

Running head: INITIAL RESPONSE TO THE COVID-19 PANDEMIC

Initial Response to COVID-19: A Mixed-Methods Analysis of Media and School
Communications to Identify Pedagogical Implications for Remote Teaching

Abstract

Purpose

Immediately following the declaration of the national emergency of the COVID-19 pandemic in the United States, this study examined one month of social media, news media, school district websites' continuity plans, and educational affiliate organizations, to unveil K-12 stakeholders' initial response to K-12 remote instruction.

Design/methodology/approach

Framed by connectivism theory, we employed a mixed-methods sequential explanatory design to conduct a systematic content analysis of 43,870 tweets, news media, school district websites' continuity plans, and educational affiliate organizations.

Findings

Initial responses focused on community lockdown procedures, sustaining education, adapting to a remote lifestyle, and political tension. We revisited included tweets one week later to measure their connectedness, which revealed that educational organizations, who have the largest number of followers, also have the greatest outreach and visibility.

Originality

We construct a blueprint from some of the largest school districts, and consequently the COVID-19 hotspots, to broadly examine emergency preparedness and remote instruction plans.

Practical Implications

Based on the collective decision making of education stakeholders, we provide three remote teaching recommendations and pedagogical implications for sustainable remote teaching practices.

Keywords: distance learning; e-learning; students; teaching methods

Running head: INITIAL RESPONSE TO THE COVID-19 PANDEMIC

Initial Response to the COVID-19 Pandemic in the United States: A Mixed-Method Analysis of Media and School Communications

On March 13, 2020, a national emergency was declared in the United States (White House, 2020), quickly garnering the attention of schools. As COVID-19 silently and voraciously spread, “Panic-gogy,” (Kamenetz, 2020) set in among educators. Fear and uncertainty led universities and K-12 districts to extend spring break, and eventually close their brick and mortar campuses, requiring educators to teach remotely. Education conferences were cancelled, and affiliate groups scrambled to find alternate means of connecting professionals (e.g., Association for the Advancement of Computing in Education). Shortly thereafter, state mandated assessments were cancelled (Gaudiano, 2020). As learning moved to “remote instruction” (Hodges et al., 2020, p. 3), educators found themselves scrambling to locate digital tools and provide their students with effective and meaningful learning experiences. These changes have a direct impact on learner engagement and classroom climate (Fraser, 2012).

To better understand remote instruction, more research on technology and teacher education is needed that is centered around the pandemic events, specifically as it relates to understanding the educational contexts within social and news media, and within each unique community space. Therefore, to examine the education concerns in these various spaces, the purpose of this study is to analyze the initial response to the world health crisis through an examination of social media, news media, and school districts’ response. Based on the collective empirical findings, we provide remote teaching suggestions to these concerns. A literature review of K-12 online instruction, education disaster plans, and the influence of connectivism via social and news media help to grasp the complexities of the urgent transition to remote instruction.

Running head: INITIAL RESPONSE TO THE COVID-19 PANDEMIC

Literature Review

One of the earliest responses to the world health crisis called upon educational researchers and practitioners to create a book entitled, *Teaching, Technology, and Teacher Education During the COVID-19 Pandemic: Stories from the Field*. A collection of the most prevalent issues, this book focuses on strategies to improve online pedagogical strategies, community and collaboration, alternative field experiences in preservice teacher education, preservice teacher education methods and pedagogy, K-16 educator professional development, digital tools, and equity issues (Ferdig et al., 2020). This study builds on these recommendations by extracting data from the initial response to COVID-19.

In the following literature review, we demonstrate that learning situated within an online space requires the consideration of many influential factors, such as student motivation and engagement, impact of individual differences on learning, collaboration among students, parents, and educators, and best practices of distance learning and instruction. Additionally, we address an added layer of educational complexity, education disaster plans, to show how educators attempted to prepare for emergency situations. A connectivism lens provides a pathway to understanding how the media and social networks inform pedagogical and strategic learning decisions.

K-12 Online Instruction

Though not identical, K-12 online, commonly referred to as virtual instruction, has many shared characteristics with remote instruction, and virtual instruction has been an option for teachers, students, and parents since the mid 1990’s. The foundation of online learning launched in 1996 with the Florida Virtual School (formerly “Web School”), followed by the Virtual High School in 1997 (Watson & Murin, 2014). The definition of a virtual school is most commonly associated with secondary education, with the most widely accepted

Running head: INITIAL RESPONSE TO THE COVID-19 PANDEMIC

definition of a virtual school being that “a virtual school is an entity, which has been approved or accredited by a state or governing body within the state, that offers secondary-level courses through distance delivery – most commonly using the Internet (Barbour & Reeves, 2009, p. 412).” Though the majority of students in state-supported virtual schools in the US are high schoolers (e.g., about 78% in Michigan, Freidhoff, 2019), virtual schools can also include elementary and middle-school student populations.

Similar to traditional face-to-face instruction, there are many factors that educators should consider that influence student achievement in distance education environments. For example, factors that impede learning include students' motivation, engagement, self-regulatory learning skills, and individual differences, like reading ability or working memory capacity (Authors, 2020). Perceptions of students, parents, and educators all provide an additional important perspective on the challenges and concerns of remote learning and teaching. Established best practices for effective online education (e.g., Moore, 2018) offer useful guidelines to model effective remote instruction. Even in the time of a public health crisis such as the COVID-19 pandemic, educational organizations serve as ongoing resources and professional development for educators and parents.

Student motivation and engagement. Student motivation and engagement during remote teaching and learning is a focal point for educators. For example, there is a need to create a support network to sustain student-centered, active pedagogy (Williams et al., 2020) and focus on best practices to teach kindergarteners during remote learning (Vu et al., 2020).

