# TOO MUCH SCREEN? AN EXPLORATORY EXAMINATION OF DIGITAL EXHAUSTION OF EDUCATORS IN TURKIYE

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## ABSTRACT

Screen time is now widely available and due to the increasing use of these technologies in school and home, it is important to consider teacher views about their use and possible results. The purpose of this study is to analyze the digital exhaustion of educators in Turkiye and its proposed antecedents. 570 educators who live in Turkiye participated in this study. Mixed-methods research was conducted to analyze the survey results. The data obtained were analyzed using descriptive analysis, regression analysis, and thematic content analysis. Key findings were that educators had digital exhaustion and there were three main types of exhaustion (emotional, social, and physical). Educators offered some practical solutions for digital exhaustion.


**Keywords:** Screen fatigue, teacher motivation, teacher burnout, post-covid era, teachers' opinions.

## INTRODUCTION

Due to the COVID-19 pandemic that came out in March 2020, there has been a shift from face-to-face instruction to online instruction all around the world to prevent the spread of the virus in educational institutions. Educators have worked hard to ensure learning consistency throughout this transition process and students have had to continue learning remotely through their devices such as television, radio, and mostly online learning platforms and tools such as synchronous virtual meeting software and asynchronous educational content materials. They have been used in almost all OECD and partner countries to reach the greatest number of students in this process (OECD, 2020). With the closure of educational institutions and interruption of face-to-face education, the education of 1.6 billion students, which corresponds to approximately half of the student population of all educational levels, has been interrupted (UNICEF, 2020). During this period, video conferencing has become vital to conduct online lessons (Lowenthal et al., 2020) as it helps with online learning and teaching by allowing users to support, track, and communicate with teachers and students from anywhere both formally and informally (Themelis & Sime, 2020). Because of this tremendous shift, schools have changed the way they think and started to search for alternative and practical ways to provide instruction, ensuring that learning will take place remotely as a result of closures. To maintain effective learning environments, people have had to adapt themselves to these new technologies and cope with numerous challenges such as mechanical and network issues. Additionally, they have started to experience the side-effects of those challenges and also excessive use of video conferencing platforms (Epstein, 2020; Riedl, 2021; Wiederhold, 2020; Williams, 2021). Overuse of those virtual conferencing programs led to the emergence of a new term called "Zoom fatigue" by many researchers (Brenda & Wiederhold, 2020;

Epstein, 2020; Riedl, 2021; Wiederhold, 2020) which means "a feeling of exhaustion from participating in video conference calls." (Fauville et al., 2021, p.2).

In this context, this study aims to describe the impact of giving online classes on teachers in Turkiye through video conferencing during the Covid-19 pandemic. The understanding of the online learning environment is becoming more crucial as more students attend online classes (Kauffman, 2015). Although there is a growing body of study in the literature that focuses on designing interactive and effective online classes and also increasing student participation in online classes, the number of the research addresses teachers' feelings and opinions in this process is limited. For this reason, this study may contribute to the literature by presenting how teachers in Turkiye feel while giving online classes using video conference platforms. Furthermore, it may provide suggestions to teachers to overcome the challenges they face in this process. The study addresses the following research questions:

1. How do teachers in Turkiye feel after teaching online through video conferencing during the Covid-19 pandemic?
2. Does digital exhaustion differ according to variables (such as experience, the time spent etc.)?
3. How do teachers in Turkiye cope with teaching online through video conferencing during the Covid-19 pandemic?

## LITERATURE REVIEW

### Post-COVID Teaching Analysis

With the Covid-19 pandemic, the existing education systems in the world and Turkiye have been unprepared to ensure the continuity of education under all circumstances. It has been observed that learners are physically separated from their schools, teachers, and other learners (Bozkurt & Sharma, 2020). Students' lives have been affected in various ways as a result of the COVID-19 epidemic, depending not just on their level and field of study, but also on where they are in their grades (Daniel, 2020). As the COVID-19 epidemic spread across the globe, most governments took the precaution of closing schools to try to stop the virus from spreading further. In Turkiye, each week of school closures equates to roughly 23 hours of mandatory face-to-face instruction time. Schools were compelled to substitute this duration with e-learning and homeschooling (OECD, 2020).

This emergency has sparked new developments in the field of education. From radio to television and the Internet, inventive techniques have started to be used to enhance learning continuity. A great number of studies have recently been conducted on the move from face-to-face instruction to substitute delivering in all settings of education and learning (Howe & Watson, 2021). Education has undergone significant transformations, with the growth of e-learning, wherein instruction is done remotely via online platforms. According to Li & Lalani (2020), education technology was seeing rapid expansion and adoption before COVID-19, with worldwide educational technology investments reaching US$18.66 billion in 2019 and the whole industry for online education expected to reach $350 billion by 2025. Since the pandemic, there has been a considerable increase in the utilization of language learning applications, video conferencing tools, and e-learning software. However, most of the education systems in the world were not equipped for e-learning opportunities when the pandemic arose (Schleicher, 2020). During the outbreak, almost all OECD and partner countries utilized digital platforms. Students have used online learning tools to access educational content at their leisure, formalized learning programs that they could complete at their own pace, and real-time courses conducted by their instructors via video conference systems (Schleicher, 2020). When it comes to the future of learning after Covid-19, it has been revealed that there are clear advantages for students in being able to extend their study time and opportunities outside the classroom door by using several distance learning alternatives (OECD, 2020). According to Daniel (2020), the development of online learning in tertiary education may probably continue, and education institutions will arrange themselves more carefully to follow tech-enhanced learning. To conclude, with the help of COVID19 pandemic educators and learners all around the world had a chance to try and see possible results of distance education.

## Teachers' Well-being during Covid-19 Pandemic

Teacher well-being leads to job satisfaction and productivity, but most significantly, it has a beneficial impact on student well-being and academic performance (Spilt et al., 2011). Teachers were faced with integrating distance learning modes almost shortly after the epidemic broke out, frequently without adequate supervision, training, or equipment during the pandemic (United Nations, 2020). Teacher professional development activities have been conducted online or shared via mobile and video applications. Furthermore, online class interviews and texting apps have become important tools and innovative methods for educators to interact with their students, colleagues, and all stakeholders. However, teachers all around the world were mostly not ready to promote learning continuity and adapt to new instructional modes in this period (United Nations, 2020). According to UNESCO (2020), millions of teachers, administrators, and other professionals have served as frontline workers, and they have exhibited great levels of dedication and inventiveness during the pandemic which has impacted at least 63 million primary and secondary school teachers.

UNESCO Covid-19 Education Response Report (2020) emphasized that it is highly critical to promote teachers' well-being, social-emotional skills, and endurance during crises. The current research conducted on the educators who experienced crises shows that there is a need for teachers to develop their social-emotional skills and resilience in hard times. The report also highlighted that a human-centered approach is a need for students and teachers because physical distance makes it more difficult for teachers to establish close relationships with learners during Covid-19. In this sense, teacher well-being is vital because instructors who are demotivated or anxious are less successful at promoting student well-being. Even though the teaching profession already experiences some obstacles and demands from students, families, and a continuously changing system, the epidemic is probably to add to the profession's stress and fatigue (Brenda & Wiederhold, 2020; Dabrowski, 2020; Epstein, 2020; Riedl, 2021; Wiederhold, 2020). To sum up, spending hours in front of a screen influences the well-being of educators.

