakeholders in the study. Improving students' learning experiences requires an understanding of how various forms of instruction impact their academic success. Stakeholders in the project include academic staff, professors, and teachers whose practices and techniques of instruction are being examined. The research's conclusions can be used to improve the efficacy of training programs and professional development initiatives that offer online education.

Stakeholders in the research include universities, colleges, and other higher education establishments in Sri Lanka, as it assesses the effectiveness of their instructional strategies, which may involve incorporating digital technologies. The results could impact investments in digital infrastructure, institutional policies, and tactics. In shaping educational policies, financial allocations, and regulations, government agencies, ministries of education, and policymakers are stakeholders. The results of the study can help guide decisions on how best to allocate resources, support higher education institutions, and develop policies pertaining to digital education. Because they have a stake in the caliber and applicability of higher education outcomes, employers and industry representatives are considered stakeholders. Workforce development programs and partnerships between business and academia can benefit from an understanding of the ways in which various forms of education affect students' abilities, competencies, and employability.

Due to the critical role that their goods and services play in the provision of online education, businesses and organizations that create and offer digital education technologies, platforms, and

resources are considered stakeholders. Research findings can guide the creation and enhancement of instructional technology suited to Sri Lanka's higher education requirements. Stakeholders in the education sector include NGOs, advocacy groups, and civil society organizations that may promote inclusive and equal access to education, especially for underprivileged or marginalized groups. The results of the study can guide campaigns and advocacy work meant to remove obstacles to the adoption of digital education. Stakeholders in Sri Lankan education efforts include international organizations, donor agencies, and development partners who may provide resources, knowledge, and technical help. Their funding choices, goals, and capacity-building initiatives in the education sector can all be influenced by the research findings.

1.6. Outline

Below is a list of this research's outline. It gives a thorough explanation of what each chapter contains.

Chapter 1: introduction: With an emphasis on SLIATE as a case study, Chapter 1 presents the research focus on digitization's effects on post-pandemic Sri Lankan higher education. It lists the research gaps, emphasizes the difficulties of making the switch to online learning, and lists the study's stakeholders. In general, the chapter lays the foundation for assessing academic performance results in relation to the integration of digital technologies.

Chapter 2: Literature Review: The literature study explores the difficulties of implementing digital education in underdeveloped nations such as Sri Lanka, highlighting obstacles pertaining to infrastructure, resources, and socioeconomic variables. It addresses obstacles including unequal access and the requirement for pedagogical adaptation while examining the potential of digital technology to enhance learning outcomes. It also describes the future paths that higher education in Sri Lanka will take, emphasizing the value of inclusive strategies, innovative pedagogies, and continuing research to optimize the advantages of digital learning after COVID-19

Chapter 3: Theoretical framework: In Chapter 3, Schatzki's theory is applied to study social practices in post-COVID-19 higher education in Sri Lanka, with a focus on the role of physical spaces, digital technology integration, and temporal dynamics. The study technique combines quantitative and qualitative methods, such as surveys and interviews, to learn more about social interactions and the results of academic success. With an emphasis on ethical issues throughout the study process, workable solutions are put forth to improve social practices and technological integration in both conventional on-campus and online learning environments.

Chapter 4: results and analysis: Using both quantitative and qualitative data, Chapter 4 examines the shift to online learning in Sri Lankan higher education following COVID-19. Through survey data, it evaluates accessibility, efficacy, and student involvement; instructor interviews shed light on their difficulties, modifications, and effects on student results. The chapter, which is situated within theoretical perspectives on social practices, emphasizes the necessity for continued support and fair access to technology.

Chapter 5: Conclusion: Chapter 5 concludes that the COVID-19 pandemic has significantly impacted Sri Lankan higher education by necessitating a rapid shift to online learning, revealing both opportunities and challenges related to technology access and educator adaptation. Future studies should focus on longitudinal effects, comparative analyses of online learning environments, and strategies to enhance digital equity and pedagogical innovation.

Chapter6: Reference and Appendix: An appendix and reference are included in Chapter 6 along with the sources used for the study.

Chapter 2

"The literature study explores the difficulties of implementing digital education in underdeveloped nations such as Sri Lanka, highlighting obstacles pertaining to infrastructure, resources, and socioeconomic variables. It addresses obstacles including unequal access and the requirement for pedagogical adaptation while examining the potential of digital technology to enhance learning outcomes. It also describes the future paths that higher education in Sri Lanka will take, emphasizing the value of inclusive strategies, innovative pedagogies, and continuing research to optimize the advantages of digital learning after COVID-19."

2. Literature review

2.1. Digital education adoption in Developing context

It is important to understand the potential and problems associated with using the technology to promote education from the debate regarding the adoption of digital education in underdeveloped countries like Sri Lanka. Although the global shift to digital education has been pushed by COVID-19 epidemic, its effects have varied greatly amongst various socioeconomic circumstances.

As with many other developing countries, there are significant barriers to the widespread adoption of digital technology in higher education in Sri Lanka. These include problems with resources, accessibility, and infrastructure. According to yang et al, (2022) research, these problems must be fixed in order to ensure that everyone has equal access to high-quality education. Bhuasir et al., (2012) highlight the significance of talking these obstacles in order to guarantee fair access to higher quality education and fully capitalize on the advantages that digitalization may offer.

As noted by Hettiarachchi et al. (2021), efforts to incorporate digital technologies in to Sri Lankan educational practices have accelerated in reaction to the pandemic. Organizations such as SLIATE provide insight examples of the tactics and modifications requires for efficient digital education delivery in arears with limited resources. The revolution potential of digital technology integration in higher education, as highlighted by scholarly research, includes wider access to educational resources, improved, student involvement, and tailored leaning experience (Lai & Brower, 2019). According to Ellapola (2022), the acceptance of digital education is largely influenced by an institution's level of readiness with regard to its digital infrastructure, technological assistance, and administrative policies. Lai & Brower do, however, also recognize the significance of closing the digital literacy gap and guaranteeing fair access

to technology, especially in poor nations. Qolamani (2024) investigates how pedagogy, student experiences, educator roles, and institutional learning are affected by a range of instruments, including learning management systems, data analytics, online learning, and artificial intelligence.

The difficulties of integrating digital technology in educational context are further highlighted by research by Selwyn (2015). Although technology has the potential to enhance learning outcomes, its success depends on how well it is incorporates in to instructional strategies and matched with learning objectives. To get the most out of digital tools, teachers need to assess their pedagogical consequences thoroughly. Intense training courses are required to raise instructors' comfort levels with digital tools and platforms and facilitate their easier integration into instructional strategies (Jayasuriya et al., 2021).

Rich nations' financial advantages and plenty of resources have made it easier for higher education to successfully implement digital technology (Razeeth et al., 2019). On the other hand, developing countries such as Sri Lanka have limited resources, which means that comprehensive plans to close the digital divide and provide equal access to education are required (Mailea et al., 2020). There are particular difficulties in implementing digital education in poor nations like Sri Lanka. Socioeconomic difficulties, such as restricted access to technology, insufficient funding for ICT infrastructure and lack of opportunity for educator training, are among the barriers to effective implementation that Gupta et al., (2020) Highlighted.

In developing countries, the conversation surrounding the adoption of digital education emphasizes the significance of tackling resources and infrastructure constraints in addition to carefully analyzing the pedagogical effects of technological integration. To ensure that digital education is adopted fairly, it is imperative to guarantee that every student has access to the digital resources they require, including reliable internet access and electronic equipment (Jayasuriya et al., 2021). According to Jayasuriya et al. (2021), having restricted access to cutting-edge technology and receiving insufficient technical support may make it more difficult for digital education to be effectively adopted. Moreover, educational gaps could get worse if pupils from low-income households can't easily access digital resources. Organizations may the strive to guarantee that all students have fair access to high-quality education and to fully utilize digitization potential to promote education.

2.2. Digital technology and educational outcome

Although there are a number of obstacles to overcome, the use of digital technologies in higher education has the potential to improve learning outcomes. The flexible and individualized aspect of digital education was highlighted by Solc et al. (2016), who found a favorable association between undergraduate students' academic progress and online learning. Similar to this, Razeeth et al., (2019) found a link between improved academic achievement in higher education and shift to online learning. How ever according to Bhuasir et al., (2012), the quality of digital infrastructure and the extent of technology integration have a substantial impact on how well online education is delivered.

To maximize the influence of digital education on academic performance, studies conducted in the Sri Lankan context, such as those conducted by Mailewa et al., (2020) and Jayasuroya et al. (2021), highlighted the significance of addressing financial restrictions, restricted access to technology, and training needs. The necessity of context-specific techniques for the successful deployment of digital education is highlighted by these findings. Studies show that the use of digital technology and academic performance outcome in context of higher education are positively corelated 9solc et al., 2012) but depending on contextual elements like instructional approaches and infrastructure preparation, this integration efficacy differs (Gupta et al., 2020).

The use of digital materials in the classroom has completely changed how teachers impart knowledge and how students absorb it. Teachers can apply a range of instructional tactics that greatly improve student learning results by utilizing a variety of digital technologies. A dynamic and captivating learning environment can be produced, for example, by using interactive simulations, multimedia presentations, and online discussions (Stem, 2020). These technological advancements, such as online collaboration tools and virtual classrooms, encourage active student participation and engagement, enhancing the engaging and stimulating nature of the learning process (Jayasuriya e t al., 2021). The freedom that digital platforms provide educators with is one of their most noticeable advantages. These platforms, in the opinion of Allen and Seaman (2017), make education more accessible by allowing instructors to communicate with students in different time zones and geographical locations. In the worldwide world of today, where educators and students may reside on various continents, this adaptability is essential. Additionally, a wide range of resources are available on digital platforms, including as online libraries and instructional videos, which improve students' academic performance and increase their learning chances (Ellapola, 2022).

The use of adaptive learning technologies in education is another important development. These technological advancements provide individualized learning experiences that increase motivation and engagement by customizing instructional content to each student's needs (Stem, 2020). It has been demonstrated that the individualized character of these virtual learning environments enhances academic results. According to research, because digital tools offer personalized and engaging learning experiences, students who use them often achieve higher academic standards (Jayasuriya et al., 2021). The plethora of materials accessible on digital platforms, like instructional videos and online libraries, greatly enhances students' learning chances and helps them succeed academically (Ellapola, 2022). But there are drawbacks to digital learning as well as advantages. Differences in student performance might result from unequal access to technology, underscoring the necessity of resource distribution in an equitable manner to guarantee that every student can take advantage of digital education (Jayasuriya et al., 2021).

Moreover, one of the biggest challenges still facing educators is modifying evaluation techniques to accurately assess student learning in a digital setting. Innovative approaches to evaluation may be necessary because traditional assessment methodologies may not be sufficient to fully capture the breadth and depth of student learning in digital contexts (Stem, 2020). To realize the full potential of digital education, these issues must be resolved. Even if digital tools have a great deal of potential to improve teaching and learning, it is critical to solve the integration challenges. Teachers can provide a more effective and inclusive digital learning environment by guaranteeing equal access to technology and creating creative methods of assessment. Using these digital breakthroughs to create individualized, accessible, and high-quality learning experiences for every student is where education is going to go in the future.

2.3. Socio economic implications on Digital education

Socioeconomic factors have a significant impact on the acceptance and effectiveness of digital education in developing nations, highlighting important issues and the necessity of comprehensive policy interventions. Effective digitization attempts are hampered by outdated information and communication technology (ICT) systems in many developing countries, as Moussa & Moussa (2009), in order to promote digital education projects, there must be strong policy support. They also highlight financing restrictions, access concerns, and training gaps.

According to Ryotato et al., (2020), the pandemic-related closure of educational institutions in Sri Lanka made already-existing inequalities in access to digital resource worse. This was

especially true for students from underprivileged and rural groups. The need of inclusive digital education techniques is emphasized by initiatives such as offering free internet access to educational platforms, which demonstrate efforts to close these gaps (Hayashi et al., 2020)

Particularly in developing countries the socioeconomic environments has a substantial impact on the uptake of digital education and its results. In their investigation of the socioeconomic aspects of digital education program in India, Gupta et al. (2018) draw attention to issues with access to technology, infrastructure, and socioeconomic inequality. Their results highlight the necessity of removing these obstacles in order to promote fair participation in digital learning.

The socioeconomic effects of digital technology use in higher education are also examined by AI-Samarraie et al. (2017), who emphasized the need for inclusive policies and measures to close the digital divide. To enhance educational opportunities for underrepresented people and promote digital inclusion, government measures, institutional assistance and community partnerships are essential.