An investigation into adolescent students' attitudes toward virtual learning reveals that a motivation to learn is connected to their commitment to education, in addition to whether students receive appropriate support and guidance from their teacher (Weiner, 2003). A variable more difficult to gauge is teachers' knowledge and use of digital technology

Running head: INITIAL RESPONSE TO THE COVID-19 PANDEMIC

applications (e.g., Padlet, Flipgrid), which influences to what extent students engage socially in lectures and discussion (Frangou & Keskitalo, 2020). Engagement can also vary by learner, which has been noted when secondary students used technology to enhance their learning. Students identified as higher performing were able to concentrate and focus on their digital work compared to lower performing students, who were otherwise distracted by social media and streaming media (Bergdahl et al., 2020). Inequitable engagement opportunities are an even larger concern since the pandemic, which has revealed greater disparities among students' individual access to digital technologies and the Internet (Carey et al., 2020; Plante & Palmer, 2020).

Impact of individual differences on learning. Additionally, virtual school populations tend to differ from traditional schools, and for this reason, virtual school students tend to have different needs. These differences have direct implications on instruction. For example, socio-economic status impacts student achievement. In Michigan, 66% of virtual school students live in poverty, of which only 49% pass, compared to a 69% pass rate for students not living in poverty (Freidhoff, 2019). Educators emphasize the importance of understanding the virtual school population, possessing technical expertise, and providing regular feedback and clear expectations for students (Oliver et al., 2010). Achievement is also affected by students' self-efficacy—higher performing students tend to have higher self-efficacy and a greater effort regulation, which lead to increased achievement (Kim et al., 2015). The most important factor shown to impact student achievement is directly related to students' time spent in the learning management system, or what's often referred to as behavioral engagement (Liu & Cavanaugh, 2011, 2012). A study of 802 high school students enrolled in 14 online courses found females actively participated more than males and that a higher degree of

Running head: INITIAL RESPONSE TO THE COVID-19 PANDEMIC

online activity and discussion forum viewing and posting was associated with improved final grades (Lowes et al., 2016).

Collaboration among students, parents, and educators. Because parents provide instructional support in a virtual setting, the parental role is a vital factor to support student learning (Borup et al., 2014). A study of 24 African-American and 16 Hispanic students identified factors that led to achievement: collaborative learning activities, access to resources, time convenience, student- teacher interactions, and student-student interactions (Kumi–Yeboah et al., 2018). Students emphasized the need for parental support to enhance online learning experiences and students’ academic self-concept, and remarked that virtual learning lacked a social presence and lack of cultural inclusion in course content (Kumi–Yeboah et al., 2018). Individual parent interviews also relayed considerations for educators, students, and parents. For example, educators should support families through effective communication, transparency to use tools, and individualizing instruction (Curtis & Werth, 2015). Parents added that students should be self-motivated, engaged, participate actively, and accountable for their own learning; however, parents should be available to monitor, mentor, and motivate students (Curtis & Werth, 2015). As a result of limited interactions due to significant structural institutional barriers (e.g., large class sizes, rolling enrollment, the profession, the independent-study model adopted by the school) educators caution a sense of disconnectedness among students and their peers (Hawkins et al., 2012).

Best practices of distance learning and instruction. Best practices of effective online teaching, which we extend to our current remote teaching scenario, are derived from educational organizations such as: American Distance Education Consortium: Guiding principles for distance teaching and learning; American Federation of Teachers: Distance education guidelines for good practice; National Education Association: Guide to Teaching

Running head: INITIAL RESPONSE TO THE COVID-19 PANDEMIC

Online Courses (Ferdig et al., 2009). Broad in nature to address instructional design and systemic processes, for the purpose of this study, we focus on K-12 educator stakeholder recommendations. Summarized by Ferdig and colleagues' (2009), educators should consider these six best practices:

- a) personal (e.g., compliance with licensing, standards, and credentials; use of technology to deliver content, reflective, involvement in the profession),
- b) communication (e.g., shares student progress, multiple opportunities for communication, quick and meaningful responses),
- c) programmatic (e.g., ability to modify content and delivery, maintain student records, knowledge of students' background knowledge),
- d) pedagogy (e.g, develops critical thinking skills, accommodates for students' differences, fosters participation and collaboration to establish community, provides engaging content, knowledge of content and pedagogy, team teach),
- e) classroom management (e.g, outlines materials and reminds students of deadlines, communicates technical support, supports time management skills, enforces academic conduct/honesty, monitors student interactions, models and participates in student discussions, balances structure and flexibility)
- f) course management (e.g, course requirements and timetable, ability to provide tech support, evaluates and assesses students including students' self-assessment, ensures course is up-to-date).

While these best practices for virtual instruction provide some guidance, the National Standards for Quality Online Courses developed in 2007 updated their statement in response to COVID-19, which also serves to provide educators with research supported instructional benchmarks, revised guidelines, and resources to helpful teaching organizations, standards,

Running head: INITIAL RESPONSE TO THE COVID-19 PANDEMIC

legal guidelines, and teaching frameworks (Virtual Learning Leadership Alliance & Quality Matters, 2019).

Education Disaster Plans

Best practice guidelines are limited by previous experiences and an ability to plan for emergency situations. Nearly every school district in the nation has a plan in the event of a disaster, typically called an All-Hazards Plan or an Emergency Operations Plan (Pigozzi, 1999). These plans include guidelines for reunification and responses to a school shooting, student death, death of a faculty member, evacuation, hazardous spills, lockdown, and lockouts (Appendix A). Some plans also include procedures for a school response during a pandemic, with most preparations in response to an illness such as the flu (Rebmann et al., 2016). As part of the planning process, schools describe disaster prevention and mitigation, a community resource list, school preparedness for different types of disasters, and disaster response and recovery. These checklists outline the type of disaster and school district expectations to minimize the impact on staff, students, and greater community.

