



# Crisis-Based Remote Education: A Comprehensive Model

RESEARCH ARTICLE

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## ABSTRACT

The COVID-19 pandemic revealed significant gaps in institutions' ability to maintain education under crisis conditions, which is now commonly referred to as Emergency Remote Teaching (ERT). A critical analysis of the literature reveals that ERT is a label that does not differentiate adequately between the different ways ERT manifested worldwide and over time. In this conceptual paper, we analyze empirical research on remote teaching conducted over single, double, and three+ learning terms. Our analysis shows not only multiple possible phases of remote education but also different stages, scopes, and pathways between them. The proposed model in this paper can be used to analyze current literature, ground future research, and serve as a foundation for developing protocols and practices to proactively maintain education when exigent circumstances demand remote teaching over the short-, mid-, and long-term.

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## INTRODUCTION

At the start of the COVID-19 pandemic in early 2020, the phenomenon of Emergency Remote Teaching (ERT) became a universal household experience for billions worldwide as a result of social distancing countermeasures and movement control orders (Bond, 2021; Bond et al., 2021, UNESCO, n.d.). Virtually overnight, ERT would become the de facto method of maintaining educational continuity as a one-size-fits-all emergency response method (Hodges et al., 2020; Jandrić et al., 2020; Moore et al., 2021) despite numerous contextual variations among educational institutions and their students (Stewart et al., 2023). ERT, however, is not a new practice in the field of distance education, and had previously been implemented during natural disasters (e.g., floods, earthquakes, fires) and civil conflicts (e.g., military interventions, political unrest) (see Ayebi-Arthur, 2017; Davies & Bentrovato, 2011; Rhema & Miliszewska, 2012). These kinds of crisis events, however, are often both independent of one another and usually short-lived, occurring at different times and places, making the overall impact of ERT on the population at large relatively limited or inconsequential. COVID-19, however, progressed quickly from a regional epidemic in East Asia into a global pandemic affecting everyone, everywhere, all at once. The pandemic, ultimately, lasted several years, with the novel coronavirus eventually becoming endemic to humanity.

The enduring nature of the pandemic and consequent long-term dependence on ERT, however, contrasts sharply with ERT's initial conceptualization as a temporary shift in the mode of educational delivery (Stewart et al., 2023). Further, given ERT's widespread implementation, ERT has become an emergent area of scholarship, though not one without growing pains (Moore et al., 2021; Shattuck, 2021). While ERT literature has extensively been reported on and summarized (see Adedoyin & Soykan, 2023; Bond, 2021; Bond et al., 2021; Dalpati et al., 2022; Dhawan, 2020; Laato et al., 2022; Stewart, 2021; Su et al., 2022), one salient limitation of ERT scholarship is the disproportionate focus on the first term of the pandemic in 2020. 2023, however, marks the fourth year in which policymakers and educators have relied on remote education to varying degrees around the world. While the mass scale of remote teaching and learning has substantially lessened since early 2020 (Moore et al., 2021), it has persisted in certain regions (Stewart, Lowenthal et al., 2022). Given how ERT has grown beyond a temporary measure, we posit that reexamining assumptions about the practice is warranted (Stewart et al., 2023). Further, critically reflecting on two years of remote teaching also allows us to consider how the practice may change over time across multiple sequential learning terms (Cicha et al., 2022; Crutchfield & Eugene, 2022; Nikolopoulou & Kousloglou, 2022; Stewart et al., 2023; Yang, 2022). Moreover, while the specific circumstances of COVID-19 have also disproportionately influenced current ERT scholarship, there are other applicable crises (e.g., geopolitical, economic, human capital production, health, logistical, etc.) where remote teaching would be a relevant strategy to maintain education while prioritizing public/personal health and safety (Yang, 2022). For example, short-term remote teaching would be an appropriate method to address more mundane "emergencies" that cause schools to routinely close or cancel courses, namely severe weather events such as heavy rain, snowing, flooding, storms, fires, extreme heat/cold, etc. (see Esnard et al., 2018; Montz et al., 2015). Similarly, short-term remote teaching would be a viable tool in the wake of short-lived natural disasters like earthquakes, tornados (Ayebi-Arthur, 2017) or even armed conflicts that require infrastructure repair and rebuilding (Rhema & Miliszewska, 2012). Despite the broader applicability of a crisis-based remote praxis across both pandemic and non-pandemic crises, a more critical and comprehensive understanding is absent at present (Cicha et al., 2022; Crutchfield & Eugene, 2022; Nikolopoulou & Kousloglou, 2022; Stewart et al., 2023; Yang, 2022).

