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A Synthesis of Research on Mental Health and Remote Learning: How Pandemic Grief Haunts Claims of Causality

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Abstract

While there has been a lot of debate over the impact of online and remote learning on mental health and well-being, there has been no systematic syntheses or reviews of the research on this particular issue. In this paper, we review the research on the relationship between mental health/well-being and online or remote learning. Our review shows that little scholarship existed prior to 2020 with most studies conducted during the COVID-19 pandemic. We report four findings: (1) pandemic effects are not well-controlled in most studies; (2) studies present a very mixed picture, with variability around how mental health and well-being are measured and how/whether any causal inferences are made in relation to online and remote learning, (3) there are some indications that certain populations of students may struggle more in an online context, and (4) research that does not assume a direct relationship between mental health and online provides the best insight into both confounding factors and possible strategies to address mental health concerns. Our review shows that 75.5% of published research on this topic either commits the *correlation does not equal causation* error or asserts a causal relationship even when it fails to establish correlations. Based on this study, we suggest that researchers, policymakers, practitioners, and administrators exercise extreme caution around making generalizable assertions with respect to the impacts of online/remote learning and mental health. We encourage further research to better understand effects on specific learner sub-populations and on course—and institution—level strategies to support mental health.

Keywords: mental health, online learning, remote education, anxiety, stress, well-being, wellness

Introduction

As a result of the COVID-19 pandemic, the preponderance of school and university students switched from a predominantly in-person educational experience to remote forms of teaching and learning. Concomitantly, student struggles with mental health and well-being have been a common concern (e.g., Houlden & Veletsianos, 2022; Clabaugh et al., 2021; Gillis & Krull, 2020; Islam et al., 2020). The co-existence of these two phenomena has led many to wonder whether there is a link between remote education and student mental health. Does such a relationship exist? More importantly, is remote education a contributing factor to declines in student mental health?

This study is motivated by widespread assertions that we observed in the public sphere that remote learning is detrimental to the mental health and well-being of learners. It has also been claimed that the existence of such a relationship should outweigh other health and safety concerns in policy and decision making. Many of these claims seem to be based on anecdotal observations, reports in public media, isolated research studies, isolated evaluation reports, or pure speculation. To date there are no comprehensive studies, systematic reviews, or systematic syntheses of the research on the relationship between online or remote learning and learner mental health and well-being. In the course of conducting this study, an investigation by Viner et al. (2022) reviewed the research on the relationship between school closures during COVID-19 lockdowns and mental health. However, they did not examine the role of online learning in their study, mentioning in passing that online learning may have a mitigating effect on some harms that resulted from school closures but noting that their data did not allow them to examine this question and suggesting this is an important area for further investigation. Motivated by our inability to identify systematic analyses that investigate this topic, we engaged in a systematic approach to uncover and synthesize evidence that speaks to remote and online learning as it relates to mental health. Our analyses answer the following questions:

- Is there a larger body of research?

- What does that body of research have to say?

- Are there any methodological issues that should be accounted for?

We tackle this topic by first reviewing relevant literature. Next, we present our methods and results. We end this paper by discussing our findings and their implications.

Context and Review of Relevant Literature

Since the COVID-19 pandemic much has been written in the popular press about the impact of remote learning on learners' mental health. Highly publicized articles include Malesic (2022) and Oster (2022), for example, with the latter noting that since most students are vaccinated remote education is "a mistake [as it not only] reflects an outmoded level of caution [it also] represents a failure of universities to protect their students' interests" (Oster, 2022, para. 2). Oster argued that remote learning represented an "abdication of universities' responsibility to educate students and protect all aspects of their health" (para. 6). As students suffer from isolation and loneliness, Oster claims that "it's difficult not to make the connection" with remote learning (para. 7). Hodges et al. (2020) have argued that the rush to online learning during the pandemic is better described as "emergency remote teaching" as opposed to online learning because educators were given so little time to adequately prepare quality online learning experiences.

Instruction delivered during school closures, they argue, was akin to temporary housing provided to residents displaced because of a natural disaster. Comparing emergency remote teaching to carefully designed online learning or face-to-face learning is like comparing the cot at a Red Cross shelter to one's own bed at home. Additionally, a robust body of research on the efficacy of online learning already exists, replete with meta-analyses demonstrating there is no significant difference in learning outcomes between online learning and face-to-face (Bernard et al., 2004; Bernard et al., 2009; Clark & Mayer, 2011; Means et al., 2014; US Department of Education, 2010; Zhao et al., 2005). Failures to acknowledge the difference between routine instruction and emergency measures, the existing body of research on online learning, and the confounding context of the pandemic itself cast doubts on claims about the relationship between online or remote teaching and mental health.