However, it was not until COVID-19 that the term “remote instruction” (Hodges et al., 2020, p. 3) was introduced by educators, to describe a more synchronous approach to teaching and learning from home. An analysis of schools’ disaster plans across the United States revealed “state requirements that school districts plan for disasters varied greatly as did the resulting school disaster plans” (Burling & Hyle, 1997). Thus, emergency preparedness plans lacked a strategic response to remote learning. With the exception of individuals who had a personal experience with a school disaster, school leaders admit the importance of revising disaster plans, emergency response training, availability of equipment and supplies, and implementation of the plan (Kano et al., 2007).

Theoretical Framework

Running head: INITIAL RESPONSE TO THE COVID-19 PANDEMIC

As K-12 educators design, test, and implement strategies for emergency response teaching, they turn to social media outlets such as Twitter, for brainstorming, feedback, and professional development (Carey et al., 2020). Similarly, policy makers, state and federal agencies, and school district leaders use social media to rapidly disseminate new guidance, resources, and opportunities (Hulon et al., 2020). Insights regarding how educators, leaders, students, parents and other relevant stakeholders negotiate strategies to respond to the challenges of emergency remote teaching can be gleaned through the theoretical lens of connectivism (Siemens, 2005, 2014).

Connectivism is a theoretical framework useful for understanding the nuances of the nature and dynamics of distributed knowledge in online communities of practice, such as K-12 teacher groups (*nodes*), part of a larger network of educators who use social media (Downes, 2008). Knowledge is distributed in the sense that it is generated and transformed by the various nodes of the network, with learning as the dynamic process of traversing the ever-changing conceptual landscape within the nodes and networks that create and connect units of information. Connectivism is useful for understanding knowledge generation in a digital, global society that is characterized by rapid changes. Today’s social groups are more connected and diverse (demographically, geographically, disciplinarily, generationally), with interactions constantly mediated by the progress between information and communication technologies. A diversity of opinions has become the primary driver of ways of knowing on social media. Thus, a core skill set for today’s connected learners is information literacy—identifying connections between information sources, filtering information, and providing validation—to facilitate continual learning. Personal knowledge consists of a system of networks, and learners can stay current on any topic through the connections they have created (Duke et al., 2013).

Running head: INITIAL RESPONSE TO THE COVID-19 PANDEMIC

Connectivist learning is supported by social media. Twitter specifically has a whole set of connectivism affordances to support a) individuals to self-organize into nodes and networks (e.g., by creating a personal network of individuals and groups to “follow” and via Twitter lists), b) information to be shared and rapidly transformed within and across nodes and networks (via just-in-time and relevant notifications based on the user’s Twitter activity), c) new node connections to be rapidly formed using Twitter hashtags, and d) trends to be analyzed by examining the currently trending hashtags. Connectivist learning among self-organizing and dynamic communities of practice on Twitter relies on the currency of information, diversity of opinions, ability to experience multiple perspectives, recognition of patterns within the information that is actively transformed by the community into knowledge, and ongoing professional development.

Research Questions and Significance

Despite earlier research on distanced learning and emergency preparedness plans, additional research is needed that examines how educators, schools, and community spaces responded to the United States’ declaration of the COVID-19 health crisis. These findings can inform future educators’ pedagogical response, adaptability, and preparedness for emergency remote instruction.

1. As evidenced in social media, news media, school district continuity plans, and educational affiliate organizations, what is the initial response to the mandate to transition to emergency remote instruction?
2. Based on this collective empirical evidence, what pedagogical strategies do teachers employ to facilitate remote instruction?

Method

This study implemented a mixed-methods sequential explanatory design (Creswell & Creswell, 2018) to investigate social media, news media, school district websites’ continuity

Running head: INITIAL RESPONSE TO THE COVID-19 PANDEMIC

plans, and educational affiliate organization approaches to support remote learning during the COVID-19 pandemic. A content analysis (Neuendorf, 2002) of relevant news media and social media communications (i.e., Twitter) provides empirical data to investigate the study's research questions. We support descriptive findings with qualitative data to provide evidence to substantiate education stakeholders' decision-making.

Participants

Participants include 12,970 education stakeholders engaged in discussing COVID-19 imposed remote learning from around the world on Twitter. Additional data was obtained from major news media sources, educational organizations (e.g., Common Sense Media), and 15 school districts across the United States.

Data Collection Procedures

Immediately following the declaration of the national emergency in the United States, we implemented a Twitter Scraper add-on tool in Google sheets to systematically (up to 100/hr) scrape 43,870 tweets between March 12-30, 2020 that included #COVID19 or #Coronavirus. By March 30, saturation on the immediate response was achieved. This initial time period was selected to measure how different education stakeholders initially responded to the remote learning mandate, to reveal a level of preparedness and provide pedagogical recommendations for remote learning.

To narrow the tweets dataset, we used the excel function IF, filtered by keyword (e.g., edtech, school, home, teach, online) to include 12,970 tweets for analysis. For tweet categories greater than 100, we used the excel function to select 20 tweets at random to analyze those related tweets over time. The decision to select 20 at random was the moment of saturation (Fusch & Ness, 2015) to capture the message from the data. Out of 12,970 tweets, each of the 16 keywords and phrases were systematically analyzed, which left 356

Running head: INITIAL RESPONSE TO THE COVID-19 PANDEMIC

tweets for an in-depth analysis. Each included tweet was only coded once. Of the remaining 30,896 tweets, 100 were selected at random to ensure they were outside of the keywords applied in this study, of which none were relevant.