While academics agree that conventional residential education, distance education, and ERT are distinct practices (Hodges et al., 2020; Jandrić et al., 2021; Moore et al., 2021; Stewart et al., 2023), scholarship on ERT has generally not focused on differences and nuances of remote teaching within the practice itself (Moore et al., 2021; Shattuck, 2021; Stewart, Lowenthal et al., 2022; Stewart et al., 2023; Tulaskar & Turunen, 2022). Thus, not only is a reflection on crisis-based remote teaching warranted, it is direly needed (Cicha et al., 2022; Crutchfield & Eugene, 2022; Shiratori et al., 2022) since educational learning outcomes as a consequence of ERT have ranged from ambiguous at best (Abdulrahim & Mabrouk, 2020; Fuchs & Fangpong, 2022; Keser Aschenberger et al., 2023; Stewart, Baek et al., 2022) to disproportionately negative at worst

(Ávalos et al., 2022; Jelinska & Paradowski, 2021; Mostafa et al., 2022; Wladis et al., 2021; Woo & Archambault, 2022). In addition to inconsistent and/or mixed educational performance, scholars have noted the formation of a negative feedback loop starting from the transition to ERT which remained throughout the pandemic, often showing little if any improvement (Alqurshi, 2020; Cicha et al., 2022; Jandrić et al., 2021; Moore et al., 2021; Schlesselman, 2020; Shattuck, 2021; Shim & Lee, 2020; Stewart, Lowenthal et al., 2022; Stewart et al., 2023; Tulaskar & Turunen, 2022).

Additionally, college deferments and gap years have occurred in record numbers; the effect of pandemic-related learning losses is likely to be felt for years to come (Ardington et al., 2021; Ardissonne et al., 2023; Azevedo et al., 2021; Kaffenberger, 2021; Wladis et al., 2021; Woo & Archambault, 2022). Thus, it comes as no surprise that calls for a more proactive and concerted effort into educational continuity and resiliency planning with more concrete intervention strategies have been made (see Cicha et al., 2022; Crutchfield & Eugene, 2022; Holzmann-Littig et al., 2022; Nikolopoulou & Kousloglou, 2022; Shiratori et al., 2022; Stewart, Lowenthal et al., 2022; Stewart et al., 2023). Given this performance paradox and current limitations in ERT literature, the purpose of this conceptual paper is threefold: (a) to critically analyze the assumptions and characteristics of remote education under crisis conditions; (b) to describe how remote teaching processes can unfold over the short-, mid-, and long-term; and (c) to provide suggestions for best practice. In the following paper, we present a comprehensive model of crisis-based remote education that looks beyond COVID-19 which can serve as the foundation of theory, plans, and policies that proactively address future crises that require or could benefit from remote teaching as a strategic, rather than emergency, response.

## STRUCTURE AND GROUNDING

### CONCEPTUAL PAPERS

Conceptual papers, which are instrumental in theory building, propose novel relationships as well as logical and comprehensive arguments about how different components and processes of a system relate and interact (Hirschheim, 2008; Jaakkola, 2020; Prinsloo et al., 2022). We present our conceptual analysis using Hirschheim's (2008) heuristic of (a) claims (explicit statements that readers are being asked to accept as true), (b) grounds (the evidence and reasoning supporting the claims), and (c) warrants (underlying assumptions connecting grounds and claims). Ultimately, conceptual papers not only critically examine existing knowledge but push its boundaries (Whetten, 1989). Additionally, we draw upon two relevant conceptual frameworks to structure our analysis and model. First, we draw on Stewart et al.'s (2023) contextual model of Sustained Remote Teaching (SRT), which examines assumptions and characteristics about ERT, and second, we refer to Hersey and Blanchard's (1969) situational leadership theory (SLT) since it proposes prescriptions for improving performance in relation to a particular stage of experience and/or expertise (Daniëls et al., 2019; Thompson & Glasø, 2015).

### SUSTAINED REMOTE TEACHING (SRT)

Stewart et al. (2023) suggested that given the shifting conditions of the pandemic, the initial concept of ERT was limited. This is principally because Hodges et al.'s (2020) discussion of ERT did not consider (and understandably so) that COVID-19 would endure as a mid- or even long-term crisis spanning several years. For example, in the second semester of 2020 and onwards into 2021 and 2022, institutions, educators, and students could draw on experience to plan for remote delivery and predetermine various course tools, practices, materials, etc. (Jandrić et al., 2021); this contrasts with ERT as a sudden, unplanned, temporary practice (see Hodges et al., 2020). This led Stewart and colleagues (2023) to suggest that SRT was actually the dominant mode of remote practice rather than ERT since shifting contexts (e.g., having no prior experience and having ERT-based experience) created distinctly different stages underpinning practice. Further, since ERT evolved with changing conditions (Stewart et al., 2023), a crisis-based remote education model could similarly be structured in the form of progressive stages with corresponding interventions as prescribed in SLT.

