Voices of the students: Adolescent well-being and social interactions during the emergent shift to online learning environments

Deborah Cockerham¹ · Lin Lin¹ · Sharon Ndolo¹ · Marc Schwartz¹

Received: 31 January 2021 / Accepted: 23 May 2021 / Published online: 14 June 2021

© The Author(s), under exclusive licence to Springer Science+Business Media, LLC, part of Springer Nature 2021

Abstract

Health and safety concerns during the COVID-19 pandemic required many face-to-face United States schools to suddenly shut their doors, moving classes to virtual learning environments. Amidst concerns of technology overuse, adolescents across the country saw dramatic increases in both personal screen time use and social isolation as they learned to navigate online schooling. Understanding the impact of the pandemic-related shutdowns upon adolescent well-being, learning, and social life is critical for designing effective online learning experiences, but research provides few insights from the adolescent perspective. This mixed methods study works to fill this gap by investigating adolescent needs and perceptions during the pandemic. The main questions asked are:

- To what extent does adolescent well-being during the pandemic differ from pre-pandemic well-being?
- What factors do adolescents view as influences upon their learning during the imposed shift to online schooling?
- What social changes and concerns do adolescents report during the pandemic?

Twenty-one adolescents completed Likert scale surveys and participated in semi-structured one-to-one interviews. Results showed a significant decrease in positive affect and a significant increase in negative affect during the pandemic, suggesting a decline in well-being. The majority of participants reported high distractibility and noted the lure of entertaining technology, but also described their smartphones as “connecting” and “necessary”. Social interactions were a priority for all participants, but participants agreed that opportunities for social connectedness in online education were limited. The challenges of online learning, the importance of identifying and responding to student needs, and suggested strategies for online education are discussed.

Keywords Online learning · Adolescents · Well-being · COVID-19 · Social interactions · Student needs

1 Introduction

Over the past ten years, the impact of technology on adolescents has been a growing concern among parents, educators, and researchers (Twenge, 2017, p. 81; Park, 2005). Yet as COVID-19 shutdowns moved schools from in-person instruction to online learning platforms, thousands of elementary and secondary students were suddenly required to use technology for activities that had previously been conducted face-to-face. Schoolwork, extracurricular activities, and even connections with friends all moved online and, for many students, time spent on technology increased dramatically. At the same time, stay-at-home mandates brought both physical isolation from peers and concerns about an uncertain future, setting the stage for increased fear, anxiety, depression, and other mental health concerns. The move to online schooling during the COVID-19 pandemic has emphasized the critical need to understand student needs, perspectives, and well-being when designing online education (Organisation for Economic Co-Operation and Development, 2020). This study investigates adolescent well-being, perspectives of online education, and social needs during the COVID-19 pandemic.

2 Literature review

2.1 Impacts of COVID-19 upon adolescents

Although the physical health impacts of COVID-19 upon adolescents have generally been mild (Jiao et al., 2020), this age group is still subject to social distancing, “stay at home” orders, closure of face-to-face schools, and other measures taken to protect the health of individuals. Government mandates are important for maintaining physical health, but they have also disrupted a sense of normalcy, and have led to feelings of isolation, fear, and anxiety for individuals of all ages. Adolescents, who are developing a sense of autonomy and often depend on their social connections to build an understanding of themselves (Steinberg & Morris, 2001), may experience more intense reactions to this stress. Technology overload, particularly in children and adolescents, has been a concern as both isolation from peers and the move to online schooling have increased reliance on technology during the pandemic (Williamson et al., 2020).

Online education may provide few opportunities for social and emotional development, creating gaps that can lead adolescents to withdraw and increase their time online (Montag & Elhai, 2020). While the ability to interact socially has been viewed as a critical component of online learning, achieving social presence is often a challenge in virtual environments (Akcaoglu & Lee, 2016). Educators may need to support the development of both social and academic skills by leveraging media and other technological resources that are not typically incorporated into face-to-face school settings (Anshari et al., 2017). An understanding of adolescent needs in

online learning experiences is essential for addressing socioemotional gaps, aiding recovery from pandemic-related stress, and encouraging positive well-being (Caffo et al., 2020). Positive well-being has been linked with motivation and learning (Boekarts, 1993), and an educational environment that supports positive well-being has been shown to boost adolescent learning and development (Stanton et al., 2016).

2.2 Adolescent development and technology use

Adolescence, the transition from childhood into adulthood, is often a time of inner turbulence. The brain's organizational schema is restructuring, and the frontal cortex gradually takes a stronger role in self-control (Yurgelan-Todd, 2007). As the brain develops, physical, emotional, and social changes may create an instability in adolescent behavior (Yurgelan-Todd, 2007). Inner conflict builds as a continued sense of attachment and a developing need for autonomy cause adolescents to simultaneously pull away from and cling to their caregivers (McElhaney et al., 2009). As adolescents move increasingly towards autonomy, the desire to establish an understanding of personal beliefs and an awareness of personal identity becomes a priority (Steinberg & Morris, 2001, pp. 91–92).

The need for social acceptance intensifies as adolescents try to identify with and build status among peers (Buchanan et al., 1992). Peers become a primary source of social and emotional support, and the feedback others provide must be balanced with self-perceptions (Erikson, 1968). Adolescents may view technology as a path for meeting these needs. In smartphones, they often find autonomy, self-identity, social connections, and prestige (Shapiro & Margolin, 2014).

However, smartphone usage has been shown to interfere with social interactions in face-to-face classrooms (Kosnik & Dharamshi, 2016), and may be even more concerning in online classrooms because of limited teacher oversight. High levels of technology usage have also been associated with mental health issues, withdrawal, and weaker social skills (Twenge, 2017). For adolescents, social relationships appear to be central to positive affect and well-being (Alivernini et al., 2019; Moore & Zaff, 2002).

