



# Towards Digital Thinking and Practices: Experiences of Sri Lankan Teachers and Students

RESEARCH ARTICLE

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## ABSTRACT

Commonwealth Digital Education Leadership Training in Action (C-DELTA), an open and free online programme of the Commonwealth of Learning, provides a framework to foster digital education. The Open University of Sri Lanka implemented an intervention during 2020-2021 to promote digital education in Sri Lankan secondary schools, through the adoption of C-DELTA. This paper presents how C-DELTA supported developing digital thinking and practices among teachers and students, challenges faced and supports received by them, and impacts of the intervention. Participants' experiences were captured through questionnaire surveys, concept maps, focus group interviews, reflective stories, and video narratives. The findings revealed that the intervention has enhanced developing digital learning skills of teachers and students, and changing their thinking and practices, yet, amid various challenges. While the implementation of C-DELTA in schools has been slow during the COVID-19 pandemic, the pandemic itself has shown the significance of improving digital literacy and digital practices.

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## INTRODUCTION

The digital revolution has transformed how individuals access information, communicate, teach, and learn. Global initiatives to scale up digital learning skills and digital education practices will eventually speed up the progress towards achieving the Sustainable Development Goals (SDGs), especially, SDG4, which aims to ‘ensure inclusive and equitable quality education and promote lifelong learning opportunities for all’ (United Nations, 2021; UNESCO, 2015). On a par with SDG4, education systems worldwide must equip both teachers and students with digital literacy to face the challenges of the 21<sup>st</sup> century. Sri Lanka is no exception, as envisioned in the Sri Lankan National Goals of Education and Policies (National Education Commission, 2020).

The COVID-19 pandemic has triggered an accelerated move towards the adoption of digital technologies in education (EDUCAUSE, 2021; European Union, 2020; UNESCO, 2020). The unprecedented nature of the new reality forces the education systems to embark on digital learning practices. Thus, enhancing digital competencies of teachers and students becomes a key priority in the current scenario. Further, this sudden shift necessitates educators to rethink how best to meet the demands of a rapidly changing digital world through the provision of systematic and structured learning opportunities for both teachers and students.

Commonwealth Digital Education Leadership Training in Action (C-DELTA) is an open and free online programme offered by the Commonwealth of Learning (COL) to promote digital education. It provides a framework to foster digital learning and develop skilled citizens for lifelong learning (<https://cdelta.col.org/>). The curriculum and learning modules of the C-DELTA programme have been developed by the Centre for Innovation in Learning and Teaching (CILT) at the University of Cape Town, in collaboration with the C-DELTA CILT Advisory Group, with support from COL in 2016 (Brown et al., 2016).

The Open University of Sri Lanka (OUSL) in partnership with COL, successfully implemented Phase 1 of the C-DELTA project in 2018, to promote the adoption of C-DELTA programme in Sri Lankan secondary schools (Karunanayaka, 2020; Karunanayaka & Weerakoon, 2020; Karunanayaka et al., 2019). Upon the successful completion of Phase 1, OUSL implemented Phase 2 of the C-DELTA project in selected Sri Lankan secondary schools during 2020–2021, scaling up the project to reach a wider group of teachers and students. This paper presents a study based on Phase 2 which explores the impacts of the C-DELTA experience on teachers and students in changing their digital thinking and practices.

## REVIEW OF LITERATURE

### DIGITAL TRANSFORMATION AND RELATED ISSUES

Digital transformation is a global phenomenon that has been gradually shaping education over the years, yet associated with various challenges (Kopp et al., 2019). Online learning is a key aspect of digital transformation. Since online teaching and learning is mainly dependent on technological devices and the internet, it poses challenges for institutions, faculty, and learners (Adedoyin & Soykan, 2020). Not only the technology-related issues, but socio-economic factors also have been identified as challenges for institutions within the digital transformation. Further, the lack of digital competencies of teachers has been identified as a hindrance in digital teaching and learning (Scully et al., 2021). While digital technology is largely redesigning the nature of learning in the classroom and enhances the quality of education, often its effective implementation is hindered due to the digital divide and lack of institutional preparedness (Kummitha et al., 2021).