## Video Conferencing after COVID-19 Pandemic

Numerous educators all around the world had to change from face-to-face to distance education because of the COVID-19 pandemic. Not only educators, but students are also facing unprecedented challenges and psychological challenges due to the exclusive online education which became the new norm. For example, in one investigation around 80% out of 350 students revealed that during Zoom simultaneous lessons not just have they experienced issues centering and remaining present, yet additionally experienced more disengagement, uneasiness, and depression contrasted with up face-to-face lessons (Peper, 2021). As to encounters, COVID-19 has inspired extensive sensations of anxiety while adjusting to web-based instruction and learning (Besser et al., 2020). Regardless of whether these encounters sway faculty prosperity, rely upon their interpretation of this trouble (Sabagh et al., 2018). Accomplishment objectives and mentalities can be viewed as assets or determinants of people's essential and auxiliary evaluations of stressors, and accordingly, matter for the sign of pressure (Daumiller & Dresel, 2020). According to Bailenson (2021), nonverbal overload and numerous elements of the present video conferencing tools interface, have led to psychological effects. The researchers also identify four primary causes of exhaustion: excessive close-up stare, cognitive overload, increased self-evaluation as a result of watching a video of oneself, and physical mobility restrictions (Bailenson, 2021). One study found that the frequency, length, and burstiness (periods of high activity followed by periods of little to none) of Zoom meetings resulted in higher levels of fatigue among teachers. Not surprisingly, fatigue then caused negative attitudes towards video conferencing in general (Fauville et al., 2021; Kara, Dilek, & Liman-Kaban, 2022; Riedl, 2021; Wiederhold, 2020).

When educators all around the world start to work from home and try to remotely conduct their teaching responsibilities through digital devices (Liman-Kaban & Asci, 2021), video conferencing tools have become a vital tool for education (Lowenthal et al., 2020). Video conferencing is a technology that allows users in various locations to have face-to-face sessions without having to move to a single location together. Especially after covid19 struck the world, video conferencing tools became trending. Video conferencing statistics and studies on remote work in 2019 show that the global remote workforce has increased by 140% since 2005 (Stone, 2020). Zoom is a video-conferencing application that can be given as an example of the rapid increase in the use from approximately 10 million daily Zoom meeting participants in December 2019

to 200 million in March 2020 and 300 million in April 2020 (Iqbal, 2020; Chawla, 2020). Educators all around the world start to cry out their extended workloads as a result of long hours of teaching in front of the screen. When the literature is analyzed, there are limited numbers of studies examining the psychological effects of teaching through video conferencing tools. Hinds (1999) illustrated that video conferencing increases the cognitive load when it is compared to voice calls. Furthermore, Bailenson (2021) draws four explanations for the causes of Zoom Fatigue and they are the extraordinary amount of eye gaze at a close distance, limited physical mobility, constant viewing of self-video, and increased cognitive load for senders and receivers. The current study aims to understand educators' digital exhaustion and look for solutions to it.

## Effects of Excessive Use of Screen

There are some results of excessive screen use. In this part, the negative results of excessive screen use are explained. According to Nielsen Company Audience Report (2016), adults log a total of 11 hours of screen time a day can influence their life negatively such as eye diseases, sleep disorders, addiction, reward seeking, weight gain, and health problems such as obesity, heart disease, type 2 diabetes, and some types of cancer.

Eye diseases are one of the common results of excessive screen use. Asthenopia is a condition that occurs when your eyes become exhausted as a result of prolonged use. Long periods of staring at a computer screen or straining to see in dim light are two prominent causes. Symptoms of asthenopia are pain around the eyes, a headache that may be aggravated by using your eyes, dry or watery eyes, blurred vision, burning, sore, or tired eyes, sensitivity to light, difficulty keeping your eyes open, and vertigo. Long-term computer and digital devices use has been called "computer vision syndrome" or "digital eye strain" since it is such a common cause of asthenopia. Reading for long periods, exposure to bright light or glare, activities requiring intense focus, being stressed or fatigued, exposure to dry moving air, such as air conditioning or heater, and underlying eye conditions, such as dry eye or uncorrected vision, are all causes of asthenopia.

Humans sleep roughly one-third of the day, making sleep a crucial health behavior (Irish et al., 2014). Excessive screen time is linked to poor sleep via a number of processes, including nocturnal exposure to bright lights, which may decrease melatonin production, and the displacement of other sleep-promoting activities like physical activity (Ghekiere et al., 2018; Lissak, 2018; Strasburger & Hogan, 2013). A link between screen time (a common form of sedentary behavior) and sleep problems can be explained in part by exposure to blue light, which enhances alertness and can make it difficult to fall asleep (Boniel-Nissim et al., 2015; Nuutinen et al., 2013).

As stated by World Health Organization (WHO, 2021), screen time has been related to an increased risk of obesity, which in turn increases the risk of diabetes. Obesity and diabetes rates have risen dramatically in recent years. Burnout is classified as an occupational phenomenon in the 11th Revision of the International Classification of Diseases (ICD-11), rather than a medical illness (WHO, 2019). According to ICD-1, burn-out is defined as follows: "Burn-out is a syndrome conceptualized as resulting from chronic workplace stress that has not been successfully managed. It has three dimensions: emotions of tiredness or depletion of energy; increasing mental distance from one's employment, or thoughts of negativism or cynicism about one's career; and decreased professional efficacy. Although there is no particular study on teachers' excessive screen use, when the literature is analyzed there are various studies on working in front of the screen. The results of those studies were discussed in this part.

## METHOD

## Research Design

The methodology of the study was designed regarding the purpose of the study and research questions. The study briefly aims to describe how teachers feel while teaching through video conferencing in the Covid-19 pandemic and provide suggestions to help them overcome the challenges they face in this process. The study employed convergent mixed methods design. Implementing a convergent mixed method design allows researchers to collect quantitative and qualitative data simultaneously and it enables researchers to reach an overall understanding of the research problem by collecting qualitative data and merging the results

of qualitative data with quantitative data collection methods to provide a deeper analysis of the research problem (Creswell, 2011). Convergent mixed method design is vital when an investigator is interested in using multiple data sources to examine similar issues at the same time points (Onwuegbuzie & Teddlie, 2003; Teddlie & Tashakkori, 2009).

## Setting

The context of this study is teachers in K12 and university instructors in Turkiye. As the sampling method of the study is random, many teachers from various K-12 schools and universities around Turkiye participated in the study. For this study, various K-12 schools and universities around Turkiye are sampled, including public and foundational ones. Although there are slight differences in their program, there is something in common; all schools offer online education because of covid19. The data collection tool, which was a questionnaire, was sent to instructors online through social media (Twitter, Instagram, WhatsApp). Participation was voluntary. The participants did the questionnaire online and sent it through Google Forms.

## Participants

This part presents the demographics of the participants of the quantitative phase and qualitative phase of the study. The participants of the study included 570 teachers from both public and private schools who have been teaching online since the pandemic started in Turkiye (N=570). There were 210 foundation school educators and 360 state school educators. 184 of the participants had 15 years and more of teaching experience. Only 36 of the participants had 3 years and less teaching experience. In table 1, the teaching experience of the participant educators can be found.

**Table 1.** Teachers' demographic information

|  |  | Frequency | Percent |
|---|---|---|---|
| Teaching Experience | 1-3 | 40 | 7,0 |
| (years) | 4-5 | 56 | 9,8 |
|  | 6-10 | 141 | 24,7 |
|  | 11-15 | 136 | 23,9 |
|  | 15+ | 197 | 34,6 |
|  |  |  |  |
| Devices | Notebook | 471 | 82,6 |
|  | Tablet Computer | 55 | 9,6 |
|  | Desktop PC | 30 | 5,3 |
|  | Mobile Phone | 14 | 2,5 |
|  |  |  |  |
| School Type | Foundation | 210 | 36,8 |
|  | State | 360 | 63,2 |

In table 1, the devices that teachers use while giving video conferencing sessions can be found. 442 of the educators claimed that they were using notebooks while teaching video-conferencing lessons and only two of the participants were using notebooks, tablets, and computers at the same time. Participant educators' grade-level teaching information can be found in table 2.

