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Katarzyna Tomaszek
University of Rzeszów, Poland
http://orcid.org/0000-0001-7019-5403

Agnieszka Muchacka-Cymerman
Pedagogical University of Cracow, Poland
https://orcid.org/0000-0002-1627-4036

Students' Burnout in the E-School Environment: Pilot Study Results of the Validation of the E-learning Burnout Scale

Abstract

The COVID-19 pandemic caused widespread school closures and therefore forced students to study outside of the classroom at home via the Internet. However, for some students remote education was found to be challenging and stressful (Bilal et al., 2022). Past research revealed that despite the advantages of online classes, there are several threats e .g. lower academic performance, lower engagement and work avoidance goals, higher depression and anxiety (Daumiller et al., 2021; Srivastava et al., 2021), and school burnout (Salmela-Aro et al., 2022). Because previous studies regarding the student burnout syndrome have used predominantly traditional school in-personal learning, there is a great need for developing an instrument with the potential to measure online student burnout symptoms. The aim of this research was to investigate the appropriateness of using an E-learning burnout scale with an adolescent population. The E-Learning Burnout Scale (E-SBS) was designed specifically for measuring exhaustion and learning difficulties caused by school closures during the COVID-19 pandemic. E-learning burnout syndrome, which is defined as the five-dimensional construct, captures thoughts, feelings, and behaviours related to educational difficulties experienced by adolescent students during online classes. The results confirmed the E-SBS to

be psychometrically sound regarding the five-factor structure, content validity, and discriminative validity. Hence, the E-SBS scale has shown potential for use in a variety of educational areas.

K e y w o r d s: e-learning burnout syndrome, adolescents, education, psychometric validation

The COVID-19 pandemic caused widespread school closures and therefore forced students to study outside of the classroom at home via the Internet. However, for some students remote education was found to be challenging and stressful (Bilal et al., 2022). Past research revealed that despite the advantages of online classes, there are several threats e .g. lower academic performance, lower engagement and work avoidance goals, higher depression and anxiety (Daumiller et al., 2021; Srivastava et al., 2021), and increase in school burnout level (Salmela-Aro et al., 2022). Because previous studies regarding the student burnout syndrome have used predominantly traditional school in-personal learning, there is a great need for developing an instrument with the potential to measure online student burnout symptoms. The E-Learning Burnout Scale (E-SBS) was designed specifically for measuring exhaustion and learning difficulties caused by school closures during the COVID-19 pandemic. The theoretical background and validation of this instrument is discussed in this paper.

What is more, many past studies have confirmed the significant associations between higher student burnout syndrome and lower psychological well-being (Bhugra & Molodynski, 2022), however to our knowledge, none of them examined the above-mentioned relationship in the distance learning context among Polish adolescents.

Research Background

During the COVID-19 pandemic, both teachers and students faced many difficulties related to external resources (e.g. internet connection, access to devices) and internal resources (e.g. anxiety, phobia). As the pandemic grew, the Ministry of Education and Science in Poland decided to close all schools and thus embark on remote learning, for which neither teachers nor students and, just as often, the system itself, were prepared. According to Winiarczyk and Warzocha (2021), remote teaching formulated a quite different educational reality. The tasks facing teachers were no longer just educational, but often IT-related and psychological. Getting students interested in learning also plays a very important role, which is made possible by teaching materials available on educational platforms. For many teachers, especially at the beginning of remote work, it was a challenge to find materials interesting enough for the group. Nearly half of the teachers felt

insufficiently prepared for online learning (Ptaszek et al., 2020). In addition, almost 80% of teachers have not participated in training on remote work (Winiarczyk, Warzocha, 2021). According to a report by Plebanska et al. (2020), teachers were insufficiently prepared for remote teaching.

Also for the students, working remotely was difficult. They were left at home overnight with no information on how long they would function in this way. The theory of wearing different masks depending on the environment in which the individual finds him-/herself is well-known (Tylikowska, 2000, 2016). Students who created themselves at school different to how they are at home were forced to create a new version of themselves, one that from behind the door of the room would not be too difficult for the parent to accept. Often, then, relationships that had been enduring were broken, and it was hard to 'like' someone completely different. The consequences were myriad, from anxiety (Munir et al., 2021) through depression (Al Azzam et al., 2021) to thoughts or suicide attempts (Rahman et al., 2021). A very important barrier – highlighted by both groups – was limitations in accessibility to the teacher/face-to-face contact (Azlan et al., 2020). Both teachers and students find it easier to pay attention to something they do not understand in class time.

Students' burnout with the distance learning concept

Burnout syndrome is affecting a growing group and is becoming a serious social problem that can affect both teachers and students. A significant group exhibits some symptoms of burnout, but underestimates them. Negative attitudes and behaviours related to the educational process can be seen in students as a result of their burnout, such as unwillingness to go to school every day, avoiding contact with classmates, escaping to the computer, lack of involvement in the educational process, lack of interest in the issues presented in class, lack of an intrinsic motivation to learn, or loss of bonds with classmates, among others (Muchacka-Cymerman & Tomaszek, 2017). Wilsz (2009) sees the causes of school burnout in students as the occurrence of negative attitudes and behaviour related to the educational process consisting of, among other things, reluctance to go to school every day, lack of commitment to the educational process, avoidance of contact with classmates, lack of faith in receiving good grades and appreciation from the teacher and other students, lack of intrinsic motivation to learn consisting of fear of school, loss of bonds with classmates, and frustration over lack of success. The author states that student burnout in the educational process is mainly due to students' failure to cope with stress, inadequate adaptation of the learning process to individual students' personality traits, a poor school atmosphere, too much information provided to students in the educational process due to overloaded curricula, and a high pace of delivery (Wilsz, 2009). Maslach et al. (1997), on the other hand, points out that burnout among students refers to a sense of exhaustion from the demands of learning, a cynical attitude towards learning,

and a sense of incompetence in the role of a student. These three variables form the 3-dimensional burnout theory, and research by Schaufeli et al. (2002) support the three-component nature of this phenomenon. Burnout is defined by Schaufeli et al. (2002) as a chronic and negative mental state resulting from performance. Initially, the individual has a sense of exhaustion, while the next stage is discouragement from performing tasks, reduced effectiveness of activities, decreased motivation and negative attitudes and behaviours that hinder adaptation at work.