Oster's (2022) arguments are representative of the ways in which the relationship between student mental health and remote forms of learning has been portrayed. Public policy officials have also made similar arguments. For instance, in a letter dated December 2021 to the Presidents of post-secondary institutions in British Columbia, the provincial health officer noted:

> The previous move to online post-secondary education in 2020 and 2021 was associated with *significant negative consequences for post-secondary students* [emphasis in original], who reported significantly poorer and worsening mental health and greater negative economic impacts than other British Columbians [and that] moving to online instruction can be … detrimental to the mental health and wellbeing of students. (Government of British Columbia, 2022, pp. 3, 22)

The text in italics was hyperlinked to a report authored by Sami et al. (2021) for the province's Center for Disease Control. The report identified mental health as a growing concern and, for our purposes here, it explicitly identified youth and learners as people disproportionately affected. Nonetheless, the data upon which these assertions were made seem to be grounded on mental health comparisons before and after the pandemic, without isolating the role of remote learning in this relationship. In particular, Sami et al. (2021) noted: "Canadian students pursuing graduate studies (*n* = 1,431) reported increased anxiety, depression, feelings of helplessness, loneliness, or being overwhelmed compared to before the pandemic, with most (72%) attributing these feelings to COVID-19" rather than remote learning per se (p. 22). To be clear, Canadian students, like students around the world, reported declining mental health. For instance, in a study which synthesized 21 surveys examining the impacts of COVID-19 and emergency remote learning on approximately 155,000 post-secondary Canadian students, researchers found that mental health and well-being was a significant concern for students (Houlden & Veletsianos, 2022). Nonetheless, the research assessing the source of those concerns does not appear to unequivocally attribute them to remote learning.

Beyond discussions in the popular media, prior to the COVID-19 pandemic there existed a large body of literature that examined isolation and loneliness in distance education, but a dearth of literature investigating mental health and well-being. The literature on online and distance learning noted that isolation and loneliness were a major concern (e.g., Glusha, 1997), highlighting that such feelings resulted from a confluence of factors–and often identifying strategies to address them, including developing opportunities for meaningful instructor-learner, learner-peer, and learner-institution interactions (e.g., Croft et al., 2010; Jones et al., 2019; Shin,

2003). The literature examining mental health with respect to online and distance learning is scant, and while this gap in the research had been identified nearly a decade ago (Thompson & Porto, 2014) it has not yet been extensively addressed. Thompson and Porto, as well as Scheer and Lockee (2003), highlighted the need to provide wellness resources and support (including mental health) for online and distance learners. While other studies focused on issues related to mental health, we were unable to identify efforts in the literature that synthesized or investigated the topic in a systematic manner. For example, we identified studies that showed that distance education learners with mental health difficulties had lower completion rates, but not lower grades (Richardson, 2015). Further, some studies reported that some doctoral students were aware of their wellness needs but had little time available for self-care and wellness (Lynch et al., 2020); and that beyond the online environment, distance learners' mental health is also impacted by work and family conflicts (Waterhouse et al., 2020).

Still, it is difficult to isolate whether declines in student mental health and well-being are due to the online environment, a confluence of factors, or an interaction of factors. In their study on mental health impacts of COVID-19 on undergraduate social work students, Apgar and Cadmus (2022) noted that "even before COVID-19, stress was on the rise among young adults" (p. 56). In 2018, Burwell wrote about the on-campus mental health crisis in higher education in the United States, citing statistics from a study conducted by the Healthy Minds Network (2017) which indicated increases in reported symptoms of depression or anxiety and suicidal ideation. The disproportionately high levels of stress for college students in particular has been documented for some time (Hirsch et al., 2019; Lepping et al., 2016). Common contributors to stress include financial worries, fears about the future, pressure from school work and load, and transitioning to new environments away from support systems (Shi, 2019). Echoing similar themes as Apgar and Cadmus (2022), other studies of mental health during the pandemic also similarly noted that on-campus students were experiencing declining mental health and quality of life. As a few examples, Amerson et al. (2021) described this phenomenon in nursing programs, Ehmke et al. (2022) focused on women in agricultural science programs, and Gusman et al. (2021) explored a general undergraduate population. In light of the pre-pandemic evidence of a growing problem with mental health and well-being for on-campus, in-person learners, it is reasonable to infer that there are significant factors besides learning modality that impact student mental health. To that end, we agree with Oster (2022) in that universities have a "responsibility to educate students and protect all aspects of their health" (para. 6). One significant step towards this direction is by establishing–rather than conjecturing–whether or not remote education contributes to declines to student mental health.

