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Exploring new literacies: A case study on technology and teacher development in Cuban primary schools

Abstract

Cuba has successfully eradicated traditional illiteracy -- boasting rates upwards of 99% of its population. However, as other societies have digitized and moved towards a globalized marketplace, U.S. sanctions have severely limited the import of new technologies into the country and classroom. In response, this case study sought to investigate the learning environments of Cuban primary schools to determine the breadth of a divide and the suitability for applying recommended frameworks to teaching. Observations of primary school classrooms and facilities provided insight, bolstered by semi-structured group interviews and surveys with teachers, teaching students, and education professors. Findings revealed a high-level of awareness and optimism around the use of technology, crowdsourcing, and knowledge sharing, as well as a strong informatics-based curriculum. However, low resources and techno-determinism infringe upon equitable skill-building, continuous scaffolding, and sustainable integration.

Keywords: Cuban Studies, new literacies, digital technology, mixed methods

Introduction

Since the socialist revolution in 1959, Cuba has successfully eradicated illiteracy - - boasting literacy rates upwards of 99% (UNESCO, 2017). The education system is rooted in critical pedagogies, and Cuban students have shown high levels of achievement on international standardized tests (Carnoy & Marshall, 2005). These results have been reported favorably by multi-national agencies despite low resources and economic development. The Cuban commitment to education encompasses the entire student lifespan with subsidized education at all levels and a staggering investment of 12.8% of the GDP (UNESCO, 2019). Additionally, an increasing number of international students turn to Cuba for competitive higher education (Zhang, 2017).

However, as other societies digitize and move towards a globalized marketplace, Cuba has not adapted similarly. Technological advancement has been curtailed by the enduring U.S. Embargo, severely limiting the import of new technologies into the country and, consequently, the classroom. Internet penetration remains low with high costs and slow speeds across the region. Existing telecommunications is both strictly controlled and censored by the government (Shahbaz, 2018). This has seemingly hindered the continued development of literacies as they evolve in the 21st Century. However, limited

comparative study has been done in the Cuban context. Additionally, many international educators have begun developing frameworks centered on technology integration at the primary level instead of just targeting specific skills-building at the secondary level, which has historically been the norm. Emerging digital pedagogical models also include how to build digital literacies when in low tech classroom environments, but many are not yet mainstream.

In response, this exploratory case study sought to investigate the learning environments of Cuban primary schools to determine the breadth of a divide and the suitability for applying recommended frameworks. Observations of primary school classrooms and facilities provided insight, bolstered by semi-structured group interviews and surveys with teachers, teaching students, and education professors on how they conceptualize teaching and the role of new literacies. The purposes of this research were to (a) understand the ways in which primary school educators in Cuba use rote, analog, and digital technologies in their classrooms and to (b) measure their perceptions on how digitization influences literacy skills. It was designed to inform pedagogical strategies in Cuban classrooms and build better intercultural understanding between Cuba and the United States.

Data was collected in March 2019 – one-year prior to the international outbreak of COVID-19. Certainly, livelihoods and educational delivery have been impacted by the crisis, particularly for Cuba as a country heavily reliant on international tourism. Prior to COVID-19, the Cuban people were experiencing the strains of increasingly tightened sanctions under the Trump Administration, including severe food and fuel shortages. During these challenging times, I hope that these insights can support a path forward from a potential learning crisis. I also hope that it lessens the gap in academic research on the lived Cuban experience. Incidentally, this study provides a baseline sample of the experiences with, approaches to, and opinions on technology in Cuban schools prior to the pandemic. It will be important to survey how these realities have evolved post-COVID-19.

Literature Review

Prior to the 21st Century, education systems around the world focused their learning objectives on the accumulation of facts and rote learning. Basic literacy and numeracy were central for adult livelihoods, but the ways in which these skills were defined are no longer sufficient for life in a digital age. Technology developments have redefined the ways in which we access information and connect as people. The skills needed for literacy require the ability to safely and effectively navigate these heavily mediated environments, particularly in collaborative and constructivist ways. In turn, literacy is no longer built only on the ways we process and articulate linear narrative. Rather, the Internet and other

information and communication technologies (ICTs) require new literacies to make sense of our world. Theoretical studies on new literacies have emerged over the past twenty years to address this need; however, applied conceptualizations of digital pedagogies remain nascent with widespread inconsistencies across global classrooms.

Digital literacy research in Cuba is a largely unexplored field with many substantial knowledge gaps. Particularly due to the unique conditions of Cuba, it is also a false equivalence to rely upon other contexts from Latin America and the Caribbean. For many Americans, the little research that does exist might not be published in English language and most access to Cuban publications is restricted by the Embargo. It is also more common to find normative studies.