SLT was first introduced in the late 1960s in the form of a life cycle of leadership practices and is a theory that has since been empirically investigated and developed for decades (Blanchard, 2010; Hersey & Blanchard, 1969; Thompson & Glasø, 2015). While SLT originates in the fields of organizational management and leadership, SLT has also been applied in education. Grow (1991) adapted SLT by creating a staged model of self-directed learning (SSDL), providing prescriptive interventions for educators to instruct students more effectively at different stages of learning ranging from novice to advanced. That is, the level of maturity needed to accomplish a particular task serves as the primary determinant of how an instructor should lead an individual learner (Graeff, 1983). For example, novice learners usually benefit more from direct interventions in which instructors provide direct instruction and feedback and act as a coach. By contrast, more experienced learners typically benefit from instructors serving as facilitators of learning through seminars, group projects, etc. However, SLT, and by extension other derivations such as SSDL, are not without limitations. Developing competency in a domain or role is not necessarily a linear, long/short, or predictable process; competency development is influenced by numerous external and internal variables, which can be unrelated to any specific intervention strategies (Thompson & Glasø, 2015). For example, a new employee may be an expert in their domain and not require direct interventions the way a new employee who is a novice would. Nevertheless, when the information required to complete even simple tasks or the number of tasks themselves becomes overwhelming, even direct instruction for basic knowledge/skills transfer can be ineffective (Meier, 2016).

In the context of COVID-19, the information and skills required to teach remotely overloaded institutions, educators, students, and caregivers (Alves et al., 2022; Lindner et al., 2021; Moore et al., 2021; Moorhouse & Kohnke, 2021). This was partially due to the initial lack of crisis-based remote teaching plans, institutional and personal experience, requisite technology skills, and competency to educate both effectively and remotely under duress (Holzmann-Littig et al., 2022; Moore et al., 2021; Shattuck, 2021; Stewart, Lowenthal et al., 2022; Tulaskar & Turunen, 2022). Thus, a staged, crisis-based remote education model has not only scholarly value but practical purpose (Cicha et al., 2022; Crutchfield & Eugene, 2022; Holzmann-Littig et al., 2022; Nikolopoulou & Kousloglou, 2022; Shiratori et al., 2022; Stewart, Lowenthal et al., 2022; Stewart et al., 2023). In order to develop our model, we examine COVID-19 literature over the short- (single learning terms), mid- (two sequential learning terms), and long-term (three + sequential learning terms).

## **MODEL BUILDING: AN OVERVIEW OF ERT LITERATURE**

### **SHORT-TERM STUDIES: SINGLE LEARNING TERMS**

Studies conducted on ERT are overwhelmingly short-term in nature, having been conducted predominantly during Spring 2020 (and to a lesser degree in Fall 2020). Many of these studies are discussed in one or more of the multiple literature reviews conducted on online learning and COVID-19 (see Adedoyin & Soykan, 2023; Bond, 2021; Bond et al., 2021; Dalpati et al., 2022; Dhawan, 2020; Laato et al., 2022; Stewart, 2021; Su et al., 2022). There are far too many of these studies (i.e., in the hundreds) to reference them individually. There are some studies (e.g., Alves et al., 2022; Obermeier et al., 2022; Olurinola & Adelana, 2022; Washburn, 2021), however, that were described as “longitudinal” by technically having multiple pieces of data collected throughout a single semester. There are also single-semester studies (e.g., Kotchetkov & Dockeray, 2022; Venaruzzo et al., 2022) that were conducted in the second year of the pandemic, offering a slightly different perspective on ERT yet too are limited in scope timewise. For this paper and model development, we classified all of these studies as short-term. Based on these studies, we present the following claims, grounds, and warrants.

#### **Claims**

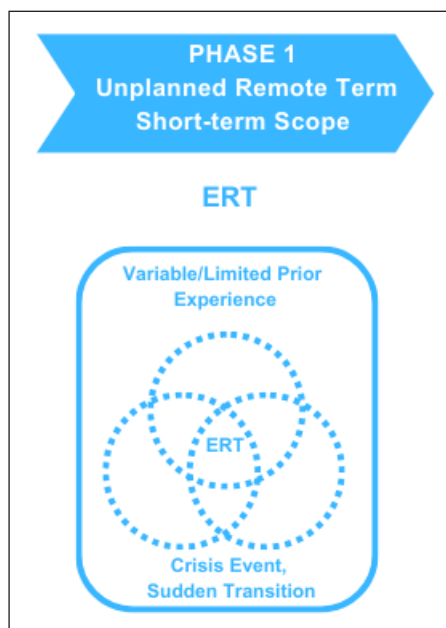
ERT is the first phase of crisis-based remote education and is characterized by five key components: (a) an initial crisis event, (b) a sudden transition to remote learning, and (c) different manifestations of remote teaching transitions, particularly in terms of (d) limited prior experience and (e) timing.