There are major obstacles in Sri Lanka that prevent digital education projects from begin fully adopted. Gupta et al., (2020) draw attention to issues such as inadequate funding for digital infrastructure, restricted access to technology, and inadequate programs for teacher preparation. These challenges are made worse by socioeconomic differences. Rural kids frequently do not have access to basic electronic equipment, which increase the gap in educational opportunities (Jayasuriya et al., (2021).

In addition, Sri Lankas educational institutions used digital teaching resources comparatively little before the COVID-19 pandemic. In 2021, Hettiarachchi et al. pointed out that very few establishments provided online learning via open distance learning, such as the Open University of Sri Lanka. Rapid changes were required for educational continuity, as demonstrated by SLIATE, due to the sudden transition to digital learning during the pandemic, which showed institutional inadequacy (Ryotaro et al. 2020). These incidents highlight the urgent need for deliberate investments and policies to raise the adoption of digital education in underdeveloped nations such as Sri Lanka solve socioeconomic issues.

2.4. Future directions for Sri Lankan Higher education

Academic research into the effect of online on academic performance outcome in higher education has been encouraged by the change to online learning brought about by the COVIS-19 pandemic. Although Stem (2020) emphasizes how the internet has transformed

postsecondary education, she also encourages a careful comparison of student results in online and traditional on campus settings.

Ellapola (2022) emphasizes the significance of considering digital technologies integration, pedagogical innovations, and temporal dynamics when evaluating student accomplishment and learning experiences in Post COVID-19 education situations. A framework for evaluating the impact of digital education interventions on academic performance outcomes is offered by Ellapols research.

Furthermore , successful online instruction is presented by Hodges et al. (2020), who highlighted important ideas including accessible content, encouraging interactions, and transparent communication. The pedagogical practices play a crucial role in fostering student engagement and success, and this framework acts as guide for instructor making the switch to online instruction.

In the future, research endeavors in higher education in Sri Lanka ought to concentrate on assessing the enduring effects of digital education on academic achievements and organizational procedures. In order to overcome sociocultural issues and advance digital equality in international education settings, Chang & Gomes (2022) support inclusive method to digital education. Kuure et al., (2018) further stress the significance of novel methods for understanding language pedagogy and instructional practices in dynamic digital environments, such as mediated discourse analysis (MDA) and nexus analysis (NA).

There are benefits and drawbacks to Sri Lankan's higher education digitization, which calls for all- comprehensive approaches to improve the quality of the counties digital infrastructure and solve socioeconomic gap. Institution of higher learning such as SLIATE may leas long-term digital transformation in the post COVID-19 age by utilizing the knowledge gained from the pandemic's transition to remote instruction.

Summary of literature review

The literature review provides insights into the shift to online learning in Sri Lankan higher education following the COVID-19 pandemic. It discusses the challenges and opportunities associated with this transition, including issues related to ICT infrastructure, technology access, educator preparedness, and student engagement. Existing studies, such as those by Jayasuriya et al. (2021), Stem (2020), and Ellapola (2022), highlight the importance of addressing these challenges through professional development initiatives, infrastructure improvements, and

pedagogical innovations. Additionally, the literature emphasizes the potential of online learning to enhance flexibility, inclusivity, and learning outcomes in higher education settings.

Chapter 3

"In Chapter 3, Schatzki's theory is applied to study social practices in post-COVID-19 higher education in Sri Lanka, with a focus on the role of physical spaces, digital technology integration, and temporal dynamics. The study technique combines quantitative and qualitative methods, such as surveys and interviews, to learn more about social interactions and the results of academic success. With an emphasis on ethical issues throughout the study process, workable solutions are put forth to improve social practices and technological integration in both conventional on-campus and online learning environments."

3. Theoretical framework and Research methodology

This Study approach operationalizes Schatzki's theory of social practices in the context of higher education, with an emphasis on the distinctions between traditional on-campus and online education in post COVID 19 Sri Lanan higher education (Splitter et al, 2018; Georg et al, 2019). The key components of the theory will be broken down and applied to examine the social practices that are present in all learning environments.

3.1. Schatzki's Theory

To obtain important insights into social practices in educational contexts, theoretical framework must be used in educational research. Schatzki's site ontology is one framework that provides a sophisticated lens to analyze the interdependence of practices, the significance of temporal spatial dimensions, and the incorporation of organizational into larger social settings (Splitter et al, 2018; Georg et al, 2019).

The way educational procedures change in reaction to social standards and technological improvements is highlighted by Schatzki's idea. By using this approach, researchers may examine the complex relationships present in educational institutions and comprehend how they have responded to outside factors. Anders Buch, (2020) mentioned this theory hold that peoples learning and personal development are influenced by the activities they engage in. at the same time, these activities alter according to how people engage with them.

The application of Theodore Schatzki's site ontology in the field of organizational studies is examined by Splitter et al., (2018). They explore significant questions including how Schatzki's approach clarifies micro foundations and highlights the processes by which organizations adapt in to social environments. The study emphasize the interaction of time and space in organizational practice by giving special attention to ideas like teleoaffective structures and

practice arrangement bundles. According to Anders Buch, (2020) the relationships that exist between education, personal development, and experience people have in their social settings highlight how important for us to engage in various activities and engage with others since these things shape development and have an effect on the organization connect with.

"Teleological and affective" are two essential aspects of social behaviors that are combined under the word "teleoaffective". From a teleological perspective, it refers to the objectives, motives, or goals driving human behavior in a particular profession (Splitter et al., 2018). The goals and course of actions are shaped by this factor. For example, the teleological component of educational activities may include objectives like skill or knowledge growth.

According to Splitter et al. (2018), the term "affectively" refers to the emotional or affective aspects of social practices. People's motivation, experiences, and level of engagement in an activity are influenced by their emotions, feelings, and affective states. Affectivity in the classroom has an effect on students' emotional reactions to instruction, motivation to learn, and general involvement in the process.

These two dimensions are combined in the idea of teleoaffectivity, which provides a thorough explanation of how objectives, motives, emotions, and experiences connect in social behaviors (Splitter et al., 2018). Teleoaffectivity in higher education provides light on the underlying motives, feelings, and objectives that influence student-teacher relationships, institutional arrangements, and teaching and learning activities.

When it comes to methodology the study support the use of qualitative techniques like ethnography and interviews to look at the structures and behaviors of organizations. Although actual data is not presented in the study, it provides guidance for future researchers who wish to use Schatzki's site ontology in empirical projects.

The adoption and use of Schatzki's theory in organizational studies has been greatly aided by Georg et al, (2019), despite challenges such as the theory intricacy and its lack of empirical research. The key strengths of the study are its comprehensive theoretical framework, careful consideration of micro-foundations and methodological recommendations for empirical research.

With respect to how organizations are rooted in larger social structures and how temporal spatial dynamics shape practices, Schatzki's site ontology offers a unique view point for understanding organizational process in educational contexts. Schatzki's theory continues to be an important resource for improving our understanding of educational systems and their flexibility in response to changing social environments, despite its complexity and continuous change.

3.2. Social Practices in higher Education Settings

In higher education, the differences between traditional on-campus and online environments go beyond simple geographic proximity to include unique social conventions and ways of interacting with others. Immersion in physical classroom activities, face-to-face interactions between students and lecturers, and active participation in various campus events are characteristics of on-campus education (Moussa & Moussa, 2009). Both students and faculty members benefit from these aspects as they strengthen interpersonal bonds and create a strong feeling of community.

On the other hand, active participation in virtual learning environments is required for online education, which promotes alternative social norms and behaviors. When learning online, students engage in cooperative activities and communicate with instructors and classmates through virtual technologies. As essential elements of the online learning environment, video conferencing, asynchronous online discussion boards, and cooperative group projects help to create a virtual community (Splitter et al., 2018; Georg et al., 2019). Students establish relationships, share ideas, and work together virtually on assignments using various digital channels.

3.3. Temporal dynamic of social practices

In higher education, the temporal dynamics of social practices involve analyzing how social norms change over time in both on-campus and online learning environments. In order to identify patterns and trends, this inquiry will examine the timetable, length, and order of instructional activities in each environment (Splitter et al., 2018; Georg et al., 2019).

In on-campus education, the temporal dynamics are shaped by the structured timetable of classes, extracurricular activities, and academic events that occur within physical campus boundaries. This includes regular class sessions, office hours with educators, and scheduled study groups or club meetings, all of which contribute to the establishment of social norms and routines over time (Splitter et al., 2018).

On the other hand, asynchronous communication and variable scheduling define the temporal framework in which online learning environments function. Students participate in class discussions and access course materials at times that work for them, allowing them to complete learning activities at their own speed. Online learning's asynchronous structure provides a unique temporal dynamic that can be more flexible but also calls for self-control and time management abilities (Splitter et al., 2018; Georg et al., 2019).

3.4. Conceptual frameworks

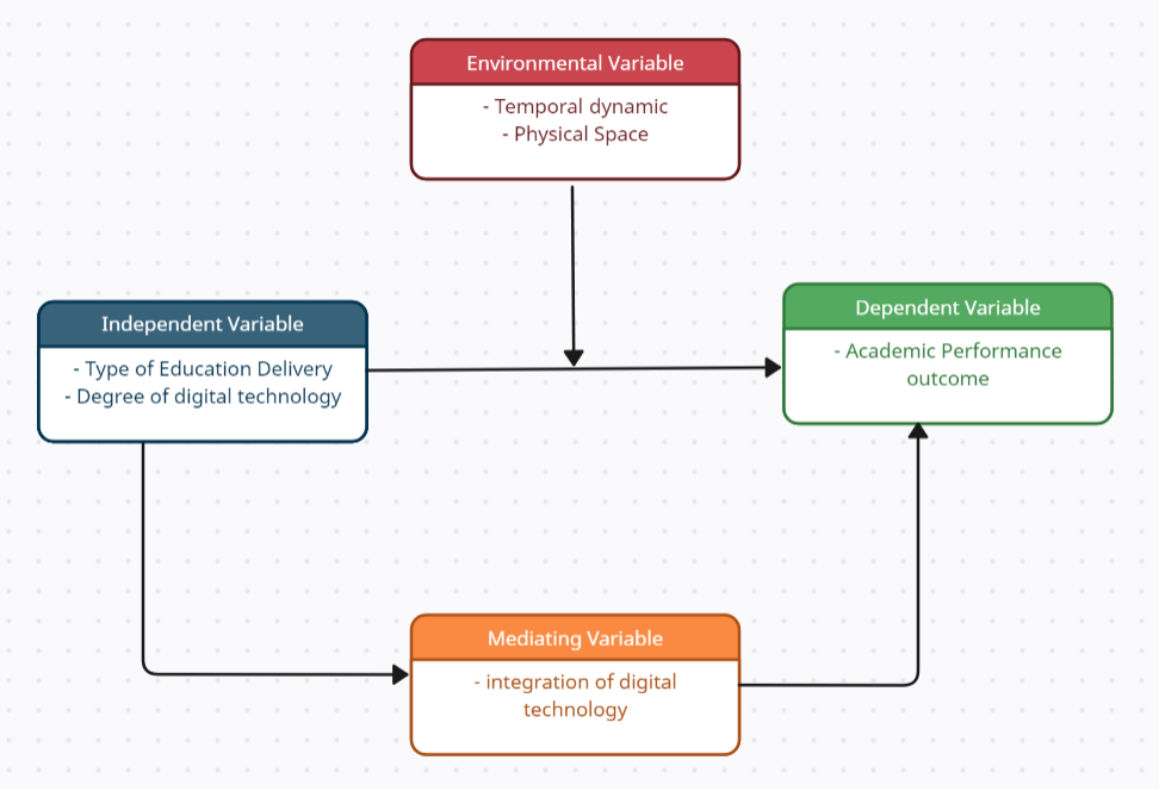

Figure 1: Conceptual framework

Independent variable

Type of education Delivery

According to Schatzki's theory, social practices are influenced by shared understandings and norms that have their roots in particular contexts (Splitter et al., 2018; Georg et al., 2019). According to this viewpoint, the manner in which education is delivered whether it be online or on campus reflects particular social practices that are particular to each environment and are defined by particular norms and institutions.

Every mode of delivering education has a social structure and teleoaffective framework that shape how it is perceived and used in a specific educational context. For instance, in-person contacts, being physically present in the classroom, and conventional teaching strategies influenced by long-standing institutional norms may all be prioritized in on-campus education. On the other hand, flexible learning strategies tailored to the advantages of digital technology, virtual interactions, and digital platforms are commonplace in online education.

These various social practices connected to both on-campus and online learning environments draw attention to the various norms, expectations, and learning settings that influence both students' and teachers' educational experiences. Comprehending the unique attributes of every delivery modality is vital for proficiently formulating, executing, and assessing educational initiatives across diverse settings.