After one week, to explore the notion of connectivism (Siemens, 2005, 2014) and investigate whose voices were acknowledged and shared, we revisited the 356 included tweets to closely examine the connections among each tweet. We investigated whether the tweet originated as a retweet, counted whether it was retweeted, tallied its number of likes and number of comments, and identified the individual according to their Twitter profile biography.

Qualitative data were obtained from the tweets, news media, school district websites² continuity plans, and educational organizations, to provide a deeper understanding and improved contextual understanding of the Twitter analysis. The researchers in the study collated these resources, sent to them by educational organizations where they were a member or subscribed to (e.g., Common Sense Media). A thorough web search included keywords such as “remote teaching plan,” “remote learning plan,” “remote instruction,” “educator response,” and “teacher response.” Emergency teaching plans were obtained from some of the largest 15 school districts and those identified as COVID-19 hot spots, where the virus was spreading more rapidly.

Data Analysis

Neuendorf’s (2002) six-step process to conduct a content analysis was applied to analyze stakeholder responses from social and news media, and school district education plans. Our analysis closely adhered to the process, with a) reliance on the scientific method, b) message as the unit of analysis, c) counting key categories, d) summarizing, e) applicability to all contexts, and f) analysis of message characteristics.

Running head: INITIAL RESPONSE TO THE COVID-19 PANDEMIC

Beginning with the first phase of Neuendorf’s (2002) content analysis, a) reliance on the scientific method, we hypothesized schools and teachers would demonstrate uncertainty related to school closures and expectations for teaching, while brainstorming ways to use educational technology to support the transition to remote teaching and learning. To address the message as the unit of analysis, we specifically completed a manifest analysis, to encompass a broad surface structure of multiple news and social media outlets. To count key categories within the dataset, we looked for meaning and patterns across institutional announcements and Tweets which used the hashtags #coronavirus and #COVID19, sorted response items by question, and finally organized these findings into categories. Finally, we tallied each category within each question to determine salience. To count key categories within the qualitative dataset, items were deductively sorted by their source (e.g., Twitter, news media, school district websites’ continuity plans, educational organizations) in an excel spreadsheet, to provide evidence for the descriptive findings from the content analysis of Tweets. The next phase, summarizing, led us to read through each source to arrive at a comprehensive summary of each data source type’s response to K-12 emergency remote teaching. We then took this summary to assess its applicability to all contexts, such as the influence of the pandemic on education at the local, state, national, and international levels. The findings and implications were extracted by conducting an analysis of message characteristics, such that we arrived at themes most salient to stakeholders across these contexts during the United States’ initial response to the pandemic.

Results

Educator responses regarding emergency remote teaching to the virus were publicly available on the Internet on social media (e.g., Twitter), news media (e.g., *Education Week*)

Running head: INITIAL RESPONSE TO THE COVID-19 PANDEMIC

school district websites' continuity plans (e.g., Alachua County Public Schools), and education affiliate organizations (e.g., Common Sense Media).

Social Media Response

Of the 43,870 tweets, 12,970 met the criteria for analysis, after narrowed by relevant keywords. The most commonly used keywords were home ($n = 5,094$; 39.28%), lockdown ($n = 2,363$; 18.22%), "clos" for close/closure ($n = 1,693$; 13.05%), school ($n = 909$; 7.01%), and teach ($n = 329$, 2.54%). Following a systematic approach to random selection, 356 tweets were included for in-depth analysis (refer to Table 1 for tweet examples).

<<< Insert Table 1 here >>>

The most frequent tweets include mentions referring to community lockdown procedures ($n = 114$, 32.02%), with an emphasis on social distancing, closure of public places, lockdown preparation, reported virus cases, precautionary measures, school announcements, and one educator obituary in connection to the virus. The topic of sustaining education ($n = 76$, 21.35%) focused on online teaching pedagogy, homeschool support, online learning, obstacles to remote learning, student and teacher perceptions of online learning, state teaching guidelines, and teachers' perspectives. Experts and researchers in the field of education offered their expertise to educators' aspiring to learn a new software or technology tool. Concrete examples of instruction and learning with preferred technology tools (e.g., Screen-cast-o-matic, Google Meet, Google Classroom, Kahoot!, Zoom) were recommended with an emphasis on making personal connections with students. An example of a resource sharing to promote online learning:

Join #literacy experts, authors, and experienced virtual educators, Dr. Troy Hicks and Shaelynn Farnsworth, for the webinar on March 25 as they discuss resources and strategies to best support remote teaching and learning. Learn More:

<https://tryingtogether.org/event/literacy-virtual-learning/>... | #edtech #covid19

Running head: INITIAL RESPONSE TO THE COVID-19 PANDEMIC

Sustaining education focused on pedagogical strategies and not the technology tool itself. The theme of adapting to a remote lifestyle ($n = 62$, 17.42%) led to sharing community resources, remote work conditions, community support, online shopping, discovering new hobbies, and exercising online. Political tension ($n = 55$, 15.45%) focused on political decisions, impact on the economy, chastising others' behavior, and streaming religious gatherings. Emotional responses ($n = 49$, 13.76%) were evidenced through satire, gratitude, encouragement, uncertainty, mental health support, anxiety, kindness, hopefulness, analogous comparisons, and nostalgia.

To provide a better context and understanding of Twitter conversations in relation to connectivism, we revisited the Tweets one week later. Of the 356 included tweets that were re-examined the week following the initial three-week data collection time period, the repeated analysis identified 335 tweets remained active (i.e., 21 tweets had since been deleted). Of these 335 tweets, 62 (18.51%) were retweets, which had a total of 10,727 likes and 776 comments. Of this active tweet dataset, 4,070 tweets had been retweeted. To examine who was addressing these educational issues, 189 (56.42%) were identified as other (e.g., citizen, unknown), 38 (11.34%) from an educational organization, 34 (10.15%) news media, 34 (10.15%) identified as educators, and 17 (5.10%) parents. A deeper analysis revealed that educational organizations had the most likes, retweets, and comments, followed by other, news media, educators, and parents (Table 2).