Santinello's (2008) Burnout Theory refers to four aspects of burnout: psycho-physical exhaustion, lack of engagement with the audience, lack of self-efficacy, and disillusionment with one's professional trajectory. The psychophysical exhaustion sphere can refer to high levels of stress or exhaustion. Lack of commitment to the relationship with others largely refers to the individual's social environment, along with his/her relationship with that environment (e.g. student-student, student-teacher). The sense of efficacy is related to how the individual assesses his/her competence in relation to the area of his/her actions. The last aspect touches on the sphere of the individual's existence, his/her satisfaction with the action he/she takes, or his/her motivation to work.

According to Aypay's (2012) theory, school burnout is a consequence of burnout that has occurred as a result of excessive demands placed on the individual from school. In his theory, Aypay believes that burnout consists of seven-factors: loss of interest in school, burnout from family, burnout from learning, burnout from homework, burnout from teacher demands, the student's need for rest and time to play, and a sense of inadequacy at school. According to the research, gender also plays a significant role in the occurrence of school burnout syndrome. School burnout in the adolescent population is generally higher among boys (Zinali, 2013). In contrast, girls are more likely to be burned out in late adolescence (Imani et al., 2018). Research by Herrmann et al. (2019) explains that girls' higher exhaustion scores may be explained through aspects of self-esteem and motivation. In addition, adolescents who experience burnout may also be susceptible to the occurrence of Internet addiction (Tomaszek & Muchacka-Cymerman, 2020) and depression (Malooly et al., 2017). Researchers have also noted that burnout increases as students' age increases and may correspond to the level of stress experienced as adolescents change their level of education (Lee et al., 2013).

The COVID-19 pandemic forced students and teachers to widely use the new technologies in education, which created new study conditions, accompanied by lack of direct contact and support from teachers, social isolation from classmates, and challenges in learning as students had to become more involved in the individual study, while parents were forced to assume the role of the tutor or, in some cases, teacher. In such stressful conditions students experienced increase in distress and mental health problems, e.g. depression and anxiety, as well as difficulties in meeting educational demands. Hence, the depletion of personal resources and high study demands might have caused a higher risk of burnout

symptoms development, directly related to learning at home via the Internet. To date, researchers have focused on measuring burnout level with traditional scales created for the in-personal school environment, also during the COVID-19 pandemic. However, in the light of school closures, pupils faced new challenges related to distance learning. As such, there was a great need for developing new measurement of burnout symptoms experienced by youths because of education via virtual technologies. The afore-mentioned five dimensional construct of e-learning burnout was developed based on classical Maslach 3-dimensional burnout theory, Santinello 4-dimensional approach, as well as Aypay's dimensional student burnout theory.

E-learning burnout syndrome is defined as a students' response, extended in time, to chronic online learning stressors in the e-school environment. It comprises five key sub-dimensions:

- feeling exhausted with distance learning that comprises the physical and mental feeling of being overwhelmed caused by the increased workload, with poor instructional support from teachers and physical strains such as long hours in front of the computer;
- burnout due to parental pressure that refers to an increase in parents' supervision, doubts about children's e-study efforts, and demands related to academic achievements;
- loss of educational interest, motivation and aspirations, which contains student's loss of interest in acquiring knowledge, loss of study engagement and effort, lowering of expectations regarding school performance, and resignation from full participation in the e-classes by engaging in social mediaor online games;
- negative attitude towards school measures, the change in attitude towards school into a more negative and cynical one;
- study disappointment, which captures students' boredom and displeasure caused by frustration and difficulties in understanding the teachers' instructions and the presented learning materials.

Research Focus

The E-learning Burnout Scale (E-SBS) is an experimental version of the tool, developed to measure a new educational phenomenon, namely student learning loss due to school closures caused by the COVID-19 pandemic. Thus the main goals of our study were two-fold aimed to test the psychometric properties of the E-SBS scale in the Polish education context, and to establish the factor structure of the adolescents' e-learning burnout syndrome, and to examine its, internal consistency, and construct validity. Additionally, we also analyzed the distribution of e-learning burnout scores in the studied adolescent population by sex and age.

Given the limitations of currently available instruments to test e-learning burnout, the main study question was What are the psychometric properties of a novel E-SBS scale? Particularly we were looking for the answer to the following

questions: (1) What is the factor structure of e-learning burnout phenomenon? (2) What is the internal reliability of the E-SBS scale? (3) Does a 22-item E-SBS scale meet the convergent validity criterion? (4) Do girls and boys score differently in E-SBS scale? (5) Do E-SBS scores are different among early, middle and late adolescent groups? Our main hypotheses were as follows:

H1: E-learning burnout syndrome is a multidimensional phenomenon. The multidimensional structure is postulated in past theoretical approaches suggest 3 up to 5 components of burnout syndrome e.g. Maslach's or Aypay's theory.

H2: The five components of e-learning burnout syndrome measured by E-SBS scale will be interrelated to one another. According to main past burnout theories, the symptoms of burnout are connected to each other, and one symptom may be the cause of the full syndrome development (Tucholska, 2009; Salmela-Aro et al., 2009). Madigan and Curran (2021) in their meta-analysis found that while is the core academic burnout symptom is exhaustion, while cynicism and inadequacy are recognized as the consequent behavioral and emotional expressions of exhaustion.

H3: The E-learning burnout symptoms will be significantly related to burnout symptoms observed by parents (convergent validity measurement). Burnout literature define study-related syndrome as a maladaptive emotional, cognitive, behavioral and physiological response to long-term exposure to stressful events (Tomaszek & Muchacka-Cymerman, 2020). The most observable burnout symptom is behaviors and reactions indicating depressive moods and lack of energy (Tucholska, 2009).

H4: Girls will score higher in E-SBS than boys. Past studies have confirmed sex differences in burnout experience, with girls to be more prone for developing this syndrome (Tomaszek, Muckacka-Cymerman, 2019). A more recent study revealed that female students score higher in exhaustion, cognitive impairment, and emotional impairment (Fiorilli et al., 2022).

H5: There will be differences in E-SBS scores among early, middle and late adolescents. The burnout level and changes in its dynamics are related to the progression of students to the next educational stages. Past longitudinal and cross-sectional studies have shown that school burnout increases with age (Farina et al., 2020).