Degree of digital technology

The amount that technological instruments are integrated into teaching methods is represented by the degree of digital technology integration. Schatzki's theory highlights how material configurations, like those seen in digital technology, influence social activities(Splitter et al, 2018 and Georg et al, 2019). This variable looks how relationship, norms and expectations in learning environments are impacted by digital technology as they become a part of the social fabric of educational practice (Orlikowski, 2000).

The term "Digital Technology integration" describes how much digital tools, platforms and resources are integrated into online learning environments, instructional strategies, and resources. This includes utilizing a range of technologies, including virtual communication platforms, online assessment tools, interactive tools for student engagement, multimedia content delivery techniques, and learning Management System (LMS).

I took into account a number of important metrics to evaluate the incorporation of digital technology.

- Evaluated how frequently, and in-deathly instructors used LMS platforms for communication, grading, content delivery, and assignment submission.
- Examined how interactive programs and technologies are used to encourage student participation and engagement.
- It assessed how well online tests, peer evaluations, quizzes, and automated grading systems are used to measure student learning and development.
- examined the incorporation of online communication systems for synchronous and asynchronous student-teacher contact, such as messaging apps like Slack and WhatsApp and video conferencing solutions like Zoom, Microsoft Teams, and Google meet.

Online education's efficacy and results are strongly impacted by the degree of digital technology integration. Increased learning outcomes, improved accessibility, more student engagement, and more flexibility in the delivery of teaching have all been linked to higher degrees of

integration. Furthermore, successful digital technology integration can help build inclusive learning settings where students from different backgrounds can excel.

Dependent variable

Academic Performance outcomes

According to the theory, academic performance outcomes are understood within the relational nature of practices and outcomes, where contextual factors shape student achievement (Splitter et al., 2018; Georg et al., 2019). These outcomes reflect the results of social practices within educational contexts, highlighting how various factors influence student academic achievement.

This variable captures how social practices affect students' academic performance while taking into account how various modalities of education delivery and the integration of technology affect learning outcomes (Leonardi, 2011; Nicolini, 2012). Whether education is delivered online or on campus, the way it is integrated with technology greatly influences the learning experiences and results of students.

By examining how social practices, technology integration, and educational delivery modalities interact, important insights about the factors influencing students' academic success can be gained. Understanding these dynamics is necessary to design effective educational interventions and policies that encourage positive learning outcomes in a range of educational situations.

Environment Variable

Temporal dynamic/ physical space

Social practices in education are strongly influenced by temporal dynamics such as time duration and semester schedule, as well as physical location, classroom or online resources. Schatzki's theory highlighted how time space configurations influence practices (Nicolini, 2012). These factors examine how Temporal dynamic and physical space impact the implementation and development of educational practices, influencing student participation and educational experience.

The research document emphasizes how important it is for modern educational practices to use digital technology into instructional methods. This variable goes beyond just rating the

frequency of digital tools; rather, it explores the degree to which these resources are integrated into instructional strategies and pedagogical approaches.

Based on the findings presented in the research document, the integration variable encompasses several key components. Firstly, there is an emphasis on strategic utilization, where educators carefully select digital tools that align with educational objectives and curriculum requirements. This approach ensures that technology serves as an enabler rather than a distraction in the learning process (Ellapola, 2022).

Furthermore, alignment with more general educational objectives and learning outcomes is necessary for successful integration. In order to facilitate a smooth integration of digital tools into the curriculum, educators make sure that the use of technology increases the achievement of educational objectives and complements current teaching approaches (Jayasuriya et al., 2021). Moreover, effective integration requires modifications to teaching methodologies. To best serve students with a variety of learning needs, educators adapt lesson designs, instructional delivery strategies, and assessment procedures to allow for the use of technology (Stem, 2020).

Another goal of integration is to use digital technology to its full potential in order to produce interesting and relevant learning experiences. Teachers use interactive learning materials, online collaboration tools, and multimedia resources to encourage student participation, critical thinking, and information acquisition. This enhances the learning environment as a whole (Jayasuriya et al., 2021).

Finally, the integration variable highlights how pedagogy and technology interact dynamically. Teachers use technology to provide a welcoming and inclusive learning environment that meets the needs of all students, as well as to facilitate interactive learning experiences and collaborative learning possibilities (Ellapola, 2022). Sophisticated instructional techniques, pedagogical alignment, and meticulous planning are necessary for the successful incorporation of digital technology into teaching methods. Digital tools can be deliberately incorporated into the teaching process to create dynamic and engaging learning environments that prepare students for success in the digital age.

Mediating Variable

Integration of Digital Technology into Teaching Procedures

This variable shows how much digital technology is incorporated into online education platforms, resources, and teaching techniques. The theory highlight the relationship between

material arrangements and actions. The use of digital technology in the classroom is influences the relationship between academic outcomes and modes of education delivery (Nicolini, 2012).

3.5. Data collection

A mixed method strategy is used in this study, integrating quantitative and qualitative techniques. Through the concurrent collection of quantitative data on academic achievement and qualitative insight from interview, an accurate understanding of social interactions and learning experiences in various learning environments (online and on campus) will be attained.

3.5.1. Quantitative data collection

The Higher National Diploma in Accountancy (HNDA) and the Higher National Diploma in Information Technology (HNDIT) were the two separate courses that were the subject of the study. The courses were chosen based on how differently they viewed the use of digital gadgets. Furthermore, the research was carried out in Jaffna and Colombo, two distinct geographic areas. Colombo and Jaffna were selected to offer a diversified representation of urban and regional contexts, adding a range of viewpoints and experiences to the study's conclusions.

In order to gather quantitative data from a sample of students enrolled in the HNDA and HNDIT programs at the Sri Lanka Institute of Advanced Technological Education (SLIATE), a structured survey instrument was created based on established scales and verified measures. The poll asked questions about students' perceptions of the effect of online learning on their academic achievement, their experiences with online learning, their satisfaction with digital learning tools, and their availability of the required technological resources. The following topics will be covered in survey.

1. Demographic Variables
2. Social practice and learning environment.
3. Technology and learning experience.
4. Academic performance

This questionnaire is designed to collect organized numerical data for statistical analysis, which will allow various factors associated with academic achievement and digital education to be compared and correlated.

The survey was widely distributed via institutional email lists and online platforms that were available to all students in both courses and locations in order to guarantee a representative sample. Over a predetermined period of time, the survey results were gathered, enabling sufficient participation from students in various cohorts in Jaffna and Colombo. Statistical

software SPSS was then used to analyze the survey data and find trends, patterns, and correlations between the variables.

3.5.2. Qualitative data collection

The study used qualitative methods in addition to quantitative data collecting to better understand the opinions and experiences of educators regarding the transition to online learning. Twelve instructors from the Sri Lanka Institute of Advanced Technological Education (SLIATE), representing a range of subject areas, degrees of experience in the classroom, and geographic regions of Sri Lanka, including branches in Colombo and Jaffna, participated in structured interviews.

The purpose of the interview questions was to elicit information on a variety of topics related to the shift to online learning, such as the educators' past experience with digital platforms, the difficulties they faced during the shift, their methods for incorporating technology into their lesson plans, and their opinions on how online learning affected student outcomes.

The selection of educators from the Colombo and Jaffna branches was done using a purposive sample technique, which ensured representation from various geographic areas and possibly varied perspectives regarding the use of digital gadgets. In order to guarantee a variety of viewpoints, participants were chosen via professional networks and institutional channels.

The interviews were carried out virtually over WhatsApp calls in order to work with the participants' varied schedules and geographical locations. All participants gave their informed consent prior to the interviews, and precautions were taken to protect the privacy and anonymity of their answers.

With the participants' permission, each interview session was audio recorded and lasted roughly 45 minutes. In order to record important observations and ideas, thorough notes were also collected during the interviews. To aid in data analysis, the audio recordings were later verbatim transcribed.

To find trends, themes, and recurrent concepts in the interview material, thematic analysis was used. The transcripts had to be coded, related codes had to be grouped together to form broad themes, and the results had to be interpreted in light of the goals and research questions.

The qualitative information gleaned from the interviews enhanced the quantitative results by offering in-depth, contextually sensitive insights into the experiences of educators using online instruction. A thorough investigation of the complex consequences of the switch to online

learning in Sri Lankan higher education was made possible by the combination of qualitative and quantitative data sources.

3.6. Comparative analysis and solutions

The results from different subjects in selected SLAITE courses from 2017 to 2022 will be gathered in order to generate quantitative statistics. The primary goals of the investigation will be to figure out the pass rate for each subject, which is a measurement of the percentage of student that passes, and to analyze how students' grade differed from A+ to D. additionally, cumulative data gathered over the whole semester will be combined to evaluate the overall performance of the students. the Garde Point Average (GPA) will be computed in order to organize students in to performance groups, such as those with GPA below 2, and GPA between 2 to 3 , and between 3 to 4. In order to support evidence based decision making and focuses interventions to improve academic results and student achievement at SLIATE, this Quantitative approach attempts to offer objective insights into trends and patterns in student performance over the design period.

In examining the case of SLIATE within the post-pandemic educational landscape, the institute has strategically adapted its social practices by embracing technology integration, modifying physical infrastructure, and adjusting temporal dynamics(Splitter et al, 2018 and Georg et al, 2019). The incorporation of digital technologies has played a pivotal role, impacting both on-campus and online education settings. A comparative analysis reveals variations in academic performance outcomes between traditional on-campus education and online education at SLIATE. The extent of technology integration appears to be a key factor influencing these outcomes. To optimize social practices, it is recommended that SLIATE focuses on enhancing technology integration in both education modes, ensuring a balance that fosters effective learning. Furthermore, practical solutions for SLIATE and other educational institutions include making investments in reliable online platforms, giving teachers thorough training, and designing flexible schedules to suit a range of learning preferences. These actions have the potential to improve opportunities and overcome obstacles, thereby improving the quality of education.

This research attempts to provide a thorough knowledge of the changing environment of higher education in Sri Lanka post-COVID-19 by operationalizing Schatzki's theory and including the multidimensional characteristics of digitalization, physical spaces, and temporal dynamics.

3.7. Ethical considerations

Several possible ethical issues come to mind while thinking about my research, and I'm determined to take proactive measures to solve them. First and foremost, it is critical to protect participants' confidentiality and integrity. If necessary, I will take steps to ensure participant privacy, such as replacing real identities in any publicly released data or findings with codes or anonymous identities. All participants will also be asked to provide informed permission, which will include a detailed explanation of the study's objectives, the extent of their participation, and how their data may be used. Another ethical consideration involves the risk of harm, both to participants and myself. I will take steps to minimize any potential harm to participants by utilizing respectful and non-intrusive research methods. Any sensitive or personal information shared by participants will be handled with utmost confidentiality, and data will be stored securely. Moreover, I will be aware about my own well-being throughout the research process, seeking support or guidance if needed.

Regarding the use of citations and quotations, I am committed to adhering to academic integrity standards. Proper referencing and citation will be employed to acknowledge the work of other authors, and I will avoid any form of plagiarism. Direct quotations will be used carefully and will be clearly attributed to the original source. The use of my own words to summarize and convey the ideas of other authors will be a standard practice to maintain academic honesty.

Chapter 4

"Using both quantitative and qualitative data, Chapter 4 examines the shift to online learning in Sri Lankan higher education following COVID-19. Through survey data, it evaluates accessibility, efficacy, and student involvement; instructor interviews shed light on their difficulties, modifications, and effects on student results. The chapter, which is situated within theoretical perspectives on social practices, emphasizes the necessity for continued support and fair access to technology. "

4. Results and analysis

4.1. Quantitative analysis

4.1.1. Cronbach alpha test

Robust internal consistency was found among the survey items used to measure perceptions of online learning in this study, which involved a varied sample of higher education students from Sri Lanka, according to the reliability analysis done. The dependability of measurement instrument used is attested to by the computed Cronbach's alpha coefficient of 0.943 and similarly high coefficient of 0.945 for standardized items. These results support the validity of survey items in capturing the targeted construct, which in turn strengthens the validity and relevance of the research findings. Due to this strong reliability, the assessment instrument can be used to investigate more about Sri Lankan student's online learning experiences in the future, which help to advance educational research in the area and make educated pedagogical judgments.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.943	.945	6

Figure 2: reliability statics

Utilizing SPSS, the Cronbach's al[ha test provided comprehensive statistical analysis for every item in the questionnaire, as represented in the image that goes with it. As assessment of the

possible effects of removing certain items from the scale was made easier by this statistical summary. The majority of the questions contribute significantly to the internal consistency of the scale, generally removing them would result in a lower Cronbach alpha score. Table 1 in the appendix contain the complete set of questionnaire items.

