PERCEPTIONS OF ONLINE TEACHING AND LEARNING DURING THE COVID-19 PANDEMIC IN BARBADIAN PRIMARY AND SECONDARY SCHOOLS

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ABSTRACT

This paper explores a sample of data collected from a UNICEF Eastern Caribbean rapid assessment on teaching and learning during the COVID-19 pandemic in eight countries. The primary investigation method was mixed and captured data from key participants/stakeholders in education using CAPI Technology and Video Conferencing tools. Statistical analyses and qualitative thematic analysis were conducted to report on findings using Statistical Package for the Social Sciences and Nvivo Qualitative Software. The data on online teaching and learning from Barbados was selected for further review and presented an opportunity to assess the Barbadian experience against other developing and developed countries. In assessing these perceptions in a sample of primary and secondary schools, stakeholders were generally dissatisfied with the online and blended learning modalities citing challenges relating to the equality and equity in access to devices and the enabling environment that facilities effective online teaching and learning.

KEYWORDS

Teaching and Learning, COVID-19, Online Learning, Blended Learning, Education Equity

1. INTRODUCTION

The SARS-COV-2 virus came to international attention in December 2019 when citizens in Wuhan City, China presented to hospitals with an acute respiratory illness [1]. Given the popularity of intercontinental travel, it was no surprise that the virus quickly spread across the globe and on March 11, 2020 was declared a pandemic by the World Health Organisation recording <34,000 new infections and 277 daily deaths at that time [1,2]. This declaration was the harbinger for the year 2020, with multiple and compounding social and economic shocks; catastrophic death tolls; and varied stressors.

Living in a pandemic necessitated numerous changes to social life and activity which in many cases were drastic deviations from social norms [3]. Social and physical distancing- its social implications, syntax and ability to flatten the curve were discussions of global, local and familial import. The shift to online teaching and learning was one of many drastic changes with related socio-economic implications [1, 4,5]. The traditional lecture-style pedagogical model was

upended by the pandemic and its attendant mitigation policies. Curfews; closure of non-essential business; national shutdowns, and; closure of schools placed educators and policymakers under great strain to quickly transition into online learning [3,6,7].

The impact of this pedagogical shift was felt worldwide. UNESCO reported that 87% of the global school population had been affected by the pandemic and sought to launch distance learning programmes to reach the most vulnerable in an effort to provide support for continued education as the pandemic shed light on numerous issues affecting access to education and broader socioeconomic complications [6,7,8].

While students in higher education institutions would have been familiar with components of blended learning such as online quizzes and assignment submission. For the majority of students and teachers in junior education (4-16 years) online learning was an extreme departure from the traditional approach to teaching to which they had become accustomed. Putri et al [4] described the online transition of primary education in India as "chaos", impacting all aspects of education: curriculum and planning; student examinations; transitions into new grade levels, and further education. For many students and teachers globally, though there would have been conservative integration of technology in the physical classroom, the exclusive use of the virtual environment was a new concept and though met with hesitancy, it was the safest option for an estimated 1.5 billion students globally [7].

In Barbados, the integration of technology in junior education started in earnest over two decades ago, and over the ensuing period despite the use of technology in multiple aspects of our daily lives, technology in the delivery of education did not realise the goal of full integration with tuition delivered lecture-style with little integration in traditional subject areas such as mathematics [9,10]. Similar reports were made for Indonesia [4], India [11] and Italy [12] where gradual integration of technology in education left teachers unprepared for the shift to online learning given the access to resources for online teaching and learning were not generally available for all outside the school environment [4,11,12].

The driving problem statement of this paper deals specifically with exploring the experiences, perceptions and challenges of the online learning environment in a small developing country (Barbados) during the SARS-COV-2 pandemic. A growing body of recent research on the impact of COVID-19 on the education sector has demonstrated that there have been a number of significant challenges faced by teachers and students alike. For example, research in Indonesia and Pakistan highlighted that the main areas of difficulty in transitioning to online teaching and learning amid COVID-19 included limited access to technology, digital resources, and WIFI-connectivity; problems with student concentration and focus within the online learning environment; and competency deficits in the use of technology and associated adjustment constraints for teachers who find it difficult to acclimate to the new online teaching platforms [13, 14]. There were also concerns about the lack of face-to-face interaction and absence of traditional classroom socialisation which emerged as key issues in the transition to online modalities in education [14]. It was also not surprising to observe, from other research, the impact of COVID-19 on increased workload demands for both students and teachers, which in turn, adversely affected the general educational and classroom environment, and desired learning/academic outcomes [15].