2.3 Well-being

Subjective well-being is considered to have both a cognitive and an affective component (Andrews & Withey, 1976; Diener & Emmons, 1984). The cognitive aspect focuses primarily on life satisfaction, self-esteem, and, in some studies, optimism (Lucas et al., 1996), whereas the affective component focuses on transitory experiences that work together to build an individual's interpretation of emotion (Watson et al., 1988).

Life satisfaction considers the degree to which personal desires and goals are met, often within specific life domains (e.g., family, friends, environment) (Frisch, 1998). Life satisfaction is viewed as an internal characteristic that remains relatively consistent for an individual throughout situational changes and across the lifespan (Diener et al., 1999). Life satisfaction may reflect a collective

view of a person's affect (Lazarus, 1991), because attitude and internal approach to life appear to influence one's life satisfaction more than external circumstances such as wealth or friends (Athay et al., 2012).

Self-esteem is also known as self-confidence (Fleming & Watts, 1980, cited in Lucas et al., 1996). Self-esteem is not related to specific life situations, but takes a more global approach, considering questions such as "At times, I think I am no good at all" and "I am able to do things as well as most other people." (Rosenberg, 1965). Self-esteem may be a composite of everyday assessments of self-worth (Savin-Williams & Demo, 1983). This creates a fairly consistent self-esteem rating that is not influenced by changing emotions or life circumstances (Rosenberg, 1986; Wells, 1988). Diener and Diener (1996) suggest that most individuals maintain a positive life perspective, which both supports the ability to recover from difficult situations and strengthens social and emotional health.

Optimism, or positive thinking, is associated with motivation, goal achievement, and emotions (Scheier & Carver, 1992). Some researchers (Lucas et al., 1996) consider optimism to be a confounding factor in subjective well-being, since common items on optimism scales are similar to those found on measures of self-esteem: "I hardly ever expect things to go my way" and "I'm optimistic about my future."

The affective component of subjective well-being examines positive affect (e.g., peacefulness, excitement, happiness) and negative affect (e.g., anger, fear, gloom). Positive affect and negative affect are considered independent attributes; an increase in one does not necessarily mean a decrease in the other (Watson et al., 1988). Instead, positive affect is often expressed in enthusiasm and energy; negative affect may be shown through sadness, loneliness, or guilt (Watson & Clark, 1984; Watson & Tellegen, 1985, cited in Laurent et al., 1999). Positive affect at school has been linked with motivation, academic success, and positive well-being (Alivernini et al., 2019). In contrast, uncertainty and inconsistency may create or intensify negative affect (Di Santo et al., 2020). Affect is considered a major indicator of well-being (Costa & McCrae, 1980; Watson & Clark, 1984).

The impact of COVID-19 shutdowns upon adolescent well-being has been a global concern (Jiao et al., 2020; Orgilés et al., 2020). In a study of 1,143 parents in Italy and Spain, pandemic-related quarantines and isolation from peers were seen to exert a negative influence on children and adolescents (Orgilés et al., 2020). In addition to distractibility, boredom, loneliness, and worry, parents reported that their children increased their time on technology, slept more, and spent less time in physical activity. The study concluded that mental and social well-being must be priorities in both physical and online schools. However, identification of strategies that can effectively address adolescent well-being in online learning and social experiences will require insights into adolescent perspectives, attitudes, and feelings (Silverman, 2021). This study investigates effects of the COVID-19 pandemic upon adolescent well-being, learning, and social needs. Questions include:

- To what extent does adolescent well-being during the pandemic differ from pre-pandemic well-being?

- What factors do adolescents view as influences upon their learning during the imposed shift to online schooling?
- What social changes and concerns do adolescents report during the pandemic?

3 Methods

3.1 Participants

This study was approved and conducted in accordance with the ethical standards of the University of North Texas Institutional Review Board. Participants were recruited through an email flyer sent by the Fort Worth Museum of Science and History. A total of twenty-seven adolescents and parents provided written informed assent/consent prior to their inclusion in a participatory action research study on smartphones and well-being. Initial data on well-being was gathered at the museum in February 2020, while students were still attending traditional face-to-face schools. However, on March 11, the World Health Organization declared the COVID-19 outbreak to be a global pandemic (Cucinotta & Vanelli, 2020), and local schools and businesses, in line with many U.S. schools and businesses, suddenly closed.

Pandemic-related issues required a research study modification request and approval by the university's Institutional Review Board. The revised research goal focused on assessing adolescent well-being, experiences in online education, and social needs during COVID-19. Twenty-three of the original students agreed to continue participating in the study. However, data from two of the participants was removed because it was incomplete. The final sample consisted of twenty-one adolescents (12 F, 9 M; 12 – 17 years, $M = 14.24$; $SD = 1.79$). At the time of the second data collection in May 2020, all participants' schools were temporarily being conducted online due to pandemic-related school shutdowns.

3.2 Data collection

For initial data collection before COVID-19 shutdowns, data was collected onsite at the museum. Participants completed paper surveys related to well-being. For the final data collection during COVID-19 shutdowns, each participant completed the same surveys online and also participated in a thirty-minute one-to-one interview. The surveys addressed both cognitive and affective aspects of subjective well-being, with focus on three primary domains: (a) life satisfaction, (b) affect, and (c) self-esteem. Optimism was not assessed because it has been considered a confounding factor (Scheier & Carver, 1992) and aligns closely with self-esteem. Semi-structured interviews, in which prepared questions served as a springboard for a more in-depth discussion, covered school technology usage, attitudes towards online education, social needs, and motivation for learning. Assessment measures for each domain are described below.