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
rate_expericance	18.00	27.762	.846	.756	.930
rate_online_education	18.00	29.857	.775	.630	.939
rate_digitaltechnology_ physical	18.21	28.693	.871	.835	.928
rate_digitaltechnology_ online	18.07	28.352	.817	.770	.934
academicperformance_ satisfaction	17.88	28.915	.852	.748	.930
facetoface_importanct	18.33	26.701	.827	.756	.934

Figure 3: item total statistics

4.1.2. Respondent in questionnaire

There were 123 recorded responses from the total number of participants, and 123 of those were considered legitimate answers to the questionnaire. Four sections make up the structure of the questionnaire. While social practices and the learning environment are discussed in the second section, demographic considerations are covered in the first. With focus on traditional on campus education and online education, respectively the second portion is further divided in to two subsections. Academic performance is covered in final segment, while questions concerning technological integration and the learning process are covered in the third area.

Age, gender, institute, and course are key demographic variables that may influence students' attitudes and preferences toward online and on-campus education. Younger students tend to be more comfortable with digital technologies, while older students might favor traditional classroom settings. Gender can affect participation rates and learning environment preferences, as research indicates different learning styles between males and females. The choice of institute can shape access to resources, teaching methods, and overall educational experience, thus affecting perceptions of education modes. Finally, the specific

course of study influences the integration of digital technologies into learning activities, with tech-focused courses differing significantly from more traditional ones.

The section on Social Practice and Learning Environment examines students' experiences and perceptions in both traditional on-campus and online education settings. For traditional on-campus education, it looks at attendance patterns, peer and lecturer interactions, the importance of face-to-face interactions, and overall satisfaction with the learning environment. For online education, it explores participation rates, interactions with peers and lecturers, challenges with digital devices and internet connectivity, sense of community, effectiveness of virtual interactions, perceived benefits, and overall satisfaction.

The perceptions of students regarding the employment of digital technology in both on-campus and online classes are examined in the section on Technology Integration and Learning Experience. It addresses the frequency and skill with which digital tools are used, the effect of technology on learning as a whole, and the effects of technology integration on academic performance.

Students' happiness with their academic success is discussed under the section on academic performance and is contrasted with traditional classroom-based instruction. It highlights the main obstacles to adjusting to online learning and investigates what students envision as the direction of higher education in Sri Lanka, especially with regard to the use of digital technologies.

4.1.3. Demographic analysis of dataset

According to the demographic variable factor’s dataset, the distribution of participant across different age groups is as follows among the 123 participants, 93 (76.2%) are between the age 18 to 24 and 20 (16.4%) belong to the age group of 25 to 30 and 9 (7.4%) are in the age group of 31 to 40. Regarding gender, out of the total participants, 66(53.7%) are female students and 57 (46.3%) are male students. notably, no response was recorded for any other gender category. When considering the participating institutes, the majority of responses were received from the Colombo branch, with 72 participants (58.5%), while 51 participants (41.5%) were from the Jaffna branch. In addition, of the courses taken by the participants, 77 (62.6%) were from the HNDIT Course and 46 (37.4%) were from the HNDA Course.

Responses		f(%)
Age group	18-24	93 (76.2%)
	25-30	20 (16.4%)
	31-40	9 (7.4%)
Gender	Male	57 (46.3%)
	Female	66(53.7%)
	Other	0 (0%)
Institute	Colombo	72 (58.5%)
	Jaffna	51 (41.5%)
Course	HNDIT	77 (62.6%)
	HNDA	46 (37.4%)

Table 1: Demographic Variables (N=123)

4.1.4. Social practice and learning environments.

This section looks at how students behaved in live and virtual classes after the COVID-19 pandemic. Of the participants, 109 (88.6%) reported taking on campus lessons every day after COVID-19, 9 (7.3%) reported taking classes three to four times a week, and the remaining participants took classes one to two times a week or never at all. In contrast, during in-person classes, just 8 (6.5%) did not participate in any discussions, while 67 (61.7%) regularly participated in talks and group activities and 48 (31.8%) infrequently did so.

With a standard deviation of 1.116, the mean for the reported face-to-face interaction boosting learning experience was 4.02 The scale, which went from 1 (Least Important) to 5 (Most Important), showed that most respondents had a high degree of approval for the notion that in-person engagement improves learning.

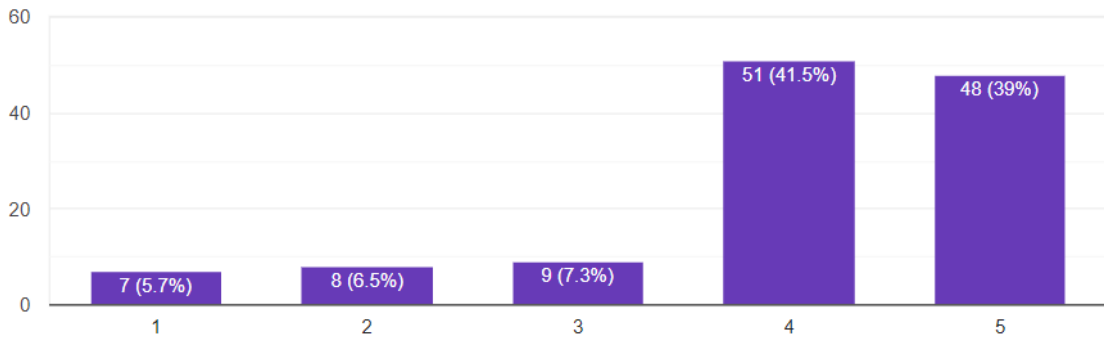

Figure 4: face to face interaction with learning experience enhance

22 (17.9%) thought it was not flexible, 74 (60.2%) thought it was somewhat flexible, and just 27 (22%) thought it was very flexible when it came to the flexibility of time scheduling and class arrangements in traditional classrooms. The mean overall satisfaction rate for the classroom experience was 4.15, with a 1.014 standard deviation. This shows that most students were happy with their overall experience in physical classrooms, on a scale from 1 to 5 Very poor to very good).

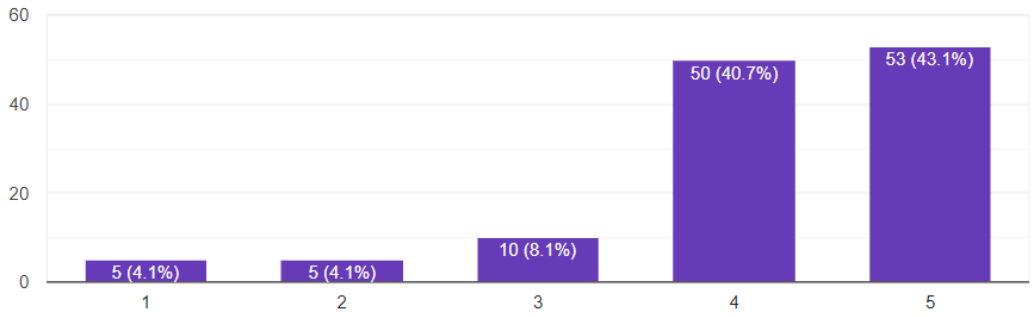

Figure 5: tradition on campus overall rating

The results align with earlier studies that have examined the significance of in-person interaction in improving academic performance (Chang & Gomes, 2022; Loscher et al., 2019). One reason for the preference for in-person communication could be the importance that people have on having direct interactions with teachers and peers during the learning process (Gómez et al., 2022). Furthermore, it's possible that higher education settings require more flexible approaches to scheduling and class structure due to the perceived rigidity of traditional classroom arrangements (Qolamani, 2024).

Hayashi et al. (2020) highlight the significance of establishing learning settings that prioritize student engagement and interaction, given the high level of satisfaction indicated with physical classroom experiences. Nonetheless, it is critical to recognize the difficulties and constraints involved in making the switch to online learning, especially with regard to preserving the same degree of connection and engagement that is possible in traditional classroom settings (Hodges et al., 2020). In order to further improve student satisfaction and learning outcomes, future research could examine methods for incorporating face-to-face interaction features into online learning settings (Bhuasiri et al., 2012; Gupta et al., 2020).

This section examines how students behaved in online courses after the COVID-19 pandemic. A considerable segment of the student body participated in virtual learning initiatives during

the COVID-19 pandemic. In particular, 107 respondents (87%) took part in these programs, but 16 respondents (13%) did not attend any.

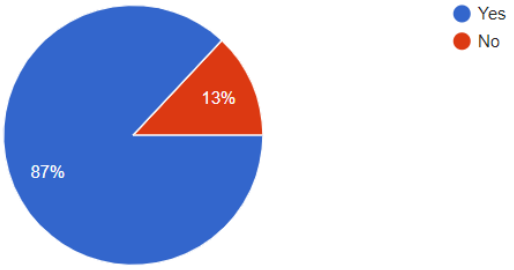

Figure 6 : tradition on campus overall rating

Only 9 (7.3%) of the respondents, however, continued to take daily online classes after COVID-19, and 8 (6.5%) never did. 40 (32.5%) respondents attended online classes 1-2 times per week, while 66 (53.7%) respondents attended 3–4 times each week. Remarkably, during the online courses, 32 students (26%) regularly participate in group discussions and activities, while 81 students (65.9%) sometimes do so. Ten students (8.1%), however, participate in class little or never.

Some students had trouble connecting to online classes due to connectivity concerns. 73 (59.3%) students said they had no trouble finding gadgets, whereas 37 (30.1%) said they had problems, and 13 (10.6%) said "maybe." Of the pupils who had internet connectivity, 88 (71.5%) had a working connection, whereas 35 (28.5%) had trouble. The mean score for virtual interactions that assist learning was 3.85, with a standard deviation of 1.22. This indicates that students generally have a positive view of the helpfulness of online interactions (Al-Samarraie et al., 2017).

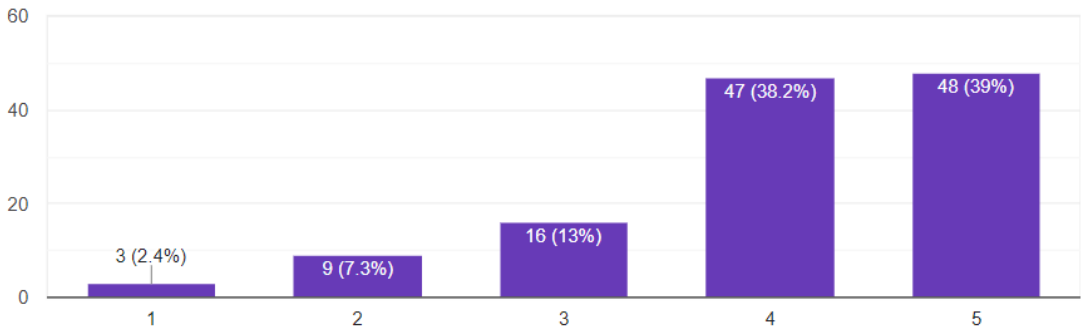

Figure 7: virtual interaction effectiveness

Students thought that flexibility in study schedules (82, 66.7%), availability to course materials anytime, anyplace (97, 78.9%), virtual peer connectedness (77, 62.6%), and the utilization of digital learning platforms/tools (67, 54.5%) were all positive characteristics of online education.

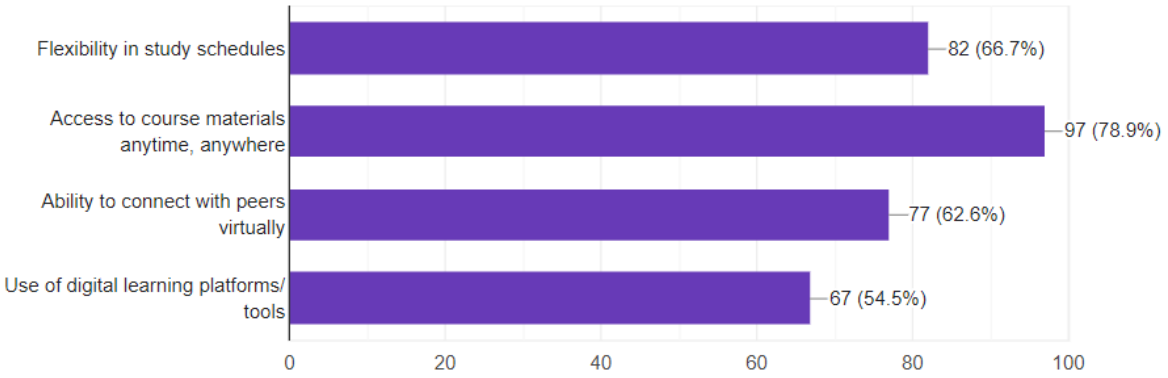

Figure 8: most beneficial aspects of online education

In terms of integration, 77 respondents (62.6%) said there was equal integration between online and physical forms, 39 (31.7%) thought there was less integration, and 7 (5.7%) thought there was more integration. These results align with the observations of Yang et al. (2022), who also noted varying levels of perceived integration in educational environments.