**Table 2.** Grade Levels

| Grade Levels | Number of teachers in each group |
| --- | --- |
| Preschool | 79 |
| Preschool & Primary School | 6 |
| Preschool, Secondary School &High School | 1 |
| Preschool & Primary School & Secondary School | 7 |
| Primary School | 124 |
| Primary School &Secondary School | 17 |
| Primary School & Secondary School & Adult Education | 3 |
| Primary School & Secondary School & High School | 3 |
| Primary School & Adult Education | 2 |
| Secondary School | 120 |
| Secondary School & High School | 7 |
| High School | 94 |
| Preparatory Level | 33 |
| Preparatory Level & Bachelor | 7 |
| Bachelor | 25 |
| Bachelor & Adult Education | 4 |
| Adult Education | 2 |

## Procedure

To participate the questionnaire, participants were supposed to use video conferencing tools while teaching. After participants accepted to take part in the questionnaire, they were initially asked some demographic questions. Participants were then introduced to the 16 items digital exhaustion questionnaire in Turkish and asked to indicate their level of exhaustion on a five-point Likert-type scale from 1 = "absolutely disagree" to 5 = "absolutely agree". At the end of the questionnaire, there were two open-ended questions.

## Instrument

The first stage in developing a questionnaire is to identify a topic of focus and create items that measure various features of that domain. This step was intended to develop a vast and diverse set of prospective items for the Digital Exhaustion Questionnaire that address various aspects of digital fatigue of educators. To do this, we used a combination of deductive and inductive methods, drawing on theoretical insights from a literature study and semi-structured interviews to investigate people's experiences with digital fatigue. To measure the level of general digital exhaustion in educators, an instrument was designed utilizing a five-point Likert questionnaire. Researchers created the digital exhaustion scale in Turkish and feedback was taken from six field experts. As a result of the feedback some of the items were excluded and some of the items were edited. The final instrument contained a total of 34 items. 16 items' purpose was to understand the demographic information of the participant educators. They participated in a questionnaire which included 16 demographic questions about age, experience, and screen time. 16 of the items were related to digital exhaustion. There were two open-ended questions.

## Data Analysis

All responses of the participants were exported via Google Forms for the quantitative part. Quantitative data items were analyzed in the form of descriptive statistics with means, percentages, and standard deviation. The data obtained from Google Forms were transferred to SPSS and tables and trends will be given through demographics and digital exhaustion. The data obtained from were used to perform confirmatory factor analysis and to estimate Cronbach's alpha internal consistency coefficients, composite reliability (CR), average variance extracted (AVE), maximum shared variance (MSV), and average shared variance (ASV). For quantitative analysis, descriptive statistics and ANOVA were conducted. For qualitative data analysis, answers to open-ended questions were downloaded. The analysis was done as thematic content analysis by hand. According to Miles et al., (1994), content analysis is a research technique that identifies the presence of specific words, topics, or concepts in qualitative research. Researchers may benefit from content analysis to measure and evaluate the presence, interpretations, and relationships of specific words, themes, or concepts. After the participants' responses were examined in general terms, codes were created in chunks, and categories and themes were created based on these codes. Interpretation of the created theme and important codes has been made in the further sections. For the reliability of the created themes and codes, a cross-check was made by the researchers, and the results obtained were compared. The interpretation of all the information obtained from data analysis is available in the findings and discussion sections.

## FINDINGS

This section shows the findings based on the research questions. Findings are presented as both quantitative (Questionnaire) and Qualitative (open-ended questions) data. While the first research question focuses on teachers' experiences of online education, the second research question targets the findings of teachers' screen fatigue in online education. On the other hand, the third question aimed to reveal teachers' experiences in online education.

## Quantitative Findings

Content Validity based on the ratings of three subject-matter experts, the content validity ratio (CVR) for each of the 30 items was calculated. The CVRs for 16 items were equal to 1, indicating perfect agreement. On the other hand, the CVRs for 6 items were equal to -0.2, for 8 items equal to 0.2. Thus, these 14 items (6+8) with CVRs less than .99 were excluded from the scale. That left 16 items remaining, which included: 5 in the emotional exhaustion (EE) subscale; 7 in the physical exhaustion (PE) subscale; 4 in the social exhaustion (SE) subscale. Since all components of the digital exhaustion survey (DES) were represented in these remaining 16 items, content validity was not impaired by the removal. In addition, the content validity index (CVI) value was equal to 1 for each subscale and overall scale. Thus, it can be said that the content validity of the DES was statistically significant (Lawshe, 1975).

The construct validity of the DES was initially tested using EFA in the SPSS Statistics 20 program (Hair, Black, Babin, Anderson, & Tatham, 2014; Tabachnick & Fidell, 2013). Before the analysis, the data set was checked to meet the assumptions of EFA. To this end, first, both univariate and multivariate normality assumptions for the data set for 570 participants were tested. To test univariate normality, cases with z scores exceeding ± 3.29 (p <.001) were considered outliers (Tabachnick & Fidell, 2013). Also, skewness and kurtosis values for all items were calculated and found to be between ±1 (skewness = -.800 to .693; kurtosis = -.882 to .293). To test multivariate normality, Mahalanobis distances were calculated, and a total of 60 outliers were detected for p < .001 significance level (Tabachnick & Fidell, 2013). After deleting these outliers, the data set was reduced to n = 463. Next, the missing values, not exceeding 1.1% for any item, were replaced using the series mean technique. The correlation matrix for all items was examined and coefficients were found above. 30 for all variable pairs. Also, all correlation coefficients were lower than .90, indicating no multicollinearity problem between variables.

**Table 3.** Factor Analysis of Digital Exhaustion Questionnaire

| | | Factor Loads | | | % of Variance |
|---|---|---|---|---|---|
| | | 1. Factor | 2. Factor | 3. Factor | |
| VKS10 | | ,863 | | | |
| VKS11 | | ,859 | | | |
| VKS9 | | ,704 | | | |
| VKS12 | | ,665 | | | 50,4 |
| VKS8 | | ,617 | | | |
| VKS3 | | ,612 | | | |
| VKS1 | | ,574 | | | |
| VKS5 | | | ,876 | | |
| VKS6 | | | ,835 | | |
| VKS4 | | | ,795 | | 10,3 |
| VKS7 | | | ,783 | | |
| VKS2 | | | ,598 | | |
| VKS16 | | | | ,820 | 7,8 |
| VKS13 | | | | ,737 | |

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | ,904 |
|---|---|

Bartlett's Test of Sphericity: Sig: 0,00 df: 120 Chi-Square: 5567

Reliability Statistics: Cronbach's Alpha: ,920; N of Items: 14

Results of the Bartlett Sphericity test [X2 = 0.00; df=120, p<0.01]. The significance value was found lower than 0.05, which means factor analysis can be conducted. and KMO statistics (KMO = .904) indicated the sampling adequacy of the whole data set, while anti-image correlation coefficients for each item (r =.657 to.983) were adequate for sampling adequacy of individual items. In the 16-item factor analysis (items 14 and 15 were removed during the analysis), it was seen that the items formed 3 factors. The first of these factors account for 50.4% of the total variance; the second 10.3%; the third covers 7.8%. A detailed table will be given in the following sections. The construct validity of the digital exhaustion questionnaire was determined by using principal component analysis. A factor load must be at least 0.30. In addition, the difference between the factor loads given by a variable to more than one factor should be at least 0.1 (Stevens, 2002). According to Tabachnick and Fidell (2013), the factor load of an item on a factor should be at least 0.32. In this study, it was decided that the minimum factor load should be 0.30 and the factor number should consist of at least 2 items. Factor extraction methods were compared according to the number of factors removed, the size of factor loadings, and the percentages of variance explained. As a result of the EFA, item 14 and item 15 in the draft scale were removed because they had close loadings (<.10) in two factors. In table 3, the factor analysis results of the digital exhaustion questionnaire can be found.