3.3 Materials: Well-being

3.3.1 Affect assessed through PANAS-C

The *Positive and Negative Affect Schedule for Children* (PANAS-C; Laurent et al., 1999) assesses an individual's outward expression of emotion. On this self-reported survey, the participant indicates the extent to which s/he has experienced each of twenty-seven emotions during the preceding week. A five-point Likert scale provides options of (1) Very Slightly; (2) A little; (3) Moderately; (4) Quite a bit; or (5) Extremely. For each participant, an overall score in positive affect was determined from totaling the fourteen positive affect items, and an overall score in negative affect was determined from totaling the thirteen negative affect items.

3.3.2 Life satisfaction assessed through BMSLSS

The *Brief Multidimensional Students' Life Satisfaction Scale* (BMSLSS; Seligson et al., 2003) is a self-reported survey designed to measure the life satisfaction of children and adolescents in each of six areas: family, friends, school, self, living environment, and life as a whole. For each area, participants are asked to complete the sentence: "I would describe my satisfaction with _____ as ..." A total of seven response options are provided: Delighted, Pleased, Mostly Satisfied, Mixed, Mostly Dissatisfied, Unhappy, and Terrible. The scores are averaged together to provide a global measure of life satisfaction.

3.3.3 Self-esteem assessed through RSES

The *Rosenberg Self-Esteem Scale* (RSES; Rosenberg, 1979) is designed for adolescents to self-report on personal confidence in their own abilities. The ten RSES items are ranked on a 4-point Likert scale that includes (1) Strongly Disagree, (2) Disagree, (3) Agree, or (4) Strongly Agree. Half of the items were reverse scored so that Strongly Agree received 1 point and Strongly Disagree received 4 points. Items were then totaled to provide an overall score in self-esteem.

3.3.4 Semi-structured interviews on adolescent viewpoints of online education and social life during COVID-19

Semi-structured one-to-one interviews were conducted on Zoom with twenty participants. The format of this interview structure, in which prepared questions are adapted based on the participant's response, allowed for deeper conversations. Interviews lasted approximately thirty minutes and were videorecorded. The researcher typed detailed notes during the interviews and referred to the videorecordings for accuracy in final transcriptions. To analyze data from interview responses and open-ended questions, participant responses were divided into themes based on common phrases and ideas. Qualitative analysis of this information consisted of first cycle coding, in which two researchers independently read and explored the data for initial highlights and themes. Patterns and important features were noted through analytic

memos and in vivo analyses (Saldana, 2012, pp. 43–64; 105–110). During second-cycle coding, pattern coding (Saldana, 2012, pp. 236–239) was conducted independently by the researchers to ascertain meaning from previous analyses. Words and phrases that best illustrate the themes were included in the study findings.

The interviews provided insights into participants' online learning experiences and social life. Participants discussed the ability to focus on online schooling, best and worst things about the shutdowns, new insights about technology, and social connections with friends. A list of prepared interview questions is included in the [Appendix](#).

4 Results

4.1 Descriptive statistics for continuous variables

Data for the first research question was analyzed using IBM Statistical Package for the Social Sciences (SPSS, version 27). The means and standard deviations for all of the continuous study variables are presented in Table 1. Age ranged from 12 to 17 with a mean of 14.24 ($SD=1.79$). Pretest variables for all other instruments are detailed below.

4.2 Research question 1: To what extent does adolescent well-being during the pandemic differ from pre-pandemic well-being?

Three components comprised the concept of adolescent sense of well-being: positive affect and negative affect (PANAS-C), general life satisfaction (BMSLSS), and self-esteem (RSES).

Table 1 Means and standard deviations for continuous variables

	<i>N</i>	Mean	<i>SD</i>	Min	Max
BMSLSS Score Pre-pandemic	21	5.89	.76	4.83	7.00
BMSLSS Score During pandemic	21	5.76	.69	4.83	6.83
RSES Score Pre-pandemic	21	20.48	6.61	10.00	30.00
RSES Score During pandemic	21	19.33	6.17	8.00	29.00
PANAS-C PA Pre-pandemic	21	45.29	10.37	25.00	60.00
PANAS-C PA During pandemic	21	40.29	11.50	22.00	60.00
PANAS-C NA Pre-pandemic	21	25.14	8.37	17.00	44.00
PANAS-C NA During pandemic	21	30.81	11.53	18.00	61.00
Participant age	21	14.24	1.79	12.00	17.00

BMSLSS Brief Multidimensional Students' Life Satisfaction Scale, *RSES* Rosenberg Self-Esteem Scale, *PANAS-C* Positive Affect Negative Affect Scale for Children, *PA* positive affect, *NA* negative affect

4.2.1 Affect: Positive affect significantly decreased and negative affect significantly increased during the COVID-19 shutdowns

A paired-samples t-test was conducted to compare positive affect experienced by adolescents over time. A significant decrease was seen in the positive affect scores *during* COVID-19 shutdowns ($M=40.29$, $SD=11.49$) as compared with positive affect scores *before* COVID-19 shutdowns ($M=45.29$, $SD=10.37$); $t(20)=-2.74$, $p=0.01$. These results suggest that positive affect decreased during the COVID-19 shutdowns.

A paired-samples t-test was conducted to compare negative affect experienced by adolescents over time. There was a significant increase in the negative affect scores *during* COVID-19 shutdowns ($M=30.81$, $SD=11.53$) as compared with negative affect scores *before* COVID-19 shutdowns ($M=25.14$, $SD=8.38$); $t(20)=-3.47$, $p=0.002$. These results suggest that negative affect increased during the COVID-19 shutdowns. See Fig. 1.

4.2.2 Life satisfaction: No significant differences before and during COVID-19 shutdowns

A paired-samples t-test was conducted to compare life satisfaction experienced by adolescents over time. No significant difference was seen in the life satisfaction scores before COVID-19 shutdowns ($M=5.89$, $SD=0.76$) and during COVID-19 shutdowns ($M=5.76$, $SD=0.69$); $t(20)=-1.05$, $p=0.31$.