With a mean reported value of 3.80 and a standard deviation of 1.157, the overall experience with online education was quite positive. This suggests that the majority of respondents had a very positive experience with online learning overall (Qolamani, 2024). The importance of online learning as a workable and fulfilling substitute in the post-COVID-19 educational environment is shown by these findings.

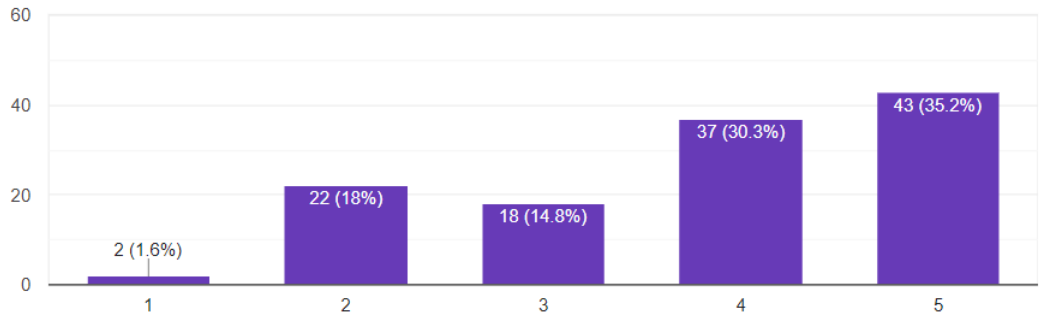

Figure 9: overall online education rating

4.1.5. Technology integration and learning experience

71 respondents (57.7%) said that both traditional on-campus education and online education are equally successful when compared. But only 5 (4.1%) respondents thought online learning was more effective than traditional on-campus learning, out of 47 (38.2%) respondents who thought so.

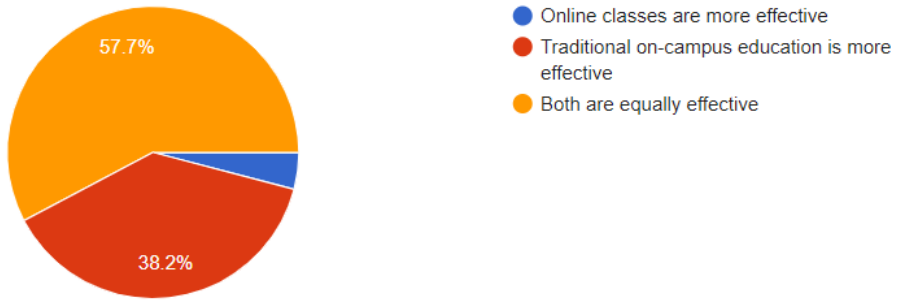

Figure 10: technology integration and learning experience

Digital technology's usefulness in on-campus classes was highly evaluated, with a mean of 3.94 and a standard deviation of 1.01. Furthermore, respondents strongly believed that digital technology was effective in online classes, as evidenced by a high mean value of 3.82 and a standard deviation of 1.124. This assessment is supported by the findings of Hayashi et al. (2020) and Yang et al. (2022).

73 (59.3%) of the respondents indicated that they thought digital technology integration would have a major impact on academic achievement results in online education. Furthermore, 30 respondents (24.4%) did not think that digital technology would have an impact on results, while 20 respondents (16.3%) were unsure. When it came to the use of digital tools, only 8(6.6%) of the respondents did not use any, while 66 (54.1%) respondents used resources like online libraries and learning management systems occasionally. The remaining 48 (39.3%) respondents used products like these regularly. Just 10 respondents (8.2%) reported having low skills with these instruments. In contrast, 53 respondents (43.4%) reported intermediate proficiency, and 59 respondents (48.4%) reported high proficiency. These findings align with the results reported by Bhuasiri et al. (2012) and Gómez et al. (2022).

The participants thought that there were several ways in which digital technology affected academic achievement. Specifically, 83 respondents (69.2%) noted that digital technology promoted communication and collaboration, while 72 respondents (60%) believed it improved

access to information. Moreover, 71 respondents (59.2%) stated that digital technology enhanced organization and time management, with 52 (43.3%) indicating that this improvement positively impacted academic performance.

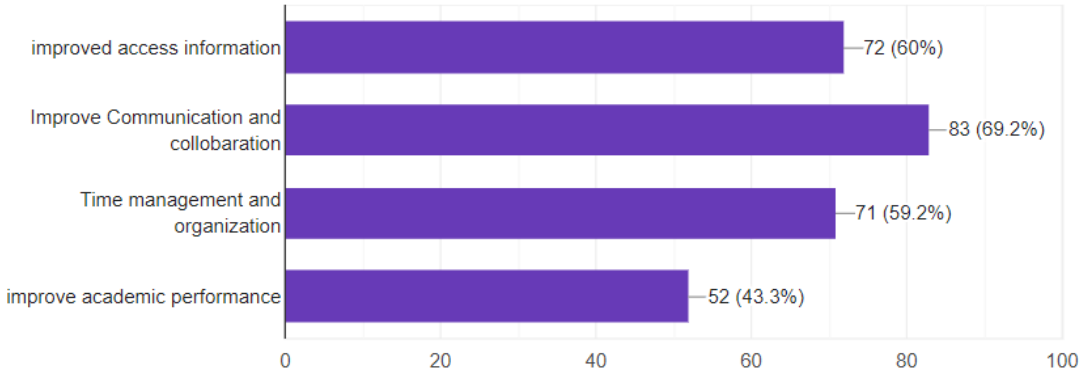

Figure 11: how digital technology influence academic performance

Furthermore, only 37 (30.3%) respondents disagreed with the 85 (69.7%) respondents' assessment that using online platforms improved their engagement with course material. These results demonstrate how digital technology is seen as having a significant impact on the academic experience and results of online learning (Buch, 2020; Moussa & Moussa, 2009).

4.1.6. Academic Performance

The mean score of 4.08 and standard deviation of 0.955 suggest that students are content with their present program's academic outcomes (Hettiarachchi et al., 2021).

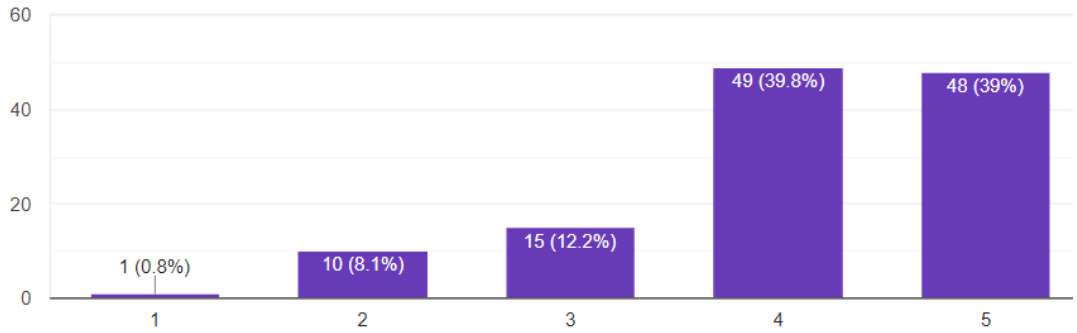

Figure 12: academic performance satisfaction of current program

When contrasting performance with conventional classroom-based instruction, replies were not all the same. Comparing online learning to traditional classroom settings, 63 students (51.6%) felt that it had enhanced their ability to manage their time and exercise self-discipline. On the

other hand, compared to traditional classroom-based education, 73 (59.8%) students believed that online learning had negatively impacted their capacity to communicate with peers and teachers. Furthermore, in comparison with traditional classroom-based education, 38 (31.1%) students said that online learning has limited their ability to adapt to different learning styles, and 18 (14.8%) students said that online learning has decreased their motivation and discipline (Ellapola, 2022; Qolamani, 2024).

In response to open-ended questions, students listed the main difficulties they had adjusting to online learning after COVID-19. Many students expressed difficulty adjusting to the new learning environment and noted the abrupt switch from in-person to online instruction as a key barrier. Prolonged screen use caused eye strain and pain, according to some kids. Others noted difficulties keeping lecture notes in an online format and network problems, such as frequent interruptions and drops (Hodges et al., 2020; Yang et al., 2022).

When asked how they would like to see digital technology integrated into higher education in Sri Lanka, the majority of respondents said they preferred online learning. They emphasized the possible financial benefits of doing away with travel and lodging costs. In addition, participants underscored the significance of a just allocation of resources throughout the nation to guarantee impartial access to digital education. To allay these worries and guarantee the accomplishment of digital education projects, they emphasized the necessity of a carefully thought-out implementation approach (Hayashi et al., 2020; Mailewa et al., 2020). These observations highlight how higher education in Sri Lanka is changing in tandem with the growing adoption of digital technologies.

4.2. Academic performance by analyzing examination results

In this part, I examine the pass rates at the ATI Institute's Colombo and Jaffna branches for a variety of topics throughout a range of years.

Pass rate ATI Colombo

In the HNDIT course at ATI Colombo, pass rates varied across different subjects and years. Notably, subjects like Visual Application Programming, Web Programming, and Project Management maintained relatively high pass rates throughout the years, ranging from 86% to 96% in 2022. Graphics and Multimedia exhibited a slight fluctuation, with pass rates ranging

from 87% to 91% over the same period. System Analysis and Design consistently maintained high pass rates, ranging from 88% to 93% from 2017 to 2022.

For the HNDA course at ATI Colombo, pass rates also showed variation across subjects and years. Financial Accounting and Operational Research consistently maintained high pass rates, ranging from 82% to 96% and 88% to 92%, respectively, from 2017 to 2022. Advanced Financial Accounting and Marketing Management exhibited slightly lower but stable pass rates, ranging from 78% to 92% over the same period. Microeconomics showed some fluctuation, with pass rates ranging from 80% to 90% during the years analyzed.

Pass rate ATI Jaffna

In the HNDIT course at ATI Jaffna, pass rates for subjects like Visual Application Programming, Web Programming, and Project Management showed variation across the years. Visual Application Programming and Web Programming exhibited fluctuating pass rates, ranging from 62% to 83% and 68% to 83%, respectively, from 2017 to 2022. Graphics and Multimedia showed a slight decline in pass rates over the years, ranging from 80% to 80% over the same period. System Analysis and Design consistently maintained high pass rates, ranging from 80% to 91%.

For the HNDA course at ATI Jaffna, pass rates also varied across subjects and years. Financial Accounting and Operational Research consistently maintained high pass rates, ranging from 72% to 88% and 78% to 91%, respectively, from 2017 to 2022. Advanced Financial Accounting and Marketing Management exhibited slightly lower but stable pass rates, ranging from 71% to 91% over the same period. Microeconomics showed some fluctuation, with pass rates ranging from 76% to 87% during the years analyzed.

Pass rate analysis

Examining pass rates for students in Colombo and Jaffna between 2017 and 2022 shows how different lecture delivery methods were affected by COVID-19 epidemic. When classes were held entirely on Campus in 2017 and 2018, Colombo students perform better than Jaffna students, who has lack of resources in traditional on campus. Previous research has highlighted the significance of contextual elements, which are further supported by the observed variations in academic performance across teaching formats. According to Yang et al., (2022) and

Hettiarachchi et al., (2021) among others, variables including student engagement, educational techniques and resource accessibility are important in determining outcome.

Due to the outbreak, lectures had to be moved to a completely online format in 2019 and 2020. This presented challenges for both groups and most likely had an impact on pass rates due to the sudden change to remote learning. Despite their geographical differences, pass rates may have been similar during this time because students in both places had similar challenges when adjusting to the online learning environment. According to research Bhuasir et al., (2012) and Mailewa et al., (2020), effective digital literacy and infrastructure are essential. There was a slight decline in the pass rate of practical subjects, like programing, specifically in the year 2019 and 2020, according to a thorough analysis of the results tables for subjects like visual application development, web programing, graphics and multimedia, system analysis and design and project management from 2017 to 2022 across both the Colombo and Jaffna branchers. On the other hand, theoretical subjects pass rates did not significantly decline during these difficult years.

However, students in Colombo and Jaffna saw a change to blended mode lectures in the following years of 2021 and 2022, which included online and on campus instruction. In comparison to the entirely online years, this shift may have helped both groups achieve higher pass rates, demonstrating the possible advantages of a hybrid learning strategy in the wake of epidemic. This is consist with studies that support context specific strategies to maximize the utilization of digital education (Qolamani, 2024). The investigation highlights the important role that lecture formats play in the outcomes of academic achievement and indicates a relationship between better pass rates in mixed model lecturers and the successful incorporation of digital technology. These results highlight how crucial it is to modify teaching strategies in order to make the most of digital technology.