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News Media and School District Response

In early March 2020, Alabama, Oklahoma, and Virginia schools were first to announce closures for the remainder of the 2019-2020 academic school year (Peele et al., 2020). Other states extended school closures into April and May. New York's governor

Running head: INITIAL RESPONSE TO THE COVID-19 PANDEMIC

announced schools would remain closed until April 1st, and just before the end of March, the closure was extended until mid-April, with intention to reconsider additional extensions (Niedzwiadek & Toure, 2020). Figure 1 displays school closure decisions by state.

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School district continuity plans provide at-home teaching resources. While news media reported school closures, individual school district websites became the primary source for learning plans and resources to help teachers and parents support students with remote learning. From the moment closures were announced, schools worked quickly to develop and disseminate Instructional Continuity Plans (ICPs), a “fluid plan...intended to reduce the disruption for our students by providing alternative print and online assignments to extend learning during a school closure” (Alachua County Public Schools, 2020). Examples of included details of an ICT plan are guided literacy and math instructional activities that parents can complete with their children; for example, the kindergarten plan included 26 pages of lessons intended to last about two weeks, with supplemental digital learning resources (e.g., Istation, Discovery Education, TumbleBooks).

We conducted an analysis of some of the 15 largest school districts around the nation, many of which were also located within identified COVID-19 hotspots, to obtain a broad understanding of the characteristics of their remote teaching environments and determine how school ICPs varied (Figure 2). Data were obtained directly from each of the school district websites. With regard to the learning approach and platform, two districts used synchronous instruction (13.33%), four (26.67%) screen-casted their lessons, four (26.67%) used Google Classroom, and two (13.33%) used Google Meet. Online lesson plans were made available to parents and students in five districts (33.33%), 13 (86.67%) provided parents with supplementary apps and

Running head: INITIAL RESPONSE TO THE COVID-19 PANDEMIC

websites, with eight (53.33%) who disseminated worksheets or packets. Online textbooks were used by six districts (40%), with Chromebooks used by three (20%). In sum, there was very minimal consistency among the school districts featured in this analysis.

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Educational Organization Response

Organizational responses provide professional development support, which appears to be linked to the members or employees within those affiliate groups. Educational groups include but are not limited to: Association for Educational and Communications Technology (AECT); International Society for Technology in Education (ISTE); International Literacy Association (ILA); National Council of Teachers of English (NCTE); National Science Teachers’ Association (NSTA); Common Sense Media; Colorín Colorado. ILA has made keynote speeches from the most recent conference freely available, NCTE and Common Sense Media offer live Zoom chat sessions (Figure 3), and NCTE started a hashtag, #ImWithMyStudents. NSTA is offering a free 30-day membership, to give people access to more than 12,000 digital professional learning resources and tools. Meanwhile, Colorín Colorado (2020) added a multitude of multilingual resources for schools, including resources in Chinese and Spanish with fact sheets and infographics in their “Coronavirus research center.” Similarly, CRE HUB has included resources for educators to maintain a culturally sustaining environment while teaching remotely, providing resources and family engagement materials (NYU Metro Center, 2020). These educational organizations can continue to serve as ongoing resources as teachers, students, and parents navigate and close educational gaps as a result of remote learning.

Running head: INITIAL RESPONSE TO THE COVID-19 PANDEMIC

Parents and teachers scrambled to provide meaningful instruction and learning support materials, and inquired about how to quickly and easily locate high-quality resources. Within days, resource hubs were created and shared (Schaffhauser, 2020) and Common Sense Media curated a hub of resources to help engage children in live music and art classes, among other related education resources (Ucciferri, 2020). A brief two weeks later, Common Sense Media developed and introduced Wide Open School on April 1, 2020 to support families and educators in transition to remote learning (Common Sense Media, 2020). Resources were curated to support students' academic, emotional, and physical well-being. Led by the experts at Common Sense, Wide Open School is the result of a collaboration among leading publishers, nonprofit organizations, and education and technology companies. Wide Open School features a free collection of high-quality learning experiences and activities for kids, organized by grade-level band and subject. There are also daily schedules with creative breaks and recommendations to keep kids engaged and exploring, one day (or one hour) at a time.

Discussion

Social media response focused on students and families remaining in the home and adhering to safety precautions, as disseminated by government officials. Even though our systematic search targeted K-12 education stakeholder responses specifically, the community lockdown procedure was the most dominant theme in the Twitter analysis, followed by discussions of how to sustain K-12 education. Data from the school district continuity plans indicated that previous emergency plans were inadequate to respond to emergency remote teaching. Therefore, the district response varied immensely from one to another, which likely led to an increase of frustration and uncertainty. Additionally, resources to support students' cognitive and emotional needs were more prevalent in parent-supported spaces, such as Common Sense Media (2020). Collectively, the results from this study indicate less attention

Running head: INITIAL RESPONSE TO THE COVID-19 PANDEMIC

to pedagogical approaches to sustain education, but rather education stakeholders emphasized the well-being and safety of one another.

Despite the overall presence of social and news media content focused on strategies and resources for sustaining education, our analysis revealed a lack of attention to instructional scaffolds that could assist others with the self-regulation of learning and engagement (Williams et al., 2020), and establishing expectations for new daily routines, such as weekly checklists prioritizing daily tasks and processes that students and their parents can follow at home.