This paper presents a subset of the data collected for the UNICEF Eastern Caribbean Rapid Assessment of the effectiveness of communication interventions for the safe reopening of schools in select Eastern Caribbean countries (Anguilla, Antigua and Barbuda, Barbados, Dominica, Montserrat, St. Lucia, St. Kitts and Nevis and St. Vincent and the Grenadines) and generating

behaviour change during the COVID-19 pandemic (2021). The case study interrogates the data relating to perceptions of online teaching for students, teachers, principals and teacher trade union representatives in Barbados. Barbados was selected for examination given that it met all targets for data collection and had sample proportions meeting the 95% confidence interval.

In reviewing the findings from Barbados, the paper will address:

- Access to devices and ancillary materials necessary for online teaching and learning, and;
- The level of comfort and ability of educators and students to navigate and work effectively in the online learning environment.

The discussion of findings will consider the history of technology integration in public primary and secondary education in Barbados and the investments of consecutive governments in the development of technology education to assure the continued high rating of Human Development and literacy of which Barbados has come to boast [9,10,16]. Further, it will assess literature relating to equity and equality of access to education materials and present the conundrum to the reader 'is effective online education realistic? or is it an ideal type?' and the implications of this within the Barbadian context. While the pandemic has not been without its challenges, it also presented researchers and academics many opportunities to investigate this social phenomenon and underscore the need for a review of pedagogy, curricula and policy in modern education.

2. METHODOLOGY

The research investigation utilised a mixed-method approach to data collection to capture key insights of stakeholders on their perceptions of safety, and experiences in public primary and secondary education during the SARS-COV-2 pandemic. Key participants/stakeholders sampled included teachers, students, principals and teacher trade union representatives. Quantitative survey instruments were conceptualised and made digitally available for random samples of students and teachers using SNAP Surveys® and two (2) qualitative semi-structured interview schedules were prepared for a purposive sample of principals and Group Bargaining Agents (Teachers' Union Representatives) respectively, who were invited to participate in key informant interviews [17,18,19,20]. Table 1 shows the breakdown of the sample profiles of these groups of participants.

Samples were randomly drawn based on the available census data for Barbados and in consultation with the Ministry of Education, Technological and Vocational Training to determine representation from urban and rural schools [19]. Once schools were selected that met the sampling criteria, the student sample was further disaggregated to capture respondents across the spectrum of learning abilities [19]. Further, in the sample of primary schools only senior students (ages 8-11 years old) were selected to participate. Given the uncertainty of the SARS-COV-2 pandemic, this decision was taken to ensure that students would be able to self-administer the survey should COVID-19 protocols not allow for interviewer-assisted surveying. In the secondary schools, student participants were drawn from across year levels (11-16 years old).

Information and Communications Technologies (ICT) and Computer Assisted Personal Interviewing (CAPI) were used to disseminate the digital survey either by email link for self-administration or use on Tablet PCs for interviewer-assisted student surveys [20]. Moreover, tools such as Google Meet and Zoom facilitated key informant interviews in a secure and safe environment [17,18,20,21].

The modality for survey administration was mixed and ensured last minute changes to safety protocols would not prematurely end data collection [18,20,22]. A team of interviewers were trained in survey administration, COVID-19 safety protocols for in-person interviewing and ethics in interviewing minors.

At the time of data collection (November 16th, 2020 - December 11th, 2020) Barbados had transitioned into various forms of blended learning and the authors secured buy-in from all key stakeholders. The conduct of student interviews was in-person, in compliance with national COVID-19 protocols [22]. Teacher interviews were disseminated via email and were self-administered [22,23].

Table 1 – Participant Profiles for Barbados

Instrument	Primary	Secondary
Student Survey	414	423
Teacher Survey	93	81
Principal Interview	5	5
Teachers' Union Representative Interview	2	

In alignment with best practice in interviewing, the sampling for teachers and trade union representatives were proportionate to the number of schools and group representative bodies. All sampled interviews were conducted and data saturation was reached [22,23].

2.1. Ethical Considerations

In considering the ethical implications of interviewing minors, two proposals were made, that the Ministry of Education, Technological and Vocational Training act in loco parentis or submit letters to participating schools requesting parental permissions [24,25]. The Ministry of Education took the decision to act in loco parentis and on the day of interview, students were informed of the sponsor, purpose and their role in the survey in an effort that any assent/compliance would be informed [24]. This is in keeping with international best practice and ensured the student participant knew they had the autonomy to refuse participation in the evaluation [24]. Student and teacher surveys captured no identifying information and principals and union representatives were given the option of anonymity or to identify themselves in reporting [18].