From within Cuba, one article discusses the need for conceptualizing digital literacy beyond technical training and the face-value use of ICTs (Avello-Martínez et al., 2013). The authors argue that this view has not been achieved across Cuban classrooms or society and outlines a literature review for readers to understand the history and evaluation of the Internet, including the need for addressing digital literacy education specifically tailored towards Cubans.

More recently, Deursen & Andrade (2018) published a case study on Cuba discussing the digital divide in terms of skills and usage gaps rather than usual development conversation on physical hardware and access points. The authors differentiate first and second levels of a digital divide in Cuba, particularly as it relates to media restriction. They conclude that within Cuban society, increased access to the Internet is only likely to fuel existing hegemony and privilege.

Additionally, Venegas has published significant work exploring digital culture in Cuba, discussing the various ways that digital culture has emerged in public, underground, and networked spaces in-country and using these environments to further frame discussion on how technology changes social experiences and how we conceptualize knowledge and language (Venegas, 2007). In other work, she also argues that despite low-Internet penetration in Cuba, the Internet is still very much connected to Cuban society and that the Cuban people and government are mindful of the need to create new spaces for democratic expression and to resourcefully organize their electronic networks (Venegas, 2010). More recently, Deng et al. (2019) presented a short exploratory study on the ways average Cubans use the Internet in their daily lives, including within technology education. However, their work relied on online surveying, secondary statistics, and narrative analysis rather than first-hand field experiences in Cuba.

Gavric (2019) offers a qualitative analysis of how digital technologies have been integrated into Cuban society and intertwined with the government's educational goals and control of information. It draws on four months of

ethnographic field work conducted in Havana in 2016. The main result is a look at how mobile phones and the Internet seemingly fit into the lives and dreams of average Cubans, framed by anthropological theory. Divergently, See (2019) investigated the effectiveness of literacy education in the post-revolution Cuban education system. Their research sought to understand 1) the role of each player in the education system, 2) the goals and functions of Cuban literacy education, and 3) what best practices can be applied to the United States. It was a small exploratory study that used semi-structured interviews and phenomenological analysis, framed by conflict theory. It ultimately argued that although traditional literacy was high for several years following the Revolution, literacy and schools have declined. The paper briefly talks about 21st Century Skills but does not explore new literacies.

Conceptual Framing

To some, new literacies are one area of an academic field called “multiliteracies,” which focus on how blended text, sounds, and images change the ways in which people communicate and acquire knowledge (New London Group, 1996). For example, this especially relates to the multimodal processes required by online media. Digital products, such as gifs, videos, or blogs, often convey written and spoken language, as well as a diverse mix of visual, audio, gestural, tactile, and spatial signifiers. As it stands, 21st Century citizens can no longer claim to be functionally literate without having critical awareness and competency in this regard. Beyond 2020, this is even more important for distance learning and navigating mediated civic and professional life in light of crisis. In order to define new literacies, one must have a basic understanding of cyberculture, particularly as it emerged under the early days of the World Wide Web, known as Web 1.0. As Tapscott (1998) wrote, “while the old Web was about Web sites, clicks, and 'eyeballs,' the new Web is about the communities, participation, and peering. As users and computing power multiply, and easy-to-use tools proliferate, the Internet is evolving into a global, living, networked computer” (p. 19). Unlike media such as books or television, the Internet becomes a “third place” (Oldenburg, 1989) where people can come together to interact, trade, and create rather than just statically consume. It also transcends physical boundaries and challenges any notions of regional laws, jurisdictions, and traditional accountabilities.

Further, there are at least three fundamental changes in the way information is received and produced: first, the predominant code is no longer verbal but visual, auditory or audiovisual; second, the printed page is replaced by the more impermanent screen; and third, the structure of narrative and reading procedure are increasingly less linear (Avello-Martínez et al., 2013). Unlike

traditional print media, online texts require more than word processing and standard literacy (e.g., word recognition, vocabulary, comprehension, inferential reading, the writing process, spelling, and response) (Leu et al., 2013). Rather, digital narratives force readers to “choose-their-own-endings,” navigating a diverse range of multimedia and hyperlinks to collect information and construct knowledge. As described by Leu et al. (2013), each online reader must follow “a unique information path, selecting a unique sequence of links to information and sampling unique segments of information from each location . . . Thus, in addition to constructing knowledge in their minds, readers also physically construct the texts they read online” (p. 1164). This puts more cognitive burden on the user and can impair comprehension as users not only absorb subject matter knowledge but simultaneously try to account for relevance and reliability. This is even further aggravated by the fact that Internet texts integrate a range of symbols and multiple-media formats) that can overwhelm readers (Leu et al., 2013). As Coiro (2003) argues, “readers need a new type of inferential reasoning to anticipate these differences and decide whether or not each hyperlink will enhance or disrupt their search for meaning” (p. 459).