Recommendation 1: Develop an easy-to-use metacognitive scaffold (Azevedo, 2015), such as a checklist, that could provide highly needed structure for students navigating schoolwork related to a variety of classes at home. This recommendation has been recently shared by a number of experts in educational technology (e.g., McCarthy & Wolfe, 2020; Moore & Hodges, 2020) and should be a key consideration for all educators establishing new teaching and learning routines.

Additionally, our analysis showed the primary focus of the discussions to implement emergency remote teaching centered on supporting student-content interactions (what students are expected to read, videos requested to view, assignments to complete), and to a lesser extent a focus on student-teacher interactions (e.g., scheduling synchronous class sessions or check-in meetings using tools such as Zoom or Google Meet). Student-content and student-teacher interaction, however, reflect only two core aspects of effective facilitation of online learning. At least two major theories of online learning design—Transactional Distance Theory (Moore, 2018) and Community of Inquiry Model (Cleveland-Innes et al., 2018)—posit that effective online learning environments must also support student-student interactions. We acknowledge that supporting student-student interactions in

Running head: INITIAL RESPONSE TO THE COVID-19 PANDEMIC

synchronous environments, such as Zoom or Google Meet, is far more challenging due to the need to educate students to exercise proper netiquette, increased bandwidth requirements to support multiple audio and video streams, and managing remote working households.

Recommendation 2: Scaffold student-student interaction to allow students to engage in collaborative forms of learning to brainstorm, discuss content, and provide peer feedback.

It is also important to provide opportunities for informal student-student interactions that are presented and highly valued in the K-12 traditional school environment. For example, some remote teaching educators today are implementing “virtual recess” to allow students to interact with each other on non-academic topics shortly before or after the lunch break. Synchronous tools that offer the affordance of virtual breakout rooms may help address the important Internet bandwidth issue. Alternatively, educators may employ asynchronous discussions that allow students to reflect on their responses prior to posting them (Nandi et al., 2012). Asynchronous student-student interaction can afford students to be more reflective learners (Dennen, 2005) but will take away the dynamic nature of just-in-time spontaneous synchronous conversations. We advise educators to implement an array of learning opportunities for students that foster peer- peer interaction and consider the needs of each learner (Curtis & Werth, 2015).

Next, our data demonstrate that educators appreciate when their schools offer some flexibility regarding the kinds of technological tools and platforms teachers may choose to use during emergency remote instruction. And while it is true that no one technology can provide an acceptable “one-size-fits-all” solution for engaging teaching and learning, it is also problematic when different teachers at the same school ask students (and, by proxy, their parents) to become comfortable with a range of educational technologies. In other words, the freedom for each teacher to define what tools they want to use with their students may indeed

Running head: INITIAL RESPONSE TO THE COVID-19 PANDEMIC

facilitate instructional design and implementation for individual teachers, but it may come at a cost of high levels of anxiety for their students and parents who must rapidly become informed users of these various technologies.

Recommendation 3: Streamline the remote teaching process by adopting one reliable technology platform that a) offers the most useful affordances for the instructional process, and b) reflects the needs and prior experiences of student and parent users of this technology. As part of this decision to streamline the remote teaching process, we recommend school districts revisit and revise their education disaster plans. Disaster plans should consider the unique needs of the community, such as whether students’ homes have Internet capable of sustaining video streaming and devices for each student (Carey et al., 2020; Plante & Palmer, 2020).

Adoption of new technology is known to be a major contributor to the anxiety of both students and teachers (Hodges, 2018), and thus it is important to avoid the unintended consequence of increased anxiety when selecting the number and nature of technological tools to be used with students. In consideration of students’ individual experiences, we advise educators to implement inclusive assignments that their students can successfully complete (Kumi–Yeboah et al., 2018).

Limitations

This study contains some limitations. One limitation of this study is that the dataset includes publicly available data on the Internet. We did not conduct individual interviews or survey any participants, primarily because at the onset of the emergency, most educators appeared to be focused on seeking counsel on how to negotiate an emergency response and convert face-to-face instruction to remote instruction. Another limitation, findings of this study cannot be generalized to the broader population of K-12 educators and their students.

Running head: INITIAL RESPONSE TO THE COVID-19 PANDEMIC

However, in future research, a more representative study that allows for open participation might otherwise reduce this limitation.

Future Research Recommendations

Future research considerations aim to improve remote teaching practices and school district preparedness to address pedagogical strategies within future emergency teaching scenarios. First, to address the need for a social-emotional connection, researchers might consider examining how current technology tools foster student-student interactions. Additional research might deepen this by investigating student-teacher interactions with a comparison of learning management systems, or other connected-learning platforms.

Related research might explore how to scaffold student-student interactions to allow students to engage in collaborative forms of learning to brainstorm, discuss content, and provide peer feedback. This could reveal how students apply critical thinking skills within a remote learning environment. Moreover, what are the characteristics of these learning platforms that students and teachers find particularly helpful? Perhaps these learning platforms have perceived barriers that could be improved? With further regard to teaching, researchers might examine strategies to implement remote teaching in different content areas, such as the difference between teaching in the arts and teaching science. Relatedly, more research is needed to make learning more culturally relevant and explore accessible learning strategies for students from exceptional populations who have 504 and Individualized Education Plans.

We recognize that our dataset contains only public data, and future researchers should make concerted attempts to address the concerns of teachers, parents, and students within the community, particularly those who do not engage with social and news media, whether due to a personal choice or insufficient access. With clear disparities among access to individual

Running head: INITIAL RESPONSE TO THE COVID-19 PANDEMIC

technology devices and the Internet (Carey et al., 2020; Plante & Palmer, 2020), it is critical to explore strategies to engage all learners in the remote or hybrid learning environment. Schools might consider the need to lend more devices, setup mobile hotspots, provide a safe and secure socially distanced part-time learning environment, while supporting students with a virtual teacher on demand who can provide educational support to remote learners.