The revelation of the unpreparedness of the education systems worldwide to face the massive learning disruption caused by the COVID-19 pandemic has prompted the United Nations to lead a global initiative on digital learning and skills, targeting marginalized children and youth to close the digital divide and drive rapid change in education systems (UNESCO, 2021).

Essentially, the pandemic left both teachers and the students with no other option but to depend on digital technologies to continue with the teaching-learning process, which in a way accelerated digitalization of curricular delivery. Though tertiary education has had its course deliveries online at least to a certain extent this was not the case in most secondary education systems (OECD, 2021).

Digital transformation is not just about integrating new technologies to sustain the traditional learning approaches, but rather using technology to transform pedagogical practices to transcend traditional learning environments (Santos & Patton, 2018). Teachers in the digital age, thus, essentially require developing both technological and pedagogical competencies, to be effective in their professional practices (Bates, 2019; Starkey, 2012). Nevertheless, it is doubtful whether digital education is given its due attention in teacher professional development programmes, particularly in the Sri Lankan context. Nor in general secondary education, until recently with the COVID outbreak.

## **DIGITAL EDUCATION THINKING AND PRACTICES AMONG TEACHERS AND STUDENTS**

Concerning the digital education, digital competence and digital literacy are essentials to discuss. Digital competence is among the eight key competences indispensable for global citizenship (Vuorikari et al., 2016). Even though the terms digital competence and digital literacy are sometimes used interchangeably, it has been argued that the latter concerns with skills and its foci are ‘what’ and ‘how’ while the former’s foci are ‘why’, ‘when’, ‘who’ and ‘for whom’ (Spante et al., 2018). In the context of C-DELTA, digital literacy is defined as “people’s ability to live, learn and work in an evolving digitally mediated society by mobilising resources, developing digital identities and critically engaging in networks” which demonstrates “an understanding that digital literacy relates to how people are negotiating pathways within their respective contexts” (Brown et al., 2016, p. 8).

Technology-enhanced learning facilitates the development of digital literacy and 21<sup>st</sup> century digital skills among students. As highlighted by the Partnership for 21st Century Learning (P21) initiative, creativity, critical thinking, communication, and collaboration (4Cs) are essential learning and innovation skills to prepare students for the 21st century (Battelle for Kids, 2019). Seven core areas of 21<sup>st</sup> century digital skills have been identified as technical, information, communication, collaboration, creativity, critical thinking and problem-solving, together with five contextual skills – ethical awareness, cultural awareness, flexibility, self-direction, and lifelong learning (van Laar et al., 2020). Since the students in the 21st century have grown up in a rapidly advancing technological environment, teachers are expected to develop their professional digital competence to adapt to the needs of them (Engeness, 2021).