Fig. 1 Mean scores of positive affect and negative affect for pre-pandemic and during pandemic conditions

4.2.3 Self esteem: No significant differences before and during COVID-19 shutdowns

A paired-samples t-test was conducted to compare self esteem experienced by adolescents over time. No significant difference was seen in the self esteem scores before COVID-19 shutdowns ($M=20.48$, $SD=6.60$) and during COVID-19 shutdowns ($M=19.33$, $SD=6.17$); $t(20)=-0.1.39$, $p=0.18$.

4.2.4 Research question #2: What factors do adolescents view as influences upon their learning during the imposed shift to online schooling?

Participants reported the online learning content delivery system that was used by their schools. Google Classroom and Zoom were most common, with 51% of participants using at least one of these platforms. In addition, a variety of other online learning platforms and approaches were noted, and 48% of students indicated that their schools used multiple approaches. See Table 2 for a list of platforms and percentages of participants who used each.

Frequent educational approaches included online meetings (often lectures), videotaped content, and an assignment repository where students access and submit assignments. 43% of the students' schools had switched to a Pass/No Pass grading system, 43% continued using pre-pandemic grading procedures, and 14% were using "No Harm" grading in which only grades that were equal to or higher than a student's previous grades would count towards a student's grade point average. While some participants suggested that the Pass/No Pass system generally "leads students to give less effort towards assignments", others preferred this grading approach because "...my grades aren't as great...it is harder online". One student noted that the ability to retake tests was a benefit of online education.

When asked to describe their lives during the pandemic, participants responded with a total of forty descriptors. Of these responses, 62.5% presented a negative

Table 2 Learning content delivery systems by frequency ($N=71$)*

Learning Content Delivery System	Number	Percentage
Google Classroom	18	25.35
Canvas	4	5.63
Microsoft Teams	3	4.22
Edmodo	1	1.4
Zoom	16	22.53
Email	12	16.9
Text	1	1.4
GroupMe	1	1.4
Weekly assignment packets	1	1.4
Remind	1	1.4
Edgenuity	1	1.4
Google Meets/Hangouts	1	1.4

*In some situations, participants noted the use of multiple content delivery systems

Fig. 2 Valence of participant responses when asked to describe their lives, by percent ($N = 40$)

valence (e.g., “disappointing”, “unmotivated”, “anxious”), 27.5% presented a positive valence (e.g., “productive”, “eager”), and 10% were neutral (e.g., “different”, “home”). Common themes ranged from “boring” (30%) and “secluded/isolated” (15%) to “calm/peaceful/relaxed” (15%). Attitudes towards online school were similar, with teens noting factors such as inconsistencies in school expectations and confusion about complicated work procedures. Participants mentioned that they “don’t really enjoy school anymore” and noted that “the teacher is not there to help”. Others felt less motivated, since “the pressure to do well is gone”. The online environment worked well for a few participants, who remarked that they work best when allowed to take more initiative in their own learning: “I don’t need a lot of guidance. I just do it” and “I tell myself if I get the schoolwork done, I’ll have free time to do something else that I enjoy”. See Fig. 2 and Table 3.

The majority of participants (71.4%) noted personal increases in distractibility during online learning, e.g.: “I’m trying to get my [school] work done, and then I think I could check Instagram real quick...” The most common distractor listed by students was the smartphone. The lack of oversight during instruction was described

Table 3 One-word descriptors of life during the COVID-19 pandemic as shared by adolescent students

Negative Descriptors	Positive Descriptors	Neutral Descriptors
Boring (7)	Good	Different
Lousy	Eager	Busy
Secluded	Productive	Uneventful
Isolated (2)	Calm	
Lonely	Relaxed (2)	
Repetitive	Peaceful	
Uninteresting	Easier	
Anxious	Good	
Stuck		
Confined		
Disappointing		
Lazy		
Confusing		
Sort of lonely		
Unmotivated		
Hectic		

Frequency of each descriptor is one unless another frequency is noted in parentheses

as a hindrance because “we don’t have teachers watching us and keeping us on task” and “If the teacher is lecturing, I can be playing a game on my phone”. The percentage of students who described their phones as “distracting” increased from 15.9% before COVID-19 shutdowns to 21.5% during the shutdowns. However, students also described their phones as “connecting” (25.3%) and “necessary” (17.7%), noting that “...technology can be beneficial in a time like this because it helps people connect” and “I do everything on my laptop. It’s become an essential part of my life.” Other descriptors included “calming”, “entertaining” (“Technology makes you not bored”), and “a miracle”. As one participant explained, “...people are discovering new and creative ways to go about their daily lives...” See Table 4 for themes and examples related to adolescent perceptions of technology in learning.

4.3 Research question #3: What social changes and concerns do adolescents report during the pandemic?

For most students (66.7%), the greatest need during the pandemic was social interaction, but students expressed concern that their online learning environments provided few to no opportunities for social connections. Student-expressed school needs included variety in instructional approach (“it’s boring listening to a bunch of videos”) and increased teacher contact/feedback (“I haven’t had any interaction with my teachers”). Participants viewed technology as both a social support (“...lots of Snapchat and TikTok”) and a hindrance (“Sure we can talk online, but it’s not the same.”). Structure, consistency, and clear work procedures were other online learning needs.