Other researchers might consider exploring educators’ longitudinal emergency response to remote teaching, which could reveal how educators change and adapt their remote teaching strategies over time. This research could inform the development of improved 21st century education disaster plans (e.g., consider new technology tools, access, equity). To extend this, future research could gather parent and student perceptions of emergency remote instruction and the impact on the immediate and distant future of remote learning.

Conclusion

To better understand stakeholders’ initial response to “remote instruction” (Hodges et al., 2020, p. 3) and improve remote learning pedagogical practices, the purpose of this study was to examine publicly available data on social media, news media, school district websites, and educational affiliations immediately following the declaration of the United States’ COVID-19 national emergency. We identified key areas of concern as evidenced by our dataset. We found that these digital spaces are flooded with instructional plans that teachers curated to meet the needs of their students, and our analysis identifies key stakeholders and apparent effective strategies for remote teaching during a time of crisis. We acknowledged K-12 remote instructional practices and we emphasize the need for educators to streamline instructional expectations and foster students’ emotional sensitivity. The collaboration and connectivity among schools, teachers, parents, and students is evidence that remote teaching is a high priority, while a sense of well-being is of utmost importance. We urge the key

Running head: INITIAL RESPONSE TO THE COVID-19 PANDEMIC

stakeholders investigated in this study to consider our data-driven and theory-aligned recommendations as educators continue to provide remote instruction. The COVID-19 pandemic has demonstrated that educators and students will not always have a choice between face-to-face or distance learning environments. Instead, an emergency response to the health crisis has illuminated the need to focus on humanizing remote instruction. With administrator support, teachers need to adapt their pedagogical practices, respond to the individual needs of their student population, and tailor instruction around their students' access to technology, while carefully considering the emotional well-being of all.

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Conflicts of interest/Competing interests

The authors declare they have no potential conflicts of interest.

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Running head: INITIAL RESPONSE TO THE COVID-19 PANDEMIC

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Running head: INITIAL RESPONSE TO THE COVID-19 PANDEMIC

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List of Tables

Table 1. Codebook, definitions, and tweet example ($n = 356$)
Table 2. Analysis of revisited tweets.

List of Figures

Figure 1. *Education Week* report of United States school closures (Peele et al., 2020)

Figure 2. K-12 Instructional continuity plan analysis.

Figure 3. Live Zoom chat for teachers and parents, discussing remote teaching and learning strategies.

*Written permission obtained from all video participants.

Table 1. Codebook, definitions, and tweet example (*n* = 356)

Theme	Definition	<i>n</i>	Tweet Example(s)
Community Lockdown Procedures			
	emphasize social distancing	47	
	closure of public places	34	
	lockdown preparation	22	
	reported cases	6	
	precautionary measures	3	
	covid educator obituary	1	
	school announcements	1	
		114	
Sustaining Education			
	online teaching pedagogy	34	So, You Have to Move Your Classes Online. Now What? #education #COVID19 #edtech
	homeschool support	21	
	online learning	8	
	obstacles to learning	5	
	student perceptions of online learning	3	
	teacher perceptions of online learning	3	
	state teaching guidelines	1	
	teacher perspectives	1	
		76	
Adapting to a Remote Lifestyle			
	sharing community resources	39	Attention #SaratogaCounty residents: I'm writing a profile on Saratoga's Broadway Deli, who announced several days ago that they'll offer free lunch to kids who depend on school lunch programs. I want to hear your reactions. Open DMs or email: smidani@syr.edu #COVID19
	remote work	14	
	community support	4	
	discovering new hobbies	2	
	online shopping	2	
	online exercise	1	
		62	

Political Tension

impact on economy	20	1st @nytimes editor
Political decisions	20	@MaraGay cannot do basic
chastising others behavior	12	arithmetic in prepared tv
Streaming religious	3	slide, now education beat
gatherings		reporter opposes basic health
		measures during #Covid19
		pandemic & these are ppl
		opposing
		#GiftedAndTalented
		schools? These ppl should
		not have any say in DOE
		policy whatsoever #edchat
		RT @elizashapiro: Crucial
		point from pediatrician
		Aaron Carr: it's not just
		students who would have to
		self-isolate under closures. If
		parents aren't allowed to stay
		home from work, we could
		have a "worst case scenario"
		of children being passed onto
		elderly grandparents for
		emergency childcare

55

Emotional Response

satire	13	This virus knocked us out of
gratitude	11	our comfort zone. Time to
encouragement	10	come back better than ever!
uncertainty	4	#teacher #educator
mental health support	3	#teacherlife #education
anxiety	2	#teachertwitter #edchat
hopefulness	2	#educhat #edutwitter
kindness	2	#teacherchat #distantlearning
analogous comparisons	1	#teacherstrong #resilience
nostalgia	1	#bounceback #coronavirus

49

Table 2. Analysis of revisited tweets one month later.