**Table 4.** Results of Reliability Analysis

| Factors | Cronbach's alpha |
|---|---|
| EE | .94 |
| PE | .92 |
| SE | .93 |

Note. EE = emotional exhaustion; PE = physical exhaustion; SE = social exhaustion

To test the reliability of scores obtained from the DES, Cronbach's alpha internal consistency and test-retest temporal reliability coefficients were estimated. The results are shown in Table 4. Estimated Cronbach's alpha coefficients for all factors were .92 and above, which indicates very good or perfect reliability (Kline, 2011, p. 70).

**Table 5.** ANOVA Results Examining General Digital Exhaustion and other predictors

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 65,799 | 10 | 6,580 | 7,214 | ,000b |
| | Residual | 509,876 | 559 | ,912 | | |
| | Total | 575,675 | 569 | | | |

Table 6 shows a one-way ANOVA comparing the means of teachers by lenght of one lesson, course breaks, number of lessons, and time spent. No significant difference was found. The impact of individual variables on general digital exhaustion can be viewed in table 5.

**Table 6.** The Impact of Individual Variables on General Digital Exhaustion

| Model | | B | Std. Error | Beta | | |
|---|---|---|---|---|---|---|
| 1 | (Constant) | 2,407 | ,212 | | 11,368 | ,000 |
| | Length of one lesson in face-to-face education | ,086 | ,040 | ,099 | 2,129 | ,034 |
| | Length of one lesson in distance education | -,007 | ,042 | -,008 | -,165 | ,869 |
| | Length of course breaks in face-to-face education | -,055 | ,059 | -,046 | -,937 | ,349 |
| | Length of course breaks in distance education | ,066 | ,051 | ,058 | 1,297 | ,195 |
| | The number of face-to-face lessons are taught in a day | -,019 | ,017 | -,047 | -1,097 | ,273 |
| | The number of online synchronous lessons taught in a day | ,072 | ,026 | ,152 | 2,727 | ,007 |
| | Duration of job-related meetings excluding the course given | ,031 | ,029 | ,051 | 1,045 | ,296 |
| | Time spent on the lesson plan other than the lesson given | -,001 | ,033 | -,002 | -,040 | ,968 |
| | Time spent on weekly in-class assessments other than the given course | ,008 | ,027 | ,014 | ,287 | ,774 |
| | The number of hours a day is on screen for work | ,106 | ,024 | ,222 | 4,323 | ,000 |

a. Dependent Variable: general digital exhaustion

Whether the variables affect general digital exhaustion is determined by looking at the significance value (sig.<0.05). It is possible to say that variables with values less than 0.05 affect GDE: In face-to-face education, the length of one class hour has a statistically significant effect on general digital exhaustion (0,034<0,05).

Effect size is 0,099. The length of one class hour in an online synchronous lesson has no statistically significant effect on general digital exhaustion (0,896>0,05). In face-to-face education, the length of the lesson breaks has no statistically significant effect on general digital exhaustion (0,349>0,05).

In distance education, the length of the lessons has no statistically significant effect on general digital exhaustion (0,195>0,05). According to findings, the number of face-to-face lessons are taught in a day has no statistically significant influence on general digital exhaustion (0,273>0,05). On the other hand, the number of video conferencing lessons a day has a statistically significant influence on general digital exhaustion (0,007<0,05). Effect size is 0,152.

Educators who have more synchronous online lessons to cover tend to feel more exhausted than those with fewer lessons. Furthermore, instructors who are tired after a video conference lesson are more likely to have a negative opinion regarding it. The duration of job-related meetings, except for the online synchronous lessons, has statistically no significant influence on general digital exhaustion (0,296>0,05). The time spent on the lesson plan other than the online synchronous lessons given has a statistically significant influence on general digital exhaustion (0,968>0,05).

The time spent on weekly in-class assessments other than the lecture given has statistically no significant influence on general digital exhaustion (0,774>0,05). The number of hours spent in front of the screen per day for work has a statistically significant influence on general digital exhaustion (0,000<0,05). Effect size is 0,222.

**Table 7.** Correlation between General Digital Exhaustion and Teaching Experience

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 3,806 | ,133 | | 28,678 | ,000 |
| | Teaching experience | -,054 | ,034 | -,067 | -1,590 | ,112 |

Table 7 shows a one-way ANOVA comparing the means of years of teaching experience for respondents who completed the survey. One-way analysis of variance (ANOVA) was conducted to examine whether general digital exhaustion differs significantly. A significant difference was not found between general digital exhaustion and teaching experience. The impact of teaching experience on general digital exhaustion can be viewed in table 6.

## Qualitative Findings

To collect qualitative data for the study, the educators were asked to answer the open-ended questions via Google Forms. The results were analyzed using the content analysis method creating themes, categories, codes and four key themes emerged. The themes are provided below:

- Teachers' feelings after teaching online through video conferencing
- Teachers' coping strategies during the Covid-19 Pandemic /Teachers' self-motivation strategies
- Teachers' strategies to promote student motivation
- Teachers' opinions about the effects of distance education on their professional development

## Theme 1. Teachers' Feelings after Teaching Online through Video Conferencing

Most of the participants stated that they felt the negative effects of teaching online via video conferencing on their physical and mental health. It can be concluded that most of the teachers in this research try to cope with *"screen fatigue"* while teaching online through video conferencing. They are not pleased with long teaching hours and work conditions. The majority of the teachers who participated in the study stated that they did not feel well enough after online classes and that they were trying to cope with serious health problems. Teachers also said that they felt mentally exhausted and cannot spend time with their families. Whereas some teachers highlighted that they felt energetic and happy after video conferencing, the rest of the participants expressed that they have mostly negative experiences and they feel highly exhausted after online classes. Especially, *"burnout"* (52) and *"fatigue"* (80) are the most frequently mentioned feelings according to the qualitative results. Furthermore, the participants pointed out the physical side effects that they felt after online classes such as headache, backache, low back pain, and eye pain. For example, one of the teachers said *"I feel like all my energy has been depleted. I have a terrible headache after video conferencing."* The teachers who participated in this research also pointed out their exhaustion. One of them said: *"I feel exhausted, I do not feel good enough to talk to anyone after online classes."* Another teacher complained about her concentration problems and she said: *"I can't concentrate on any other work. If I have a meeting longer than 1 hour in the evening, I have difficulty falling asleep at night. Even though I can sleep, I wake up tired in the morning. My neck and shoulder pain are increasing."* On the other hand, some teachers addressed how they are pleased with giving online classes during the pandemic: *"We are able to educate students in this challenging process. I am happy to be able to reach my students via online classes."*
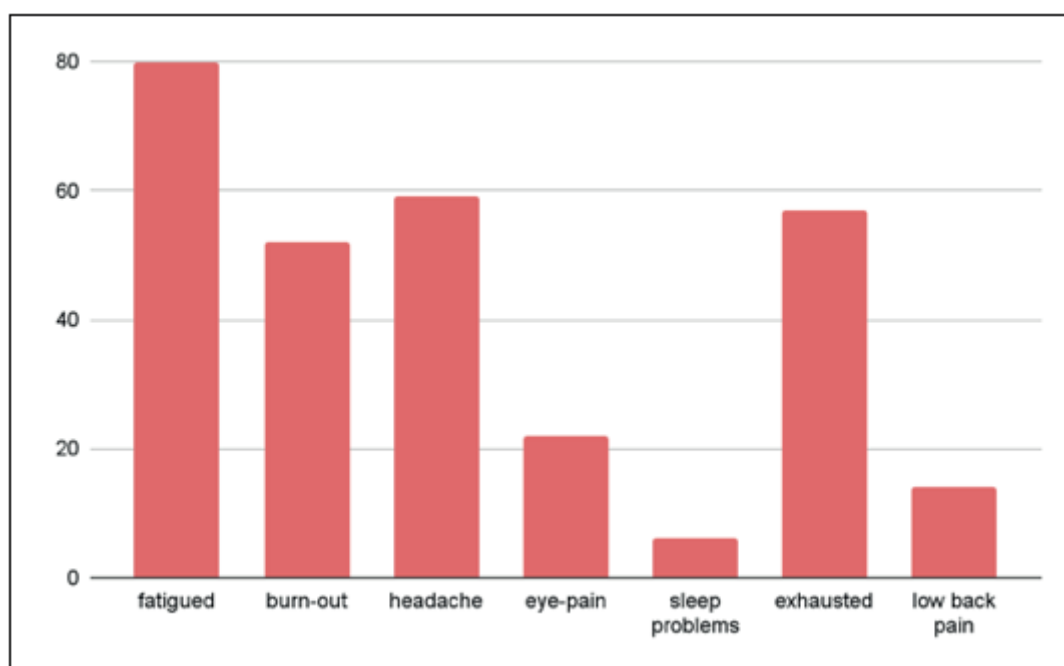