Given the dearth of literature, the significance of mental health, the claims being made about the relationship between online learning and mental health, the lack of direct empirical evidence to guide data-informed decision-making, and the scholarly and practical implications of a direct relationship between mental health and remote learning, a synthesis of the evidence surrounding mental health and remote learning during the pandemic is imperative.

Methodology

The purpose of this study was to investigate what was known from the existing research literature about the relationship between remote learning and mental health during the pandemic. Fink (2014) advised researchers that when conducting a review of the literature, they should "systematically examine all sources and describe and justify what you have done… [thus

enabling] someone else to reproduce your methods and determine objectively whether to accept the results of the review" (p. 14). In keeping with this advice, we used *Google Scholar* as the main search engine to identify possible literature for inclusion in the study. Prior to searching, we each created a library link to our respective institutions. "Library links are article-level links to subscription full text for patrons affiliated with a library" (Google Scholar, n.d., para. 3), which meant that in addition to public open access material, *Google Scholar* was able to identify full text options for any database that the libraries of our three institutions had subscribed to. Additionally, we also used a variety of popular media and social media references from their own personal networks to identify potential literature.

We searched using a variety of terms related to remote learning (e.g., distance learning, online learning, virtual learning, cyber learning, emergency remote learning, distributed learning, hybrid learning, virtual schooling, cyber schooling, correspondence education, concurrent teaching, co-seating, co-locating, etc.) and mental health (e.g., depression, anxiety, stress, psychological health, emotional health, well-being, etc.). The search of the literature occurred from January through April 2022. Inclusion criteria were the following: items focused on student mental health in an online learning context and items which were empirical. Through this search process, we identified 63 documents which fit our initial inclusion criteria.

These 63 items were placed into three groups (see Appendix A for the codebook), and each of us were responsible for coding two of the three groups (i.e., researcher 1 coded groups A and B, researcher 2 coded groups B and C, and researcher 3 coded groups A and C). This overlap meant that each item was coded by two researchers. We did so to be able to reduce the incidence of bias arising when items are coded by a single person, as well as to establish inter-rater reliability (Denzin, 1978). In cases where the two of us disagreed, the third person reviewed the paper and codes, and resolved the disagreement. Coding categories included setting or context for the study, methodology, findings, and quality. Coding for setting or context included three main sub-categories: setting (i.e., K-12, higher education, both, or other); study location (i.e., country, open-ended); and a yes/no question on whether the pandemic was also part of the context for the study. Coding for methodology included sub-categories of quantitative, qualitative, mixed methods, and *other* along with a summary of the methodology. Categories for coding the findings included: negative impacts, positive impacts, or mixed impacts, while coding for the role of remote learning included: sole focus; individual variable; one of many variables, not isolated; and no specific focus. Coding for quality categorized articles into those with no methodological concerns, those that infer or assert causation but only establish correlation, those that infer or assert causation but do not establish even correlation, and other methodological issues (e.g. media comparison studies).

This coding process generated 1008 individual codes. Inter-rater reliability was calculated at 97.8% of the codes based on the initial coding. Through the process of coding, it was determined that 18 articles did not fit the inclusion criteria and, in particular, were not research studies. These articles included opinion pieces, summaries of other's research, summaries of conference papers, and other pieces that were not empirical studies. As a result, the final corpus of research studies included and analyzed in this investigation is 45.

In addition to systematically coding and categorizing these articles, we identified preliminary themes that might characterize this literature qualitatively through discussion and reflection of

our understanding of the broader online learning literature. Heyvaert et al. (2017) suggested that a mixed methods approach for research synthesis and literature reviews aids the systematic review process in not simply summarizing the state of current research but providing an insightful synthesis.