4.2.1. Various subjects from the Colombo and Jaffna branches HNDIT course grade percentages

Several observations can be made based on the percentage breakdown of grades (A+ to A- , B+ to B-, C+ to C- and D+, D & E) for particular disciplines (Visual Application Programing, Web programing, and System Analysis and design(from 2017 to 2022 in both the Colombo and Jaffna Branches.

The percentages of top marks (A+ to A-) in all courses was higher in the Colombo and Jaffna branches in 2017 and 2018, when lectures were mostly held in physical classroom settings. This pattern is consistent with the findings of Hettiarachchi et al.'s research from 2021, which highlights the value of traditional on campus contacts in building feeling of community and improving academic achievement, especially in applied disciplines like programming. The subjects of visual application programing and web programing the years 2017 and 2018 , which mostly consisted of in person lectures in the classroom, at both the Colombo and Jaffna branchers, have comparatively higher percentages of A+ to A- grades than the years that followed.

On the other hand, lectures switched to being entirely online in 2019 and 2020, the years when the COVID-19 outbreak was at its worst. As a result of this change, the percentage of top grades in both branches significantly decreased, while the percentage of lower grades (C+ to C- and D+, D & E) increased. These trends mirrored the issue raised by Ryotato et al., (2020) about unequal access to digital resources and the escalation of already existing socioeconomic disparities.

The data for these years highlights the challenges associated with continuing to maintain a high level of academic achievement through online learning, especially in disciplines that call for practical subjects, this observation aligns with the result of prior research, including Gupta et al. (2018), which highlights the significance of mitigating barriers to technology access and implementing inclusive digital education policies to foster equitable participation and educational achievements.

However, there has been a noticeable rise in the percentage of top marks in both branchers across all disciplines since the introduction of blended mode lectures in 2021 and 2022. This change is in accordance with suggestions made by Stem (2020) and Ellapola (2022), who support a well rounded strategy for digital education that combine traditional classroom interactions with pedagogical innovations and online resources.

The analysis taken as a whole highlights how important context specific strategies are for successful adoption of digital education and how much instructional modes affect students' performance. As highlighted by earlier research, the results highlight the necessity of comprehensive policies and investments to address socioeconomic disparities, enhance technology access, and optimize learning environments in higher education settings. Gupta et al., (2020), Splitter et al., (2018) and George et al., (2019).

4.2.2. The overall GPA for the Colombo and Jaffna branches HNDIT and HNDA Courses

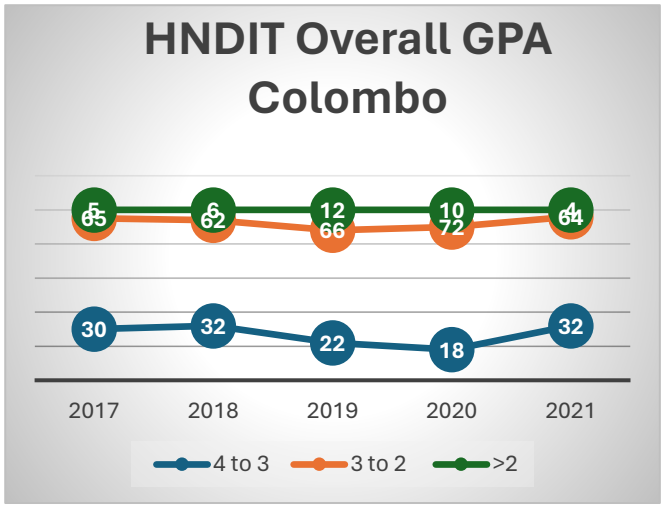

Figure 13 : overall GPA HNDIT – Colombo

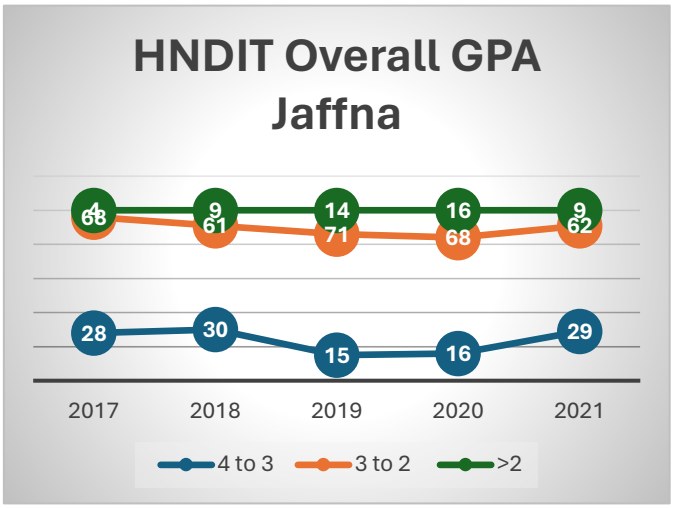

Figure 14 : overall GPA HNDIT – Jaffna

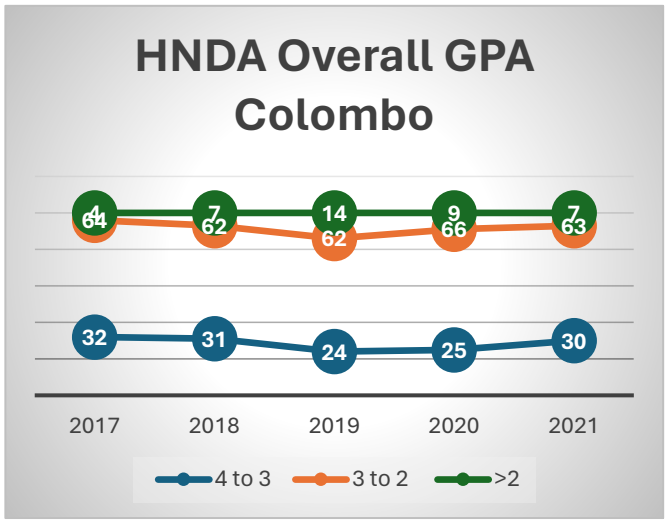

Figure 15: overall GPA HNDA – Colombo

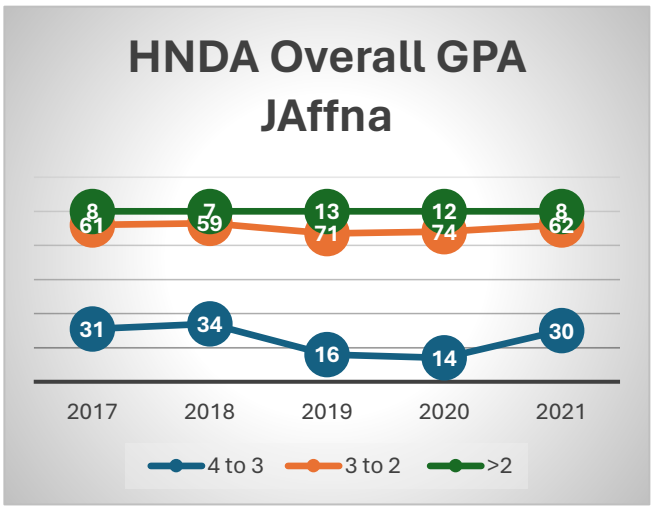

Figure 16 : overall GPA HNDA - Jaffna

The analysis of the total GPA trends for the HNDIT and HNDA courses at the colombo and Jaffana brancers from 2017 to 2021 provides valuable information about academic achievement and development.

HNDIT Course

Colombo Branch

The percentage of students that move from GPA of 4 to 3 varies between 2017 and 2021, peaking at 32% in 2018 and falling in to 18% in 2020. Over time, there has been a constant upward trend in the percentage of pupils moving from GPA 3 to 2 with figures ranging from 62% to 72%. Between 4% and 12% of students have GPA less than 2 on an average over the course of the year with the significant percentages of low GPA in 2019 and 2020.

Jaffna branch

Transitions from a GPA of 4 to 3 fluctuate, peaking at 30% in 2018 and 29% in 2021. Similar patterns are noted there as well. The proportion of students that move from 3 to 2 GPA is constant, ranging between 60% and 71%. Across different years, there is diversity in the percentages of students have a GPA below 2. It ranges from 4% to 16%. 2019 and 2020 are the years with the highest percentages of low grades.

HNDA Course

Colombo branch

The percentages that vary from 24% to 32% across the years indicate the fluctuation in the moves from a GPA of 4 to 3. The proportion of students that go from having a GPA of 3 to 2 is still quite stable, ranging from 62% to 66%. There have been minor fluctuations over the years in the percentages of students having GPA below 2 range from 4% to 14% and highest low grade is showing in 2019.

Jaffna branch

Changes in the GPA transition from 4 to 3 are indicative of similar patterns are seen in the Jaffna branch for the HNDA course. A Steady range of 55% to 74% characterized the proportion of students that moves firm a GPA 3 to 2. Every year between 7% and 13% of students have GPA of less that 2. Greatest low GPA reading in 2019 and 2020 respectively.

Academic success in higher education settings in influenced by a complex interaction of factors, which is reflected in the observed trends in GPA transitions. Transitions froma GPA 3 to 2 show stability, which points to regular patterns of academic advancement that could be linked to efficient teaching strategies and systems for providing support for students (Ellapola, 2022 and Stem, 2020). Variations in the percentage of students with GPA below 2 and in the fluctuations in the transitions from a GPA of 3 to 3 show the influence of contextual factors including access to resources, socioeconomic backgrounds, and instructional modalities (Gupta et al., 2020 and Ryotato et al., 2020)

Additionally there was a minor drop in the proportion of students moving from a GPA of 4 to 3 during the COVID-19 pandemic period (2019 and 2020), which may have been related to difficulties with remote learning and disruptions to conventional teaching techniques. Simultaneously the proportion of students with a GPA less than 2 increased somewhat, indicating the wider effect of pandemic related limitations on academic achievement (Gomez et al., 2022).

These results highlight the significance of customized tailored strategies and context specific approaches to improve student performance and advance fair access to high quality education in Sri Lankan universities. To address the issues raised and enhance learning settings for grater student performance, comprehensive policies and investments are necessary (Solitter et al., 2018 , Georg et al ., 2019 and Gomez et al., 2022)

4.3. Qualitative analysis

4.3.1. Interview structure.

The interview questions are organized with the main goal of investigating how the shift to online learning has affected higher education in Sri Lanka after COVID-19. The main purpose of the questions is to get information from educators on their perceptions, difficulties, and experiences with this change.

Knowledge of Online Learning The purpose of the inquiry is to identify the interviewees' prior experience with online learning as well as their knowledge with digital platforms and tools for teaching. It provides the groundwork for examining how ready they are for the change.

These questions try to identify the primary barriers and difficulties that educators faced by inquiring about the difficulties they encountered when making the switch to online learning. It offers understanding of the real-world challenges and constraints brought forth by the change.

Adaptation to online tool inquiries explore the ways in which teachers have adjusted to using technologies and online tools in the classroom. It looks at how they use different online platforms and how they incorporate digital materials into their teaching methods.

With an emphasis on learning outcomes, the Effect on Academic Performance of Students subject aims to assess how the move to online learning has impacted student involvement and academic performance. This provides valuable insights about the effectiveness of remote learning and its impact on academic performance.

Rewards and Challenges This investigation encourages a balanced evaluation of the change by discussing the disadvantages as well as advantages of virtual education. It affords interviewers the opportunity to contemplate the broader implications of virtual learning and identify potential avenues for enhancement.

Thoughts for Potential Future Steps This topic concludes by requesting recommendations and concepts for enhancing the integration of digital technology into instructional practices. Interviewees are urged to offer specific recommendations for improving online teaching techniques based on their own experiences.

4.3.2. Interview procedure.

The 45-minute sessions of virtual interviews were conducted via WhatsApp calls. In order to ensure that the participants adhered to ethical norms, their consent was obtained prior to recording. Based on their applicability to the study question, educators employed by Sri Lanka Institute of Advanced Technology were selected as participants. Time zone variations and participant availability were taken into account during scheduling. All relevant information was shared prior to the interview, including the purpose of the study and consent to record. The structured questioning method was used to conduct the interviews, which covered a wide range of topics such as online learning experiences, challenges faced, impacts on student learning outcomes, and recommendations for better practices.

Taking notes and actively listening made it easier to record in depth observations and thoughts. To aid in analysis, recordings were transcribed after the interview. Confidentiality and privacy were guaranteed by the implementation of secure recording storage procedures and the anonymization of interview material. Using thematic analysis, patterns and themes were found, and the study document presents the findings, which offer qualitative insights into the shift to online learning in Sri Lankan higher education.

4.3.3. The result analysis.

Transition to online education.