Some students had developed strategies for completing online schoolwork, including using a checklist, segmenting assignments or workload (“I take one class a day and knock it out and then move on to another class the next day”), and

Table 4 Adolescent perceptions of technology in online learning: primary themes and examples

Themes	Examples
Connection	<p>“Technology can be really beneficial in a time like this because it helps people connect.”</p> <p>“I never realized how easy it was to just pick up the phone and call somebody whenever you felt lonely...but you still sometimes feel just as lonely.”</p> <p>“I do everything on my laptop. It’s become an essential part of my life.”</p>
Task support	<p>“...people are discovering new and creative ways to go about their daily lives...”</p> <p>“You can literally just look up answers...”</p> <p>“We’re just now beginning to use this [technology] advantage to help with general schoolwork.”</p>
Entertainment	<p>“It [learning] is a lot more immersive....”</p> <p>“Technology makes you not bored.”</p> <p>“Me and my friends get together and watch movies over FaceTime.”</p>
Distraction	<p>“If the teacher is lecturing, I can be playing a game on my phone.”</p> <p>“I do most [schoolwork] on my computer and I also play games on it...distracting since I use the same technology for both.”</p> <p>“...if you don’t use it right, it will waste your time...”</p>

working offline (“If I am distracted, I just do the assignment handwritten and type it later”). See Table 5 for primary themes and examples related to adolescent perceptions of factors that influence online learning.

Before the pandemic, almost half of participants (45.6%) noted that their preferred communication style was talking with others face-to-face through “a relaxed straightforward conversation” or “hanging out with my friends”. Far fewer teens preferred to communicate through texting or social media (16.1% for each medium). One student noted that, “I like to talk in person but enjoy using Snapchat and texting my friends when I can’t hang out.”

When face-to-face communication was limited by the pandemic-related shutdowns, students switched primarily to texting, social media, or phone calls. Zoom meetings and Google Hangouts became new methods of connecting with friends, but “...it’s not the same.” One participant commented, “I need to get out and see people!”, and others mentioned that they were “missing friends”.

In discussing the “best thing” about the shutdowns, 57% of participants mentioned increased time for specific activities: “more family time”, “extra free time”, “more video games”, “more me time”. In contrast, 76% of adolescents viewed the worst thing about the pandemic as limited social opportunities, with comments such as “not having social interactions”, “missing friends”, and “...it’s hard to not be able to see your friends”.

Table 5 Adolescent perceptions of factors that influence learning: primary themes and examples

Themes	Examples
School expectations	<p>“Each teacher chooses their own method: Canvas, Edmodo, Google Classroom...”</p> <p>“My English teacher tries really hard to find a time to meet that others [teachers] aren’t taking.”</p> <p>“It [classwork] sneaks up on you...I feel like I’m being overworked.”</p>
Confusion	<p>“I’m not good with keeping up with my work.”</p> <p>“I didn’t go into one class because I couldn’t find the link.”</p> <p>“It does get a little confusing trying to keep track of when things are due.”</p>
Repetitive approach	<p>“It’s boring listening to a bunch of videos...”</p> <p>“It can get tedious.”</p> <p>“We have a big schedule throughout the day”</p> <p>“After awhile you just get bored because you don’t have as much to do.”</p>
Lack of socialization	<p>“I mostly enjoy being around people. It’s not the same online.”</p> <p>“It’s harder to connect. Face to face is a lot more fun.”</p> <p>“I miss my friends.”</p> <p>“In person is really the only way that we ever really connect.”</p>
Lack of teacher oversight	<p>“I haven’t had any interactions with my teachers.”</p> <p>“...More difficult because the teacher is not there to help...”</p> <p>“Your teachers aren’t there to motivate you...”</p>
Distractibility	<p>“I don’t really get anything done...”</p> <p>“We’re at home and don’t have teachers watching us and keeping us on task...”</p> <p>“I forget to do my schoolwork because I’m always playing games online.”</p> <p>“At home, it’s like you don’t have to work...”</p>
Flexibility	<p>“I’ve felt more relaxed...”</p> <p>“You can just do your own thing at your own pace.”</p> <p>“...Most definitely more aware of technology...”</p>

5 Discussion

The purpose of this study was to investigate adolescent well-being and how well the adolescents' learning and social needs were being met as school closures during the COVID-19 pandemic required students to stay at home. Primary results include:

- A significant decrease in positive affect during the pandemic, as compared with pre-pandemic measures.
- A significant increase in negative affect during the pandemic, as compared with pre-pandemic measures.
- No significant difference from pre-pandemic to during pandemic conditions in life satisfaction or self-esteem, as measured by the BMSLSS and the RSES.
- When asked to describe their lives during the pandemic, the majority of participant responses reflected a negative valence. Participant attitudes towards school paralleled descriptors of life.
- The majority of participants noted increases in personal distractibility during the pandemic.
- The greatest need for most participants was social interaction, but opportunities for social connectedness in online learning were limited.
- While participants often noted that technology was distracting, they also considered it to be connecting and necessary.
- Before the pandemic, the preferred communication style for most teens was talking face-to-face. During the pandemic, teens had adapted to communicating through a variety of online means such as texting and social media, which were different from those used for their formal online learning.

Major findings are addressed according to the research question each addresses.

5.1 Research question #1: To what extent does adolescent well-being during the pandemic differ from well-being before the pandemic?

The study showed a significant difference in the adolescents' positive and negative affect, but no significant difference in their self-esteem or life satisfaction before and during the pandemic. Positive affect showed a significant decrease during the pandemic, indicating a decline in positive emotions such as happiness, joy, and pride. This may be connected with physical isolation from peers and limitations in social opportunities resulting from COVID-19 shutdowns. Before the school closures, participants engaged in social interactions at school on most weekdays. During the pandemic, participants were involved in online schooling with limited opportunities for social interactions. Positive affect has been linked with social relationships (Alivernini et al., 2019; Moore & Zaff, 2002), and comments such as “I miss my friends. Like sure I can see them via screen, but I miss them...School is like the place where you see people most...” signaled that the decrease in face-to-face interactions with teachers and peers may have contributed to lower positive affect. In addition, participants frequently reported

that they were distracted by their phones, with one student recognizing what he viewed as a “myriad of distractions”: friends, games, and social media.