**Figure 1.** Teachers' Feelings after Teaching Online through Video Conferencing

## Theme 2. How do Teachers cope with Teaching Online during the Pandemic? *Self-Motivation Strategies

When the teachers were asked how they struggle with teaching online for long hours, most teachers stated that they had difficulties in this regard, whereas some of them stated that they use various strategies, which makes this process more manageable for them. Although most teachers participating in this study explained their various coping strategies, 39 teachers stated that they cannot handle long online teaching hours during covid-19 pandemic. The results of the study also indicate that the teachers prefer mostly physical relaxing methods such as walking or resting after giving online classes through video conferencing. The results of the study also show that the teachers who participated in this research prefer being isolated as they spend too

much working on computers (35). Teachers also stated that they do not want to use technological tools such as tablets, computers, or mobile phones for a long time because they feel mentally very tired after online synchronous online classes.

Some of the participants described how teachers face additional challenges when they attempt to collaborate on Zoom for class projects. *"Zoom has time limit if you don't have premium,"* she explained. *"You cannot have a lesson more than 40 minutes. Sometimes I give 8 classes to one class. We had to do eight separate Zoom calls, 40 minutes a piece for it."* Teachers' struggles with technology and its needs for proper operation are a major source of worry. Access to adequate technology or challenges with inconsistent internet can make it difficult to engage in video conferences, according to the teachers who responded. According to the instructor responders, these technical concerns must be solved.

Furthermore, most teachers prefer spending their time with their family members or kids when online classes are over. One of the teachers complained about her workload and said: *"I try to spend time with my family. There is a never-ending workload and if I cannot decide when to take a break, I feel like I will lose my mental and physical health due to this workload. So, I am trying to create time to stay away from the computer screen for a while, especially in the evenings."* In addition, research results also show that most teachers consume too many caffeine-containing beverages, such as tea (12) and coffee (67), during and after online classes whereas some teachers eat chocolate to motivate themselves during their break time. One of the teachers pointed out her workload and said: *"I feel tired because I work a lot. I want to sleep for a couple of hours to refresh my brain. However, I often do not have time to sleep after class. I have to check homework, prepare lessons, and reply to student emails."* The participants also explained the self-motivation strategies that they use on these difficult days. The results of the study show that teachers feel better when they think of their students although they have long working hours online during the covid-19 pandemic. 85 teachers stated that the biggest motivation source is their students. One of them said*: "A nice lesson I spent with my students is my biggest motivation."* Another teacher commented on how she feels when she thinks of her students and said: *"I think of my students, very young learners... I try to be as positive as possible. I know that a negative statement I make or any word I say can affect their whole lives. This motivates me. I forget everything in front of them."*

The teachers also addressed that lesson planning activities makes them feel more motivated. Most teachers prepare online games, discussions, or interactive activities to engage their students. One of them said:

> *"I am getting prepared before my lesson. I try to get feedback from students during the lesson. After the lesson, I check whether I use my materials effectively or not. Another teacher gave details about her routine before the online lesson and said: I have snacks. Sometimes I drink coffee, change my outfit, and put on perfume. Then, I start my online class. I ask how my students are feeling and try to motivate them with hopeful words."*

The majority of educators participate in the survey claimed that students who participate in videoconference classes with their cameras turned off, and the student respondents provided numerous reasons for their camera shyness. When students switch on the camera, they often feel more anxious because they are aware that others are seeing them, and they often admit to using the self-feedback screen to self-monitor themselves. Some educators additionally emphasize that students can multitask during class sessions by working on other projects, driving, or sleeping. Students may not be comfortable discussing their private lives with their friends on Screen, especially if it is recorded, because the camera exposes their private environment, whether at home or in a dorm. For students in videoconference classrooms, the camera, which is an intrusive component of videoconferencing, becomes a subject of controversy.

### Theme 3. Teachers' Strategies to Promote Student Motivation

When the teachers were asked what they do before, during, and after online classes, they explained the ways to increase their students' motivation. The results of the research revealed that most teachers use similar strategies to increase students' participation and motivation in online classes. For example, the most frequently mentioned strategy by the teachers is *"using online games."* 120 teachers highlighted that online games are powerful tools to engage students in online classes. One of the teachers said: *"I usually start the lesson with some interesting activities. At the end of the day, we play various games related to the topic of the day."*

Another teacher added: *"I design online games for them! I try to give them enjoyable assignments on the subjects they have learned. It is important for me to spend a good time with my students during class hours. In addition, I try to be positive, friendly, and accessible in this regard."*

In addition to the online games that the teachers used, the research revealed that starting a random conversation is one of the motivation-enhancing strategies which was frequently mentioned by the teachers. 77 teachers stated that off-topic conversations with students during online classes are effective in promoting students' motivation. Some teachers also said that they ask some random questions which are not related to the lesson topic when students' attention is distracted. They think that those random questions are highly effective in attracting students' attention, especially in online classes. One of the teachers said: *"Before I start the lesson, I talk to my students. At the end of each lesson, I try to create free time to talk to my students before saying goodbye."* One of the teachers gave an example from her online class: *"I try to talk about extracurricular topics. We talk about movies, books, etc... I try to establish a dialogue without drawing a pessimistic picture of how they feel. I am trying to make them feel good."* One of the teachers shared her observations that her students feel much better while talking and playing games: *"I talk to them and expect them to share their feelings in the individual interviews. Also, I have observed that we can play games easily via synchronous teaching, which makes them very happy."*

Another strategy which the teachers frequently used is *"music."* 86 teachers stated that they use music to motivate students in online classes. Most of them highlighted that music is a great tool to start online classes. Especially the teachers who teach English to young learners stated that they highly benefit from the video clips and songs in the online classes.