Results

Selected research studies represent research around the world. In addition, the research we reviewed includes a range of participants from children in primary and secondary education to university students. Some studies focus generally on the impact of the pandemic on learner mental health and well-being with passing mention of online/remote learning, while others aim to examine the relationship more directly. Some studies focus on specific learner sub-populations, such as learners with attention-deficit/hyperactivity disorder (ADHD) or high self-efficacy for computer use, while most studies do not control for demographic variables beyond age. Additionally, while some studies identify negative effects on mental health and well-being, many others note positive impacts or changes during the pandemic, and still others report mixed findings.

Preliminary themes from the literature appear to be consistent with broader trends in online learning research over the past few decades. The quality of the research study and methodology varies greatly. Any studies that employ a variation of "media comparison" methodology risk over-simplification of confounding variables that may better explain or account for differences in outcomes. Additionally, some studies suggest that design decisions around how online/remote learning is designed, and delivered, matter and may mitigate any potential negative impacts or even yield more benefits compared to traditional in-person solutions. In the studies we reviewed, there is substantial evidence suggesting that no sweeping assertions or claims may be made one way or another with respect to mental health and remote learning.

Context

The studies selected for inclusion in our review were primarily situated in higher education (55.6%) and K-12 (33.3%) (Table 1). One study examined a mixed population of higher education and K-12, and four were categorized as "other." These four studies focused on parents, families, or entire communities.

Table 1

Study setting

Setting	Number of studies
Higher Ed	25
K-12	15
Both	1
Other (e.g., parents, families, or communities)	4

Although nearly 50% of studies were situated in the United States, the remaining 50% represent findings across 18 other countries (see Table 2). Interpreting this literature in diverse global

contexts requires care, as the literature is dominated by Western contexts as well as the English-speaking world.

Table 2

Study location by country

Country	Number of studies
United States	22
China	3
Canada (2), India (2), Malaysia (2), Philippines (2)	8
Australia (1), Bangladesh (1), Brunei (1), Ecuador (1), Greece (1), Ireland (1), Japan (1), Jordan (1), Kazakhstan (1), Switzerland (1), United Kingdom (1)	11
Global	1

As to whether the study was specifically focused on mental health and online learning during the context of the pandemic, the vast majority were specifically situated in the pandemic context (see Table 3).

Table 3

Was the pandemic the context for the study?

Pandemic as context	Number of studies
Yes	43
Both before and after	1
No	1

Only two studies did not originate during the pandemic, one of which happened to start in Fall 2019 and continued into Spring 2020 as the pandemic unfolded. This context is important for interpretation of results, as the pandemic and its effects are persistent confounding variables throughout nearly all studies on the relationship between mental health and online learning.

Methodology

Of the studies selected for inclusion, the vast majority were either quantitative (64.4%) or mixed methods (28.9%). Significantly, a quantitative orientation was the primary method of investigation in the mixed methods studies, where qualitative efforts centered on the inclusions of some open-ended qualitative items in surveys and questionnaires (see Table 4). The dominant data collection method used was surveys or questionnaires using self-report as the means for gathering data. Most studies reported descriptive statistics, and some included correlation analyses.

Table 4

Type of methodology used for the study

Type of methodology	Number of items
Quantitative	29
Qualitative	3
Mixed	13
Other	0

Several significant issues were observed in the methodologies used in these studies. First, "online learning" was rarely defined and often measured using participant interpretation of "online learning" and self-reported perceptions and satisfaction scales. No studies attempted to identify or control for characteristics of the online learning experience, such as degree and types of interaction, that are well-established factors in the efficacy of online learning (Bernard et al., 2009; Clark & Mayer, 2011; Means et al., 2014; U.S. Department of Education, 2010; Shin, 2003; Zhao et al., 2005). Second, establishing causality requires the use of certain statistical methods such as controlled experiments, structural equation modeling, or controlled pre-post testing. None of these methods were used in any of the studies. Of the 45 studies analyzed, very few used regression analyses. Of those that conducted a regression analysis, online or remote learning was not identified as a significant contributing variable to student mental health.

Study Findings

The findings in these 45 studies indicated a mix of impacts. Of these papers, 53.3% reported negative impacts, 8.9% reported positive impacts, 35.6% reported mixed impacts, and 2.2% reported no impact (see Table 5). We urge careful interpretation and further probing of these summary findings in the context of methodological issues (reported above) and quality concerns (reported below).

Table 5

Did online learning have an impact on mental health in the study?