2.2. Data Analysis and Reporting

Use of CAPI technology for survey administration ensured all survey data was received in a digital format [15,17]. At the end of data collection, data sets were downloaded from the secure online server and uploaded to the software programme Statistical Package for the Social Sciences (SPSS) where a range of analyses including benchmarking and summary statistics were conducted [25]. Key informant interviews were recorded with the permission of interviewees and interview transcripts were prepared for thematic analysis using Nvivo Qualitative Software [26].

2.2.1. Limitations

The exclusive use of quantitative metrics for students and teachers was necessary to ensure representation, generalisability and comparability of measures across the eight participating territories of the parent investigation given the safety considerations. The use of interview data of collective bargaining agents (Teachers' Unions) and sampled principals allowed for those key

stakeholders, who are responsible for teachers and students to share experiences on their behalf in the absence of their first-hand account [18,27].

3. KEY FINDINGS

Recording its first case of the SARS-COV-2 virus in March 2020, the Government of Barbados acted swiftly to mitigate its spread and protect the vulnerable through the use of curfews; closure of non-essential businesses, and; the shift to online learning for Term 3 (April-July) 2020 for all schools. At the time of data collection (November-December 2020) students, teachers and principals had returned to the school plants and had transitioned into combinations of blended learning and face to face tuition as seen in Table 2. Therefore, participants in Barbados were in a nuanced position to assess the utility of the traditional classroom, exclusive online learning and the blended learning environment.

3.1. Access to Devices and Tools for Online Learning.

A review of the data relating to teaching modality (Table 2) and access to the necessary tools (Table 3) provides useful context in an assessment of the efficacy of teaching modalities.

The majority (74%) of secondary school students were being taught using a blended approach (Table 2). In reporting their access to devices, a moderate majority reported access to Tablet PC (71.8%) and/or Laptop (67.9%) and over 97% reported access to adequate internet and Wi-Fi access (Table 3). On the measures of access to electronic devices that facilitate completing and submitting assignments the percentages were considerably lower, with only 20.8% of students having access to a scanner and 52.9% having access to a printer (Table 3).

Primary school students generally (80.4%) attended face to face classes (Table 2) and recorded moderate percentages of access to adequate internet/Wi-Fi (52.9%) and ICT devices; of concern were the low percentages of access to printers (18.8%) and scanners (2.4%) (Table 3).

Table 2 - Teaching Modalities (Students)

Teaching Formats	Primary	Secondary
Only face-to-face classes	80.4%	18.2%
Only attends face-to-face classes but using the shift system	7.0%	7.8%
Only online classes	0.0%	0.0%
A mixture of online and face to face classes	12.6%	74.0%

Table 3 – Access to Technology and Electronic Devices (Students)

Tools for Online Teaching/Learning	Primary	Secondary
Tablet PC	56.5%	71.8%
Laptop	25.9%	67.9%
Printer	18.8%	52.9%
Scanner	2.4%	20.8%
Adequate Internet/Wi-Fi Access	52.9%	97.8%

A review of the data for Teachers in Table 4 below shows that while the majority of teachers had access to internet and devices, there was still a considerable percentage of teachers who did not. This finding is supported by the interview data from both representatives of the teachers' union. Trade_Union_Representative1 stated "Some members did not have computers. Some have expensed themselves to get the computers to teach. Some teachers were using their cellular phone and data plans where some did not have internet at home." This was corroborated by Trade_Union_Representative2 who shared "Teachers were eager to get back into the classroom the challenge was being able to teach students using the online platform with some of them not having devices, some of them not having Wi-Fi, some of them not having electricity."

Table 4 – % Agreement in Access to Technology and Electronic Devices (Teachers)

	Primary	**Secondary**
Having access to reliable WIFI/Internet at home	70.33	77.5
Having access to a computer, laptop or tablet PC to develop and deliver lessons online	69.23	66.15

3.1.1. Perceptions of The Online Learning Environment

The physical school environment was preferred by students across school levels with the majority of students reporting low levels of satisfaction with online school (Table 5).

Secondary students preferred the physical school environment with high levels of satisfaction recorded for social interaction (92.4%) and completing assignments at school (93.2%) (Table 6). Though secondary students reported high levels of satisfaction with the ability to use the technology (94.9%) and navigate the online learning environment (91.1%); only moderate percentages of satisfaction were recorded on measures related to learning activities in the online learning environment with a 52% satisfaction recorded for the measure 'interacting with students and teachers online' (Table 6). Further, too few secondary students were comfortable with their ability to focus (35.1%) and understand lessons in the online environment 'just as well as at school' (36.1%) (Table 5).