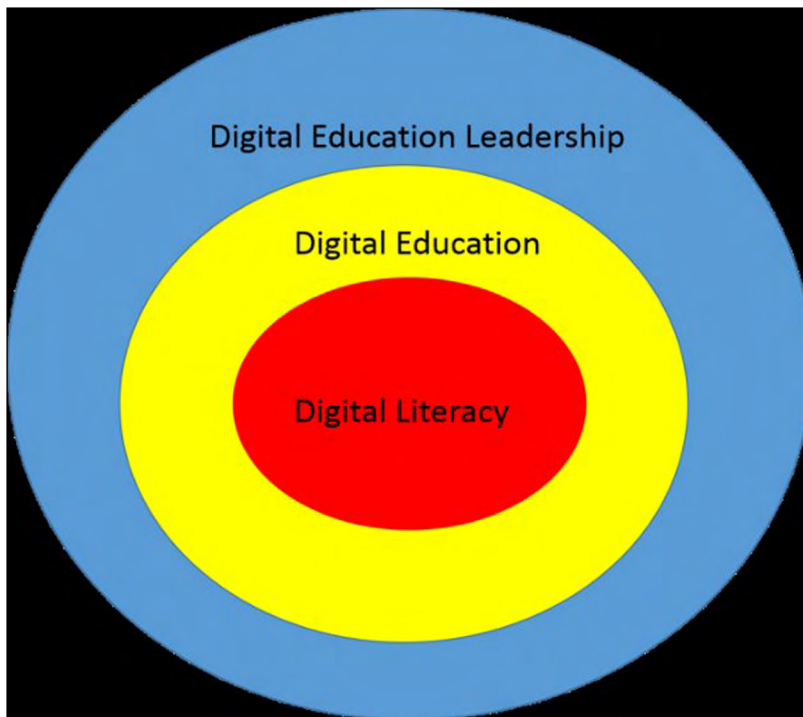
Digital technologies have brought about a tremendous amount of value to learners of every age, yet, the digital world is one with its own set of rules and risks. For instance, digital technologies increase children’s vulnerability to risks, and hazards such as cyberbullying and online threats (UNICEF, 2017). Hence, assuring student safety in the use of digital environments and tools is of great importance (Balyer & Öz, 2018). The use of digital devices and digital platforms in Sri Lanka has significantly increased during the recent past (Department of Census and Statistics Sri Lanka, 2020; Kemp, 2021). Simultaneously, cyber-security related issues have also escalated (Sri Lanka CERT-CC, 2019). This implies the digital challenges to be faced by educational institutions and educators when integrating digital technologies, and the need to equip both teachers and students with digital literacy skills and instill positive digital practices.

Furthermore, for students to get the most out of the benefits offered by digital technologies, they need to know how to use, process, deliver and receive digital information most effectively. We argue that one’s ability to access, critically assess the available information, adapt, or adopt them in a more informed manner, and create new information to disseminate have become essentials of skilled citizenship in the 21st century and beyond. For this, children must be safer when surfing the somewhat rough seas of the digital world. It is the educators’ responsibility to take the leadership in facilitating the development of digital literacy among learners, through digital education.

## CONCEPTUAL FRAMEWORK

The current study was planned and implemented grounded on the conceptual framework of C-DELTA Programme.

The C-DELTA programme has been developed conceptualizing a holistic approach focusing on the relationship between digital literacy, digital education and digital education leadership (See Figure 1). It views that digital education leadership is grounded in the practice that it seeks to foster, which is digital literacy practice, and the processes involved in teaching that practice, which is digital education. This viewpoint signifies that digital education is a pedagogic intervention that drives fostering of digital literacy as a social practice, as an outcome of digital education leadership (Brown et al., 2016).



**Figure 1** A holistic view of digital education leadership. (Source: Brown et al. 2016, p. 10; Attribution: CC BY-SA).

C-DELTA aims to develop digital education leaders who will demonstrate effective digital practices in their respective social contexts, and who can foster capabilities amongst others in their communities of practice. Digital education leadership is concerned with providing direction in terms of digital education by enhancing access, capacitating peers, making informed decisions, and cultivating innovation, to achieve the learning goal, i. e. digital literacy (Brown et al., 2016).

In the context of C-DELTA, digital education concerns development of digital literacy among individuals which is vital for them to effectively navigate through the advancing digitally mediated society within their respective contexts. Thus, C-DELTA emphasizes enhancing capacity building in context-based digital literacy practices and developing digital education leaders who will become change agents in their own contexts.

## METHODOLOGY

### RESEARCH QUESTIONS

The following research questions guided this study:

1. How did the C-DELTA intervention enhanced digital thinking and practices among teachers and students?
2. What are the factors that supported teachers and students to adopt C-DELTA?
3. What challenges were faced by the teachers and students in adopting C-DELTA?
4. What are the impacts of the C-DELTA intervention in Sri Lankan secondary schools?