## Grounds

While the pandemic became global in nature, it did not begin as such. The novel coronavirus outbreak was first limited to China but quickly progressed into a regional epidemic in East Asia with an outbreak in Korea (see [Stewart & Lowenthal, 2021, 2022](#)). Knowledge of the outbreak and consequently different timings of ERT transitions had some degree of effect on how ERT manifested ([Petillion & McNeil, 2020](#)). For example, students might have already been oriented to courses if transitions occurred mid-semester, as in many Western countries, resulting in fewer negative experiences ([Van Heuvelen et al., 2020](#)). By contrast, countries in Asia with semester start dates in early March/April could delay their semesters for a few weeks and better prepare to a certain extent for a semester based on remote teaching from the very beginning ([Stewart & Lowenthal, 2022](#)). Moreover, countries with prior disease epidemic experience (e.g., SARS, MERS), such as Korea or Hong Kong, were more successful in transitioning to ERT than others, given past experiences, public awareness, and existing education-related epidemic policies ([Sangster et al., 2020](#)).

## Warrants

While the ERT experiences of this first remote learning term of the COVID-19 pandemic have been characterized as chaotic and frantic, a key underlying assumption is that there is a lack of preparation or relevant experience in terms of both remote teaching/technology and crisis response. As noted in the literature, this is not necessarily the case (see [Sangster et al., 2020](#); [Van Heuvelen et al., 2020](#)). Experience in this sense is limited rather than completely absent. Moreover, institutions outside of East Asia had advanced warning of what the COVID-19 epidemic in East Asia not only looked like but also of their initial responses thus the transitions to some degree could be planned for. Additionally, there was a general characterization that ERT experiences and outcomes are inherently negative and while this is accurate to an overwhelming degree ([Bond, 2021](#); [Stewart, 2021](#)), it is possible to have positive ERT experiences in terms of skill development or improved learning outcomes (see [Abdulrahim & Mabrouk, 2020](#); [Alqurshi, 2020](#); [Amin & Sundari, 2020](#); [Crick et al., 2020](#); [Choi et al., 2020](#); [Sepulveda-Escobar & Morrison, 2020](#)). ERT, ultimately, is the first stage of crisis-based remote education, given the necessity to transition delivery methods on short notice. It is also an experience and practice that is heterogeneous (see [Figure 1](#)).



**Figure 1** Phase 1: Emergency Remote Teaching (ERT).

## MID-TERM STUDIES: TWO SEQUENTIAL LEARNING TERMS

There have been substantially fewer studies that took a longitudinal/comparative approach despite COVID-19 still being pervasive globally through Fall 2020. We identified 21 studies that covered two consecutive terms (i.e., one traditional academic year) that investigated differences over time. We categorized these papers as mid-term though some of these studies

(e.g., Kraft et al., 2021; Olofsson et al., 2021; Sánchez-Cabrero et al., 2021; Wladis et al., 2021; Yee et al., 2022) coincidentally overlapped with the pandemic or were routine annual data collection points (e.g., Lindner et al., 2021; Shiratori et al., 2022) and were able to compare pre-COVID data with COVID data. For our analysis, we classified mid-term studies as having at least two data collection points during two sequential pandemic learning terms (i.e., Aparicio-Chueca et al., 2023; Azorín, 2020; Cobo-Rendon et al., 2021; Holzmann-Littig et al., 2022; Jandrić et al., 2021; Lobos et al., 2022; Moorhouse & Kohnke, 2021; Nabe-Nielsen, 2022; Nikolopoulou & Kousloglou, 2022; Oliveira et al., 2022; Tulaskar & Turunen, 2022; Stewart, Baek et al., 2022; Yagmur & Koksal, 2022). There were four “long-term” studies that ultimately had one pre-COVID and two COVID data points (see Garcia et al., 2021; Reuter et al., 2021; Sevimli, 2023; Whittaker & Pearson, 2021) that we ultimately considered as mid-term studies given our focus on longitudinal data only during COVID. Based on these studies, we present the following claims, grounds, and warrants.

## Claims

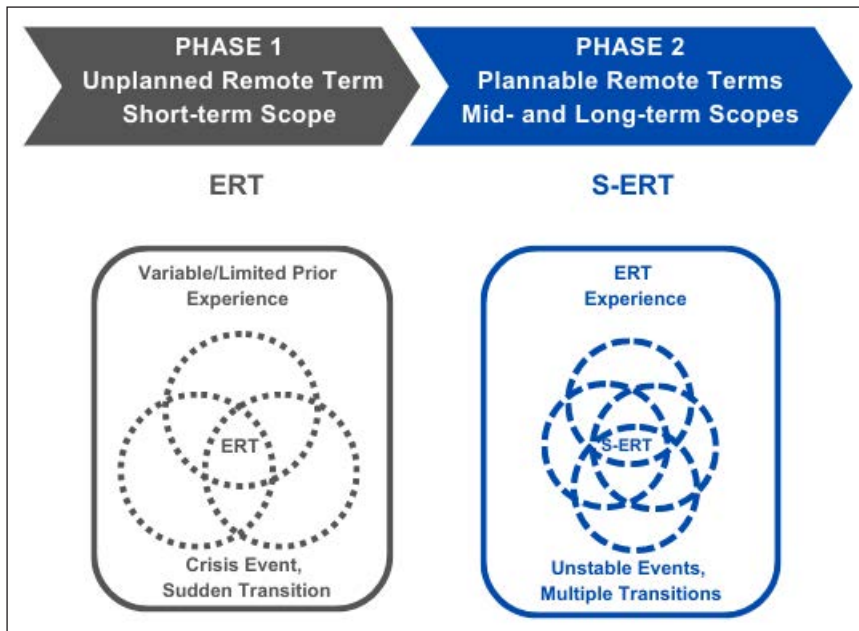
Another stage of crisis-based remote education is (a) Sustained-Emergency Remote Teaching (S-ERT), which, despite having time to plan and prepare for is characterized by (b) premature attempts at resuming regular residential education, (c) reliance on relatively chaotic and heterogeneous ERT practices, and (d) multiple remote teaching transitions within a single learning term.