Type of impact	Number of items
Positive impacts	4
Negative impacts	24
Mixed impacts	16
No impact	1

As the studies treated the role of remote/online learning in different ways, we sought to categorize them based on this hypothesized role in mental health. Of the 45 included studies, 11% focused on online learning as the sole variable, 31% treated online learning as an individual and discrete variable, 35.5% treated online learning as one of many variables but did not isolate it from other variables in the study, and 22.2% discussed online learning but did not treat it as a primary focus or variable (see Table 6).

Table 6

Was online learning the only variable or were other variables considered?

Type of impact	Number of items
Online learning was the sole focus	5
Online learning was individual and discrete variable	14
Online learning was one of many variables and was not isolated	16
Online learning was not a specific focus	10

Based on how few studies carefully defined and controlled for online learning or considered other confounding variables in their studies, we urge further caution in interpreting the findings on impacts.

Quality

In addition to methodology and treatment of online learning as a variable, we coded each article for its quality evaluating whether we observed any methodological issues (see Table 7). Of the 45 included articles, 20% raised no quality concerns. The rest raised quality concerns: 44.4% established a correlation between online learning and mental health, but concluded that a causal relationship existed; 31.1% did not establish correlation between online learning and mental health and yet still concluded a causal relationship existed; the remaining 4.4% exhibited other methodological issues (e.g., Prokes & Housel (2021) acknowledged that there were no questions in their instrument related to mental health, but still reported findings related to student perceptions of their own mental health based on the authors' beliefs). Of the 45 included studies therefore, a full three-quarters of the studies (75.5%) committed a questionable-cause logical fallacy, violating a basic tenet of research fundamentals that correlation does not equal causation, with a significant portion of those failing to even establish a correlation. This presents a significant cause for concern both for online learning and mental health research as well as any policy or decision-making that cites this research as a basis.

Table 7

Methodological concerns

Type of impact	Number of items
No quality concerns	9
The study inferred causation, but only established correlation	20
The study inferred causation, but did not establish correlation	14
Other methodological issues	2

Of the nine studies with no quality concerns (i.e., Apgar & Cadmus, 2022; Becker et al., 2020; Goldberg et al., 2022; Halliburton et al., 2021; Lischer et al., 2021; Lister et al., 2021; Perkins et al., 2021; Racine et al., 2021; Schaffer et al., 2021), six were in the United States, one in the United Kingdom, one in Switzerland, and one was global. Three were conducted in the K-12 context, four in the higher education context, and two in other contexts. Four employed mixed

methods, another four employed quantitative methods, and one was qualitative. Findings across these nine studies were mixed in aggregate, with four indicating negative impacts, four indicating mixed impacts, and one indicating positive impacts. Of these studies, one was conducted before the pandemic and the other eight were focused on the pandemic as the context. In four of these studies, remote learning was not a specific focus; in three of the studies, it was one among many variables not carefully isolated; and in two studies, online learning was an individual variable. Some of the authors of these studies were also careful to note that they were unable to control and identify confounding factors, that causal inferences cannot be made from surveys alone, and that all data was self-reported, introducing reliability and validity limitations.

Discussion

While many of the studies included in our review and synthesis were situated in the context of the COVID-19 pandemic, it was clear from these same studies that significant stress for students pre-dated the pandemic or any shifts to online and/or remote learning. Such concerns were increasing before shifts to online/remote learning (Burwell, 2018). This finding was evidenced by a number of literature reviews in the 45 articles that documented prior levels of stress generally or mental health issues more specifically, including depression, anxiety, suicidal ideation, difficulty sleeping, and other forms or indicators of mental health challenges. Studies included in this review documented both general trends of mental health declines for on-campus students predating the pandemic, in higher education in particular (Healthy Minds Network, 2017), as well as specific trends among students in specific disciplines (e.g., Apgar & Cadmus, 2021). Research that predated the pandemic identified factors impacting mental health, such as financial worries, fears about the future, pressure from school work and load, and transitioning to new environments away from support systems (Shi, 2019).