Negative affect, in contrast, increased significantly during the pandemic, signifying that participants were experiencing a rise in negative emotions such as sadness, fear, and loneliness. Multiple students indicated that their school expectations were confusing and inconsistent. All participants were facing an uncertain future. Uncertainty and inconsistency may have influenced the increase in negative affect, in line with the work of Di Santo et al. (2020). In addition, loneliness resulting from the impacts of pandemic-related shutdowns may have intensified the overall negative affect. As one participant expressed: “I never realized how easy it was to just pick up the phone and call somebody whenever you felt lonely. But it still isn’t the same. You still sometimes feel just as lonely.” No participants specifically mentioned concerns about COVID-19 itself, but it is possible that an underlying fear related to the pandemic may have intensified negative affect in other areas.

Positive and negative affect do not necessarily change in tandem; they represent two independent measures. The simultaneous changes in these areas suggest a lower sense of well-being among participants. Affect is considered a major factor in well-being (Costa & McCrae, 1980; Watson & Clark, 1984), and the decline in well-being is reinforced by the high percentage of responses with negative valence when participants described their lives during the pandemic. It is also reflected in the hopelessness expressed by some participants in their last year of high school, e.g.: “I am very sad now...I am missing my senior banquet...and I just learned this week that I will probably never see most members of my senior class again.”

In contrast to affect, measures of both life satisfaction and self-esteem remained relatively consistent during the COVID-19 shutdowns. These findings align with previous research results indicating that life satisfaction measures frequently parallel those of self-esteem (Lucas et al., 1996). Both life satisfaction and self-esteem may reflect an aggregate of a person’s affect (Lazarus, 1991), and both suggest a life mindset that impacts one’s perspective more strongly than momentary factors (Athay et al., 2012). For most participants, scores were high, indicating a generally positive perspective of life. A positive approach to life can build social connections, bolster resilience during negative circumstances, and promote more robust mental health (Diener & Diener, 1996, cited in Gilman & Huebner, 2003).

5.2 Research question #2: What factors do adolescents view as influences upon their learning during the imposed shift to online schooling?

Regardless of the learning platform used, the outlook and needs for online schooling were similar between participants. Adolescent attitudes towards school often reflected their descriptors of life. Participants noted lack of engagement (“It’s easier to get away with being on my phone. If the teacher’s lecturing, I could be playing a game on my phone”) and decreased interest (“I’m definitely less motivated to get my work done”). One participant noted, “Honestly, I would prefer [face-to-face] school learning over doing online learning just because I like the interaction with friends.

I was a little bit surprised...but after awhile you get bored [online].” Some wished for more contact with teachers, indicating the importance of the teacher-student relationship. This reinforces findings that indicate the importance of relationships in adolescent development (Alivernini et al., 2019). Other participants appreciated the opportunity to work independently online, supporting the adolescent need for autonomy (Steinburg & Morris, 2001).

The majority of participants noted increased distractions during the pandemic. While lack of face-to-face time with friends, increased time on computers, and accessibility to smartphones were often mentioned as the primary reasons for distraction, underlying factors are likely to include abrupt changes in daily environments, fears about personal and family health, and uncertainty about the future. Di Santo et al. (2020) indicated a link between uncertainty/inconsistency and increased negative affect, which suggests that these pandemic-related factors may be decreasing adolescent well-being and impacting adolescent focus and productivity in online schooling. It is interesting to note that, while participants frequently were concerned about the distractions created by smartphones, they also described smartphones as “connecting” and “necessary”. The tension between these opposing viewpoints may reflect the inner conflict frequently experienced in adolescence as brain regions develop at differing rates (Yurgelan-Todd, 2007).

5.3 Research question #3: What social changes and concerns do adolescents report during the pandemic?

The greatest need expressed by most participants was social interaction, but participant comments suggested that opportunities designed to support social connectedness, especially in online learning, did not always address the need. One participant noted that “Social interaction isn’t the same [online]. It’s different in person, you know” and another commented, “[Face-to-face] school is like the place where you see people most”. Before the pandemic, almost half of the participants selected face-to-face conversations as their preferred method of communication. During the pandemic, shutdowns limited face-to-face interactions. However, adolescents worked quickly to adopt new communication practices in order to stay in contact with friends. Although connecting with others in new ways can be uncomfortable and may pose challenges such as learning to navigate new technology platforms, peers are often a primary source of social and emotional support for adolescents (Erikson, 1968). All students found ways to stay connected, using their available tools to communicate even amidst the challenges of the pandemic. One student’s comment that technology “is only a tool” is a reminder that human input and creativity are needed to develop strategies for building social bonds online.

6 Conclusion

The qualitative methods used in this mixed-method study provided opportunities for rich conversations with the adolescents. Listening to the students provided deeper insights into their online learning experiences, social connections, needs, perspectives, and well-being. Students are the experts on their own experiences, and listening to experts should be a priority in educational settings. While curriculum developers and district leaders often base educational decisions and lesson plans upon recommended instructional practices and results from standardized tests, involving the students in conversations and seeking student input into the learning design can build stronger and more engaging learning experiences. Student voices will provide essential feedback for designing effective learning environments after the pandemic.

The strong adolescent need for social interaction and the importance of adolescent communications with friends suggest that innovative opportunities for social opportunities in online schooling are critical. Using both familiar apps and new media, from texting and social media to creative new platforms, can allow students to implement discourse strategies that are relevant in their lives. Opportunities to create videos, interact with content, take virtual field trips, and embrace learning through game-like approaches could enhance not only social interactions, but also engagement and motivation in online learning (Anshari et al., 2017). Teaching approaches that provide interest-based educational activities, support social interaction, and allow adolescents to take the lead in their own learning can motivate students and further accelerate learning.

Online learning presents new challenges for educators, but students are important resources for insights that can lead to effective practices. Finding time to listen and respond to student voices is essential as educators work to design optimum approaches for educating the leaders of our future.