In order to thrive online, current users need to focus not only on technological components but also on how to be communicative, social, and participative. These values are foundational to conceptualizations of global citizenship and exchange in a globalized knowledge-based economy. As Postman & Weingarter (1971) prophetically advocated, “when you plug something into a wall, someone is getting plugged into you. Which means you need new patterns of defense, perception, understanding, evaluation. You need a new kind of education.” (p. 20). Many have argued that inquiry methods would come to fruition with the rise of digital technologies. To this end, the SAMR (*Substitution, Augmentation, Modification, Redefinition*) Model prompts teachers to actively think about the way technology can either enhance or transform lessons for optimal learning. As Pfaffe (2017) explains, “one of the most important clarifications is that SAMR is not a ranking or qualitative of teaching or technology. Rather, it is a progression, showing how technology can move learning tasks beyond what is possible without technology” (Pfaffe, 2017, p. 80). Awareness of SAMR can be a useful means for delivering innovative lessons and better integrating computer usage across the curriculum rather than keeping usage restricted to computer class. In turn, this also models to students how to practically apply technology to their daily lives. Implementation research argues that there is a need to build capacity in both infrastructure and human capital that can fuel the pedagogical integration of ICTs. SAMR is recognized as one of the most suitable models for technology integration because it is partially based on constructivist theory. Studies have shown that learning activities are most often at the Enhancement levels (Substitution and Augmentation) as opposed to

Transformational levels (Modification and Redefinition) with the biggest challenge to the successful implementation of education technologies a lack of training and time (Hockly, 2013; Jude et al., 2014; Pfaffe, 2017). Most often, digital devices in classrooms are used to perform the same tasks that were previously completed without the digital device, considered to be the lowest level of SAMR.

However, there are additional instructional strategies. For one, Internet Reciprocal Teaching (IRT), which emerged out of the New Literacies Research Lab, was developed as a model for better preparing students to communicate in the 21st Century by recognizing that reading comprehension on the Internet requires a unique set of user strategies (Castek, 2006). It poses problem-based tasks to students, having them build their own response through various online-based activities.

As a general overview, the implementation of Internet Reciprocal Teaching within a lesson usually takes two phases. In Phase 1, the teacher focuses on hard skills like word processing and web searching, going about modeling those behaviors to students. For Phase 2, tools such as discussion charts facilitate Think-Aloud exercises, encouraging students to wonder about different solutions while considering their classmates' ideas. Recent research demonstrates how this helps to build critical evaluation and synthesis skills (White, 2016; Dobber et al., 2017; Oczkus, 2018).

Ultimately, the end goal is to enable students to constructively engage with strategy and meaning making, multimodal literacies, and appraising information reliability in their lives. Beyond teaching strategies, "new technologies such as the Internet and other ICTs require additional social practices, skills ... and dispositions to take full advantage of the affordances each contains" (Leu et al., 2013, p. 1159). To start, "Internet readers need both prior knowledge of the topic related to the search task and experience of the use of the Internet to be able to locate relevant information" (Kiili et al., 2009, pp. 655-656). Many Internet readers do not evaluate for credibility and greatly vary in their own abilities to design and upload content in the way that it is intended and afforded by current platforms.

Thus, understanding and comfort with digital authorship also becomes a necessary component of a revised curriculum. As Stern (2008) writes, "young people are curious about what authorship entails, eager to take on the technological challenges presented by online authorship, and anxious to establish an online presence" (p. 99). Yet, rarely do youth stop and think about whether such expression is particularly valuable. The need for further scaffolding is high for "this sequence of events appears to be different for adults, who generally reflect on the expected utility of online expression before commencing to author a

personal site” (Stern, 2008, p. 101). However, this creates the need for a nuanced approach:

on the one hand, the figure of the ‘creative consumer’ is seen as both a key to the new economy and a major disruption to the dominance of commercial media ... On the other, the notion of a ‘digital divide’ based on hard access to ... [ICTs] has shifted to concerns around social inclusion and the unevenness of access to ‘voice’ in the global mediascape. (Burgess, 2006, p. 201)

Moreover, this ability is also what drives the need to educate students in the way of critical consumerism since “information is much more widely available from people who have strong political, economic, religious, or ideological stances that profoundly influence the nature of the information they present to others” (Leu et al., 2013, p. 1161). Both critical consumerism and digital authorship help to create more equitable and equal opportunities.