## Grounds

Several main characteristics stand out from studies conducted longitudinally over two semesters. While it was understandable in the Spring of 2020 that there would be no clear objectives for how to transition to remote teaching or performance indicators for doing such under the duress of the pandemic, there were surprisingly few to none during the second (Moorhouse & Kohnke, 2021; Nikolopoulou & Kousloglou, 2022; Stewart, Baek et al., 2022). Evidence for this can be seen in relatively little (if any) improvement term over term, semester over semester (Moore et al., 2021; Stewart, Baek et al., 2022; Tulaskar & Turunen, 2022). Further, the trial-and-error approach to conducting courses remotely was not only stressful and challenging but unsustainable and unproductive (Alves et al., 2022; Lindner et al., 2021; Moore et al., 2021; Moorhouse & Kohnke, 2021). The second important characteristic that we noted was that although many institutions attempted to resume residential education practices in the Fall of 2020, many were forced to return to remote learning due to surges in COVID-19 cases and additional lockdowns (see Gitschthaler et al., 2022; Holzmann-Littig et al., 2022; Kavvas et al., 2022; Lindner et al., 2021; Oliveira et al., 2022; Stewart, Baek et al., 2022) just as they had during the Spring semester. Some institutions continued to delay the return of face-to-face courses or had complex (and confusing) plans for who could attend courses in person and when/where in relation to the degree of COVID cases at any given time (Stewart, Baek et al., 2022).

## Warrants

The absence of clear goals is likely a significant obstacle to performance change (Stewart, Baek et al., 2022). Based on the extended nature of remote teaching, Stewart et al. (2023) suggested that the dominant mode of remote delivery was, in fact, SRT rather than ERT. However, given the findings of studies showing a rebounding effect (i.e., several transitions in a single term based on worsening COVID conditions) during Fall 2020, a paradox emerges not only with an implicit assumption that ERT performance will improve over time but also that ERT will stabilize over time. During the second term of the pandemic, remote teaching ironically became more chaotic (see Aparicio-Chueca et al., 2023; Lindner et al., 2021; Lobos et al., 2022; Nabe-Nielsen, 2022; Oliveira et al., 2022; Stewart, Baek et al., 2022; Tulaskar & Turunen, 2022). Further, this is not to say that improvement is unable to occur (e.g., Alves et al., 2022), but that improvement was generally not the case. Moreover, the assumption that unplanned, limited prior relevant experience is still the default state of affairs is flawed since ERT now serves as the new baseline of experience compared to the initial transition in Spring 2020. These different contexts are illustrated in Figure 2. While S-ERT can be the second stage in sequence, it is not necessarily so.



**Figure 2** Phase 2: Sustained Emergency Remote Teaching (S-ERT).

### LONG-TERM STUDIES: THREE OR MORE SEQUENTIAL LEARNING TERMS

There are significantly fewer studies that occur over three or more learning terms (i.e., three consecutive semesters or 1.5 years or longer). This is due, in part, to the fact that residential face-to-face education had broadly resumed in many parts of the world as of early 2023. While we identified 14 studies that were long-term in nature collecting data over three or more semesters, four of these were comparing pre-COVID data with COVID data (see Garcia et al., 2021; Reuter et al., 2021; Sevimli, 2023; Whittaker & Pearson, 2021), leaving 10 long-term studies (e.g., Berger et al., 2021; Bettencourt et al., 2022; Cicha et al., 2022; Kavvadas et al., 2022; Myhre & Dewaele, 2022; Rogowska et al., 2021; Senior, 2022; Shiratori et al., 2022; Stracke et al., 2022) that spanned at least three consecutive semesters and in one case, four (see Stewart, Lowenthal et al., 2022). All of these studies documented little to no meaningful change over the long-term despite educators and students having experience with and the ability to plan for remote teaching, and institutions committing to the practice for consistency and stability. Based on these studies, we present the following claims, grounds, and warrants.

#### Claims

Another stage of crisis-based remote education is a) Sustained Remote Teaching (SRT), which reflects a) a stabilization in practice and which is characterized by b) commitment to consistent remote education, c) relatively standardized remote education practices and policies, and d) no delivery method transitions during learning terms.