Author	Comments	Likes	Initial Retweet	Retweeted (1 mo.)
Educational Organization	152	3,161	2	1,147
Other	74	954	32	364
News Media	14	510	2	109
Educator	14	119	5	33
Parent	22	112	9	25

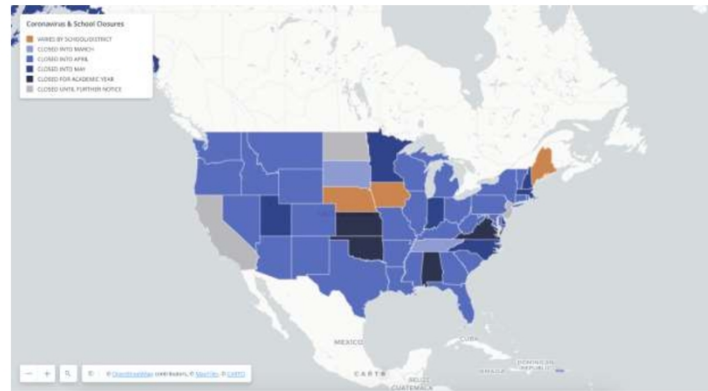


Figure 1. *Education Week* report of United States school closures (Peele et al., 2020)

Figure 1. Edu Week U.S. report school closures

215x279mm (600 x 600 DPI)

	Synchronous Delivery	Google Classroom	Google Meet	Online Lesson Blogs	Chrome- books	Supplementary Apps and Websites	Screen-casted Lessons	Online Textbooks	Worksheets or Packets
Alachua Public School	+	+	+	+	+	+	+	+	+
Baltimore Public School	--	--	--	--	--	+	+	--	+
Charlotte Public School	--	--	--	+	--	+	--	+	+
Chicago Public School	--	+	+	--	--	--	+	--	+
Detroit Public School	--	--	--	--	--	+	--	--	+
Denton Public School	--	+	--	+	+	+	--	--	+
Denver Public School	--	--	--	+	--	+	--	--	+
Houston Public School	--	--	--	--	--	+	--	+	--
Nashville Public School	--	--	--	--	--	+	--	+	--
Las Vegas Public School	--	--	--	--	--	+	--	--	--
Los Angeles Public School	--	--	--	--	--	+	--	--	--
Louisville Public School	--	--	--	--	--	--	--	--	--
Philadelphia Public School	--	--	--	+	+	+	--	+	--
San Francisco Public School	+	--	--	--	--	+	+	--	+
Seattle Public School	--	+	--	--	--	+	--	+	--

-- NO + YES

Figure 2. K-12 Instructional continuity plan analysis.

61x45mm (600 x 600 DPI)

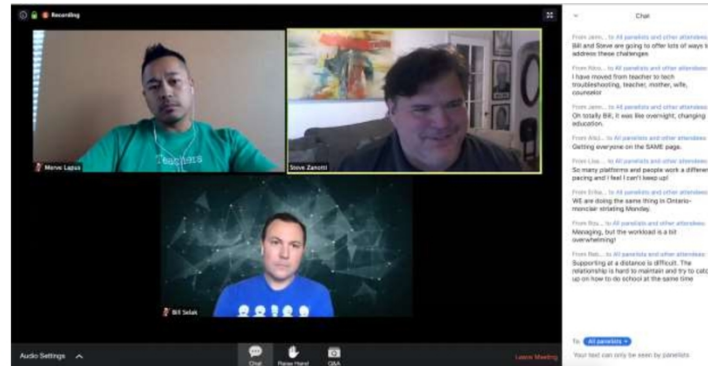


Figure 3. Live Zoom chat for teachers and parents.

215x279mm (600 x 600 DPI)

Sample Checklist for Pandemic Influenza

DIRECTIONS: Use the following checklist to assess the school building’s/school district’s response. Place the date below and mark the individual’s name, in the completed block, who is confirming that the action item has been completed.

DATE: _____

Action Item	Completed
Pandemic Influenza Procedures:	
Identify or create district committee to provide guidance to school sites regarding pandemic flu preparations.	
Review district emergency response and communicable disease policies and procedures.	
Determine if any additional policies and procedures need to be implemented.	
Work with Human Resources regarding School districts/schools functioning with 30% of work force absent. Look at alternatives such as staggered school times, changes in bussing, and telecommunications.	
Assess financial impact of alternate scheduling or school closures.	
Identify school-based individuals to educate staff about pandemic influenza.	
Identify school-based individuals to educate students about hand washing, covering cough, and staying home when sick.	
Identify individuals or organizations to educate families about pandemic influenza and school plan.	
Ensure each room has soap/water for hand washing or alcohol-based hand washing product.	
Distribute and post in each classroom Pandemic Influenza posters.	
Establish chain of command in case of illness. Establish a back-up chain of command, if necessary.	
Review procedures for sending ill students and staff home and make adjustments, as necessary.	
Track the number of staff and students absent daily.	
Report numbers absent to District Office and local Health Department if over 10% or requested.	
Hold staff meeting to provide information on the extent of infection at school site and potential changes that may take place.	
Identify and pre-screen health and grief service providers.	
Provide training to staff on grief and possible health problems associated with pandemic influenza.	
Mobilize the Mental Health Team to provide emotional-psychological support.	

If there is loss of life in the school district, establish location site for counseling services to be provided.	
Hold staff meeting and provide information on extent of pandemic influenza in the community and activities that may assist students, signs and symptoms to look out for, and safe room function and location.	
Announce counseling support services available to staff and students.	
Provide rest places for those that tire easily.	
Provide physical assessments, if needed, or make appropriate community health referrals.	
Recommend Employee Assistance Programs to deal with loss and grief.	
Identify students, families, and staff who may need long-term physical and mental health support or intervention and develop school and community resources to support these needs.	
Monitor the effects of cumulative stress on caregivers, such as office staff, school nurses, teachers, aides, school counselors, and other crisis team members.	
Modify work roles and responsibilities or add volunteer or support staff, as needed.	
Follow up with student referrals made to community agencies.	
Conduct debriefings with Mental Health Team.	
Call staff meeting to hold a review of the incident and discuss changes to procedures.	
Update checklist, if necessary.	
Communications:	
Notify the Public Information Officer to activate the Communications Plan.	
Communication Plan is activated.	
Cautions/Notes:	