Some teachers also stated that they use music and dance together to increase their students' energy:

*"I start my lesson with a song from YouTube. My students and I stand up, dance, and clap!"*

Another teacher pointed out that videos or songs related to the lesson topics work well to internalize what they learn in online classes:

*"Sometimes I try to find music videos for students and link them to the topic."*

This research also revealed that the teachers' design creative content to make the online classes more enjoyable for their students. The teachers commonly use web 0.2 tools such as Kahoot, Wallword, and Jeopardy to promote motivation in their classes (24). One of the teachers said: *"I plan great online activities for them, I add color to the lesson using web 0.2 tools. I always get prepared for my students and online classes."* Furthermore, the teachers also use *"WhatsApp"* to communicate with their students. Some teachers believe that students enjoy when teachers share content, class material via Whatsapp: *"I share my movie and article suggestions with them and send some interesting random questions through WhatsApp. If they give the correct answers for the questions, I give extra points, which motivates them."* Also, some teachers stated that they use the Whatsapp voice message feature to make announcements, give feedback for student performance or motivate their students:

> *"I remind those who do not send their homework from the WhatsApp group of the class so that they send their homework immediately. I know that they feel unhappy those days because of the pandemic. I am trying to motivate them by saying that I am hopeful for them. I answer their questions as soon as possible during the day and night, and when they hand in their assignments individually, I thank them by saying "well done, you are a diligent, smart girl."*

### Theme 4. Teachers' Opinions about the Effects of Distance Education on their Professional Development

The teachers participating in the study were asked whether their experiences during distance education contributed to their professional development or not. While most of the teachers stated that this period contributed to their professional development, some teachers stated that it placed a great burden on teachers rather than contributing, and as a result, it was a very intense and difficult period for them. 449 (%84.4) teachers underlined that they found this period very helpful for their professional development. One of the teachers said:

> *"Certainly. Although I think that it is quite demanding, I also believe that the experience I have gained since March is very valuable. I learned how to become more flexible and open to new*

*developments. I have improved myself professionally and technologically. Now, I am more confident and I feel that I can help my students everywhere in any way!"*

Another teacher commented on the positive effects of distance education on her career and also her personality: *"Definitely yes! I feel more creative and organized. I have learned new techniques and programs. I can criticize myself more."* One of the teachers also pointed out the power of online training she attended this year and also underlined how collaborative learning created an impact on her mood: *"Yes. I learned a lot of new things. I attended many online training sessions. I learned new programs and applications and even had many teacher friends from social media from cities far away. Learning and developing together with them was good for my soul."*

On the other hand, some teachers think that the distance education process has no benefits for their professional development. Moreover, the teachers believe that this period is more harmful than beneficial and that it affects teachers' mental and physical health negatively. For this reason, 68 (%12.8) teachers answered *"absolutely no"* to this question. Some teachers who participated in the study also compared traditional (face-to-face) education with distance education and they think that distance education is much less efficient for students and teachers. For example, one of the teachers said: *"No. The knowledge gained through face-to-face experience and education can never be obtained remotely."* Some teachers referred to their digital skills: *"I already had digital skills before the pandemic. This period didn't help me much."* Another teacher gave a similar answer and said: "No. I had already experienced it, my experience guided me in this period. Learning about Zoom did not make me more patient or thoughtful.
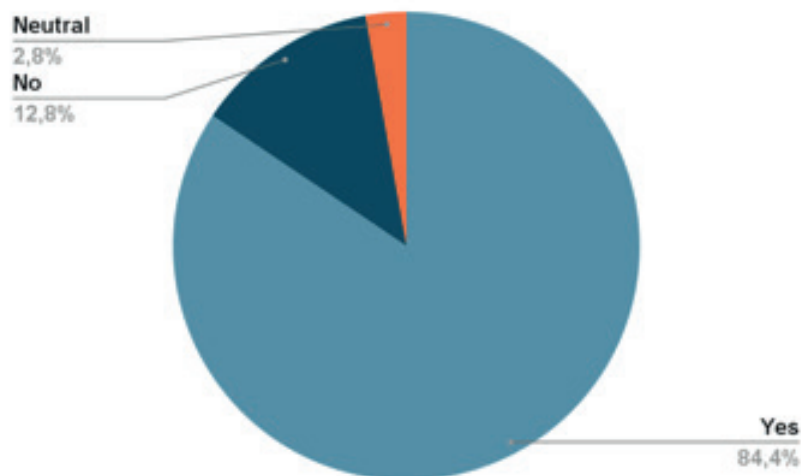


**Figure 2.** Teachers' Opinions about the Effects of Distance Education on their Professional Development.

## DISCUSSION

This study aimed to investigate the relations between teachers' digital exhaustion and working conditions. It also examined the interactions between the above factors in their relation to teachers' digital exhaustion. Researchers often consider workload, time allocation, and self-esteem to be part of a teacher's managerial competence or to be related to the quality or efficacy of teaching (Zydziunaite et al., 2020). In our study, we could not find any correlation between experience and digital exhaustion. It is possible to state that both experienced and inexperienced educators are vulnerable when the topic is screen time.

Due to a lack of feedback on leadership from fellow instructors and school management, teachers feel stressed when working on school initiatives (Gordon & Solis, 2018). Educators claim that they were alone in this process so coaching programs need to be started and they should spread the process throughout the year. Because of the effects of the Covid-19 epidemic that the globe is currently facing, a large number of instructors are facing difficulties as they are unprepared for this unprecedented scenario. Around the world, there has been a trend away from face-to-face education and toward remote learning and this transition

has also had an impact on the field of teacher professional development. As a result, online professional development programs have lately gained popularity (Karchmer-Klein & Pytash, 2020). In Turkiye, there are several main issues with teacher education and the solutions given to address those issues are not effective enough (Bellibas & Gumus, 2016). Although teacher professional development programs on the subject, pedagogy, and teaching practice were offered to %76 of Turkish teachers, several professional fields such as ICT and teaching in multicultural contexts are still absent from those training programs (OECD TALIS Report, 2018). In this sense, based on the answers given by the teachers, it can be deduced that online teacher professional development programs can be helpful for the teachers who need training and support, especially during the pandemic.

It is critical to consider the teacher's workload as a whole, as it consists of formal not only *"visible"* but also *"invisible"* components (Lieberman & Miller, 2005). The invisible component of teaching usually entails more work completed as a matter of duty and dedication, boosting the teacher's self-esteem by proving their expertise. As a result, the teacher's workload and the time he or she devotes to various targeted or purposeful tasks are important aspects of their position, but they are not self-evident and difficult to achieve. The teacher's capacity to implement the workload in a meaningful and purposeful manner, as well as allocate time to key activities that are both professionally required and complementary, demonstrates his or her leadership (Ballet & Kelchtermans, 2009).

Furthermore, the findings support prior research that indicated communication through videoconferencing violates several conversational norms, including turn-taking and nonverbal cues (Ferran & Watts, 2008; Storck & Sproull, 1995). Participant educators explained that the video conferencing environment prevented them from giving direct feedback during lessons because students did not want to disrupt the lecturers or talking over their classmates. Instead, students kept their microphones muted and took a passive role in the discussion.

The current study's findings reveal that teacher workload is strongly linked to stress. This link is critical because it may imply that the most draining and buffering component of teaching is the workload, as well as the quality of relationships formed at school with kids and their parents, fellow teachers, and school management. Excessive paperwork and high-stakes accountability expectations are two non-teaching-related workloads that pose significant challenges to teacher leadership and can contribute to stress (Van Droogenbroeck et al., 2014). Our findings reveal that a teacher's workload has a direct impact on their stress levels; a higher workload predicts higher teacher stress. Any amount of teacher workload that is overlooked has a negative influence on both teacher and student performance, which are both indicators of teacher leadership (Liman-Kaban, 2021; Wakoli, 2015).