7 Limitations and future directions

The study was limited in the following ways. First, all the adolescents in this study were volunteer participants who visited the same local museum in a southern U.S. city. They may not represent adolescents or populations in other areas. Second, all data were collected online due to the pandemic, which may have limited the richness of the qualitative data. Third, the data were collected from a small sample size of 21 participants. However, the study, with findings based on quantitative data from validated instruments as well as qualitative in-depth interviews and voices from the 21 participants, serves as a catalyst for more in-depth discussions. The negative valence identified in the current study illuminates the need for future researchers to examine the learning outcomes of adolescents during the pandemic. Future research focusing on specific stress symptoms, learner satisfaction and burnout symptoms could contribute to our understanding of the factors that led to increased negative valence among the adolescents. Moreover, future scholars could also include longitudinal studies and explorations into the

perspectives of the adolescents' teachers and parents, which could provide a more robust understanding of effective online learning approaches. Lastly, more research is needed to investigate the effectiveness of new approaches and strategies that were utilized in enhancing online learning during the pandemic.

Appendix

Questions for semi-structured interviews.

1. How does your school conduct classes?
 2. Has your school switched to a Pass/No Pass system?
- If so, how has this impacted your role and responsibility as a student?
3. Has your ability to focus on schoolwork changed? Which technologies or strategies have supported your focus? Which have increased your distraction?
 4. Do you have limits on your technology usage? If yes, explain.
- Have these changed since COVID-19?
5. What, for you, has been the worst thing about the shutdowns? The best thing?
 6. Are you experiencing problems or needs that technology is not addressing? Explain.
 7. Do you have any new insights about technology?
 8. How would you describe your life during the pandemic?
 9. Which of the following words describes how you feel about your smartphone? You may choose more than one: Distracting, Connecting, Necessary, Separating, Interrupting, Addicting, Other (what?)
 10. How are you connecting with your friends? How often?
 11. Are you recognizing ways that technology can solve problems that you had not considered in the past? Explain.
 12. Is technology causing problems for you in any way? Explain.

Data transparency Data is available upon request.

Declarations

Conflicts of interest We have no conflicts of interest to disclose.

References

- Akcaoglu, M., & Lee, E. (2016). Increasing social presence in online learning through small group discussions. *The International Review of Research in Open and Distributed Learning*, 17(3).
- Alivernini, F., Cavicchiolo, E., Girelli, L., Lucidi, F., Biasi, V., Leone, L., Cozzolini, M., & Manganelli, S. (2019). Relationships between sociocultural factors (gender, immigrant and socioeconomic

- background), peer relatedness and positive affect in adolescents. *Journal of Adolescence*, 76, 99–108.
- Andrews, F. W., & Withey, S. S. (1976). *Social indicators of well-being: American perceptions of life quality*. Plenum.
- Anshari, M., Almunawar, M. N., Shahrill, M., Wicaksono, D. K., & Huda, M. (2017). Smartphones usage in the classrooms: Learning aid or interference? *Education and Information Technologies*, 22(6), 3063–3079.
- Athay, M. M., Kelley, S. D., & Dew-Reeves, S. E. (2012). Brief Multidimensional Students' Life Satisfaction Scale—PTPB Version (BMSLSS-PTPB): Psychometric properties and relationship with mental health symptom severity over time. *Administration and Policy in Mental Health and Mental Health Services Research*, 39(1–2), 30–40.
- Boekaerts, M. (1993). Being concerned with well-being and with learning. *Educational Psychologist*, 28(2), 149–167.
- Buchanan, C. M., Eccles, J. S., & Becker, J. B. (1992). Are adolescents the victims of raging hormones? Evidence for activation effects of hormones on moods and behavior at adolescence. *Psychological Bulletin*, 111(1), 62.
- Caffo, E., Scandroglio, F., & Asta, L. (2020). Debate: COVID-19 and psychological well-being of children and adolescents in Italy. *Child and Adolescent Mental Health*, 25(3), 167–168.
- Costa, P. T., & McCrae, R. R. (1980). Influence of extraversion and neuroticism on subjective well-being: Happy and unhappy people. *Journal of Personality and Social Psychology*, 38(4), 668.
- Cucinotta, D., & Vanelli, M. (2020). WHO declares COVID-19 a pandemic. *Acta Bio Medica: Atenei Parmensis*, 91(1), 157.
- Di Santo, D., Chernikova, M., Kruglanski, A. W., & Pierro, A. (2020). Does inconsistency always lead to negative affect? The influence of need for closure on affective reactions to cognitive inconsistency. *International Journal of Psychology*, 55(5), 882–890.
- Diener, E., & Diener, C. (1996). Most people are happy. *Psychological Science*, 7(3), 181–185.
- Diener, E., & Emmons, R. A. (1984). The independence of positive and negative affect. *Journal of Personality and Social Psychology*, 47(5), 1105.
- Diener, E., Suh, M. E., Lucas, R. E., & Smith, H. L. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin*, 125(2), 276–302.
- Erikson, E. (1968). *Youth: Identity and crisis*. Norton.
- Fleming, J. S., & Watts, W. A. (1980). The dimensionality of self-esteem: II. *Journal of Personality and Social Psychology*, 39, 921–929.
- Frisch, M. B. (1998). Quality of life therapy and assessment in health care. *Clinical Psychology: Science and Practice*, 5(1), 19–40.
- Gilman, R., & Huebner, S. (2003). A review of life satisfaction research with children and adolescents. *School Psychology Quarterly*, 18(2), 192–205.
- Jiao, W. Y., Wang, L. N., Liu, J., Fang, S. F., Jiao, F. Y., Pettoello-Mantovani, M., & Somekh, E. (2020). Behavioral and emotional disorders in children during the COVID-19 epidemic. *The Journal of Pediatrics*, 221, 264.
- Kosnik, C., & Dharamshi, P. (2016). Intertwining digital technology and literacy methods courses: Exemplary practices of six literacy/English teacher educators. In *Building Bridges* (pp. 163–177). Brill Sense.
- Laurent, J., Catanzaro, S. J., Joiner, T. E., Jr., Rudolph, K. D., Potter, K. I., Lambert, S., Osborne, L., & Gathright, T. (1999). A measure of positive and negative affect for children: Scale development and preliminary validation. *Psychological Assessment*, 11(3), 326.
- Lazarus, R. S. (1991). *Emotion and adaptation*. Oxford University Press.
- Lucas, R. E., Diener, E., & Suh, E. (1996). Discriminant validity of well-being measures. *Journal of Personality and Social Psychology*, 71(3), 616–628.
- McElhaney, K. B., Allen, J. P., Stephenson, J. C., & Hare, A. L. (2009). Attachment and autonomy during adolescence. *Handbook of Adolescent Psychiatry*. Chapter 11. Carrollton, TX: John Wiley & Sons. <https://doi.org/10.1002/9780470479193>
- Montag, C., & Elhai, J. D. (2020). Discussing digital technology overuse in children and adolescents during the COVID-19 pandemic and beyond: On the importance of considering Affective Neuroscience Theory. *Addictive Behaviors Reports*, 12, 100313.
- Moore, K. A., & Zaff, J. F. (2002). Building a Better Teenager: A Summary of "What Works" in Adolescent Development. In *American Teens Series: Child Trends Research Brief*. Accessed January 20,