Furthermore, observations since teaching and learning have returned to the in-person classroom have documented persistent issues with student disengagement and disconnection. One author described students as 'checked out' and 'stressed out,' with reports of significant percentages of students not showing up for class or completing any of the assignments (McMurtrie, 2022a, 2022b). Another author observed that many students appeared to be suffering from cognitive overload and also something deeper, attributing detachment and disconnection to failure to establish productive relationships and failure to help students see the relevance of their learning (Mintz, 2022). While these issues are classic motivational challenges in education, there is a sense that the pandemic has profoundly aggravated them. As we reviewed the literature, a clear theme that permeated accounts and descriptions–but that was not identified directly except in a few instances–was a sense of grief. Commonly-cited factors for mental health impacts across the 45 studies included loneliness, isolation, physical distancing, quarantine, intangible losses, loss of and grief for loved ones, psychological impacts of how the pandemic was being handled by local and state- or federal-level leaders, worry about one's own health or that of loved ones (reported especially by women and those in jobs considered 'essential workers'), and managing their own illnesses and symptoms (e.g. Biber et al., 2020). Intangible losses reported by participants across studies included the loss of daily routines, changes to eating and sleeping habits, and changes to exercise habits and routines–all of which were also coping mechanisms for managing stress, so disruption to these routines also disrupted individuals' abilities to cope (e.g. Apgar & Cadmus, 2021). Still others identified factors that accounted for negative mental health impacts such as long periods of quarantine, fears of infection, frustration, boredom, inadequate supplies, inadequate information, and stigma (Li et

al., 2020). These studies provide insight into the range of variables that impact mental health and confound simplistic study designs seeking to establish the relationship between online learning and mental health. We suggest that these studies are able to provide more meaningful insights into root causes–and therefore into possible solutions.

The disproportional impacts of the pandemic have been well documents in the broader literature. Preliminary patterns in the studies analyzed in this paper suggest that certain learner groups struggled significantly with online learning during the pandemic. Specifically, learners with ADHD, learners with severe anxiety (but not mild or moderate), and learners with severe depression (but not mild or moderate) experienced significant difficulties with online learning and increased mental health needs as a result of the pivot to online learning (Becker et al., 2020). The data also suggested that the disproportional effects of the pandemic across demographic lines are also reflected in remote/online learning. Individuals disproportionately impacted by the pandemic also struggled more with online learning, especially women, minorities or students of color, and students from a lower socio-economic status. However, the data for these demographics suggested that online learning was not a root cause–it was another way in which existing inequities were manifested. In other words, our analysis of this literature suggests that the inequities that are present in our broader world are reflected in online/remote learning settings. For example, Ehmke et al. (2022) observed that as individuals' reported experiences with discrimination decreased, so did their mental health and their perceptions of online learning. They also observed the inverse, that women who experienced less or no discrimination did not experience a decline in mental health and also had more positive views of online learning. Becker et al. (2020) studied adolescents with and without ADHD and found that "ADHD significantly moderated the associations between positive and negative effects and adolescent remote learning difficulties" (p. 772). However, they also noted that "only 59% of school services that were being received before COVID were maintained during remote learning" with only 35% continuing to receive school counseling and 39% continuing to receive tutoring (p. 771). Additionally, a full 25% of families in their study did not receive any materials to support remote learning. As we have not aggregated the data across these studies to calculate effect sizes by group, we should underscore that this is a trend we believe we are observing in the data but are unable to verify statistically the effects of remote learning on certain sub-groups of learners. When these factors are not controlled for, any effects may wash out as mixed or no significant effect. The data from studies that did control for these factors suggested that some between-group differences may be significant (see for example Arain et al., 2021; Becker et al., 2020; Biber et al., 2020; Hawrilenko et al., 2021), but further studies are warranted along with careful consideration of services and supports that students in these sub-groups do or do not receive as part of a more comprehensive remote learning solution.

We also repeatedly observed survey results showing that a majority of students reported positive views of online learning. In some studies, students also reported lower stress after the move to online/remote learning. For example, in Gusman et al. (2021) – the study that spanned both pre- and post-pandemic – students reported increasing stress levels in Fall 2019, but then decreased stress in Spring 2020 after the university moved to online. In this same study, students also reported that their sleep quality improved significantly and sleep duration increased significantly after the move to online learning. The authors did observe increases in stress and decreases in sleep quality in some sub-populations, and perceptions of stress were correlated with socioeconomic status and specific living situations. In Chaturvedi et al. (2021),

62% of respondents rated their online learning experiences as average or excellent, and this rate varied by age groups: the 18-22 age group in their study had a higher rate of dissatisfaction than the 7-17 age group. Their survey results also showed a correlation between limited time and interactions online significantly affected satisfaction, again underscoring existing research that designing for interactions online (with content, with other students, and with the instructor) is essential. Idris et al. (2021) similarly reported that a majority of students in their survey had positive views of online learning, with students summarizing benefits and detriments of both online and in-person learning. Taken together, the data across these 45 studies suggested that students largely had either neutral or positive views of online learning and that a minority subset of students struggled with the emergency remote learning context.