A research study from Huang (2019) comparing the teachers' role in face-to-face and online environments by examining the learners' perceptions of the teachers' roles has found that according to the learners, the primary role of teachers in face-to-face context was cognitive whereas the primary role of teachers in online context was manager and affective. The learners also reported that they valued learning in the classroom setting more than the online because they believed that the teacher was better at giving immediate feedback in the classroom. Moreover, it is worth mentioning that the researcher in this study tracked the interaction and communication between learners and learners and teachers by logging on to their online programs and found little communication. The researchers concluded that if the teachers devote much of their time only to one mode of online learning program, it will probably cause a sense of dissatisfaction among learners and rigorously weaken the effectiveness of learning outcomes.

## CONCLUSION

The following are the recommendations based on the study's findings: Teachers' workloads should be lowered because an increase in workload may lead to burnout. Given that nearly all the instructors experience digital exhaustion, it is critical to investigate why teachers experience digital exhaustion and then devise preventive ways to alleviate the problem. When the characteristics of the working environment were examined simultaneously, they were found to be strongly connected to teachers' digital exhaustion: student self-regulated skills, teacher cooperation, and teacher workload. This is consistent with the earlier study, which indicates that social working circumstances are more essential to instructors than physical ones

(Johnson et al., 2012). This should not be read as a denial of the importance of well-maintained school facilities, adequate workspace, teaching and learning resources, but rather as a recognition that these aspects pale in comparison to relationships with students and colleagues. International research could point to ways to avoid digital weariness. Investigating why instructors at the Covid19 Pandemic report more digital exhaustion than before is also critical to identifying solutions.

Some changes that may help prevent digital exhaustion and are suggested below:

- Choosing the right eyewear might relieve your eyes. If you have eye disorders, you might consider investing in glasses or contact lenses designed specifically for computer work.
- The brightness of your display should not be left at the default setting but it needs to be adjusted according to the brightness of the room where it's installed. This can greatly reduce the strain on your eyes.
- Reducing the amount of blue light on your screen can be another solution. It's become increasingly common to hear blue light mentioned as a cause of eye fatigue. This is light that is visible to humans (visible light) and has a wavelength that is similar to UV rays. It is commonly stated that it strains the eyes due to its high degree of energy.
- Checking computer work environment. If the lights are near the center of the room and your PC is set up with you facing the wall, you may notice something that looks like sunlight shining on your screen from behind you. If that's the case, think about switching around the arrangement.
- To improve the quality of the air in the room, a humidifier can be used to change the temperature to lessen blowing air, and avoiding smoke are some modifications that may help prevent dry eyes. Moving your chair to a new location can assist to lessen the quantity of dry air that gets in your eyes and face.
- Perceived gaze, self-presentation concerns, and immobility can be the reason for eye fatigue. For future studies, the reasons for eye fatigue can be examined. Future research might look into how different contexts (e.g., work vs. socializing, video conferencing size) and individual variables (e.g., gender, personalities) affect how people experience digital weariness. Give your eyes a break by gazing away from your monitor throughout the day. Try the 20-20-20 rule: stare at anything 20 feet away for at least 20 seconds every 20 minutes.
- An ophthalmologist should be consulted as soon as possible. If you've tried everything above and your eye fatigue hasn't improved or there are indicators that it's becoming worse, you should see an ophthalmologist. Not only will you receive expert guidance on your symptoms, but it could also lead to the early diagnosis of previously undiagnosed eye illnesses such as glaucoma.

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## REFERENCES

Ainley, J. and R. Carstens (2018), "Teaching and Learning International Questionnaire (TALIS) 2018 Conceptual Framework", *OECD Education Working Papers*, No. 187, OECD Publishing, Paris, https://doi.org/10.1787/799337c2-en.

Ballet, K., Kelchtermans, G. (2009). Struggling with workload: Primary teachers' experience of intensification. *Teaching and Teacher Education. 25*(8): 1150-1157. 10.1016/j.tate.2009.02.012

Bailenson, J. N. (2021). Nonverbal Overload: A Theoretical Argument for the Causes of Zoom Fatigue. *Technology, Mind, and Behavior*, 1(3). doi.org/10.1037/tmb0000030.

Bellibas, M. S., & Gumus, E. (2016). Teachers' perceptions of the quantity and quality of professional development activities in Turkey. *Cogent Education*, *3*(1), 1172950.

Besser, A., Flett, G. L., & Zeigler-Hill, V. (2020). Adaptability to a sudden transition to online learning during the COVID-19 pandemic: Understanding the challenges for students. *Scholarship of Teaching and Learning in Psychology*. Advance online publication. https://doi.org/10.1037/stl0000198

Boniel-Nissim, M., Lenzi, M., Zsiros, E., de Matos, M., Gommans, R., & Harel-Fisch, Y. et al. (2015). International trends in electronic media communication among 11- to 15-year-olds in 30 countries from 2002 to 2010: association with ease of communication with friends of the opposite sex. *The European Journal of Public Health*, *25*, 41-45. https://doi.org/10.1093/eurpub/ckv025

Bozkurt, A., & Sharma, R. C. (2020). Emergency remote teaching in a time of global crisis due to CoronaVirus pandemic. *Asian Journal of Distance Education, 15*(1), i-vi. https://doi.org/10.5281/zenodo.3778083

Chawla, A. (2020). Coronavirus (COVID-19) – 'Zoom' application boon or bane. http://dx.doi.org/10.2139/ssrn.3606716

Daniel, J. (2020). Education and the COVID-19 pandemic. *Prospects*, *49*(1), 91-96. https://doi.org/10.1007/s11125-020-09464-3

Daumiller, M., & Dresel, M. (2020). Researchers' achievement goals: Prevalence, structure, and associations with job burnout/engagement and professional learning. *Contemporary Educational Psychology*, *61*, 101843. https://doi.org/10.1016/j.cedpsych.2020.101843

Epstein, H. (2020). Virtual Meeting Fatigue. *Journal Of Hospital Librarianship, 20*(4), 356-360. doi: 10.1080/15323269.2020.1819758

Fauville, G., Luo, M., Queiroz, A. C. M., Bailenson, J. N. & Hancock, J. T. (2021). *Zoom Exhaustion & Fatigue Scale.* SSRN. http://dx.doi.org/10.2139/ssrn.3786329

Ferran, C., & Watts, S. (2008). Videoconferencing in the field: A heuristic processing model. *Management Science, 54*(9), 1565-1578. https://doi.org/10.1287/mnsc.1080.0879

Ghekiere, A., Van Cauwenberg, J., Vandendriessche, A., Inchley, J., Gaspar de Matos, M., & Borraccino, A. et al. (2018). Trends in sleeping difficulties among European adolescents: Are these associated with physical inactivity and excessive screen time?. *International Journal Of Public Health*, *64*(4), 487-498. https://doi.org/10.1007/s00038-018-1188-1

Gordon, S.P., Solis, R.D. (2018). Teacher Leaders of Collaborative Action Research: Challenges and Rewards. *Inquiry in Education. 10*(2): Article 3. https://digitalcommons.nl.edu/ie/vol10/iss2/3

Hair, J. F., Jr., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate data analysis* (6th ed.). New Jersey: Pearson Prentice Hall.

Howe, E. R., & Watson, G. C. (2021, May). Finding Our Way Through a Pandemic: Teaching in Alternate Modes of Delivery. In *Frontiers in Education* (Vol. 6, p. 187). from https://www.frontiersin.org/articles/10.3389/feduc.2021.661513/full

Huang, Q. (2019). Comparing teacher's roles of F2f learning and online learning in a blended English course. *Computer Assisted Language Learning, 32*(3), 190–209. https://doi.org/10.1080/09588221.2018.1540434

Iqbal, M. (2020). Zoom revenue and usage statistics. *Business of apps.* Retrieved February 12, 2021 from: https://www.businessofapps.com/data/zoom-statistics

Irish, L., Kline, C., Rothenberger, S., Krafty, R., Buysse, D., & Kravitz, H. et al. (2013). A 24-hour Approach to the Study of Health Behaviors: Temporal Relationships Between Waking Health Behaviors and Sleep. *Annals Of Behavioral Medicine*, *47*(2), 189-197. https://doi.org/10.1007/s12160-013-9533-3

Kara, G., Dilek, M., & Liman-Kaban, A (2022). Teachers Practices towards Providing Interaction during Online Education in K-8 Settings. *Transferring Language Learning and Teaching from Face-to-Face to Online Settings.* IGI Global, Editor: Giannikas,Christina, ISBN:9781799887171.