The second aim of the current study was to examine the associations between students' e-learning burnout syndrome and their psychological well-being during the pandemic Covid-19. Educational burnout is recognized as one of the most significant factors predicting loss in psychological well-being (Hwang, Kim, 2022). A decrease in psychological well-being is related to students' inability to align study and environmental demands (Anriyani et al., 2017). Therefore, it affects both the life and educational satisfaction of students, as well as the ability to play an active role in school and cope with everyday stressors. Because the pandemic Covid-19 was recognized as a serious source of life threat and educational stressor, "this new social reality has introduced new stressors such as the irrational fear

of contagion, social distancing that leads to isolation and distrust, together with the loss of positive attitudes such as security, predisposition, or effort" (Ruiz--Robledillo et al., 2022, p.3). As regards these findings, we assume that *higher e-learning burnout will be associated with lower psychological well-being* (H6).

Methodology of Research

Composition of the E-SBS scale

The E-SBS Scale focuses on five factors regarding the e-learning difficulties experienced by students. Thus, it assesses the thoughts, feelings and behaviours of students during their online classes which prevent them from participating effectively in the e-lessons. The first step of preparing the research tool was developing 22 questionnaire items and dividing them into five sub-scales according to the categories corresponding to Student Burnout with E-Learning concept. Next, two independent judges (doctors of psychology with experience in working with adolescents) assessed the degree of comprehensibility and relevance of the items. In line with their comments, some items were changed or reversed. This experimental version of the scale was used in the pilot study.

Sample and Procedure

The study was conducted online between 16 April and 30 May 2021, using the Google Forms application. Prior to starting the survey procedure, the consent to participate in the study was obtained from primary and high schools (12 schools located in different parts of Poland), parents and students. The information about the survey with the link to the online forms were sent via school e-mails to adolescents, and their parents. The sample consisted of 186 students from grades 7–8 of primary school and grades 1–3 of high school (112 girls (60%), 74 boys (40%); 11–19 years of age with Mage = 15. 93 years; SD = 1.70). The parent sample was composed of 29 participants (Mage = 44.31; SD = 6.85), mostly mothers (14% fathers).

Ethical Consideration

The study was conducted in accordance with the Helsinki Declaration for research on people, and was approved by the Ethical Committee of the Institute of Psychology in the Pedagogical University of Cracow.

Instruments

The E-learning Student Burnout Scale (E-SBS)

The scale was developed by Tomaszek and Muchacka-Cymerman based on past theoretical and empirical approaches to student burnout syndrome (Maslach, Aypay) and the recent studies on distance learning specificity and challenges (Basar et al., 2021; Özüdoğru, 2021, Macałka i in., 2022). The final list of items within the E-SBS was devised after being revised by two experts within educational settings (doctors of psychology).The E-SBS scale is a self-report 22 items scale to measure the adolescent students' burnout with online learning total score and its five sub-dimensions. The students answer on a 5-point Likert scale (1–I completely agree, 5–I completely disagree). The questions contains five areas of difficulties:(1) Feeling exhausted with distance learning (e.g. My study duties overwhelm me when I sit at the computer during classes), (2) e-burnout due to parental pressure (e.g. Since I am studying via the Internet, my parents keep reminding me to learn), (3) Loss of educational interest, motivation and aspirations (e.g. Due to the fact that I am studying via the Internet, I am not motivated to learn), (4) Negative attitude towards school–a reversed scale (e.g. Since I am studying via the Internet, I have a more positive attitude towards the classes), (5) Study disappointment (e.g. During my online classes, I feel disappointed more often with the knowledge that the teacher provides).

Measures used for validation

The E-SBS scores were correlated with indicators of adolescent psychological well-being (self-report subjective opinion of students) and with the SBO scale that captures the student burnout symptoms perceived by parents and teachers. The following measures from the Pilot Study were used to assess the criterion accuracy of E-SBS:

The observation scale of student burnout symptoms for parents and teachers (SBO) developed by Tomaszek and Muchacka-Cymerman is a brief measurement for assessing the presence (or absence) of eleven student burnout symptoms. The list of questions was obtained on the basis of Maslach and Salmela-Aro burnout syndrome definition and discussed with two experts in the field (doctors of psychology). The scale contains items that captures the symptoms like the lack of enthusiasm and energy to learn, irritability and nervousness appearing during conversations about school duties, anxiety related to school tasks, negative beliefs about own school skills, the belief about 'being' a worse student than others, the lack of engagement in school duties (negligent performance of tasks, study weariness and anhedony, etc.). The respondents also had the option to add a symptom that was not listed. The person completed the scale by selecting one from two options Yes/No. The scale allows to measure the overall level of observed parent or teacher student burnout symptoms.

Psychological Well-Being Scale Caroll Ryff (PBW), adapted by Karaś & Cieciuch (2017) to the Polish context, is an 18-item instrument used for measuring subjective psychological well-being. It taps six areas of well-being and happiness such as autonomy (AT) ("e.g. I have confidence in my opinions, even if they are contrary to the general consensus", environmental mastery (EM) (e.g., "In general, I feel I am in charge of the situation in which I live"), personal growth (PG), (e.g., "I think it is important to have new experiences that challenge how you think about yourself and the world"), positive relations with others (PR) (e.g., "People would describe me as a giving person, willing to share my time with others"), purpose in life (PL) (e.g., "Some people wander aimlessly through life, but I am not one of them"), and self-acceptance (SA) (e.g., "When I look at the story of my life, I am pleased with how things have turned out"). The respondents are asked to rate each of the statements on a 5-point Likert scale (1–strongly agree; 5–strongly disagree) (e.g. Maintaining close relationships has been difficult and frustrating for me). In this study, Cronbach's αfor total score reached .81, for sub-dimensions .58(AM), .51 (EM), .49 (PG),.59(PR), .42(PL), and .73 (SA).

Data Analysis

Descriptive statistics, namely the mean (M), standard deviation (SD), kurthosis, skeness, and Shapiro-Wilk normality test for E-SBS scale data items, and comparison analysis e.g. U Mann-Whitney test and Kruskal-Wallis test, as well as Tuckey post hoc tests for examining gender and age differences were calculated. The Pearson's correlation analysis were performed to test the inter-correlation between five sub-factors of E-SBS scale, and to examine the associations between E-SBS and PBW scores. The structure of the e-learning burnout was explored by using exploratory factor analysis (EFA) on E-SBS items. The above-mentioned statistics were performed using IBM SPSS Statistics 22.0. Reliability analysis (Cronbach's α and McDonald's ω coefficients) and model fit indexes in EFA and confirmatory factor analyses (CFA) statistics were calculated with Jamovi free software. Prior to performing EFA and CFA statistics, data were verified in terms of removing all missing data. The bivariate Pearson Correlation was performed on continues variables e.g. E-SBS and PBW results from the total sample (N = 187). The sample size over 100 causes that although both variables did not meet the normal distribution criterion the bias is small and does not affect obtained results (Beversdorf, 2008). The Spearman correlation analysis was performed on the data from 29 parent-adolescent dyads. The non-parametric analysis was chosen because of the non-normal distribution of E-SBS scale data.