Limitations and Future Research

It is important to note that this study faces a number of limitations. First, this study represents a snapshot in time in a rapidly changing field of interest, and as new research is conducted, this study ought not be taken as the final word on the topic. For instance, prior to publication a study by Gellish et al. (in press) came to our attention which examines differences in student stress levels between modalities, suggesting stronger stress responses in an in-person setting, and this study isn't included in our analysis. Readers ought to consider our study as analyzing the body of evidence that was available to us at the time of investigation. The data range for our articles search is provided in our methodology section. We hope that this limitation is taken seriously by other researchers and motivates others to not only expand upon the research presented here, but also to conduct further systematic analyses and syntheses as more evidence is uncovered. Second, this study is unable to speak to any particular context, as contexts vary significantly–sometimes within the same school, let alone between different countries. In other words, while the findings we present reflect the current state of the research literature, it would be nearly impossible to speak to the relationship between remote learning, COVID-19, and mental health in any particular context such as a classroom, school, or university. Third, our search and sampling criteria established specific boundaries for inclusion and exclusion that may limit results. While we have attempted to be as comprehensive as possible in our search terms, our search strategies and use of Google Scholar database may have limited the search results. We do not believe, however, that this substantially limits the findings.

As noted throughout the paper, we believe there are significant opportunities for on-going research on this topic. First, as our search was limited to a particular timeframe, a review of literature that captures research in the years following our window of review would be valuable in extending this research. Additionally, the methodological limitations of the studies we reviewed indicate that research where online learning is more carefully defined and controlled for may yield more insightful findings and results that can better guide decision making and policy making and also identify specific areas where more research is needed. Furthermore, some of the themes around learners with ADHD, severe depression, or severe anxiety bear further exploration. While we see some indications in the current literature that students with these characteristics in particular may be negatively impacted by online learning, the evidence foundation for any such assertion is slim at this point. This is certainly an area where research can further investigate and see if future studies yield similar results.

Conclusions and Implications

Our synthesis reveals that the existing literature is unclear on the relationship between online and/or remote learning and mental health. Because of the lack of careful controls through rigorous research methodologies, multiple studies confound instructional modality with the pandemic itself. In some cases, references to online or remote learning and the pandemic were used almost interchangeably as synonymous phenomena (e.g., the title for Horita et al., 2021 is about the effect of remote learning but then the paper refers to the effect of the pandemic with these two phenomena confounded all throughout). In many studies, perceptions of online learning were used as a proxy measure, introducing validity and reliability limitations that were not acknowledged or discussed. Further, surveys were the primary method, and several survey designs and questions raised questions about the rigor and biases in question framing. For example, one survey in one study asked "How badly has it (online learning) affected the health of your child?" with options only for high, medium, and low–but no option for none. The authors then use that question as a basis for asserting both correlation and causation. In short, the current state of research on the relationship between mental health and online learning seems to include a significant bias against online learning and in many instances authors asserting causation either based on correlations that are based on perception and self-reported data or based in no established correlations at all.

However, some patterns from the findings provide helpful insights for groups of students and for potential strategies that can be used in online learning regardless of disruptive events such as pandemics. For example, social distancing and isolation during the pandemic due to closures and quarantines created a pervasive feeling of isolation and loneliness. This sense of loss and isolation seemed to permeate participant descriptions of online interactions, as the devices and online environments became a constant reminder of the circumstances and associated griefs. From loss of important life experiences, such as graduations and proms, to loss of health and loved ones, loss and grief seemed to color participants accounts of pandemic learning. Perhaps because profound loss and grief were ever-present during pandemic-era online/remote learning, these two became intimately associated in the minds of many. While the conditions for learning modality may have shifted, the underlying conditions that actually contribute to the sense of loss and grief have not changed. Thus, as students returned to classrooms, many mental health challenges have persisted and appear to be worsening still (McMurtrie, 2022a, 2022b). Because trends in mental health among students have been both documented prior to the pandemic and observed as students return to class, the evidence seems to suggest that instructional modality is not a root cause of mental health concerns. We urge decisionmakers, including institutional and political leadership, to consider that simply changing modality will not address mental health needs. Instead, it appears that we need to contend more directly with grief, loss, and other stressors that students are experiencing with long-term effects.