## RESEARCH DESIGN

The project was designed as an action research study, comprising the design, development, and implementation of an intervention for teachers on the adoption of the C-DELTA programme in their schools. Action research involves a participatory, reflective, flexible and a responsive approach undertaken by practitioners in social situations to improve their own practices which can be of a collaborative nature (Carr & Kemmis, 1986). It is basically about changing an environment, a system, or a practice, and learning about the context through changing it. In the current study where the C-DELTA programme was introduced to teachers and students as a novel intervention to enhance digital literacy and digital practices in the school system, the action research methodology was selected as an appropriate approach.

## PARTICIPANTS

The intervention program was implemented with a group of 33 teachers, selected from among student teachers of the Faculty of Education and the Postgraduate Institute of English at OUSL from two academic programmes: Postgraduate Diploma in Education (PGDE) and Postgraduate Diploma in Bilingual Education (PGDBE).

The following factors were taken into considerations in the selection of participants:

- Representation from nine Provinces of Sri Lanka
- Representation from different mediums of teaching (Sinhala/Tamil/English)
- Representing male/female participants
- Having basic ICT skills and teaching in a school with an ICT laboratory

The participants included 12 males and 21 females, representing three media of teaching – Sinhala (10), Tamil (07), and English (16). (See Table 1)

These participants were designated as ‘Coordinating Teachers’ of C-DELTA in their respective schools.

PROGRAMME	MEDIUM			GENDER	
	SINHALA	TAMIL	ENGLISH	MALE	FEMALE
PGDE	10	07	–	9	8
PGDBE	–	–	16	3	13
TOTAL	10	07	16	12	21
	33			33	

**Table 1** Participant Teachers’ Distribution.

## THE INTERVENTION

A systematic intervention was conducted in several steps in accordance with the four stages of the action research cycle – planning, acting, observing, and reflecting (Masters, 1995). Within the action research methodological framework, a systematic process of activities was conducted during a period of one year, comprising the design, development, and implementation of the intervention programme and the evaluation of its impacts on changing digital thinking and practices of teachers and students. Two phases of the intervention were implemented during a period of 16 months. (See Table 2).

During the first phase, after obtaining of permissions from the relevant authorities, the coordinating teachers were selected. A three-day capacity building workshop was held in January 2020 at the OUSL, to orient these teachers and to develop their capacity on the adoption of C-DELTA and its implementation in their respective schools. During this workshop, the teachers engaged in various hands-on activities exploring the key concepts such as digital literacy, digital identity, digital footprint, internet searching, open educational resources and digital networking. Further, they developed capacity to use the C-DELTA platform and taking a leadership role to promote the adoption of C-DELTA programme their schools, as designated coordinating teachers of C-DELTA.

STAGE	ACTIVITIES
<i>Phase 1: Capacity development of the coordinating teachers (November 2019–February 2020)</i>	
Plan	Selection of coordinating teachers and obtaining approvals from the Ministry of Education, Provincial Ministries of Education, and Principals of the schools. Design of the capacity-development workshop sessions. Development of data collection instruments.
Act	Conduct the three-day capacity-development workshop for coordinating teachers. Monitor implementation in schools, encourage, motivate, and provide guidance.
Observe	Data collection via questionnaire survey, concept mapping, self-reflections, User Analytics in the C-DELTA Platform
Reflect	Evaluate effects of the capacity-development workshop on teachers Find out challenges faced during implementation in schools. Revise the strategies of the intervention, based on the findings.
<i>Phase 2: Implementation of the intervention in schools, monitoring and evaluation (March 2020 – March 2021)</i>	
Plan	Design Zoom-based evaluation workshop sessions Development of data collection instruments and guidelines. Design novel data collection strategies via video narratives of teachers and students.
Act	Conduct of Zoom-based evaluation workshop sessions Monitor implementation in schools, encourage, motivate, and provide guidance.
Observe	Data collection via focus groups, self-reflections, User Analytics in the C-DELTA platform; reflective stories, video narratives
Reflect	Evaluate effects of the overall intervention on teachers and students. Find out challenges faced during implementation in schools. Based on data analysis of both cycles, identify the impacts of the intervention on changing digital education practices of teachers and students.