Karchmer-Klein, R., & Pytash, K. E. (Eds). (2020). *Effective practices in online teacher preparation for literacy educators*. IGI Global.

Kauffman, H. (2015). A review of predictive factors of student success in and satisfaction with online learning. *Research in Learning Technology, 23*(1063519), 1–13. https://doi.org/10.3402/rlt.v23.26507.

Kline, R. B. (2011). *Principles and practice of structural equation modeling* (3rd ed.). New York London: The Guilford Press.

Lawshe, C. H. (1975). A quantitative approach to content validity. *Personnel Psychology, 28*(4), 563–575. https://doi.org/10.1111/j.1744-6570.1975.tb01393.x

Li, C., & Lalani, F. (2020). The COVID-19 pandemic has changed education forever. This is how. *World Economic Forum.* https://www.weforum.org/agenda/2020/04/coronavirus-education-global-covid19-online-digital-learning/

Liebermann, A., Miller, L. (2005). Teachers as leaders. The Educational Forum. 69: 151-162. DOI: 10.1080/00131720508984679

Liman Kaban, A. (2021). The influence of online CoI presences on learner satisfaction in higher education. *Asian Journal of Distance Education, 16*(1), 230-246. https://doi.org/10.5281/zenodo.5021228

Lissak G. (2018). Adverse physiological and psychological effects of screen time on children and adolescents: literature review and case study. *Environ Res*;164:149-157.

Lowenthal, P., Borup, J., West, R., & Archambault, L. (2020). Thinking beyond Zoom: Using asynchronous video to maintain connection and engagement during the COVID-19 pandemic. *Journal of Technology and Teacher Education*, *28*(2), 383–391. https://www.learntechlib.org/primary/p/216192/

Nielsen Company Audience Report (2016). Retrieved May 9, 2021, from: https://sites.nielsen.com/yearinreview/2016/assets/pdfs/Nielsen_AnnualReport_2016.pdf

Nuutinen, T., Ray C, Roos, E. (2013). Do computer use, TV viewing, and the presence of the media in the bedroom predict school-aged children's sleep habits in a longitudinal study? *BMC Public Health 13*:684. https://doi.org/10.1186/1471-2458-13-684.

OECD (2020). *Education at a Glance 2020: OECD Indicators,* OECD Publishing, Paris.

OECD (2020). Turkey: School education during COVID-19: Were teachers and students ready? Retrieved March 9, 2021, from OECD: www.oecd.org/education/Turkey-coronaviruseducation-country-note.pdf

Onwuegbuzie, A., & Teddlie, C. (2003). A framework for analyzing data in mixed methods research. In A. Tashakkori & C. Teddlie, (Eds.). *Handbook of mixed methods in social and behavioral sciences* (pp. 351-384). Thousand Oaks, CA: Sage.

Peper, E. (2021). Resolve eyestrain and screen fatigue. *Well Being Journal*, 30, 24–28.

Riedl, R. (2021). On the stress potential of videoconferencing: definition and root causes of Zoom fatigue. *Electronic Markets*. doi: 10.1007/s12525-021-00501-3

Sabagh, Z., Hall, N., & Saroyan, A. (2018). Antecedents, correlates and consequences of faculty burnout. *Educational Research*, *60*(2), 131-156. https://doi.org/10.1080/00131881.2018.1461573

Schleicher, A. (2020). *The impact of COVID-19 on education: Insights from Education at a Glance 2020*, OECD Publishing, Paris.

Spilt, J. L., Koomen, H. M., & Thijs, J. T. (2011). Teacher wellbeing: The importance of teacher-student relationships. *Educational psychology review, 23*(4), 457-477.

Stevens, J. P. (2002). *Applied multivariate statistics for the social sciences* (4th ed.). Lawrence Erlbaum Associates Publishers.

Strasburger, V.C., & Hogan, M.J., (2013). *Children, adolescents, and the media. Pediatrics. 132:*958-961.

Stone, K. (2021). *The State of Video Conferencing in 2020 [50 Statistics] | GetVoIP*. Getvoip.com. Retrieved 20 May 2021, from https://getvoip.com/blog/2020/07/07/video-conferencing-stats/.

Storck, J., and Sproull, L. (1995). Through a glass darkly: What do people learn in videoconferences? *Human Communication Research, 22*(2), 197-219. https://doi.org/10.1111/j.1468-2958.1995.tb00366.x

Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics* (6th ed.), Boston: Allyn and Bacon.

Teddlie, C., & Tashakkori, A. (2009). *Foundations of Mixed Methods Research: Integrating Quantitative and Qualitative Approaches in the Social and Behavioral Sciences.* Los Angeles, CA: Sage.

Themelis, C., & Sime, J. A. (2020). From Video-Conferencing to Holoportation and Haptics: How Emerging Technologies Can Enhance Presence in Online Education?. In *Emerging technologies and pedagogies in the curriculum* (pp. 261-276). Springer.

UNICEF (2020). UNICEF and Microsoft launch a global learning platform to help address the COVID-19 education crisis. UNICEF.

United Nations (2020, August). Education during COVID-19 and beyond. Retrieved March 9, 2021, from United Nations: https://kyrgyzstan.un.org/index.php/en/86264-educationduring-covid-19-and-beyond.

UNESCO (2020). COVID-19 Educational Disruption and Response. https://en.unesco.org/covid19 / educationresponse.

Van Droogenbroeck, F., Spruyt, B., Vanroelen, Ch. (2014). Burnout among senior teachers: Investigating the role of workload and interpersonal relationships at work. *Teaching and Teacher Education. 43*: 99-109.

Wakoli, C. (2015). Effects of Workload on the Teachers' Performance in Kanduyi Division, Bungoma District. *International Journal of Science and Research. 5*(10): 1215-1219. DOI: 10.21275/SUB154454.

Wiederhold, B. (2020). Connecting Through Technology During the Coronavirus Disease 2019 Pandemic: Avoiding "Zoom Fatigue". *Cyberpsychology, Behavior, And Social Networking, 23*(7), 437-438. doi: 10.1089/cyber.2020.29188.bkw

Williams, N. (2021). Working through COVID-19: 'Zoom' gloom and 'Zoom' fatigue. *Occupational Medicine, 71*(3), 164-164. doi: 10.1093/occmed/kqab041

World Health Organization (2021). *Diabetes.* Retrieved 20 May 2021, from https://www.who.int/news-room/fact-sheets/detail/diabetes#:~:text=The%20number%20of%20people%20with,stroke%20and%20lower%20limb%20amputation.

World Health Organization (2021). *Burn-out an "occupational phenomenon": International Classification of Diseases.* Retrieved 20 May 2021, from https://www.who.int/news/item/28-05-2019-burn-out-an-occupational-phenomenon-international-classification-of-diseases.

Zydziunaite, V., Kontrimiene, S., Ponomarenko, T., & Kaminskiene, L. (2020). Challenges in Teacher Leadership: Workload, Time Allocation, and Self-Esteem. *European Journal Of Contemporary Education, 9*(4). https://doi.org/10.13187/ejced.2020.4.948