Results of Research

Descriptive statistics

The assumed structure of the e-learning burnout syndrome was examined by EFA statistics, with the measures of the obtained correlation matrix (the Kaiser-Meyer-Olkin, KMO), and the Bartlett's sphericity test. The items' distribution significantly differed from the normal distribution (Shapiro-Wilk normality test results equal to $p < 0.001$). However, the values of skewness and kurtosis themselves ranged between –1.35 to 1.26, and did not exceed the range from –2 to +2, which suggests that the deviation was not significant. Therefore, the principal axis method for EFA statistic – which does not require a normal distribution of the analysed items – was chosen. Most of the extraction communalities determining the variance of the given variables obtained values greater than the acceptable 0.3 (only two items were lower than the criterion e.g. items 11 and 22). The result indicates the possibility of assigning almost all of the items to the structure of the tool (see Tab. 1).

Table 1
Descriptive statistics of E-SBS items, the results of the Shapiro–Wilk normality test, and the extraction communalities

Item	M	SD	Skewness	Kurtosis	Shapiro-Wilk normality test	Extraction communalities
ESWS1	3.29	1.20	–.26	–.66	.91***	.51
ESWS2	2.05	1.16	.85	–.32	.82***	.49
ESWS3	3.50	1.32	–.45	–.99	.87***	.72
ESWS4	3.47	1.23	–.35	–.88	.89***	.48
ESWS5	3.73	1.37	–.78	–.68	.82***	.62
ESWS6	3.04	1.45	–.00	–1.35	.88***	.54
ESWS7	3.18	1.40	–.20	–1.22	.89***	.40
ESWS8	3.47	1.33	–.46	–.89	.88***	.78
ESWS9	2.56	1.13	.28	–.74	.90***	.44
ESWS10	2.82	1.35	.20	–1.13	.90***	.35
ESWS11	2.36	1.19	.68	–.38	.87***	.18
ESWS12	1.87	1.16	1.26	.68	.75***	.62
ESWS13	3.50	1.35	–.58	–.84	.86***	.65

ESWS14	3.39	1.31	–.37	–.95	.89***	.45
ESWS15	3.42	1.29	–.32	–1.00	.89***	.64
ESWS16	2.61	1.38	.34	–1.14	.88***	.37
ESWS17	2.42	1.08	.33	–.59	.89***	.55
ESWS18	2.93	1.22	.06	–.84	.91***	.40
ESWS19	2.22	1.24	.66	–.72	.84***	.90
ESWS20	2.72	1.28	.34	–.95	.90***	.37
ESWS21	3.49	1.34	–.46	–1.04	.87***	.58
ESWS22	3.24	1.33	–24	–1.07	.90***	.26

Note: *** $p < 0.001$

Sources: Own work

The structure of E-learning Student Burnout Syndrome – EFA results

The KMO test was equal to .86, which indicates that the composition was satisfied (KMO value > 0.50) (Kaiser, 1974). The Bartlett's sphericity test ($\chi^2_{(231)} = 1815.47$; $p < .0001$) suggests significant correlation coefficients and the presence of acceptable shared variance (Reddy et al., 2019). An EFA was calculated using the principal axis method with Oblimin rotation and the critical factor load value < 0.4. The graphic presentation of the EFA results is shown in Fig. 1. The findings suggest that the first five factors account for most of the total variability in data (given by the eigenvalues > 1).

Five factors distinguished on the basis of scree plot explained 61.8% of the variance. All of them assumed the acceptable sum of the squared loadings greater than 1 (see Tab. 2).

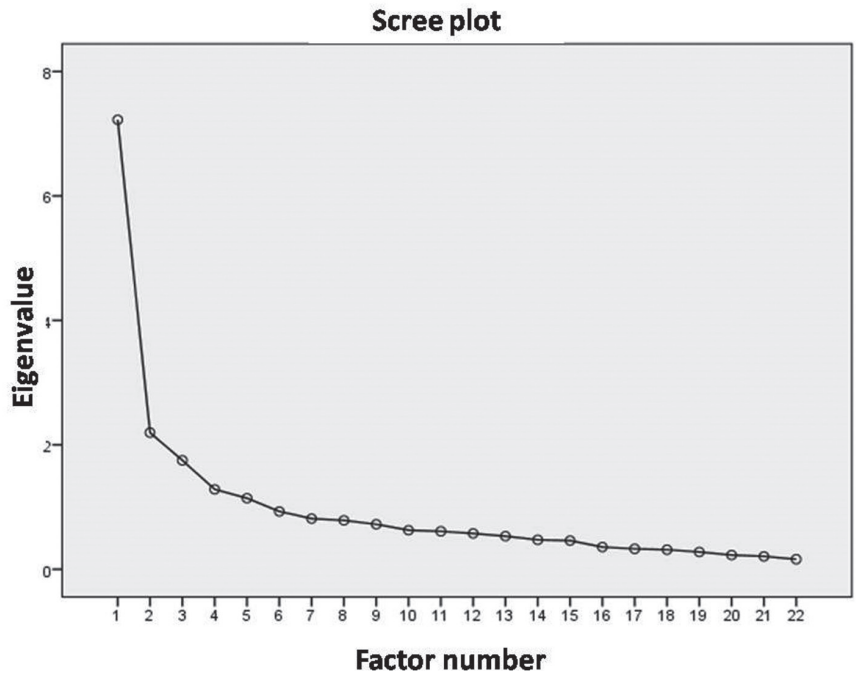

Figure 1. Scree plot of EFA results

Table 2

Total variance explained values

Factor number	Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
1	7.22	32.84	32.84
2	2.12	9.98	42.82
3	1.75	7.96	50.77
4	1.28	5.84	56.61
5	1.14	5.19	61.80

S o u r c es: Own work

The five factors solution included statements with the factor loadings > 0.4. The first factor e.g. Loss of educational interest, motivation and aspirations consisted of 8 items with loadings ranging from .51 to .83, and other 3 statements assigned to the second factor (E-burnout due to parental pressure) had loadings ranging from .70 to .90. The structure of the third factor (Negative attitude towards school)

contained 4 items with the values of factor loadings from .46 to 0.79. The next factor (Study disappointment) consisted of 3 statements with loadings ranging from .69 to .75, and the fifth and final factor (Study exhaustion) had 4 items with loadings ranging from .63 to .82. Most of items loaded with high value single factor, simultaneous loadings were much lower – equal to 0.4 and lower. Only two statements simultaneously loaded other factors e.g. item 3 loaded the third (.59), fourth (.49) and fifth (.69) factor; and item 21 loaded the third (.49), fourth (.50) and fifth (.63) factor (see Tab. 3).