Primary school students similarly preferred the social interactions (94.5%), and completing assignments (96.8%) at school (Table 6). Ease of use of the learning technology (98%) and application software (91.8%) also recorded high percentages of satisfaction. Similar to the secondary students, only moderate levels of satisfaction were recorded for online learning activities, with 'sending or receiving emails' recording moderate (61%) satisfaction. Of note, primary students enjoyed 'watching videos' and recorded 98% satisfaction on this measure. In reviewing the data for primary school students, despite the preference for in-person tuition, there were moderate percentages of satisfaction recorded on their focus (53.8%) and the ability to understand 'just as well as at school' (65.4%) in the online learning environment (Table 5).

Table 5 - % Agreement of Attending School and Online Learning (Students)

Statement	**Primary**	**Secondary**
I feel safe coming to school	81.2%	71.6%
I prefer the online class to coming to school	34.6%	19.8%
I prefer the coming to school rather than online school	75.0%	66.9%
I am able to focus during online class	53.8%	35.1%
I can understand the lessons during the online class just as well as at school	65.4%	36.1%

Table 6- % Satisfaction with Online School and use of Technology (Students)

	Primary	**Secondary**
Interacting with teachers and other students in the physical classroom	94.5%	92.4%
Completing schoolwork/projects in the physical classroom	96.8%	93.2%
Doing class activities online	62.7%	59.7%
Interacting with teachers and other students online	66.7%	52.5%
Completing schoolwork/projects online	71.4%	57.0%
Sending and receiving emails from teachers	61.2%	57.3%
Downloading materials online	62.0%	58.9%
Watching online videos provided by the school	98.0%	77.6%
Knowing how to use the computer, laptop or tablet to do your schoolwork or online classes	98.0%	94.9%
Knowing how to use the online technology (e.g. Zoom, Google Classroom) to do your school work or classes	91.8%	91.1%

A minority of teachers at both primary and secondary schools (12.8% and 35.3%, respectively) reported preferring the online learning environment (Table 7). While over 70% of primary and secondary teachers reported being able to use devices to prepare digital learning materials and deliver tuition in the online environment (Table 8), there were low to moderate levels of recorded satisfaction in conducting class activities online, assessing schoolwork online and interacting with students online across both school levels (Table 8). In contrast, higher percentages of teachers from both primary and secondary schools expressed satisfaction with interacting with teachers and other students in the physical classroom. It was not surprising to observe the divergence in attitudes regarding the physical or in-person environment and the online environment as it was purported that the authentic and meaningful experience of social interaction was absent in the former as there was no ability for "social learning from the online modality in conflict management and interpersonal relationships"- Trade_Union_Representative1.

In identifying reasons for the low satisfaction levels in online learning among primary and secondary teachers, Table 9 provides further insight with parental support and distractions in the home environment recording moderate levels of dissatisfaction by teachers across both school levels. Additional challenges to online learning were gleaned from the textual data of union representatives presented below:

"…full classes not logging into online environment, they may not have devices, there may be 1 device across several students in the home or they may be not interested in logging on" – Trade_Union_Representative1

"Tired, Exhaustion, Burn Out, Frustration. There is a large percentage of teachers complaining about how tired they feel having to cater to both types of learning" – Trade_Union_Representative1

"The Ministry of Education is trying to at least ensure that devices are available. I am not sure that they can address the health challenges in terms of providing the proper ergonomics. Maybe as we negotiate going forward we may have to look for some special allowance for teachers if we are going to continue in this environment. Those are things we will have to discuss with the

Ministry in terms of our terms and conditions of service going forward."- Trade_Union_Representative2

Further, in reporting on the efficacy of online tuition, secondary teachers registered levels of concern with respect to finishing the curriculum (65.43%). Moreover, teachers in primary schools recorded a moderate level of satisfaction on the measure 'standard of education' (56.41%) and 44.73% of teachers thought their students were struggling in the online environment.

Table 7-% Agreement of Attending School and Online Learning (Teachers)

	Primary	**Secondary**
I prefer to stay home to do my classes online	12.82	35.38
I think my students are struggling in the online environment	44.73	63.07
Despite challenges the pupils are still getting a good standard of education	56.41	59.37
I am worried about finishing the curriculum	51.64	65.43

Table 8 - % Satisfaction with Online School and Use of Technology (Teachers)

Statement	**Primary**	**Secondary**
Interacting with teachers and other students in the physical classroom	84.78	69.23
Doing class activities online	31.58	45.31
Interacting with teachers and other students online	38.48	52.3
Assessing school work/projects online	33.33	44.62
Sending and receiving emails to/from parents/teachers	68.13	64.2
Providing electronic written materials online for students	64.1	76.92
Posting/making available online videos for students	79.49	81.54
Knowing how to use the computer, laptop or tablet to effectively design and deliver online classes (if necessary)	77.78	78.75

Table 9 – Perceptions of Online Teaching (Teachers)