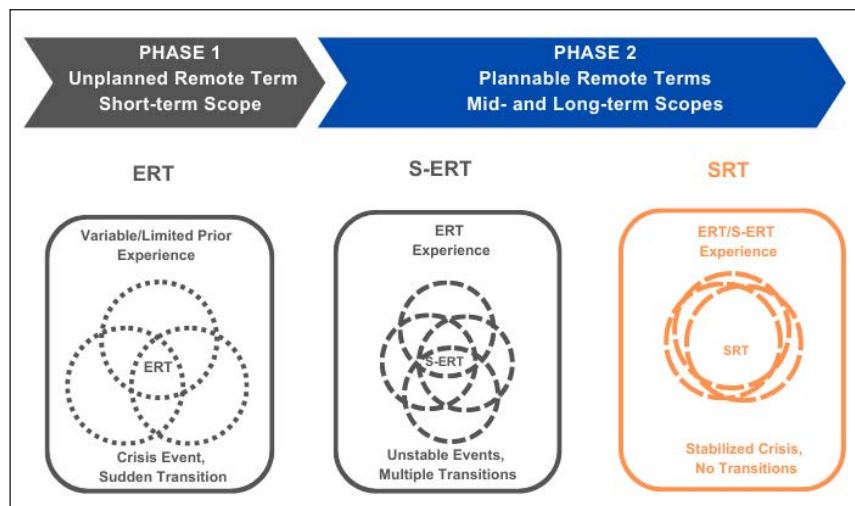
#### Grounds

If institutions commit to sustained remote teaching, consistency will likely bring stability, which should theoretically improve the experience and/or process of remote teaching (Senior, 2022). Consistency and stability, however, are not a proxy for improving learning outcomes (Stewart, Lowenthal et al., 2022) or improving student/faculty mental health, given the extended nature of stress and fatigue related to remote teaching under duress (Rogowska et al., 2021). The extended nature of SRT exacerbated worsening mental health due to extended confinement and lack of social interactions for many (Reuter et al., 2021; Rogowska et al., 2021; Sevimli, 2023) though remote teaching practices had stabilized to a significant extent.

#### Warrants

Long-term remote teaching often had negative effects on work/school life balance (Bettencourt et al., 2022). Thus, while maturity and stability in remote education can occur, this will not necessarily improve learning (or result in more “normal” learning outcomes) nor will it necessarily address the other negative effects (isolation, lack of social interactions) associated with ERT. Thus, there is a potential paradox where stability and maturity in practice

can address some educational issues, yet exacerbates others more closely related to the specific crisis context(s). While process stability can be achieved over the mid and/or long term, other inherently negative effects still require structure and support mechanisms (Berger et al., 2021). For example, student depression doubled over two years which was thought to be attributed to sleep loss for some (Shiratori et al., 2022). As noted by Rogowska et al. (2021), the continual waves of the pandemic acted like another negative feedback loop that exacerbated stress and other negative mental health factors, as well as difficulties adapting to repeated lockdowns (Whittaker & Pearson, 2021). Certain student demographics (e.g., female students, international students) were documented to be more vulnerable and more negatively affected than others (Ardissone et al., 2023; Kavvadas et al., 2022). Nevertheless, this more stable stage of remote teaching is illustrated in Figure 3.



**Figure 3** Phase 2: Sustained Remote Teaching (SRT).

## CHARACTERISTICS AND LOGICAL IMPLICATIONS OF MULTIPLE STAGES

In addition to our claims of multiple phases and specific stages (ERT, S-ERT, and SRT) of crisis-based remote education, we also posit the following claims based on the characteristics of these stages as well as the logical implications therein.

### Claims

Crisis-based remote education is a) not necessarily a linear process; there are (b) three general phases (unplanned short-term, plannable mid/long-term, post-crisis), (c) four possible pathways (short-, mid- [unstable and stabilizing], long-term) between the stages, (d) two general environmental states (unstable, stabilizing) and that (e) a post remote teaching stage is needed to institutionalize new practices for more effective practice, capacity, and resilience.

### Grounds

While a single stage of remote teaching should be theoretically “short” in nature, affecting a single learning term (such as a semester), the mid-term manifestations of crisis-based remote education can occur in two different sequences. The first is where ERT progresses to S-ERT due to premature attempts at returning to conventional educational delivery (Cicha et al., 2022). The second is where it is theoretically possible for ERT to transition directly to the stabilizing stage of SRT. Making this directly stabilizing path possible requires planning and commitment to remote education prior to the occurrence of a crisis, however. The four possible pathways are outlined in Table 1.