Table 3
EFA with Oblimin rotation (N=186)

Number of item	Component number				
	1	2	3	4	5
Factor 1. Loss of educational interest, motivation and aspirations					
8	**.83**				
13	**.73**				
20	**.66**				
14	**.66**				
6	**.63**				
5	**.60**				
11*	**–.52**				
10	**.51**				
Factor 2. E-burnout due to parents' pressure					
19		**.90**			
12		**.85**			
16		**.70**			
Factor 3.Negative attitude towards schoola					
17*			**.79**		
2*			**.75**		
9*			**.73**		
22*			**.46**		
Factor 4. Study disappointment					
15				**.75**	

18				**.75**	
4				**.69**	
Factor 5. Study exhaustion					
1					**.82**
7					**.75**
3					**.69**
21					**.63**
Total variance: 61.8%	16.8%	12.3%	12.2%	10.6%	10%
Model fit measures: RMSEA = .059, 90CI[.04,.07]. TLI = .90, BIC = -469, χ^2 = 215, df = 131, p < .001					

N o t e : a-reversed scale, *-reversed items

S o u r c es: Own work

Statistically significant values of Pearson's inter-correlation coefficients were revealed between all selected factors (except factors 2 and 3) and E-SBS total score (see Tab. 4).

Table 4
Component intercorrelation matrix

Factor number	1	2	3	4	5	E-SBS
Factor 1	–					
Factor 2	.26***					
Factor 3	.37***	.07	–			
Factor 4	.61***	.24**	.29***			
Factor 5	.59***	.27***	.46***	.56***	–	
E-SBS	.89***	.46***	.58***	.75***	.81***	–

N o t e : *** p < .0001; ** p < .001

S o u r c es: Own work

Validation of the internal structure of the E-SBS scale – confirmatory factor analysis with maximum likelihood method (CFA)

Two structures of e-learning burnout syndrome were examined: model 1: one factor solution and model 2: five factor solution. The statistically significant values of the quoted criterion of goodness – chi square – were obtained in both

solutions, suggesting that the restrictions imposed in the theoretical model are correct. However, such results are a frequent phenomenon with a large sample size, as χ^2 test is sensitive to the size of the sample. Moreover, the relative/normed chi-square value (χ^2/df) took an acceptable value < 5.0. (in model 1: 3.95 and model 2: 2.13) (Januszewski, 2011). Most of the other fit indices were acceptable or slightly below the criterion only in model 2. The value of Steiger-Lind's RMSEA average square approximation was below the acceptable value .08 only in model 2 (RMSEA =.078), and the comparative fit index (CFI = .87) was about equal to the permissible value of .90 (Sun, 2005; Januszewski, 2011; Netemeyer et al., 2012). In summary, the CFA results confirmed that the model is in line with reality, and quite well suited to the data, as fit indicators were mostly at an acceptable level. The obtained values could be mainly influenced by the large sample size (see Tab. 5).

Table 5
Model fit indices

Model number	χ^2, p	CFI	TLI	RMSEA	90%CI	SRMR
Model .	χ^2 = 786, p < .001	.66	.62	.122	.113;.131	.095
Model 2	X^2 = 424, p < .001	.87	.84	.078	.068;.088	.081

S o u r c es: Own work

Scale Reliability Statistics

The questionnaire is characterised by high Cronbach's α and McDonald's ω reliability coefficients for total score (α,ω = .89). High reliability value was also obtained in factor 1 (α,ω = .85), acceptable values were revealed in the remaining factors (Cronbach's α ranged from .66 to 78; and McDonald's ω from .69 to .80) (see Tab. 6). Due to the small number of scale items (factors 2 and 4 consist of only 3 items, and factors 3 and 5 of 4 items), α values in the range of .45–.60 are acceptable (Taber, 2018). Moreover, the calculated values of the McDonald's ω for all e-learning burnout indicators are within the range of acceptable values, i.e. above the minimum value of ωh = .50, and in factors 1,2 and 5 even exceed the value indicating very good reliability, i.e. ωh = .75 (Ciżkowicz, 2018).

Table 6
Reliability of the E-SBS scale

Scale	Cronbach's α	McDonald's ω
Factor 1. Loss of educational interest, motivation and aspirations	.85	.85
Factor 2. Burnout due to parents' pressure	.77	.80
Factor 3. Negative attitude towards school	.66	.69

Factor 4. Study disappointment	.73	.73
Factor 5. Study exhaustion	.78	.79
E-learning Student Burnout Total score	.89	.89

S o u r c es: Own work

Examination of Convergent Validity

The 29 parent-adolescent dyads were examined in order to test the accuracy of the E-SBS scale with the comparison objective measure of burnout symptoms, namely perceived student burnout level by parents (SBO scale results). The e-learning burnout total score significantly positively correlated with perceived burnout symptoms by parents measured with SBO scale (rho = .48, p = .008); three distinguished factors were also significantly positively associated with SBO (factor 1: Loss of educational interest, motivation and aspirations rho = .47, p = .010; factor 3: Negative attitude towards school rho = .51, p = .005, and factor 4: Study disappointment rho = .40, p = .030).

The burnout model Job demands-resources (JD-R) states that the depletion of personal resources and overwhelming organisational demands leads to chronic distress, which in turn causes the development of burnout syndrome. Additionally, burned-out individuals suffer because of chronic exhaustion, anhedony, a present cynical attitude towards job-related duties and feel insufficient in their occupational role. As a longitudinal adverse outcome of burnout, low self-esteem and loss of mental health and well-being are characterised. A similar path was confirmed in the educational version of the JD-R model, i.e. Study-demands resources (SD-R). Hence, it was assumed that burnout symptoms will be negatively related to psychological well-being indicators. As presented in Table 7, E-SBS total score significantly negatively correlated with students' well-being, autonomy, environmental mastery and self-acceptance (r ranged between –.15, p < .05– –.37, p < .0001). Students' well-being was correlated with three components of e-learning burnout, e.g. factors 1, 2 and 5 (r ranged between –.19, p < .05– –.26, p < .0001). Two well-being indicators were mostly related to e-learning burnout components, i.e. environmental mastery (r ranged between –.18,p < .05– –.34, p <.0001), and self-acceptance (r ranged between –.20, p < .01– –.28, p < .0001). Personal growth, positive relations with others and purpose in life were not significantly related to e-learning burnout indicators (see Tab. 7).