	Primary	**Secondary**
Too many distractions or interruptions at home while doing online classes	54.8%	35.2%
My home environment is not good for teaching online classes	9.7%	3.7%
I do not get enough support from parents to facilitate effective online classes	51.6%	59.3%
I do not get adequate support from my colleagues to assist with my online classes	0.0%	3.7%
I do not get adequate support from the Ministry of Education to help me in my online classes	25.8%	44.4%
None of the challenges above I experienced	9.7%	14.8%

4. DISCUSSION

The findings of the case study of online learning in public primary and secondary schools in Barbados present two key thematic findings. These findings will now be discussed under the following subheadings:

1. Technology and Pedagogy in modern education, and;
2. Low Satisfaction Levels in Online Learning.

4.1. Technology and Pedagogy in Modern Education

In discussing the pedagogical approach to online learning, it is imperative that the historical context of education and technology integration in Barbados be presented to the reader. Barbados proudly boasts a literacy rate of 98% and a human development index rating of .814 as a result of consecutive investments in education and a social democratic welfare system that values equality of access to education through the availability of universal primary and secondary education to all citizens [9,10,28].

In the late 1990s the Government of Barbados initiated discussions with the InterAmerican Development Bank (1996) and the Caribbean Development Bank (1997) to finance the Education Sector Enhancement Programme(ESEP) colloquially known as 'EduTech' [9,10]. The EduTech Programme had 4 primary components:

1. Physical rehabilitation of schools;
2. Integrating learning technologies;
3. Curriculum reform, and;
4. Human resource development including teacher training [10].

The integration of learning technologies "intended to facilitate teaching, learning, and school administration" [10:75]. In an assessment of the EduTech programme conducted in 2012 by the Ministry of Education, the new curriculum proposed to encourage student-centred learning and technology integration did not get the anticipated support from teachers, "eighty-three percent of the teachers surveyed indicated that they had received less than 2.5 days of education around teaching the new curriculum…" [9:4]. Further, MacKinon et al[9] reported lack of buy-in from the Erdiston Teachers' College, citing the technical and resource capacity to train teachers in technology was over estimated, "from our interview research it became clear that while it was envisioned that all teacher professional development, including the enhancement of computer skills, would be coordinated by the country's teacher's college, the capacity for the institution to offer support on such a large scale was neither reasonable nor whole-heartedly supported"[9:5]. As a result, the technology investments were relegated to computer labs for the conduct of Information Technology lessons or available to teachers for the preparation of lesson plans. There was little integration of technology into teaching, "only 22% of students said that most of their teachers used computer technology to teach them" [9:4].

Over the intervening period, there have been consistent attempts to integrate technology into primary and secondary core curricula still delivered in the traditional lecture-style. However, a robust monitoring framework would have ensured that milestones were evaluated and recommendations implemented towards the overall goal of curriculum and pedagogical reform. In the absence of this, the existing teaching model did not transition well into online teaching, even those who used technology in their classrooms stated "some software used in the physical classroom to engage students could not be utilised in the online learning environment" –

Dprimary_Principal. While some application software could be shared between students in a Pre-COVID-19 environment, the protocols for physical distancing and online learning required independent learning and individual access. Moreover, in reviewing the textual data of principals across school levels, teachers initially felt unprepared and ill-equipped to use the Google Classroom and training sessions had to be convened in an effort not to lose any tuition time, "when COVID hit in March it took us by surprise, our teachers were immediately called upon by the Ministry of Education to become trained in the Gsuite platform. Training started immediately, we did not have any Easter vacation because we were training during the Easter break. Teachers launched into the using the Gsuite platform to teach children it was more or less a testing period" - Trade_Union_Representative2

Putri et al argues that "not all educational institutions are ready for the sudden shift. Some schools may be equipped with some sort of technology embedded in their regular face-to-face class. Even so, they find it quite challenging to upskill their shareholders with the technology required for distant online learning and teaching in such a short time" [4:3]. However, the finding that over 75% of primary and secondary teachers in Barbados are satisfied with their ability design and deliver lessons online would mean that other factors are responsible for the dissatisfaction reported by teachers in Barbados (Table7).

This ease of use of Google Classroom was supported in a study of Indonesian teachers who lauded the application for its utility in maintaining student interest and challenging teachers to be more creative in the delivery of education [29]. While teachers in Indonesia were of this view, several teachers reported that they found the online environment stemmed their creativity in designing learning materials for students [13]. Unlike traditional lesson plans with tactile activities to maintain students' interest and focus, teachers were now required to conduct internet searches for videos and other digital materials that were not only relevant to the concept they were teaching but in a language that could be understood and a format compatible with the Google Classroom application. Principals lamented that their teachers were "searching online for hours" in an effort to present concepts in a way that captured the attention of students in the online environment.