Reflexivity Statement

In my role as researcher, I want to create applied research that empowers individuals for a globalized world and does not just gawk at the other (Ogden, 2007). As such, I have chosen to root this study within an inquiry paradigm. Furthermore, traditional models such as positivism, simply do not help engage practitioners with problem-solving. Rather, the “received view” of science can strip context, exclude meaning, and foster a disjunction of grand theories with local contexts. Particularly for etic research, this creates a dilemma of trying to apply general data to individuals, groups, societies, and cultures. Therefore, I have chosen a constructivist paradigm, which instead values relativism, local and specific constructed realities, and hermeneutical methodology. In the words of Guba & Lincoln (1994), “such grounding is particularly crucial in view of the mounting criticism of social science as failing to provide adequate accounts of nonmainstream lives (the ‘other’) or to provide the material for a criticism of our own Western culture” (p. 106). I am faced with the challenge of how to make sense of an entire socio-cultural environment and history, especially since Cuba as a country is “often portrayed as an isolated, secretive and bureaucratic dictatorship ... [presenting] many challenges for a social researcher intent on eliciting the genuine opinions of the native population” (Bell, 2013, p. 109). Raised with virtually no exposure to the history, culture, or rhetoric of Cuba, I entered into an environment with limited preconceptions. However, this does not change how I may have been viewed as an outsider, especially as an Anglo-

American, representing a country whose historical actions have attempted to colonize, industrialize, and impose sanctions.

Research Design

Methods

According to Unwin (2009), “deciding whether or not something is truly revolutionary depends on the criteria that one selects for analysis, and on the extent to which one is willing to acknowledge the significance of antecedents in shaping the phenomenon under investigation” (p. 20-21). When researching an environment that contains multiple physical, sociological, and psychological variables, there is not one survey that can be truly comprehensive. Rather, in trying to encompass a holistic understanding and be in a position to make critical evaluations, it requires the triangulation of different methods.

It has been accepted that “if a case study is about a new technology or curriculum at work, observations are invaluable aids for understanding the actual uses of the technology or curriculum or any potential problems being encountered” (Yin, 2009, p. 110). Therefore, methods included group interviews, which were audio recorded with participants’ consent; a short Likert-based survey questionnaire on opinions surrounding literacy, technology use, and teaching strategies; and classroom observations, during which field notes were collected. Both semi-structured interview protocols and the questionnaire were written by myself based on my knowledge of the topic and what I thought appropriate to measure.

The research itself was made possible through a program called *Búsquedas Investigativas*. Participation was arranged by the program, which had to be highly regulated to make U.S.-Cuba exchange possible. The design did not seek to push any political agenda or solicit personal opinions beyond general teaching strategies and views on technologies. The population included in the study consisted of self-identified primary schoolteachers and administrators, undergraduate and graduate education students, and teacher educators located in the cities of Havana and Santa Clara. Participants were also at least 18 years old and had language translators. I only had to seek participants’ informed consent based on the access granted by *Búsquedas Investigativas* to participating sites; the individuals were recruited by the program. If I relied solely on schoolteachers, I would not have had a large enough sample to conduct the research. However, student teachers are very important as the country’s future teachers, particularly since they are often seen as introducing new and innovative tech practices to classrooms as a younger generation of “digital natives.” They bring fresh perspectives and often keener awareness towards bridging their own experiences

as students and the classrooms they are about to enter. The opinions of educators at pedagogical institutes are also extremely important as their work greatly influences Cuba's educational policies and sets expectations, best practices, mores, etc. Schoolteachers are taught how to do their jobs – and largely how to think -- by them, which is carried over into their careers.

Data Analysis

Data collection in Cuba successfully yielded interviews with roughly 20 educators and 14 questionnaire respondents with three primary school classroom observations, which included a computer lab and school library. All interviews were successfully audio recorded, translated, and transcribed. Observations utilized hand-written field notes, as well as photographic documentation. Photographs were taken of classrooms and other school grounds to document the educational environment, including supplies, physical conditions, and infrastructure. This helped to aid in providing descriptive language for field notes and journaling exercises in lieu of jottings although photographs were not analyzed or coded.

In general, it can sometimes be a challenge to add validity to qualitative interpretation (Yin, 2009). The data must tell a story, which means that interpretation can ultimately be subjective to the audience. In order to minimize this threat, data analysis relied heavily on thematic coding. However, the coding process did not use a coding framework but followed In Vivo Coding – known as “natural” coding. As Saldaña (2016), writes, “In Vivo Coding is appropriate for virtually all qualitative studies, but particularly ... studies that prioritize and honor the participant's voice” (p. 106). As an inductive approach, In Vivo Coding involves the organic coding of data to construct descriptive, higher-order themes. Here, I followed a three-stage process, which began with reading interview transcripts and other documents for phrases that seemed to be significant and noteworthy. Next, codes were consolidated and grouped according to similarities and possible content overlap. If the categories began to demonstrate both significant nuances as well as enough sources, the categories were then split to make those differences more readily identifiable.