Table.7
Pearson's correlation coefficients

Well-being indicators	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	E-SBS total score
Autonomy	–.18*	–.01	–.12	–.02	–.11	–.15*
Environmental mastery	–.34***	–.21**	–.19**	–.18*	–.33***	–.37***
Personal growth	–.09	–.18*	.06	.05	–.03	–.06
Positive relations with others	–.06	–.13	.04	–.01	.03	–.05
Purpose in life	–.13	–.12	.07	–.06	.01	–.08
Self-acceptance	–.22**	–.20**	–.14	–.22**	–.28***	–.30***
Well-being	–.26***	–.22**	–.08	–.12	–.19*	–.26***

N o t e : *** p < .0001; ** p < .001, * p < .05

S o u r c es: Own work

E-learning burnout syndrome among Polish adolescents: sex and age differences

Existing studies have viewed student burnout as a gender sensitive characteristic, with girls being more prone to develop it compared to boys (Tomaszek & Muchacka-Cymerman, 2019). The findings of the surveys conducted during the COVID-19 pandemic also confirmed the above-mentioned regularity. Hence, the additional aim of the current study was to characterise the e-learning burnout syndrome in the subgroups distinguished by sex and age of the adolescent. Due to significant inequality of subgroups regarding gender ($\chi^2 = 7.76$; $p = .005$), the comparisons were limited to the nonparametric analysis U Mann-Whitney test and basic descriptive statistics among particular groups.

Table 8
Gender differences in E-SBS scores

E-learning burnout indicators	Girls (N=112)		Boys (N=74)		z	p
	M	SD	M	SD		
Factor 1	26.63	7.80	25.78	6.77	–1,15	,252
Factor 2	6.79	3.34	6.54	2.79	–,12	,903
Factor 3	13.62	3.45	13.91	3.12	–,65	,518
Factor 4	9.57	3.03	10.19	2.98	–1,35	,179

Factor 5	13.97	3.96	12.69	4.04	–2,07	,038
E-SBS	70.58	16.54	69.11	13.62	–,94	,346

N o t e : Factor 1 – Loss of educational interest, motivation and aspirations; Factor 2 – Burnout due to parents' pressure; Factor 3 – Negative attitude towards school, Factor 4 – Study disappointment, Factor 5 – Study exhaustion E-SBS – E-learning burnout total score

S o u r c es: Own work

The analyses regarding age in terms of stage of development also revealed significant inequality in the subgroups number ($\chi^2 = 50.94$; $p < .0001$), therefore the Kruskal-Wallis test was performed in order to conduct comparison analyses. Regarding adolescent age, the participants were divided into three subgroups following the stage of development: early adolescence (11–13 years old), middle adolescence (14–16 years old), and late adolescence (17–19 years old). Early, middle and late adolescence students evaluated their overall burnout level in e-school and in pandemic conditions similarly (the differences were statistically insignificant – $\chi^2 = .92$, $p = .633$). However, late adolescents felt burned-out significantly stronger due to parental pressure than early and middle adolescents ($\chi^2 = 20.09$, $p < .0001$, Tuckey post hoc tests equal to 3.06, $p < .0001$ and 1.63, $p = .002$, respectively) (see Tab. 9).

Table 9
Age differences in E-SBS scores

E-learning burnout indicators	Early adolescence (N=20)		Middle adolescence (N=99)		Late adolescence (N=67)		Chi -square	p
	M	SD	M	SD	M	SD		
Factor 1	23.80	6.04	26.00	7.39	27.48	7.64	5.06	.080
Factor 2	8.55	2.95	7.12	3.18	5.49	2.67	20.09	< .0001
Factor 3	13.05	3.17	13.43	3.40	14.37	3.18	4.44	.108
Factor 4	9.55	2.93	9.56	2.99	10.28	3.06	2.88	.237
Factor 5	13.70	3.89	13.29	4.02	13.64	4.14	.42	.810
E-SBS	68.65	15.60	69.40	15.50	71.27	15.41	.92	.633

N o t e : Factor 1 – Loss of educational interest, motivation and aspirations; Factor 2 – Burnout due to parents' pressure; Factor 3 – Negative attitude towards school, Factor 4 – Study disappointment, Factor 5 – Study exhaustion E-SBS – E-learning burnout total score

S o u r c es: Own work

Additional analyses showed that there was no significant correlation between age and the E-SBS total score ($r = 0.07$; $p = .313$). However, age correlated

positively with factor 1: Loss of educational interest, motivation and aspirations ($r = .18$, $p = .016$) and negatively with factor 2: Burnout due to parental pressure ($r =. 24$, $p < .0001$). The remaining factors (3–5) were insignificantly related to age.

Discussion

The main aim of the current study was to examine the psychometric properties of the E-learning Burnout Scale (E-SBS). The E-SBS was developed in response to new stressful conditions of remote education caused by the COVID-19 pandemic.

The five-dimensional structure of the e-learning burnout was examined with EFA, which revealed 5 factors with eigenvalues > 1, and the model explained about 62% of the total variance. The additional EFA revealed good model fit indexes with RMSEA = .059, 90CI[.04,.07]. All item loadings were greater than criteria .40, and only two statements simultaneously loaded other factors (items 3 and 21). The results of CFA yielded the acceptable fit indexes for the model with five components, i.e. Chi-square/df value was low, = 2.13 (< 5.0), RMSEA = .078, 90CI[.07,.09] (< .08), CFI = 0.87 (the value ranged between 0.85 and 0.90 indicating a good fit (Kline, 1994; MacCallum et al., 1996; Kline, 2005). To sum up, based on the EFA and CFA results, the five-factor structure of the e-learning burnout was confirmed. Hence, the multidimensional structure of e-learning burnout syndrome hypothesized in H1 was confirmed. The second study hypothesis assumes that all components of e-learning burnout syndrome will be interrelated to each other. This study hypothesis was confirmed (only Factor 2 and 3 were insignificantly associated to each other). To test the psychometric properties of the E-SBS the Cronbach's α and McDonald's ω coefficients were calculated. The results confirm a good reliability of the tool (E-SBS total score reached 0.89), and it can be successfully used in adolescence population.