**Table 2** The Intervention Process.

The second phase was the school-level implementation of C-DELTA, which required these coordinating teachers to conduct orientation sessions for other teachers and students in their schools, encourage them take up the C-DELTA modules online, and support the adoption of the key concepts related to digital education. However, the unexpected closure of the schools and the lockdown situation in the country due to COVID-19 pandemic since March 2020 hindered the smooth implementation of the project as planned. The research team kept continuous contact with the teachers to guide, support, monitor progress and collect data via email and zoom sessions.

## COLLECTION AND ANALYSIS OF DATA

Multiple strategies were used for data collection throughout the process, including semi-structured questionnaires, concept mapping, zoom-based focus-group interviews, self-reflections, and video narratives (Table 3).

	STAGE	DATA COLLECTION STRATEGIES
<i>Pre-Intervention</i>	Prior to the capacity development workshop	Preliminary Questionnaire
	During the capacity development workshop	Concept Mapping Self-Reflections Implementation Plans
	After the capacity development workshop	Post-workshop Questionnaire
<i>Mid-Intervention</i>	C-DELTA Implementation in schools	User Analytics in the C-DELTA Platform Email communications
	Review Workshops	Interim Reports of teachers
<i>Post-Intervention</i>	Evaluation Sessions (via ZOOM)	Focus group discussions
	Final reporting	Final Reports of coordinating teachers
	Reflective video clips	Reflections of coordinating teachers via video clips (video narratives)  Reflections of peer teachers and students via video clips (video narratives)

**Table 3** Summary of data collection strategies employed.

While both quantitative and qualitative methods were used to gather a variety of data during the process, for the purposes of this study, mainly a qualitative approach was taken in the analysis of selected data with an in-depth content analysis, based on thematic coding, and categorizing.

## FINDINGS AND DISCUSSION

### HOW DID THE C-DELTA INTERVENTION ENHANCED DIGITAL THINKING AND PRACTICES AMONG TEACHERS AND STUDENTS?

A clear concept formation related to digital education is essential to support the development of digital thinking and practices. The concept mapping strategy adopted during the initial capacity development workshop revealed the development of coordinating teachers' understanding around the novel concepts related to digital education through their graphical representations.

The content analysis of the 33 concept maps/graphical representations created by the coordinating teachers signified that a majority (92.3%) indicated "digital identity" as the main theme. These indicated meaningful relationships with other concepts such as 'digital presence', 'digital literacy', 'digital footprint' and 'digital education'. Further, the teachers provided critical peer feedback to each other's individual creations and created group posters summarizing and showcasing their collective understandings of the core concepts related to digital learning in a meaningful and a creative manner.

Interestingly, many of teachers have used concept mapping activity with their students too, when implementing C-DELTA in their schools. The results indicate that the concept mapping strategy has triggered creative thinking, critical thinking, collaboration, and communication in relation to understanding digital education concepts, among the teachers as well as students.

Analysis of the self-reflections, final reports, focus group discussion transcripts and video narratives of the coordinating teachers (CT), their peer teachers (PT) and students (S), further revealed the development of their digital thinking and practices, as evidenced by selected quotes. (Table 4).