Throughout research design, data collection, and reflection, I also created an audit trail, using checklists and annotations to analyze interview transcripts and field notes. These measures facilitated the coding process and use of NVivo software for final analysis. NVivo was chosen as a software package largely because it helps to facilitate this type of unstructured In Vivo coding process. The software allows users to arrange information, examine relationships, and readily combine analysis within a variety of functions. In this way, it facilitates trend

identification and cross-examining information, so that one can build a body of evidence towards support of an argument.

Similarly, all quantitative survey data was analyzed in Microsoft Excel: numerical responses to the Likert-scale survey questions were entered per participant and then tallied into frequencies and response rates.

Findings

Themes that began to emerge during content analysis included a heightened focus on inclusivity and knowledge management, especially the creation and use of do-it-yourself repositories. Other central themes included *informatics*, *digital divide*, *crowdsourcing*, *digital nativism*, and *techno-determinism*.

Informatics and the Digital Divide

The comprehensive Cuban education system demonstrated a rigorous informatics-based national curriculum and benchmarks at each level of schooling. Starting in kindergarten, Cuban children are taught fundamentals on how to work with computers, mostly through a basic software program that runs educational games. In the words of one interviewee,

It is aimed at developing the skills the child at that age should have in different areas of knowledge – perception, vision, math, spatial location ... manipulative skills with the mouse. Here, we teach computer but only certain operations with the computer. We use it as a working tool and as a means of teaching. [We have the child] investigate software tasks that are on the computer -- to create a document, for example, or make a presentation, using the tools of [Microsoft] Office. – Education Professor

Yet, as children progress through primary school, formal computer education diminishes. The reasons for this are varied, primarily determined by a low resource environment and the way that the typical school day is structured. For example, below provides an outline of an average day:

[School begins] with a general greeting at 8:00 am, where [the school reviews] activities according to the timetable of the month. The most important activities that are happening in the country or international events are discussed. Then, throughout the morning, [the school] has class [related to core subjects] and recess. The session for lunch is an hour to hour and a half. In the afternoon, activities can be Physical Education, can be Laboratory, English [as a foreign language]. Depending on the interests

of the school itself, they will then have community activities. That is, sports or cultural activities of interest, artistic events, computers. A student has to choose at least one [extracurricular activity]. – Primary Schoolteacher

The interviews also revealed that Primex, a national intranet, is available to fourth and fifth grade students, but the World Wide Web is blocked from the schoolhouse entirely. The use of Primex should be prefaced by the fact that Internet access is not widely available in Cuba, especially in private homes. Lack of accessibility is a complicated issue – some services may be impacted by national censorship, while other platforms are blocked by their U.S.-based home organizations, fearful over penalties for engaging with the Blockade. In country, all public parks have been converted to Wi-Fi hotspots. Those who wish to connect a device – be it a smart phone or laptop – to the Internet must purchase a prepaid card from a government-approved vendor. When within a park zone, these cards can then be used for connectivity, although many websites, such as all Google services, are blocked. Because there is no net neutrality, Cubans then find many additional platforms to be limitedly available or inoperable. Surprisingly, it was observed that many app-based versions of websites had functionality whereas their web-based counterparts did not.

Nevertheless, Facebook, Twitter, and WhatsApp are very popular, especially with young adults. Internet is available on university campuses to teachers and students and covered by university fees, but all still receive an allotment of minutes to use per day. Campus libraries utilize card catalogues – in the primary school visited, the school library was only a classroom with a small collection of reading materials. There was no formal check out or tracking system for books and no use of computers in that library. One teacher commented that:

Teachers have had to make use of the phone itself in the classroom ...
Sometimes, we do not have a computer and are conducting activities [with students] from the same phone. – Primary Schoolteacher

Aside from a lack of digital equipment and Internet access points, there were substantial shortages of relevant print books, television equipment, and basic writing supplies. These are understandable conditions under the Blockade but still create a tremendous barrier to access and maintaining high literacy rates – both traditionally and in terms of new literacies. Based on the study's scope, it cannot definitively be said the extent to which these conditions are aggravated in rural vs. urban areas. However, the interviewees indicated that these conditions are likely the same in most places.

At a primary school in Santa Clara, the library consisted of a few bookshelves and boxes of old newspapers. The software in the computer lab was

Microsoft Office 2003 and Encarta 1998. Furthermore, the computer games were almost 30 years old -- a dot matrix printer possibly older. There was also only one processor for the whole lab, so the computers ran incredibly slowly. The speakers had poor sound quality and had no headphones available, making it a cacophony of activities for the students working in close proximity and sharing devices. Data indicated that primary school classrooms mostly relied on projection equipment when available rather than digital devices. It was reported that television lessons are used in place of a teacher for low-staffed subjects – however, in the observed school, this was said to have been cut back to one day a week with one teacher present to address student questions in-person.