### Warrants

During the COVID-19 pandemic, however, the theoretical stabilizing mid-term stage did not occur for many (see Adedoyin & Soykan, 2023; Bond, 2021; Bond et al., 2021; Dalpati et al., 2022; Dhawan, 2020; Laato et al., 2022; Stewart, 2021; Su et al., 2022). Further, the longest possible pathway in terms of stages and scope was seen in various parts of the world where remote teaching extended over 1.5-2 years and slowly reached a more mature format (Berger et al., 2021; Bettencourt et al., 2022; Cicha et al., 2022; Kavvadas et al., 2022; Myhre & Dewaele,



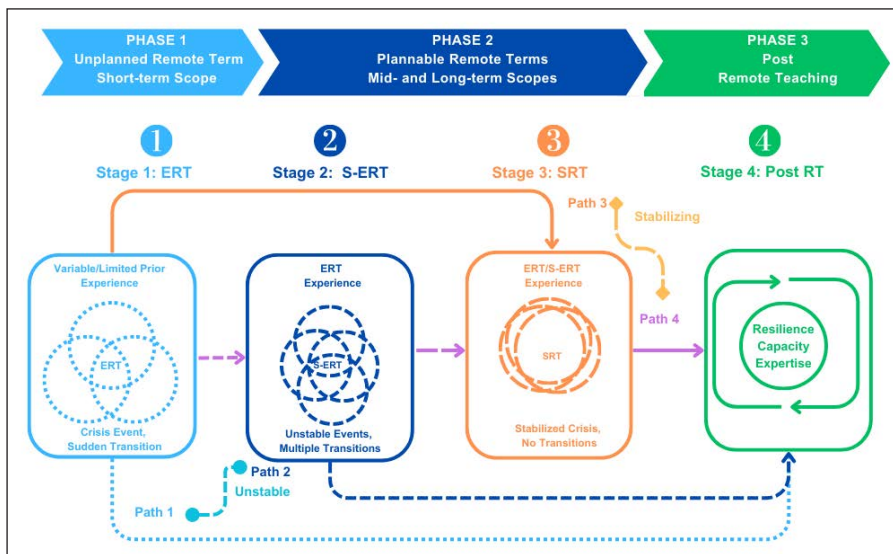
SCOPE	PATHWAYS	CHARACTERISTICS
Short term	ERT → Post RT	<b>Unstable</b> Unexpected, Minimal Planning, Major Transition
Mid term	ERT → S-ERT → Post RT	<b>Unstable</b> Expected, Plannable, Multiple Transitions
Mid/Long term	ERT → SRT → Post RT	<b>Stabilizing</b> Expected, Plannable, No Secondary Transitions, Strategic, Quicker
Long term	ERT → S-ERT → SRT → Post RT	<b>Stabilizing</b> Expected, Plannable, Multiple Transitions, Slower

**Table 1** Pathway Manifestations and Characteristics.

2022; Rogowska et al., 2021; Senior, 2022; Shiratori et al., 2022; Stracke et al., 2022; Stewart, Lowenthal et al., 2022). In light of these possible manifestations, we argue that it is apropos to make future remote delivery plans that strive for stability in the shortest amount of time possible. Such norms may even develop stability for truly short-term emergencies such as weather events to maintain education rather than simply close institutions and/or cancel courses (see Esnard et al., 2018; Montz et al., 2015).

### COMPREHENSIVE MODEL STRUCTURE AND CORRESPONDING STRATEGIES FOR BEST PRACTICE

Given our analysis and numerous claims, grounds, and warrants, we present our comprehensive model of crisis-based remote education in Figure 4. Not only are three key phases identifiable as differentiated by length (i.e., unplanned versus multiple possible plannable terms), but four key stages (ERT, S-ERT, SRT, Post RT) of remote teaching in addition to four possible pathways between them depending on which stages actually occur.



**Figure 4** Staged Crisis-based Remote Education Model.

Further, given that our model proposes different stages, there are also different strategies that can be employed when planning for and implementing remote education under crisis circumstances as outlined in SLT/SSDL (Grow, 1991). While by no means exhaustive, we present several salient strategies for evidence-based best practices corresponding with each respective stage in Table 2.

We argue, ultimately, that institutional plans should be established for remote education which target a stabilizing path (i.e., ERT → SRT → Post RT) over the mid- or long-term as planning and consistency should yield better experiences and outcomes (Senior, 2022) compared to the experiences largely had throughout the pandemic. Of course, analogous protocols do exist such as fire, tornado, earthquake drills, etc., though such events are usually singular and short. Integrating crisis-based remote education plans and protocols with contingencies for short-, mid-, and long-term events should also enable and develop institutional familiarity, experience, and resiliency. These latter characteristics were fundamentally absent at the beginning of the