In looking at the perceptions of teachers to the level of support received, it can be inferred that teachers across school levels were generally pleased with the support of the Ministry of Education and their colleagues (Table 8). Such support from school administrators and education officials is necessary to maintaining the motivation of teachers given this radical shift [13] and is evidenced in the interviews excerpts below:

"The Ministry of Education did what they needed to do in order to reopen the schools, in terms of getting out information and documentation they are doing very well."- GSPrimary_Principal

"It is believed that they have done very well, they have fought very hard to make sure of the safety of the staff and students and their online learning" – CSSecondary_Principal

Secondary to the challenge of finding engaging content and teaching, was that teachers were learning how to navigate this online platform as they were executing having only received a tutorial in the Google Classroom over the Easter vacation. This was also the case in Italy where as a result of the rise in SARS-COV-2 cases, teachers were similarly placed in a position to learn how to navigate the online learning environment while teaching their students [12].

In reflecting on the integration of technology in developed and developing countries, the inconsistent integration of technology in education was also observed in Italy [12], Indonesia [4]

and India [30] where traditional lecture-style teaching, like Barbados was the preferred pedagogy. While Truzoli et al [12] cautions that delays in the integration of technology in education should not be compared to online education during a pandemic, as the learning objectives are different when in a crisis; the absence of data and reporting on evaluation exercises that would shed light on the lack of buy-in for teachers in integrating technology education and engaging in training observed in reports of the Edu-Tech programme cannot be ignored [9,10]. The realisation of EduTech's student to computer ratios of "4:1" would have undoubtedly assisted in closing the gaps in access to devices that challenged students and teachers in the pandemic evidenced in Tables 3 and 4 above [9:75].

Therefore, while developed and developing nations have recognised its potential utility for the facilitation of education, the priority of this integration has been deferred until now. The COVID-19 pandemic and its attendant challenges have thrust this rapid transition in online learning that has not been without issues, the silver lining of the pandemic is in the opportunity to conduct descriptive policy analysis that informs education reform. Kundu et al surmises that "still, there is a dilemma among academicians while some believe that the unplanned and rapid move to online learning – with no training, insufficient bandwidth and little preparation – will result in a poor user experience that is unconducive to sustained growth, others believe that a new hybrid model of education will emerge, with significant benefits and will be further accelerated to eventually online education become an integral component of school education"[30:5].

4.2. Low Satisfaction Levels in Online Learning

The findings presented for primary and secondary stakeholders in Barbados had one conclusion, teachers and students were dissatisfied teaching and learning in the online environment respectively. This dissatisfaction was measured through their response to statements measured by a Likert attitudinal scale; while this method was measurably effective in recording satisfaction levels, a qualitative assessment of these primary stakeholders is necessary to outline exactly where dissatisfaction lies and present evidenced-based policy alternatives that will inform short to medium term education planning given the uncertainty of the COVID-19 pandemic.

Using the statistical and interview data available, useful inferences can be made until a more in-depth study can be conducted. Students and teachers across school levels reported varied levels of access to technology devices and the understanding to navigate the online environment (Table 3, Table 4, Table 6 and Table 8).

Secondary students reported higher percentages of access (Table 3) on individual tools for online learning; but taken together, Table 3 shows the lack of access to all the necessary tools to be effective in the online learning environment. Across primary schools the holistic view of Table 3 was most dire with very low percentages of primary school students having access to the electronic tools necessary for online learning. While the survey instrument did not measure teachers' access to printers and scanners, the access to the tools is markedly more concerning (Table 4) given the remarks of TradeUnion_Representative2 that some teachers were "without electricity".

While students (Table 6) and teachers (Table 8) were generally comfortable in their ability to use the technology and navigate the online learning environment, the preference remained for the physical classroom as the modality of choice. It can be inferred that the challenges of the transition to learning, lack of access to all the necessary technology and ancillary devices (Table 3, Table 4), and behavioural challenges experienced by teachers trying to compete for student's attention in the home environment contribute to low levels of satisfaction in online teaching for

Barbadian public school educators and students (Table 9). Textual data from Trade_Union_Representative1 indicated observations of "disinterest" among students but until further research can be done to interrogate this, those conclusions are beyond the scope of this paper.

On review of the literature and data presented in this case study, effective teaching and learning in the online environment requires access to tangible and intangible materials, the authors therefore propose an ideal type for effective online learning requires the access to all of following tools:

- Electricity;
- Laptop, Desktop, Tablet PC or other smart device;
- Webcam;
- Microphone;
- Printer/scanner/copier;
- Paper and ink;
- Reliable internet service;
- Designated non-distracting place for study, and;
- Enabling home environment i.e. supportive parents who supervise online school and minimise/manage distractions.