Under these circumstances, children below the fourth grade are left to play with the educational software or practice processing as available. This occurs during the afternoon, when students have open time to practice sports and other extracurricular activities – from roughly 2:30 PM to 4:30 PM. Computers were also strictly described as being used for Mathematics, Language Arts, or History lessons. By practice, usage is not encouraged for other subjects. Only 35% of survey respondents saw technology as a competitive skill for the workplace. Additionally, 72% either disagreed with or did not understand the concept of a “digital citizen.” Tools like Scratch, which teach introductory programming language, were popular from the professorial perspective but not available in field classrooms.

Crowdsourced Repositories and Knowledge Management

Overall, the computer was seen as a tool for targeted, rather than open, inquiry. The lack of connection that Cuban educators made between technology and the potential for project-based learning was problematic, especially since the latter can be seen as an extension of Freirean liberation models of education, which are highly valued by Cubans. However, there was a level of self-awareness and longing with one commenting:

I think really, we [Cubans] are still in an optimistic computerization process, and we have not reached certain levels of imagination [reached elsewhere]. – Education Professor

According to the interviews, the current national curriculum has been purposefully built to be problem-centric:

Fundamentally, we [Cuban teachers] use the problem-oriented focus, problematic [sic] teaching, project-based learning, and problem-based

approach ... Each has its own characteristics and can be interrelated in the subject. The idea is always to work on the problem. – Education Professor

Yet, there was a level of disconnect between this desired outcome and the teaching philosophies espoused by teachers and teacher educators. Although 79% agreed that a teacher's job was to guide student learning rather than transfer knowledge, a considerable 21% disagreed. Only 58% felt that collaboration and participation were more important than individual performance. Yet, 78% thought publicly sharing private information contributed to community-building. 61% believed that it was more important for students to provide the right answers rather than ask questions.

Additionally, different conceptualizations were expressed with regards to how Cuban educators defined technology consumption, particularly in how they viewed social networks and "apps." Although Facebook was acknowledged, teacher educators more often defined social networks as Academia.edu, Mendeley, and Google Scholar. The colloquial use of "apps" just referred to general software, rather than peer-to-peer web-based applications or the extensions designed primarily for use on smartphones or tablets. Ultimately, here, "collaboration" was constituted as "knowledge sharing" rather than a subset of maker education.

However, the scale to which Cuban educators collectively pooled together resources for their institutions was remarkably resilient, even if operating within the model of Web 1.0 culture. These decentralized digital libraries housed a range of materials that had to be built from the ground up, relying on collegiality and the active process of building a Community of Learning. This was a shared responsibility of faculty – to support each other as an extension of professional development. Essentially, each academic institution – from the university to the primary school – housed its own network of materials, meticulously crowdsourced, gathered, and saved by its own faculty members for the benefit of their students and colleagues. Videos, images, doctoral dissertations, monographs, reading lists, electronic presentations, blogs, handouts, activities, lesson plans were all saved into a school's computer system and networked to each teacher's account. Though done at the local level, this appeared to be happening on a national scale:

The policy of the Ministry [of Education] is to have this [content repository] to help [teachers]. Each university materializes it differently [for their institution] The idea of this project is to extend to learning objectives. – Education Professor

Having to overcome embargoed dialogues, limited print materials, and virtually no networked connectivity, these libraries were a testament to both community-building and the active pursuit of knowledge.

Digital Nativism and Techno-determinism

It was evident in the interviews that not all respondents had the same views on how to approach technology education, at least in terms of the educational lifespan. Although the Cuban education system is heavily values-based and built on principles of inclusivity and equality, it also allocates academic and professional trajectories for students based on aptitude and society's needs. It did not come across that all students were given the same amount of technological exposure. One argument was that students come to school with certain familiarity, although it was also indicated that many students (and teachers) did not have access to personal computers at home. There was also the attitude that younger teachers bring with them their own technological savvy, which just manifests as a different teaching style compared to older teachers (i.e., let the older teachers continue in their established instructional methods). The assumption here was that technology would just work its way into the classroom organically over time and to some extent that digital literacy on the part of teachers would stem from education students simply having to use computers to complete their required assignments at university. As one stated:

In my personal opinion, it is rather a generational issue. The Millennials are more natural [at technology usage] – are those who call themselves '[digital] natives.' ... Increasingly, young teachers also have a much more positive stance towards technology and possibly also know more than experienced teachers in their work. – Education Professor