- 2020, from ERIC - ED472358 - Building a Better Teenager: A Summary of "What Works" in Adolescent Development. American Teens Series. Child Trends Research Brief, 2002-Nov
- Organisation for Economic Co-Operation and Development. (2020). Youth and COVID-19: Response, Recovery, and Resilience. Accessed September 1, 2020, from <https://www.oecd.org/coronavirus/policy-responses/youth-and-covid-19-response-recovery-and-resilience-c40e61c6/>
- Orgilés, M., Morales, A., Delvecchio, E., Mazzechi, C., & Espada, J. P. (2020). Immediate psychological effects of the COVID-19 quarantine in youth from Italy and Spain. *Frontiers in Psychology*, 11, 2986.
- Park, W. K. (2005). Mobile phone addiction. In Ling, R. and P.E. Pederson (Eds.) *Mobile communications: Computer Supported Cooperative Work*, 31, 253–272.
- Rosenberg, M. (1965). *Society and the Adolescent Self-Image*. Princeton University Press.
- Rosenberg, M. (1979). *Conceiving the Self*. Basic Books.
- Rosenberg, M. (1986). Self-concept from middle childhood through adolescence. In J. Suls & A. G. Greenwald (Eds.), *Psychological Perspectives on the Self* (Vol. 3, pp. 107–135). Erlbaum.
- Saldana, J. (2012). *The Coding Manual for Qualitative Researchers*. Sage.
- Savin-Williams, R. G., & Demo, P. (1983). Situational and transitional determinants of adolescent self-feelings. *Journal of Personality and Social Psychology*, 44, 820–833.
- Scheier, M. F., & Carver, C. S. (1992). Effects of optimism on psychological and physical well-being: Theoretical overview and empirical update. *Cognitive Therapy and Research*, 16(2), 201–228.
- Seligson, J. L., Huebner, E. S., & Valois, R. F. (2003). Preliminary validation of the Brief Multidimensional Students' Life Satisfaction Scale (BMSLSS). *Social Indicators Research*, 61(2), 121–145.
- Shapiro, L. A. S., & Margolin, G. (2014). Growing up wired: Social networking sites and adolescent psychosocial development. *Clinical Child and Family Psychology Review*, 17(1), 1–18.
- Silverman, M. (2021). Want to tackle learning loss? First listen to your students. In Education Week. Accessed March 9, 2021, from Want to Tackle Learning Loss? First Listen to Your Students (Opinion) (edweek.org)
- Stanton, A., Zandvliet, D., Dhaliwal, R., & Black, T. (2016). Understanding Students' Experiences of Well-Being in Learning Environments. *Higher Education Studies*, 6(3), 90–99.
- Steinberg, L., & Morris, A. S. (2001). Adolescent development. *Annual Review of Psychology*, 52(1), 83–110.
- Twenge, J. M. (2017). *IGen: Why Today's Super-connected Kids are Growing Up Less Rebellious, More Tolerant, Less Happy—and Completely Unprepared for Adulthood—and what that Means for the Rest of Us*. Simon and Schuster.
- Watson, D., & Clark, L. A. (1984). Negative affectivity: The disposition to experience aversive emotional states. *Psychological Bulletin*, 96(3), 465–490.
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, 54(6), 1063–1070.
- Watson, D., & Tellegen, A. (1985). Toward a consensual structure of mood. *Psychological Bulletin*, 98(2), 219–235.
- Wells, A. J. (1988). Variations in mothers' self-esteem in daily life. *Journal of Personality and Social Psychology*, 55(4), 661.
- Williamson, B., Eynon, R., & Potter, J. (2020). Pandemic politics, pedagogies and practices: digital technologies and distance education during the coronavirus emergency. *Learning, Media, and Technology*, 45(2), 107–114. <https://doi.org/10.1080/17439884.2020.1761641>
- Yurgelun-Todd, D. (2007). Emotional and cognitive changes during adolescence. *Current Opinion in Neurobiology*, 17(2), 251–257.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Authors and Affiliations

Deborah Cockerham¹ · Lin Lin¹ · Sharon Ndolo¹ · Marc Schwartz¹

✉ Deborah Cockerham
deborah.cockerham@unt.edu

¹ Department of Learning Technologies, University of North Texas, Denton, TX, USA