Online learning has become increasingly popular as a replacement for traditional on-campus education, encouraged by the COVID-19 epidemic. A turning point in the history of education is marked by Stem (2020), which highlights the internet's revolutionary power in enabling this shift. Due to the suddenness of this change, many educational institutions were unprepared and had to quickly adjust in order to maintain instruction in the face of social distancing measures.

The wide variety of experiences that came from educator interviews represented the breadth of challenges and adaptations faced during the period of transition. ICT infrastructure, limited access to technology, a lack of training opportunities, and financial constraints are among the numerous difficulties that educators encounter; these issues are especially common in rural areas. also emphasized by Jayasuriya et al. (2021), These challenges demonstrated how important it is to have a wide range of resources and support networks in order to facilitate the successful integration of online learning.

Even in the face of early challenges, educators shown resilience and creativity in solving the difficulties associated with distant learning. Through dedication and professional development initiatives, many instructors have gradually grown proficient with digital tools like Zoom for virtual lectures and Learning Management Systems (LMS) for content delivery and assessment management. Ellapola (2022) emphasizes the importance of using technological tools to improve educational outcomes and shows how digital technology plays a significant role in facilitating the teaching and learning process.

Another effect of the shift to online learning was the need to reevaluate instructional techniques and pedagogical methods. Stem (2020) makes the case for a paradigm change in teaching

methods to better suit the needs of the virtual learning environment. She emphasizes the necessity of creative solutions to keep students engaged and promote interactive learning. To optimize student learning outcomes in the virtual setting, all of the interviews indicate that they have experimented with a range of pedagogical strategies, such as formative assessment tools, asynchronous discussions, and multimedia materials.

Furthermore, the experiences that educators had during this time of change offer valuable insights that will influence future educational policies and practices. Examining how universities, such as the Sri Lanka Institute of Advanced Technological Education (SLIATE), addressed the challenges posed by the pandemic can teach lawmakers and leaders in the education sector valuable lessons about how to incorporate digital technology into the classroom and be ready for emergencies.

A wide range of experiences, difficulties, and adaptations among educators have been a feature of the shift to online learning in response to the COVID-19 epidemic. The foundation for upcoming developments in digital education has been laid by educators who have proven their endurance in navigating the challenges of online teaching through tenacity, professional development, and creative pedagogical approaches.

Digital technology integration.

Many educators at SLIATE had little previous experience with or access to online learning environments prior to the COVID-19 outbreak. In keeping with the earlier research conducted by Jayasuriya et al., (2021), this lack of experience with digital tools presented major obstacles to the quick shift to online learning.

A noticeable rise in the adoption of digital technologies by educators in their teaching techniques was a response to the abrupt shift to online learning. This statement aligns with the findings of Jayasuriya et al. (2021), which suggest that while some individuals may have prior experience with online resources, others may face challenges adjusting to new teaching techniques and technological advancements due to the steep learning curve.

After the pandemic caused issues, educators turned to a variety of digital tools and resources to deliver remote education. One of the main hubs for the provision of lecture materials and assessment has become Learning Management Systems (LMS). Thanks to technologies like Zoom, which allow for real-time contact between educators and learners, simultaneous online

learning is now feasible. Moreover, educators saw that platforms like WhatsApp significantly facilitated the distribution of assignments and other informal forms of communication; Jayasuriya et al. (2021) have previously demonstrated this.

Even with the increased usage of digital materials, educators encountered a number of challenges when adjusting to the new online learning environment. Keeping students that are involved, technical issues, and concerns about education were some of these challenges. However, as time went on, many educators adapted to the new teaching methods and technologies, and they also became skilled at using online tools like Zoom and LMS, as previously demonstrated by Jayasuriya et al. (2021).

There will be a big impact on Sri Lankan educational practices from the quick adoption of digital technologies in post-pandemic education. To maximize the efficient use of technology in teaching and learning contexts and improve digital literacy abilities, educators and institutions need to give priority to continuing professional development activities. In addition, all students require equal access to online learning resources, which calls for comprehensive efforts to eliminate the digital divide (Jayasuriya et al., 2021).

After COVID-19, the state of digital technology integration in Sri Lankan higher education is changing, and the interviews with educators offer helpful details about this. Educators showed resiliency and flexibility in accepting new technology and teaching approaches despite early obstacles, highlighting the significance of ongoing professional development and fair access to digital resources.

Impact on student learning outcome.

The findings from the interviews with educators indicate that the shift to online learning has had an important impact on the academic achievements of students in Sri Lankan higher education following to the COVID-19 pandemic. This section explores how this change may affect the academic performance and involvement of students

Traditional on-campus classes provided students with opportunity for in-person interactions with teachers and peers prior to the pandemic, which facilitated prompt feedback and active participation in the learning process. The classroom environment promoted lively debates, group projects, and one-on-one time with the teacher, all of which enhanced the quality of the interactive learning process.

Maintaining student involvement in the online learning environment was one of the major issues brought up in the interviews. Paradigm changes in instructional methodologies and learning approaches were required with the move to online learning. Through the interviews, teachers discussed the various strategies they use to deal with the difficulties presented by distance learning. Instructors adopted a range of alternate tactics to improve student engagement and academic accomplishment in reaction to the constraints of online learning. Online tests have become a widely used method for evaluating understanding and emphasizing learning goals. Furthermore, group talks were employed to foster cooperative learning opportunities, allowing students to communicate, share concepts, and form relationships even in the face of physical distance (Jayasuriya et al., 2021).

In order to effectively assess students' knowledge and progress, instructors had to reconsider their evaluation methodologies as a result of the change to online learning. In the context of distant learning, conventional techniques of assessment, such in-person exams, were no longer practical. Rather than using traditional methods of assessment, teachers used technology-enabled tools including online tests and assignments to measure student learning outcomes and give timely feedback (Jayasuriya et al., 2021). In the online learning environment, virtual office hours and communication channels enabled continuous discussion between teachers and students, promoting a sense of community and academic support.

All lecturers used innovative techniques to improve students' academic performance in spite of the difficulties brought about by the shift to online learning. The use of pre-recorded lectures and multimedia elements enabled students to learn at their own pace, allowing them to review content whenever it was convenient and get a deeper understanding of difficult subjects. Carefully chosen, these resources complemented the course materials and accommodated a range of learning preferences. Furthermore, cooperative learning platforms enabled smooth peer-to-peer communication, encouraging the exchange of knowledge and eventually improving learning results (Jayasuriya et al., 2021).

All interviewees feel that instructors need to keep evaluating and refining their online teaching techniques in order to optimize student learning outcomes. This can mean taking part in ongoing professional development courses to advance your understanding of digital pedagogy and make effective use of online learning settings. By adopting a growth mindset and fostering an innovative culture, instructors can ensure high-quality learning experiences in the context of online education while also adjusting to the changing demands of students.

The interview process highlights the significance of evaluating the effects of the transition to virtual learning on student learning outcomes in post-COVID-19 higher education in Sri Lanka. Teachers can increase student engagement, encourage academic accomplishment, and create a supportive learning environment that is favorable to student success by putting new teaching practices into practice and utilizing technology-enabled assessment tools.

Challenges and advantages.

The technological challenges that educators faced throughout the change were highlighted in the interview responses. Many instructors had a high learning curve due to their limited past expertise using online platforms and software tools, as mentioned by Interviewee 3. Furthermore, Interviewee 5 brought attention to the difficulties that students from rural or economically disadvantaged backgrounds face due to limited access to resources, such as internet connectivity and electronic devices. These difficulties are consistent with the conclusions drawn by Jayasuriya et al. (2021), who stress the significance of tackling infrastructure and technology access concerns in digital education programs.

Educators acknowledged that there were a number of benefits to online learning despite the difficulties. One major advantage that has been identified is scheduling flexibility, which helps students manage their other obligations and academic goals. This research supports the idea of flexibility put forth by Stem (2020), who highlights the revolutionary potential of online learning in fostering better equality and accessibility in higher education.

One other significant benefit that educators pointed out was the ability of online education to reach students across geographic borders. One interviewee emphasized the value of interacting with students from different backgrounds in order to create a more inclusive classroom. This discovery is consistent with Ellapola's (2022), which emphasizes the value of using digital technology to overcome physical constraints in the delivery of education.

Furthermore, the provision of lectures on tape has become an invaluable tool for learners, promoting independent study and academic achievement. The study conducted by Jayasuriya et al. (2021) provides support for this conclusion, highlighting the significance of recorded lectures in augmenting learning flexibility and fostering student engagement in online learning environments.

The numerous aspects of the shift to online learning in Sri Lankan higher education is illuminated by the insights gathered from educator interviews. The benefits of online education in terms of flexibility, inclusivity, and learning outcomes are clear, even while obstacles with technology access and training still exist. Teachers may help create a more robust and equal higher education system in the post-COVID-19 era by tackling these issues and utilizing the advantages of online learning. Through placing these results in the larger context of online education research, citing works like Jayasuriya et al. (2021), Stem (2020), and Ellapola (2022), this analysis offers a thorough grasp of the complex effects of the shift to online learning in the post-COVID-19 era.

Recommendation for future practice.

Interview responses highlighted the importance of providing educators with comprehensive training on online teaching tools and platforms. This aligns with the findings of Jayasuriya et al. (2021), who emphasize the necessity of ongoing professional development to enhance educators' proficiency in e-learning pedagogy. By investing in training programs tailored to the specific needs of educators, institutions can empower them to effectively leverage digital technologies in their teaching practices.

The interviews clarified the differences in kids' access to technology, especially for those who attend rural educational institutions. Ensuring that all students have fair access to technology is crucial in order to address this problem. Ellapola's (2022) observations, which emphasize the significance of closing the digital divide in order to advance inclusive education, are in line with this recommendation. Educational institutions may improve accessibility to online learning opportunities and level the playing field by giving students the tools and infrastructure they need.

The interviewees underscored the significance of formulating tactics aimed at augmenting student involvement and engagement in virtual classrooms. Strategies like online tests, group talks, and lectures that have been recorded have been found to be successful in encouraging student participation and active learning. These observations align with the suggestions made by Stem (2020), who emphasizes the value of interactive teaching strategies in distance learning. Teachers can develop dynamic and engaging learning environments that support student achievement by promoting collaborative learning experiences and integrating interactive components into online courses.

The suggestions that came from the interviews highlight how crucial it is to take proactive steps in order to deal with difficulties and take advantage of opportunities in online education. In the post-COVID-19 era, educational institutions can promote innovation and excellence in digital teaching practices, ultimately enhancing the learning experience and improving student outcomes. These can be achieved by highlighting comprehensive educator training, ensuring equitable access to technology, and enhancing student engagement.

4.4. Overall results analysis

According to Theodore Schatzki's theory of social practices, social life is made up of a variety of interrelated practices arranged around common understandings, activities, and material arrangements. According to Splitter et al., (2018), these behaviors are not isolated but rather are a component of larger systems of activity that are affected by material resources, human behavior, and the environments in which they take place.

Schatzki's theory, in the context of studies on the effects of digitization on higher education in Sri Lanka, provides a paradigm for comprehending how the incorporation of digital technologies into instructional strategies affects social practices in educational establishments.

4.4.1. Material arrangement and technology integration

According to study, digital tools like Learning Management Systems (LMS) have a significant impact on how higher education institutions like SLIATE teach its students. Utilizing its current digital infrastructure, including its Learning Management System (LMS), SLIATE was able to respond to the pandemic's demands by making it easier to deliver online courses. Though its efforts to maintain education were met with mixed results in different areas, SLIATE quickly organized in spite of early setbacks. Online learning presented challenges for certain branches, but other branches were able to incorporate digital technologies into their teaching procedures with ease. The infrastructure through which educational practices are controlled is represented by these material arrangements, which have an impact on how educators present lessons and how students interact with the course materials (Ellapola 2022). The various sections of SLIATE demonstrate varying degrees of digital technology integration into their teaching methods, which is indicative of the varied material arrangements influencing these activities.

4.4.2. Interconnectedness of social practices.

Schatzki places a significant value on how social actions are part of larger systems of activity. According to Ellapola (2022), the use of online learning in higher education institutions signifies a change in social practices that has an impact on teaching strategies, student participation, evaluation procedures, and institutional policies. My findings highlight the interconnectedness of social practices by showing how modifications to one facet of educational practice, like the switch to online instruction, can have consequences on the entire educational system. For educators and students in Sri Lanka, the shift to online learning presented a variety of difficulties. Major challenges to students' capacity to participate completely in online coursework have come to light, including limited access to digital devices and dependable internet connectivity, as well as socioeconomic inequities. Teachers faced difficulties in modifying their methods of instruction for the online setting due to their inexperience with digital educational platforms and their lack of training in digital pedagogy.