In order to test the accuracy of the E-SBS scale, its scores were correlated with an instrument that measures perceived burnout symptoms by parents (SBO scale). We hypothesized that parents will observe the negative emotional and behavioral symptoms of student burnout, and that these will correlate with the E-SBS scores (H3). The results showed positive associations between E-SBS scores and SBO. These findings confirmed that the subjective student's feeling of experiencing burnout with remote learning may also be observed in their behavioral and emotional reactions by parents. The classical burnout literature indicates negative changes caused by exhaustion and observed by relatives (Tucholska, 2009). Similarly, Tomaszek and Muchacka-Cymerman (2018) found changes in the quality of relationships with parents and classmates related to burnout symptoms.

An additional aim of the current study was to analyse e-learning burnout levels in terms of demographic variables, e.g. gender and age. Overall, the findings did not confirm the statistical significance of both, sex and age differences. Thus, the hypotheses 4 and 5 were not confirmed. Although study exhaustion was significantly higher among girls compared to boys, late adolescents aged 17–19 scored significantly higher on burnout due to parental pressure than younger peers in the early and middle adolescence group. The lack of significant differences could result from the moment at which the survey was conducted. Burnout is a phenomenon extended over time that increases gradually; perhaps the difficulties described by young people were minimised due to the fact that they were during and just after the Easter break and the COVID-19 pandemic third wave, which was related to the information about school openings and returning students to in-person learning. In general, it is acknowledged that burnout symptoms develop with the educational stage, and children become more burned-out as they transition into adolescence. In our study, we observed such an increase in e-learning burnout, although the differences were very small. These results may suggest that the e-learning burnout process increases at a slower rate than traditional school burnout and its symptoms are more subtle, perhaps not identified by students who know modern technologies well.

The second aim of the study was to examine the negative association between e-learning burnout and psychological well-being during the pandemic of Covid-19. Negative correlations between e-learning burnout syndrome and adolescents' subjective psychological well-being were confirmed (H6). The findings are consistent with our assumptions and previous empirical and theoretical studies. For example, Lesener et al. (2020), on the basis of classical and well-established job demands-resources (JD-R) burnout theory, introduced the novel study demands-resources (SD-R) approach. The SD-R model refers to academic settings' salutogenic and pathogenic effects on students' health and well-being. The authors empirically confirmed that overwhelmed study demands lead to student burnout, whereas study resources buffer the risk of developing this syndrome. Moreover, student burnout predicts lower life satisfaction. It is worth mentioning that the associations between burnout syndrome and well-being are complex, and some authors did not find a direct significant relationship. According to Andriyani et al. (2017), school burnout served as a predictor of well-being only indirectly via state and trait anxiety.

In our study, two main facets of well-being were significantly associated with e-learning burnout, namely environmental mastery and self-acceptance. These results suggest the crucial role of the school in developing positive self-esteem and emotional health. Moreover, our findings suggest that school-related problems may affect different aspects of well-being. In addition, in our study we used the Psychological Well-Being Scale by Carol Ryff; however, it seems important to examine a more relevant aspect of this personal characteristic, i.e.

students' well-being. The Konu & Rimpelä (2002) School Well-being Model is a four-dimensional phenomenon associated with both teaching and education, and learning and achievements. The authors distinguished school conditions (having), social relationships (loving), means for self-fulfillment (being), and health status. Each well-being aspect is directly related to the students' capabilities and resources important in their life in school. Based on such a theoretical framework, it seems more relevant to capture the feelings, attitudes, and difficulties experienced by students, including the school burnout process as a predictor of study well-being depletion. Nevertheless, our results confirmed the strong need for providing school services that can make students feel more comfortable, secure, and prosperous at school – both in a natural and virtual environment.

Future directions for using the E-learning Burnout Scale and study limitations

The new measurement of e-learning burnout symptoms for adolescents will be useful as a screening tool to identify students who have difficulties in studying remotely with reduced teacher face-to-face contact. Identifying these pupils will offer the opportunity for additional interventions, e.g. additional lessons, an increase in teachers' availability, or e-tutorials. What is more, even though the COVID-19 pandemic is in retreat and most schools have reverted to the traditional way of teaching, the E-SBS scale may be used in situations where schools, classes, or individual students temporarily will be forced to undertake distance learning. Because of several advantages related to distance learning, we believe that education via the Internet and other modern techniques have great potential and will probably be used in the future as an additional tool supporting the didactic process, implemented regardless of health-related conditions, and therefore a part of school education will be conducted via these new technologies. As such, the e-school environment should be taken into account when exploring adolescent mental health and educational problems.

One of the new and important findings of this research was a statistically significant relationship between e-learning burnout and psychological well-being, mostly environmental mastery and self-acceptance. The results indicate the need to pay attention to these two aspects of the pandemic Covid-19 functioning of adolescents as the most endangered areas of mental health. Many psychotherapeutic societies now report that one of the factors influencing adolescents in various forms of self-harm is actually the lack of self-acceptance. In order to counteract the feeling of lack of influence and control over the environment, it is necessary to develop the online and social competence of youths. It is also crucial to implement preventive programs that enhance the ability to manage stress and foster personal and coping resources. One such form would be prevention carried out in schools, with an emphasis on strengthening adolescents' resources and insights. Also, teachers, through such programs, would be one of the protective factors (by paying attention to troubling symptoms) of adolescents.

The current research project was focused on E-SBS validation and has several limitations. Although the psychometric properties of the E-SBS scale are promising, the study sample was small, thus any further generalisation on the whole adolescent population is restricted. Moreover, a research sample size was not properly differentiated in terms of gender and age, which limited determining whether the sex differences and those between the age sub-groups were statistically insignificant in most e-learning burnout indicators. Accordingly, a more diverse and representative sample must be examined in the future validations of E-SBS scale. It would also be necessary to conduct a study on a larger group of environmentally diverse students (large city, small town, village). In addition, the main goal of the study was to develop a tool for assessing burnout symptoms directly related to the e-school environment. Due to this fact the E-SBS scale can be used only to examine students' at-home e-learning burnout. In addition, the rapid development of modern technologies – also in the context of educational tools – may cause the behavioural symptoms of e-learning burnout to change as well, therefore the structure of the phenomenon may also become fragmented. In further research work, it is worth taking into account the other educational stages, e.g. children from primary schools and university students, especially as in the burnout literature some studies suggest a different structure of the symptoms related to the educational level. It is also necessary to consider other reasons why a student may be experiencing burnout, i.e. problems at home or pre-existing mental disorders. We investigated the 22-item instrument and, in further analyses, a shorter version of the scale may be considered. In order to increase technological difficulties related to e-school teaching and more stressful conditions of distance learning, there is also a need for developing an adequate measurement for e-teaching burnout syndrome among the teacher population.