Fundamentally, the Cuban social system is one where inequalities are supposed to be eradicated by socialist governance. The Cubans interviewed strongly believed that issues of sexism and racism do not exist in their country, even when there was witness to the contrary. The elusiveness of full equality is not surprising considering the systemic nature of such issues around the world -- let alone for a country with as complicated a colonial history as Cuba. However, since Castro came into power, the education system was intended to be the most crucial arm towards building a modern, egalitarian Cuba. Yet, it was also seen that when it came to technology, the distribution of limited resources and skill building took more of an "equitable" approach to student access – trying to give a preference towards computer time for those with the least amount of technology available outside of school. It was upheld that:

For the child who has a computer at home, [generally those students] do not [get to] use [computers] at school ... However, you may not know how to work with a word processor -- it will be a necessary tool for your life. The computer teacher [should] motivate the child to learn what you need from the computer. – Education Professor

The opinion demonstrated here is that computers skills are mostly reliant on the computational aspects of technology, such as word and data processing. It is a functional skill set rather than a new form of literacy. Further, both these views towards digital nativism take a passive approach to skill building with computers. Neither suggest a literacy needed for navigating media messaging or the Internet. If one situated this approach within a Theory of Change, it would be premised on techno-determinism – or the idea that “the medium is the message” (McLuhan, 1964). Techno-determinism has repeatedly proven a failed approach towards sustainable development. In turn, it also shrugs off expanding teacher development, relying loosely on base principles of *communication for development*:

Even the teacher who does not want [to use digital technology], in a way has to ... all teachers in [Cuba] must demonstrate academic exercises, use of technology to make a Master [degree], to achieve a Doctorate ... Obviously, there is a subject that covers multimedia, audiovisual and must generate [a digital] end product summarizing a particular subject. For example, [teaching students] have had to do audiovisual documentation on vocational guidance for different races, on the environment, on health. – Education Professor

Educators also discussed the importance of informal education to help students attain the higher-level computer skills required at the secondary and post-secondary levels. The skills needed were not scaffolded within the primary school curriculum, and the burden was on children and families to seek secondary school readiness elsewhere. This was mostly manifested through community-organized “Youth Clubs,” which are free and government-run, but the burden is on the family to have children participate:

In each area, close to homes, there is a place that is called “Youth Club,” which is specifically aimed at the family and community. That's their slogan, in fact, "Family Computer" ... It does not belong to the school network, but it is a school support. – Education Professor

Participation in these centers was considered an essential prerequisite for

success in secondary school, especially for those on a university-bound track. In Cuba, there is little autonomy to change trajectories once they are in motion. For any Cuban primary student who aspires towards pre-university education or select vocational fields, participation in these “youth clubs” is practically mandatory.

Perceptions on Literacy and Educational Technology

Overall, Cuban educators demonstrated a high level of critical awareness involving the need to expand literacy definitions and a mostly positive perception of technology. For example, 100% of those surveyed agreed that the definition of literacy is very different today compared to twenty years ago and that students need to learn to construct knowledge from multiple sources. However, only 58% agreed that the Internet changes the way we make meaning out of text. They also all agreed that it was important for students to participate in creative authorship, and 93% believed that literacy should be defined “as the ability to find, evaluate, utilize, share, and create content.” However, 50% felt that these same skills were acquired through paper, pencils, books, and lectures and not fundamentally changed by technology usage itself. This draws into question the effective usage of the generative platforms empowered by Web 2.0. The survey respondents also all believed that they could quickly determine if a website contained authentic information. Maybe, this self-appraisal was indicative of the heightened critical literacy of trained educators, but in a post-truth era, this perception may prove a bit too optimistic about misinformation. After all, 86% also believed that information found on the Internet was “untrustworthy.”