One theme that comes through studies that were of higher quality in this review is framing the challenge in terms of what barriers to, or enablers of, mental health and well-being are present in a class or in a system and what design changes or decisions can be made to remove barriers regardless of instructional modality. Rather than attributing student mental health to one factor (i.e., modality) in an over-simplification of the problem that is facing us, these studies suggest that addressing student mental health requires a number of coping strategies, class strategies, and systemic supports. For example, Apgar and Cadmus (2021) interviewed undergraduate students about the disruptions due to the pandemic and asked them what coping strategies they

developed. Students reported coping mechanisms such as creating new sleeping, eating, and study routines; identifying new options and routines for exercise; using social media to connect; using self-distraction and mindfulness strategies; and using technology for coping. Use of technology for coping included apps for home workouts; videos/apps for breathing exercises or guided meditation; informal learning videos to learn new hobbies or other things; and use of video, phone, and text to stay in touch with family and friends. In other words, participants reported use of online tools, some of which can be categorized as online learning apps, to address mental health concerns. Participants also reported the use of two self-regulation tactics that are well-document strategies for managing stress: positive reframing (e.g., "maybe this is a good opportunity to learn x or reach to this person I haven't talked to in a while") and positive self-talk (e.g., "I know this is difficult, but I am a strong person and I can generate creative solutions for how to handle this").

Studies that framed their research as focusing primarily on mental health more frequently identified a mix of both positive and negative impacts on student mental health and also identified coping mechanisms and instructional or institutional strategies. For example, Biber et al. (2020) further translated these coping mechanisms into instructional and institutional strategies that instructors, schools, and universities can use to help students manage their stress and cope with significant social disruptions. They similarly observed that disruptions to routines appeared to be a major destabilizer for students and that helping students re-establish routines is an important intervention strategy. For example, they noted that "infusing positive emotional skills techniques into a required curriculum, such as health, wellness or physical activity course [sic], may help to reach all students to bolster coping behaviors" (p. 3). They argue that universities must attempt to better balance academic teaching, disease control, student housing, transition to online learning, and mental health promotion in pursuit of addressing mental health challenges. Those that did not treat online learning as a primary variable generated some of the most complex pictures of the need and insights into possible effective strategies, suggesting that a discussion that focuses on course modality may actually obscure important insights and discussions.

The need for research on mental health and remote forms of learning today is more pressing than it was when it was identified as a research gap nearly a decade ago (Thompson & Porto, 2014). Based on our study, there are a number of productive venues for future research. While our results suggest that the evidence to indicate that mental health concerns and shifts to remote learning is not as clear cut as it is made out to be, we need more and better research into the topic. Such research should occur in different contexts (e.g., school levels), in different countries, as well as aim to disaggregate data to examine the degree to which findings hold true for different populations. Research could also investigate coping strategies and ways in which such strategies could be embedded in instructional settings. Significantly, such literature should aim to avoid responsibilizing mental health concerns. To that end, future research should also investigate the ways in which institutions of education provide or fail to provide mental health supports to their students. In other words, future research should investigate both micro and macro issues relating to mental health and online learning.

Author's Contributions

Each of the authors had an equal contribution to the development of the project, as well as the data collection and analysis for the actual study. The authorship for this article reflects the

specific contributions to the content of this specific manuscript, which will likely change from output to output as the authors continue to analyze this data and extend the study in other ways.

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Ethics Statement

This study relies on collection and analysis of secondary data (i.e., published research). No ethical approval is necessary for this kind of study.

Conflict of Interest

The authors do not declare any conflict of interest.

Data Availability Statement

The raw data, along with the researchers' coding of that data, is available as an *Excel spreadsheet* at https://digitalrepository.unm.edu/ulls_fsp/190

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Appendix A

Categories and codes used to describe the data

Category	Codes
Setting	K-12
	Higher education
	Both
	Other
Study location	Country (Open-ended)
Is the pandemic the context for the study?	Yes
	No
	Before and after
Methodology	Quantitative
	Qualitative
	Mixed methods
	Other
Summary of methodology	(Open-ended)
Findings	Negative impacts
	Positive impacts
	Mixed impacts
Role of remote learning	Sole focus
	Individual variable
	One of many variables, not isolated
	No specific focus
Quality	No methodological concerns
	Infers or asserts causation but only establishes correlation
	Infers or asserts causation but does not establish even correlation
	Other methodological issues