CODES	SUPPORTIVE QUOTES	SOURCE
Novel concepts	<i>I could understand what digital literacy is, how digital knowledge could be beneficial...the importance of being digitally literate...</i>	CT
	<i>I did not bother about license matters to educational resources until I participated in the C-DELTA program</i>	CT
	<i>I learned a lot of things about digital literacy which I did not know before.</i>	S
Digital Identity	<i>My students...understood that they need to maintain a positive digital identity.</i>	CT
	<i>Digital Identity and digital footprint made my online activities more secure.</i>	S
Digital safety	<i>I never cared about privacy when using digital devices...Now I could understand the negative effects.</i>	CT
	<i>Now I am using social media in a safe manner.</i>	PT
	<i>I learned about the proper and safe use of internet and e-mail.</i>	S
Competency development	<i>I gained lot of experience related to digital technology that helps me to guide students towards the digital world.</i>	CT
	<i>I was able to change the ways of teaching from traditional method to student-centered methods.</i>	CT
	<i>I added concept map drawing to my teaching process.</i>	CT
	<i>My leadership qualities were developed.</i>	CT
	<i>I was able to gain knowledge about professional ethics that I should protect while being a role model for my students</i>	CT
	<i>C-DELTA helped me to improve the e-learning skills.</i>	PT
	<i>...it contributes to improve students' self-learning.</i>	PT
	<i>Now students are successfully using google translator in their work."</i>	CT
	<i>These modules helped us not only to develop our IT knowledge but also the English language proficiency.</i>	S
Sharing knowledge	<i>In the future, I will be more aware of digital identity and make the others aware too.</i>	CT
	<i>I will share this knowledge with my friends.</i>	S

**Table 4** Development of digital thinking and practices.

(Contd.)

CODES	SUPPORTIVE QUOTES	SOURCE
Motivation	<i>I was determined to implement this program at my school successfully, whatever the obstacles I face.</i>	CT
	<i>I knew that there are many barriers...but I was determined to somehow implement this project in our school.</i>	CT
	<i>This programme prompted me to enter into online education</i>	PT
Continuity	<i>As this project is worthy for students as well as teachers, I hope to continue with a new group in the future.</i>	CT
Innovative thinking	<i>I took an idea from the C- DELTA platform to design and introduce a new e-learning platform for our school system.</i>	CT

All participants were immensely interested about the novel digital concepts they were exposed to and were quite motivated to seek further knowledge about those concepts and integrate into their teaching-learning practices, supported by their newly developed digital skills. Both teachers and students have started being more concerned about ‘digital safety’ and to take measures to maintain a positive ‘digital identity’, which entails critical thinking. Further, the OER concept has instilled using resources ethically.

The competency development that has ensued in a variety of useful aspects such as eLearning, using digital tools, English language usage, self-study skills, student-centred learning, and leadership qualities have significantly affected teachers and students to change from their conventional practices and adopt novel practices. The intentions of the participants to share their new knowledge with the others, and to maintain continuity of the project in their schools, imply increased collaborative thinking and practices. It was also encouraging to note the emergence of creative thinking of some teachers to introduce innovative initiatives, inspired by C-DELTA.

Evidently, the C-DELTA intervention has promoted development of thinking and practices related to 21<sup>st</sup> century digital skill areas – technical, information management, communication, collaboration, creativity, critical thinking and problem-solving (van Laar et al., 2020).

### WHAT ARE THE FACTORS THAT SUPPORTED TEACHERS AND STUDENTS TO ADOPT C-DELTA?

Several factors have supported the participants to adopt C-DELTA, as summarized in Table 5, with supportive quotes.

CODES	SUPPORTIVE QUOTES	SOURCE
Capacity development workshop	<i>Three days' capacity building workshop...was a great opportunity to wake up and expand my vision towards Digital Education.</i>	CT
	<i>I got the opportunity to do a lot of new activities in the workshop and work in a new environment...</i>	CT
C-DELTA course content	<i>The modules were well designed and easy to learn and the quizzes that followed made me think and understand the concepts in the module</i>	CT
	<i>The pretest itself is a challenging and interesting activity, and the assessments given after each unit are very useful...</i>	CT
School administration	<i>...the school Principal admired the idea and gave permission for the task.</i>	CT
	<i>My school principal and the other staff members gave theirs fullest support to implement this as successful programme.</i>	CT
Physical and human resources	<i>My school has 2 ICT laboratory with basic facilities. Also, 4 ICT teachers are working with me</i>	CT
	<i>Other than the ICT laboratory there are 3 SMART classrooms. I used one of these for the demonstrations of C-DELTA.</i>	CT
Peer support	<i>...most of the teachers (especially ICT and English Language) volunteered...</i>	CT
	<i>Students support each other when they get technical issues</i>	CT
Student enthusiasm	<i>...[students] embraced the project with more enthusiasm...</i>	CT
e-Certificate	<i>They were interested to do this as they can have certificates and badges</i>	CT
	<i>I am happy that I was able to obtain beginners level e-certificate for pre-test and 'Fluent level and intermediate level' e-certificate for post-test</i>	S

Table 5 Supportive factors.