The replies from the educators highlight the complex dynamics of moving to online learning during the epidemic, exposing more significant changes in teaching methods. "Most educators did not use LMS prior to COVID-19, but after that all the educators started to use a wide range of digital tools and technologies in their teaching practices," said a educator, emphasizing the need for quick adaptability. This demonstrates how the epidemic sped up the incorporation of technology into instructional strategies.

Additionally, educators highlighted challenges related to student engagement and interaction in the online learning environment. One educators noted, "In physical class room, goals and emotions are influenced by face-to-face interactions, promoting a sense of community. In online classes, it is difficult to maintain face-to-face interactions." This underscores the significant impact of the online transition on student-teacher relationships and emotional experiences within the educational context.

Furthermore, the interviews provided insight into the assistance that educators require to adjust to remote learning. A educator said, "The main challenging thing was to transform from physical to online classes such as technical issues, student engagements, and redesigning course materials." This shows that for the change to be successfully facilitated, institutional assistance and professional development programs are required.

Inequalities in the availability of technology and internet connectivity also become important factors. A educator said, "Some students face difficulties with adjusting to remote learning environment difficulties with access devices and internet connectivity issues." This presents

questions regarding access and equity in the educational system, especially with regard to online learning.

Empirical data from the interviews supports the idea that social practices inside the educational system are interrelated, especially in response to the move to online instruction during the epidemic. The interviews revealed that educators are rapidly adopting digital tools and technologies, which is indicative of broader changes in educational practices. The difficulties pertaining to teacher support requirements, equity concerns, and student participation also highlight how social practices in the educational system are interrelated. By linking the observations from the interviews to broader implications for the educational system, the idea that social behaviors are interrelated is given factual support and clarity.

4.4.3. Organization and learning practices.

The theory of Schatzki recognizes the influence of human agency on social practices. In their interactions with digital technology, educators and students exercise agency, affecting how these tools are integrated into teaching and learning procedures (Splitter et al., 2018). According to the results of my research, SLIATE teachers modified their lesson plans to allow for online learning in response to the obstacles presented by the pandemic. By interacting with digital tools and platforms, students successfully adapted to online learning and showed that they had agency in influencing the field of online education.

Students can now complete their education remotely thanks to online learning, which emerged as a workable answer to the pandemic's disruptions. However, the effectiveness of online learning differed based on elements including students' resource access and the level of digital technology integration. The results of the research painted a conflicting picture of the experiences of the students. Although some did well in the virtual world, others had difficulties with digital access, engagement, and academic performance.

Applying Schatzki's theory of social practices into my research findings helps me better understand how social interactions, organizational structures, and educational outcomes are impacted when digital technologies are incorporated into teaching practices in Sri Lankan higher education institutions. The complex relationships between technology, social practices, and institutional change in the setting of post-pandemic education can be examined via the prism of this theoretical paradigm.

4.4.4. Pass rate and blended learning

The pass rates from 2017 to 2018 show that academic achievement peaked in the years when campus lectures predominated. But when the COVID-19 epidemic struck in 2019 and 2020, the sudden switch to entirely online lectures led to a drop in pass rates, which was especially apparent in practical areas. According to Ryotato et al. (2020), this change made the already-existing discrepancies in access to digital resources even more pronounced. The difficulties encountered highlighted the significance of ensuring fair access to resources and technology.
The introduction of blended learning from 2021 to 2022, integrating both online and on-campus instruction, marked a significant improvement in pass rates across theoretical and practical subjects. This shift indicated that blended learning effectively amalgamated the strengths of traditional and digital education. Studies by Stem (2020) and Ellapola (2022) support the notion that a comprehensive approach to digital education, incorporating traditional classroom interactions alongside innovative online resources, significantly enhances student performance.

Digital tools provided students with continuous access to learning materials, fostering flexibility in study schedules and locations. This adaptability proved crucial in accommodating diverse student needs and preferences. Interactive platforms like virtual labs and online forums enriched student engagement and comprehension, particularly in practical subjects, aligning with findings by Bhuasir et al. (2012) and Mailewa et al. (2020) emphasizing the importance of effective digital literacy and infrastructure in facilitating remote learning.

Blended learning, by offering personalized support and differentiated instruction, catered to various learning preferences, fostering an inclusive learning environment. The analysis of pass rates revealed the effectiveness of hybrid approaches, demonstrating higher pass rates during blended learning years compared to fully online years. Stability in GPA transitions and increases in higher GPAs during blended learning years further underscored the positive impact of integrating digital and face-to-face learning modalities.

From a Schatzki theory perspective, this analysis elucidates how blended learning, empowered by digital technology, engenders new social practices that enhance learning outcomes. Investing in reliable digital infrastructure and providing adequate training for both students and instructors are imperative for establishing supportive material arrangements (Splitter et al., 2018). Context-specific blended learning strategies, as advocated by Gomez et al. (2022), can nurture shared understandings and norms conducive to effective learning practices. Regular evaluation and refinement of instructional methods, informed by student feedback and academic performance data, are essential for adapting social practices to evolving

circumstances (Gupta et al., 2020). By amalgamating diverse practices and engaging with material arrangements, blended learning effectively caters to the multifaceted needs of students, thereby enhancing overall academic performance.

Chapter 5

"Chapter 5 concludes that the COVID-19 pandemic has significantly impacted Sri Lankan higher education by necessitating a rapid shift to online learning, revealing both opportunities and challenges related to technology access and educator adaptation. Future studies should focus on longitudinal effects, comparative analyses of online learning environments, and strategies to enhance digital equity and pedagogical innovation."

5. Conclusion and future Studies

5.1. Conclusion

In conclusion, this study has explored the transformative impact of the COVID-19 pandemic on higher education in Sri Lanka, focusing particularly on the shift to online learning modalities. Through a combination of qualitative and quantitative analyses, along with a thorough examination of existing literature, important insights have been gleaned regarding the implications of this shift on teaching methods, student performance, and institutional frameworks. The sudden transition to online learning has presented both challenges and opportunities for educators and students alike. While the integration of digital technology has facilitated greater flexibility and engagement among students, it has also revealed disparities in access, training, and socioeconomic factors. Despite these challenges, educators have demonstrated flexibility and adaptability, leveraging digital tools to enhance the educational experience and overcome barriers to learning.

Looking ahead, it is imperative for stakeholders, educators, and policymakers to leverage the insights gleaned from this study to inform future strategies and initiatives. Longitudinal research is needed to monitor the long-term effects of online learning on student achievement and career outcomes, while comparative studies can offer valuable insights into the most effective use of technology in the classroom. To sum up, this study advances our understanding of how higher education is evolving in Sri Lanka in response to the challenges and opportunities presented by the digital age. By embracing the potential of online learning and addressing associated difficulties, Sri Lanka can position itself as a global leader in leveraging technology to enhance educational outcomes and drive societal advancement.

5.2. Future studies

To further our understanding of online learning in Sri Lankan higher education, future research could focus on a number of important areas. First, in order to monitor the long-term effects of online learning on students' academic achievement, career paths, and lifelong learning habits, longitudinal research is necessary. Comparative studies of various online learning environments and resources may also offer insightful information on the best ways to use technology in the classroom.

More research should be done on pedagogical innovations like gaming and flipped classrooms that are specifically designed for the online learning environment in order to improve learning outcomes and student engagement. In addition, establishing a more equitable and productive online education ecosystem requires tackling digital equity and inclusion gaps, as well as looking into faculty development initiatives and student viewpoints on online learning. In order to improve educational practices in Sri Lanka and inform policy decisions, policy analysis, blended learning models, assessment methodologies, and cultural contextual elements present viable options for further research.

Chapter 6

"An appendix and reference are included in Chapter 6 along with the sources used for the study."

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6.2. Appendix

6.2.1. Questionnaire

Question category	Questions
Demographic variables	1. Age 2. Gender 3. Institute 4. Course
Social Practice and Learning Environment	***Participation in Traditional On-Campus Education:*** 5. How often do you attend classes on campus in a typical week? 6. interactions with peers and Lecturers during on-campus classes. How often do you engage in discussions, group activities, or other collaborative tasks? 7. How important do you find face-to-face interactions with Lecturers in enhancing your learning experience (range 1 to 5 least important to most important) 8. Describe your interactions with peers and Lecturers during on-campus classes. How often do you engage in discussions, group activities, or other collaborative tasks? 9. How important do you find face-to-face interactions with Lecturers in enhancing your learning experience? (range 1 to 5 least important to most important) 10. How do you perceive the temporal dynamics (scheduling, timing of classes, etc.) of traditional on-campus education? 11. How would you rate your overall experience with traditional on-campus education?(range 1 to 5 very poor to very good)
	12. ***13. Participation in Online Education:***

	14. Have you participated in any online education programs post-COVID-19? 15. How often do you engage in online classes or activities? 16. Describe your interactions with peers and Lecturers during on-campus classes. How often do you engage in discussions, group activities, or other collaborative tasks? 17. Did you face any difficulty to find digital devices to connect online classes? 18. Did you have proper internet connection to join online classes ? 19. How do you feel about the sense of community and belonging in on-campus classes? (range 1 to 5 very poor to very good) 20. How effective do you think virtual interactions (e.g., online office hours, virtual Q&A sessions) are in supporting your learning? (range 1 to 5 very ineffective to very effective) 21. What aspects of online education do you find most beneficial? 22. How do you perceive the integration of digital technology in online education compared to traditional on-campus education? 23. How would you rate your overall experience with online education? (range 1 to 5 very poor to very good)
Technology Integration and Learning Experience:	24. In your opinion, how does online education compare to traditional on-campus education in terms of academic performance outcomes? 25. How would you rate the integration of digital technology in your on-campus classes? (range 1 to 5 very poor to very good) 26. How would you rate the integration of digital technology in your online classes? (range 1 to 5 very poor to very good)

	27. Do you believe that the degree of digital technology integration influences academic performance outcomes in online education? 28. How frequently do you use digital tools (e.g., learning management systems, online libraries) for coursework? 29. Rate your proficiency in utilizing these tools. 30. How has the integration of digital technology influenced your academic performance? 31. Do you believe that online platforms enhance your interaction with course content
Academic Performance	32. How satisfied are you with your academic performance in your current program? (range 1 to 5 very dissatisfied to very satisfied) 33. Reflecting on your grades, how do you perceive your performance compared to traditional classroom-based education? 34. In your opinion, what are the key challenges faced by students in adapting to online education post-COVID-19? 35. How do you envision the future of higher education in Sri Lanka considering the integration of digital technologies?

Table 2 : The questionnaire questions

6.2.2. Interview questions for lectures

1. What is your education?
2. What is your professional work experience?
3. Can you briefly describe your role and responsibilities at SLIATE?
4. How long have you been involved in teaching at SLIATE?
5. What are your experiences of on-line education prior the COVID pandemic?
6. What were your initial experiences transitioning from traditional on-campus teaching to online teaching during the COVID-19 pandemic?
7. Could you explain how the lectures, assignments, and evaluations that make up your course curriculum are typically arranged or configured? (in such terms as who is doing what and when, what tools and places are used, what rules or norms are followed, what goals are pursued?
8. What are the differences between practicing and arranging learning activities in online classes compared to traditional in-person classes?
9. How do your instructional strategies influence student relationships and learning outcomes? What are their underlying purposes, goals, and objectives?
10. How do physical and digital educational environments differ in how they support learning goals, emotional experiences, and overall structure?
11. In both on-campus and online learning environments, how do you oversee the temporal components of teaching, such as the scheduling of lectures, assignments, and assessments?
12. Have you seen any variations between these two environments in terms of the temporal aspects of student involvement or learning?
13. In traditional on-campus education, how do teaching methods and student relationships are influenced by the physical location of the classroom?

    Physical location and facilities available at that location has a considerable influence on teaching method and student relationship. For example, a class room with Air conditioned and multimedia facilities encourages student's attendance and interactive participation.
14. How does the distribution and reception of educational content in online education get affected by the digital space (e.g., online platforms)?
15. Could you explain the ways in which you incorporate digital technologies (such learning management systems and internet resources) into your classes?

16. In what ways is student involvement and academic achievement in online education impacted by the degree of digital technology integration?
17. How do different teaching strategies work together and depend on one another to give students a cohesive educational experience?
18. Regarding the interdependence of practices in adjusting to online education during and after COVID-19, have you observed any difficulties or advantages?
19. In what ways have instructional strategies altered or evolved in reaction to the move away from traditional on-campus to online learning?
20. What modifications have you made to meet the requirements and difficulties that students face in various learning environments?
21. What part do you think digital technologies play in improving the results and experiences of learning for students?
22. What essential elements, in your opinion, make technology integration in teaching methods successful?