STAGE	EDUCATOR ROLES	GOALS AND STRATEGIES
ERT	First Responder	Transition assistance: <ul style="list-style-type: none"> <li>• Simplify/unify delivery methods (Stewart &amp; Lowenthal, 2021, 2022)</li> <li>• Clearly communicate and articulate plans with all stakeholders (Armstrong et al., 2022)</li> <li>• Adjust attendance/assessment policies given sudden changes in learning conditions (Petillion &amp; McNeil, 2020)</li> <li>• Balance course delivery modes (Cobo-Rendon et al., 2021)</li> <li>• Consider variable educational venues such as outdoors/open spaces (Myhre &amp; Dewaele, 2022)</li> </ul>
S-ERT	Guidance Provider	Teaching improvement: <ul style="list-style-type: none"> <li>• Improve delivery methods and increase scope of tools (Khan et al., 2022)</li> <li>• Refine educational processes (Fuchs, 2022)</li> <li>• Set goals for Post-RT or SRT transition (Kotchetkov &amp; Dockeray, 2022)</li> </ul>
SRT	Practice Stabilizer	Practice consistency: <ul style="list-style-type: none"> <li>• Use consistent delivery methods and tools (Mostafa et al., 2022)</li> <li>• Introduce revised attendance and evaluation policies (Sánchez-Cabrero et al., 2021)</li> <li>• Plan for long-term adjustments (Stewart, Lowenthal et al., 2022)</li> </ul>
Post RT	Policy and Protocol Developer	Resilience and capacity building: <ul style="list-style-type: none"> <li>• Develop protocols for future crises (Cicha et al., 2022)</li> <li>• Implement protocols that foster resilience in crisis necessitated practices (English et al., 2022)</li> <li>• Implement ongoing practices that develop institutional capacity for crisis response (Crutchfield &amp; Eugene, 2022)</li> </ul>

**Table 2** Stages, Educator Roles, and Strategies for Crisis-based Remote Education.

COVID-19 pandemic for the overwhelming majority of educational institutions worldwide. In short, remote education can serve as a strategic response to crises given appropriate planning and forethought. For example, educational institutions can plan in advance for a unified course delivery method as prescribed in the ERT Stage for low stakes emergencies (i.e., weather events) building a foundation of experience and skill. Further, longer-term SRT policies, standardized delivery tools, technology training, modified assessment practices, response leadership and team structures, etc. can be developed and introduced into current and ongoing professional development so that educators are much better prepared and equipped for longer term emergencies. This would enable a strategic response at the onset of a crisis rather than building one from scratch under pressure and duress. Our proposed model can also be used as an assessment tool in terms of the duration of an emergency and how to respond in kind, or similarly make multiple contingency plans should a theoretically short crisis event transform into one that is significantly longer than anticipated as was the case with COVID-19.

## CONCLUSION

Distance education is a practice requiring a specialized knowledge, experience, and skill set that non-specialists understandably lacked when the COVID-19 pandemic began. However, despite the prolonged nature of the pandemic, knowledge, skills, and experience generally did not improve. Rather than accept a subpar performance standard and/or forget many valuable lessons that were hard-learned throughout the pandemic, quality education can be maintained regardless of whether the emergency is short or long by proactively establishing and implementing remote education plans. Making such plans requires an understanding of the potential ways in which educational responses can unfold in an emergency as theorized in our model, as well as establishing clear objectives and general prescriptions for progression and process improvement. At present, the lasting effects of learning losses and educational deferments from COVID-19 are not yet fully understood. In the wake of the pandemic, we need to be proactive while looking ahead and in planning for responsiveness and resiliency rather than simply hoping for the best during the next crisis in an increasingly interconnected and interdependent world. Further, while the literature shows a diversity of pandemic responses given the rush to deliver courses remotely, it also shows a predominantly one-size-fits-all approach that created new problems in addition to the expected subpar educational performance and learning outcomes. Moreover, while ERT was employed as a crisis response

in the pandemic, there are pragmatic and strategic uses of remote teaching that could be normalized into conventional education practices that have generally not been considered to date. Although our analysis, model, suggestions, and conclusions are built on a relatively large number of studies, we recognize that the studies reflected here are still by no means exhaustive. Further, we also understand that some of the salient strategies suggested (as modeled after STL) will not be comprehensive or inclusive enough of nearly infinite contextual/situational variations. Thus, how our model is interpreted and/or applied should be done so with proper care, and more importantly, modified where appropriate and as needed. Further, in terms of future research on remote teaching, there are numerous avenues. While it is difficult to predict the next crisis that necessitates the praxis on a local, regional, or global scale, research could approximate the validity of the model's pathways/stages via a meta-analysis to determine if the stabilizing pathways result in better (or least bad) outcomes. Results from such an investigation could be used to revise/develop/refine the model further. Additionally, since remote teaching can be implemented strategically in low stakes educational situations, best practices for short-term remote teaching can be developed and empirically investigated when the stakes are low. After all, the question of whether remote teaching will be needed again is not one of if but rather when. Thus, we are optimistic that our model will provide much-needed structure and guidance for building institutional resilience in any future crisis, regardless of how large, small, short, or long.

## COMPETING INTERESTS

The authors have no competing interests to declare.

## AUTHOR CONTRIBUTIONS (CREDIT)

Conceptualization, W.H.S.; methodology, W.H.S.; formal analysis, W.H.S. and P.R.L.; writing—original draft preparation, W.H.S. and P.R.L.; writing—review and editing, W.H.S. and P.R.L.; visualization, W.H.S. and P.R.L.; All authors have read and agreed to the published version of the manuscript.

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