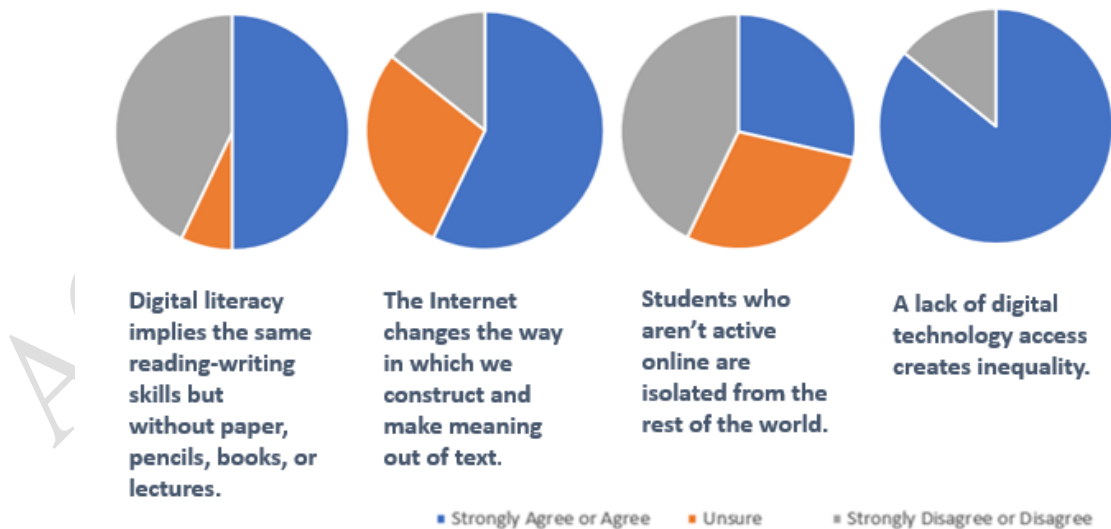


Exhibit A. Visualization of select survey questions

There were other signs of a possible disconnect. For example, 85% thought that the best schools needed to invest in technology tools. However, only 64% actually thought schools that did not keep up with technology would fall behind. 86% believed in a digital divide that fuels inequality. Yet, only 43% thought that those who are not online were isolated from the rest of the world. 65% believed that you could not promote digital skills without having a computer. 79% felt that technology only enhanced a planned lesson, not fundamentally changed it. 50% thought technology was not a distraction, and 36% thought it promoted antisocial behavior.

Discussion

These findings show that Cuban educators – and, by extension, government officials – are mindful of the need to create new spaces for democratic expression. Yet, in line with Deursen & Andrade (2019), a push for increased access to the Internet is likely to widen disparities. More curriculum development and skill building on digital literacy would help mitigate these divides. Although, the concept of new literacies has not adequately been taken up at the primary school level, it was found that the “youth clubs” discussed in interviews and by Deng et al. (2019) are appearing to meet the skills development needs of upwardly mobile students. However, this holds the potential to further exacerbate inequities and undermine Cuba’s work to educate every citizen, particularly in necessary literacies for 21st Century life.

However, the fact that the national informatics curriculum is rigorous only better positions Cubans for process improvements towards digital literacy in their classrooms. Increased teacher training in blended learning and a greater encouragement towards students for open inquiry would help transform classrooms into savvier digital spaces – even with limited hardware and connectivity. Since Venegas’ forecasting in 2010, Cubans have put a substantial amount of resources into the development of digital networks and repositories. Concurrently, both Cuban and American educators could benefit from cross-cultural dialogue on lesson planning and overall instructional practices. Many Cuban classrooms require further teacher training in educational technology, including integration models, such as SAMR, and instructional methods, such as Internet Reciprocal Teaching. More inquiry-based and scaffolded lessons would help Cuban students acquire active knowledge and better prepare them for civic and economic participation at both local and global levels. As explored by Gavric (2019), the high penetration of mobile technologies suggests that phone-based interventions might also provide a sustainable medium for collaborative and inquiry-based learning. Despite Internet access restriction, Cuba’s latest

Constitution may position districts to take more local authority over Internet regulation with China eager to build the infrastructure (Press, 2019). In line with existent popularity, smartphones will prove the most universal access point and hold potential for interactive learning games and reading materials not currently available, particularly due to the less restricted functionality of mobile phone applications in the face of enduring sanctions.

Conclusion

The purpose of this research was to collect data on digital literacy practices in Cuba. Due to U.S. sanctions, there is little insight into the Cuban experience, including around issues of access and technology. These sanctions further pose a risk to equity and social justice for the Cuban people and their participation as literate citizens in a globalized and digitally connected world.

In light of the results, there should be some concern that Cubans are at risk of diminishing literacy rates, as well as greater marginalization on the global scale as the Blockade persists. However, these findings remain exploratory. It would be beneficial to continue to collect data from other regions, particularly to witness more primary school classrooms and practices in action and to conduct site visits at a number of “youth clubs” to see how computer usage in those spaces may vary and/or complement classroom practices.

Originally, this project intended to conduct a second wave of data collection in March 2020, expanding the sample to two new regions, Artemisa and Mayabeque. It also planned to administer the survey questionnaire to American educators and then conduct a comparative analysis to see if opinions varied despite fundamental differences in classroom environments and policies. However, deteriorating U.S.-Cuba relations and the COVID-19 pandemic left a moratorium on international travel, human subjects research, and in-person teaching. Under this “new normal,” digital technologies have become the major distance learning vehicle attempting to educate all the world’s children out of school. Therefore, views on technology will be explicitly and inherently impacted – as will understandings of literacy and skills. Future research will need to explore how COVID-19 has changed teacher perceptions of new literacies and technology in the classroom and what distance solutions have been effectively used to deliver education to Cuban schoolchildren during the pandemic. Ultimately, this work now yields a unique pre-test for the relationship Cuban teachers and students had with technology prior to COVID-19. It offers an in-road to track changes in societal norms and analyze emergency education response and literacy rates for this context.

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