While the existing survey instrument only assessed access to electronic devices, these other tools outlined in the ideal type are equally important in an effort to attend class; contribute to discussion; interact with teachers and students, and; prepare and submit assignments. In assessing this list, issues of equality and equity in online learning are raised as many students and teachers have access to combinations of these tools and not enough have them all (Tables 3 and 4).

The pandemic exacerbated vulnerability for members of the lower socio-economic classes as the tools required for the effective online education were largely inaccessible for many students and teachers in the Barbadian case study presented and globally. Further, national shutdowns compromised the ability of parents to earn a living, UNESCO supports this point stating that "the disruptions they cause affect people across communities, but their impact is more severe for disadvantaged children and their families including interrupted learning, compromised nutrition, childcare problems and consequent economic cost to families who cannot work" [30:4,6].

These challenges further impair education where they are multiple learners in a household competing for space, resources, devices and bandwidth. In acknowledging the pandemic exacerbated existing social inequalities along class lines with high levels of unemployment that characterise depressed economies, the Government of Barbados, private and third sectors have sought to widen the social safety net to assist persons in meeting their basic needs, including primarily the provision of devices. While the provision of devices is a necessary component, the question must be asked, how far can provision of devices go in equipping a student to actualise their academic potential where they are still expected to prepare for national, regional and international exams? A sentiment similarly expressed in Adan et al [14]. Further, how does the challenge of inequity in online education get addressed without universal access to all the tools identified in the ideal type of online education outlined above and, is this a realistic policy goal?

In a study of the relationship between social class and its relationship to internet searches for online learning materials, the writers found that the persons in the upper-middle and upper classes were more likely to search for supplemental learning materials for their children and they

predicted that this will have an impact on learning equality and equity unless policy decisions are made to close the widening gap [6,5,31].

In recalling the reports of teachers (Table 7) who were concerned with finishing their syllabus and the quality of education as their students 'struggled in the online learning environment' Putri et al [4] in reporting on an evaluation of online primary education in Indonesia argued it took "more effort" from teachers to build students' understanding in the virtual classroom than was required in the physical classroom. In the Barbadian experience considerable percentages (>40%) of primary school teachers were concerned with finishing the syllabus and their students struggling in the online environment. Whereas, this was a greater challenge for secondary teachers recording over 60% agreement, this increased concern could relate to the preparation for transition exams into post-secondary higher education and the ability of these students to compete for scholarships on a local and international level based on their test scores.

Secondly, the synchronous learning environment presents further challenges to education equity where students may be experiencing internet connectivity or bandwidth issues, one device across multiple learners in a household resulting in not being able to attend a live lecture, or where teachers are forced to break up classes into groups to moderate the online environment and minimise distractions. While the majority of teachers (>55%, Table 7) nationally agreed that 'despite challenges the pupils are still getting a good standard of education'; there was still a considerable concern among teachers with respect to the with the quality of instruction. This concern was highlighted by Trade_Union_Representative1 who stated "in instances where new concepts were introduced, the delivery and language of that lesson cannot be replicated and therefore has implications for learning outcomes". While live lectures are integral for students to interact with the teachers and each other, the students who are absent are placed at a disadvantage of missing the lecture unless it is recorded and made available following the lecture, but this too has implications for comprehension as teachers are no longer available to address questions [13, 32]. Moreover, the challenge of missing lectures has multiple dimensions that may affect students across the socioeconomic spectrum such as network strength and/or connectivity and access to learning devices. Absenteeism due to lack of devices and tools is more likely to affect students at the lower socio-economic level [14].

Thirdly, in assessing the importance of teacher/student engagement in the online learning environment, the findings of the case study showed that teachers did not like working in the online environment with low percentages of satisfaction recorded for assessing school work/projects online, doing activities online and interacting with teachers and students (Table 8) with slightly better but moderate percentage satisfaction recorded for students (Table 6). Trade_Union_Representative1 provided valuable insight by highlighting the online learning environment does not allow for "social learning, conflict management and interpersonal relationships." In the physical classroom teachers could moderate student behaviour while conducting a lesson; the online learning environment makes it more difficult for teachers to discipline students who may be disrupting the class. Moreover, in moderating these disruptions, findings presented in Table 9 also point to the lack of parental support during online learning to ensure the attention to and participation in lessons while at home. In looking across the globe, UNESCO reports similar findings of teachers' perceptions of online learning where school closures and unemployment can put a strain on parents and breadwinners to manage online learning while dealing with personal stressors in their own lives [30,33]. These stressors therefore compound and parents may be unable to assist in online learning as a result of limited education, resources and/or their own Work-From-Home obligations [15].