While the capacity development workshop has motivated and encouraged the coordinating teachers to initiate implementing C-DELTA in their schools, without the administrative support and assistance from the peer teachers, it would not have been possible. Participants from schools with adequate infrastructure facilities were at an advantageous position to implement it successfully. Further, the student's interest was also a favorable point. The structuring of the course content in the C-DELTA course including pre- and post-tests and activities were appreciated, and especially, the award of e-certificates and badges has been a motivating factor.

### WHAT CHALLENGES WERE FACED BY THE TEACHERS AND STUDENTS IN ADOPTING C-DELTA?

The progress in the implementation of the C-DELTA programme in schools has been slow amid various challenges, primarily due to the sudden closure of schools with the COVID-19 pandemic since March 2020. Common challenges faced by the participants are summarized with supportive quotes in Table 6.

Table 6 Challenges faced.

CODES	SUPPORTIVE QUOTES	SOURCE
COVID-19 Pandemic	<i>Due to the Covid outbreak, I was not able to guide the students throughout the programme and as a result, they lacked the motivation to complete the course.</i>	CT
	<i>To avoid the gathering...it was not allowed to conduct additional activities. Due to this restriction, I couldn't do any activities after school hours.</i>	CT
Time constraints	<i>Allocation of time for the students and getting permission amidst the learning process was the first challenge I faced.</i>	CT
Limited facilities and resources	<i>The laptop was the only machine with an internet connection [...] had to do all the works with a single laptop...</i>	CT
	<i>I faced lots of problems related to internet coverage and mobile devices.</i>	S
Technical issues	<i>At that time students did not have email addresses. So, first I had to instruct them on how to create an email address.</i>	CT
Parents' restrictions	<i>With my school principal's permission, I requested parents to allow students take SMART phones to the schools...only 2 were allowed...</i>	CT
Online delivery	<i>Students encountered many issues in transitioning to online pedagogical delivery.</i>	CT
English language	<i>Some students disliked participating...due to the struggle of understanding the English language.</i>	CT
	<i>...if these modules were in Tamil, it will be easy for us to comprehend and complete</i>	S
Negative thinking	<i>Negative stereotypical thinking of some of the staff was a challenge at the initial phase.</i>	CT
Socio-economic situation	<i>...as most of the students at my school come from a lower socio-economic background and as well as with a lack of knowledge of information technology...</i>	CT
	<i>...most probably it was a problem to pay for the internet facilities. As the majority of the students are from fishing families, their parents were jobless. Therefore, students were suffering...</i>	CT

Except for the specific challenges posed by the pandemic, many other challenges were similar to those identified during Phase 1 of the C-DELTA Project at OUSL (Karunanayaka & Weerakoon, 2020), such as time constraints, limited infrastructure facilities, technical issues and skill limitations. In addition, the negative effect of low socio-economic situations on students' online learning reveals the sad reality of 'digital divide'. However, even amid such challenges, 20 out of 33 teachers (60.6%) managed to complete the project and submit their final reports by March 2021.

## WHAT ARE THE IMPACTS OF THE C-DELTA INTERVENTION IN SRI LANKAN SECONDARY SCHOOLS?

Overall, the C-DELTA intervention has made several impacts on enhancing digital education in the selected secondary schools, as a result of capacity development and enhancing digital capabilities of teachers and students. A summary of key findings revealed are listed below, with some supportive quotes:

- C-DELTA was a novel and an innovative experience which has particularly supported teachers and students to productively engage in digital practices during the pandemic situation.
  - *The pandemic has emphasized the need for students and teachers to be digitally literate.*
  - *As a trilingual teacher, C-DELTA programme was very helpful for both me and my students, during the current pandemic situation in the country.*
  - *Due to unexpected COVID-19 pandemic situation teachers were compelled to teach through Zoom technology...C-DELTA helped me to develop some basic skills needed.*
  - *...the same [pandemic] has become a blessing for us to motivate both staff and students to follow the course...*
- C-DELTA initiative not only supported professional development of teachers, but also allowed them to gain recognition as 'digital leaders' in their schools.
  - *...was an immense experience for me...to improve the skills of online learning and to identify the role of an ICT teacher as a digital leader in the school context...*
  - *...strengthened my feet as an ICT teacher in my career...*
  - *My leadership qualities were developed...and I developed my skills in e-learning...*
  - *...gave me recognition in my school and many of the students and staff started to reach me for their IT purposes...*
- The students became confident in using ICT and inspired in studying ICT as a subject due to C-DELTA experience.
  - *As a student who offers ICT as the main subject for GCE A/L, I find these modules very useful and I can't wait to complete all modules and see my post-test score*
  - *Due the engagement of this C-DELTA programme I was able to select ICT as a subject for G.C.E.O/L examination. I personally build up this confidence through it.*
- Engagement in C-DELTA has instilled positive thinking on digital education among teachers.
  - *...most of the teachers have become very positive about the use of digital resources...*
  - *...they have become tech-savvy and have realized the importance of gaining theoretical knowledge about the use of digital resources...*
- Because of the C-DELTA programme, schools were able to get the internet facility.
  - *Finally, I was able to buy a 3G Dongle supported Wi-Fi Router for the computer lab. It was a great achievement of this project to our school.*
- Teachers show a keen interest to take forward the project in their schools.
  - *This has become a successful ongoing project by now in our school.*
- Teachers made some progressive recommendations and suggestions for the future.
  - *I highly recommend this course for the students who offer ICT at both GCE Ordinary Level Examination and Advanced Level Examination.*
  - *I would recommend a localized version of C-DELTA for Sri Lanka, so the language would not affect as a negative factor.*
  - *C-DELTA is a timely teacher development project and I wish all my staff undertake the course.*
  - *It is my fervent belief that C-DELTA expands the scale, efficiency, and quality of learning by using appropriate open, distance, and technology-based approaches.*

As revealed by the quotes above, the C-DELTA intervention has significantly supported fostering digital learning environments in the selected schools. This becomes especially significant in the current pandemic scenario, where schools, teachers, and students have been compelled to shift to digital teaching and learning.

C-DELTA, as a digital education capacity development intervention, has clearly promoted enhancing access, capacitating peers, making informed decisions, and cultivating innovation among teachers and students in the secondary schools, to achieve the expected learning goal – digital literacy (Brown et al., 2016).

## CONCLUDING REMARKS

Despite various challenges during the COVID-19 pandemic, the coordinating teachers attempted to proceed with the project with a positive mindset. While the adoption of C-DELTA in schools has been slow due to the COVID-19 outbreak and the closure of schools, the pandemic itself has made teachers realize the importance of improving digital literacy and developing related skills among themselves as well as their students. The findings revealed that the intervention has impacted developing digital learning skills of teachers and students, and changing their thinking and practices, amid various challenges. The effective implementation of C-DELTA in schools has been affected by the COVID-19 pandemic. Nevertheless, the pandemic itself has shown the significance of enhancing digital literacy, digital education, and digital education leadership.

Even though the project has ended, we envisage that the adoption of the concepts and practices in relation to the C-DELTA programme will be continued in these schools, fostering digital education. We believe that the capacity building intervention in context-based digital literacy practices has developed a group of digital education leaders who functioned as change agents in their own contexts. The publishing of their ‘stories’ in the weblog “Digital Education Leaders in Action”, (see <https://cdeltaoussl.wordpress.com/>) provides an opportunity for them to share experiences with a global audience, and to gain visibility as motivated individuals who practice digital education under trying conditions.

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## COMPETING INTERESTS

The authors have no competing interests to declare.


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