Students reported moderate levels of satisfaction in interacting with teachers and their peers in the online learning environment whereas teachers at both primary and secondary schools recorded low levels of satisfaction with these interactions (Tables 6 and 8). These findings in Barbadian public primary and secondary education are not far removed from an evaluation of online learning in Pakistan [14:49] where students similarly reported preference for the physical school environment, citing challenges with "proper interaction", access to and reliability of technological devices to fully participate in online instruction.

A review of the survey and textual data highlights an additional challenge to interaction in the online environment, namely, the distractions students and teachers encounter in their respective home environments (Table 9). One Secondary Principal stated that students were in "an informal setting where they are not fully into the school mode". This finding is supported by results of an evaluation of "forced transition into online learning" at the HEI Texas A&M University, researchers in outlining best practice for teaching and learning encouraged instructors to remember "this is not business as usual" and they should not seek to impose traditional teaching methods into the online environment but instead set up online spaces where students can collaborate. These forums encourage peer-to-peer education and assist with the challenge of social isolation reported in evaluations of online learning [29,32]. However, the findings of this study are retrospective and all teachers engaged in online teaching are encouraged take a reflective look at their pedagogical approaches in this new environment and evaluate the efficacy for their student audience.

The need for an enabling home environment in online education is even more important when one considers the multiple roles that teachers can potentially assume i.e. Teacher as Teacher, Teacher as Parent and Teacher as Student. These multiple roles can be responsible for the "burn out" reported by Teachers Unions. The internal conflicts in assuming these multiple roles have psychological implications that may add to levels of dissatisfaction with online learning that are not directly related to access to the 'ideal type'. Hong et al [34] in an assessment of Teacher Perceptions on job satisfaction Pre-COVID-19 reports that "online teaching and learning is not necessarily easier or more challenging than conventional teaching and learning…it is the sudden shift to online teaching that may cause dissatisfaction." This investigation [34] of work/family conflict among preschool teachers in China may offer guidance; however, the present investigation captured no data on this measure and presents an opportunity for further research on the implications of these compounding stressors. Moreover, Johnson et al [35] outlines that teaching is recognised as one of the most stressful jobs –without the pressure of a pandemic which confirms the possibility of other factors leading to dissatisfaction outside of online teaching.

Levels of dissatisfaction among teachers were also recorded where teachers incurred additional expenses to facilitate online teaching in a time of economic uncertainty to ensure continuity of education by using cellular devices and data plans where computer/laptops and/or WIFI were inaccessible. These economic costs further compound when the strain on the body is computed for working in the online environment, with cost for ergonomic furniture, technological devices and visits to the medical (General Practitioner, Eye Specialist) and mental health practitioners are considered. In assessing the COVID-19 Phobia Scale, results [15:12] showed that "the psychological impact of the pandemic on school administrators is more extensive and intense than the other dimensions."

Assessments of student and teacher satisfaction are required for short to medium term welfare and education policy planning as we continue to navigate the pandemic. Therefore, in agreement with Karakose et al [15] and Adnan et al [14] there is a need for research on the levels of

motivation for teachers and students, and the work-life balance of teachers during this period of uncertainty in an effort to increase efficiency and ultimate satisfaction. Further, global policy priorities and international financial institutions should consider the provision of funding to developing nations to ensure no child is left behind and that equality and equity in online education can be realised.

5. CONCLUSION

The COVID-19 pandemic has presented policy makers in the field of education with an opportunity to conduct an analysis on existing education policy and review the timelines for reform in the integration of technology in public primary and secondary education. The data presented here outlined a snapshot of a larger study of teaching and learning in Eastern Caribbean countries and used Barbados as a case study to further interrogate the perceptions of key participants/stakeholders in education on online teaching and learning. Given the social democratic approach to education in Barbados and its early investment in technology education, the assumption would have been a smoother transition into online learning, but Barbados like other countries (China, Italy, Indonesia) had only minimal integration of technology in favour of the traditional classroom which resulted in challenges transitioning into online learning during a pandemic.

The findings show students and teachers were in favour of the physical classroom but not solely as a result of lack of access to ICTs, dissatisfaction with the online learning platform was recorded on the measure of social interactions and class activities with students and teachers. Moreover, in assessing equality of access and equity in online education, possession of the ICT technologies only guarantee access to the online learning platform, what is equally necessary is the environment that allows students regardless of learning ability to settle in a comfortable space, free of distraction and be engaged by teachers and colleagues in the learning environment with the presence of a parent or guardian to supervise this activity and ensure attentiveness and compliance. Given the quantitative survey method used to capture data from students and teachers, an exploratory study is necessary to qualify identify other road blocks in online learning and assess the extent to which the ideal type of online education is a realistic global policy goal.

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