Conclusions

The following article presents the results of the validation of the E-learning Burnout Scale in an adolescent sample. To the best of our knowledge, this was the first attempt to develop and validate an instrument for measuring this new phenomenon in the youth population. On the basis of the psychometric properties, the E-SBS scale of the examined tool has a good validity and reliability, thus the tool itself can be successfully used in scientific practice in the e-school environmental context and be subject to further validation processes. Additionally, after the experiences of students and teachers – as well as the research conducted in the topic of e-burnout and remote work – it seems necessary to introduce mandatory training for both teachers and students, in addition to parents of students, on both

the subject of materials and hygiene of remote work, as well as psychological aspects related to the risk of online workload. In addition, teachers should use some of the materials in the course of conducting lessons using modern technologies – this will enable rapid adaptation to the new conditions of online work in the future and will help to make stationary lessons more attractive. Higher awareness among teachers about e-burnout and its consequences will also affect the student-teacher relationship positively. In addition, an important aspect is paying attention to the school climate, in which the student will feel part of a larger system.

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Katarzyna Tomaszek, Agnieszka Muchacka-Cymerman

Wypalenie uczniów w środowisku e-szkoły: wyniki badań pilotażowych walidacji skali wypalenia e-learningowego

S t r e s z c z e n i e

Pandemia COVID-19 spowodowała powszechne zamknięcie szkół, co zmusiło uczniów do nauki w domu przez Internet. Jednak dla niektórych studentów nauka zdalna okazała się zbyt stresująca i stanowiła za duże wyzwanie (Bilal et al., 2022). Badania wykazały, że pomimo zalet zajęć w trybie online, istnieją liczne zagrożenia, np. niższe osiągnięcia naukowe, mniejsze zaangażowanie i cele powiązane z unikaniem pracy, większy poziom depresji i nerwowości (Daumiller et al., 2021; Srivastava et al., 2021) oraz wypalenie szkolne (Salmela-Aro et al., 2022). Ponieważ wcześniejsze badania dotyczące wypalenia szkolnego u uczniów dotyczyły głównie tradycyjnej nauki stacjonarnej, bardzo potrzebne jest opracowanie instrumentu umożliwiającego mierzenie symptomów wypalenia uczniów w przypadku nauki przez Internet. Celem tego badania było przeanalizowanie zasadności stosowania skali wypalenia e-learningiem wśród populacji młodzieży. Skala wypalenia e-learningiem

(E-SBS) została zaprojektowana w szczególności do pomiaru wyczerpania i trudności w nauce spowodowanych przez zamknięcie szkół podczas pandemii COVID-19. Skala wypalenia e-learningiem, zdefiniowana jako konstrukcja pięciowymiarowa, obejmuje myśli, uczucia i zachowania związane z trudnościami w nauce, których doświadcza młodzież podczas lekcji online. Wyniki potwierdziły, że E-SBS jest racjonalna pod względem psychometrycznym w zakresie pięcioczynnikowej struktury, trafności treściowej i trafności różnicowej. Zatem skala E-SBS wykazała się potencjałem do zastosowania w różnych obszarach edukacyjnych.

S ł o w a k l u c z o w e: syndrom wypalenia e-learningiem, młodzież, edukacja, walidacja psychometryczna

Katarzyna Tomaszek, Agnieszka Muchacka-Cymerman

Burnout de los estudiantes en el entorno de E-School: resultados del estudio piloto de la validación de la Escala de Burnout de E-learning

R e s u m e n

La pandemia de COVID-19 provocó el cierre masivo de las escuelas y, por lo tanto, obligó a los alumnos a estudiar fuera de las aulas, en casa, a través de Internet. Sin embargo, para algunos estudiantes la educación a distancia resultó ser un reto y una fuente de estrés (Bilal et al., 2022). Las investigaciones previas revelaron que, a pesar de las ventajas de las clases en línea, existen varias amenazas, por ejemplo, un menor rendimiento académico, un menor compromiso y objetivos de evasión del trabajo, una mayor depresión y ansiedad (Daumiller et al., 2021; Srivastava et al., 2021), y el agotamiento escolar (Salmela-Aro et al., 2022). Debido a que los estudios previos sobre el síndrome de agotamiento de los estudiantes han utilizado predominantemente la enseñanza tradicional en persona existe una gran necesidad de desarrollar una herramienta con el potencial de medir los síntomas de agotamiento de los estudiantes en línea. El objetivo de esta investigación fue investigar la idoneidad de utilizar una escala de agotamiento por aprendizaje en línea con una población de adolescentes. La Escala de Agotamiento por Aprendizaje en Línea – The E-Learning Burnout Scale (E-SBS) fue diseñada específicamente para medir el agotamiento y las dificultades de aprendizaje, causadas por el cierre de las escuelas durante la pandemia del COVID-19. El síndrome de agotamiento por aprendizaje en línea, que se define como un constructo de cinco dimensiones, capta los pensamientos, sentimientos y comportamientos relacionados con las dificultades educativas experimentadas por los estudiantes adolescentes durante las clases en línea. Los resultados confirmaron que el E-SBS es psicométricamente sólido en cuanto a la estructura de cinco factores, la validez de contenido y la validez discriminativa. Por lo tanto, la escala E-SBS ha mostrado potencial para su uso en una variedad de áreas educativas.

P a l a b r a s c l a v e: síndrome de agotamiento por aprendizaje en línea, adolescentes, educación, validación psicométrica

Катажина Томашек, Агнешка Мухацкая-Цимерман

Выгорание учащихся в среде электронной школы: результаты пилотного исследования по валидации Шкалы выгорания в электронном обучении

Аннотация

Пандемия COVID-19 вызвала повсеместное закрытие школ и поэтому вынудила студентов учиться вне класса, дома через Интернет. Однако для некоторых студентов дистанционное обучение оказалось сложным и стрессовым (Bilal и др., 2022). Предыдущие исследования показали, что, несмотря на преимущества онлайн-классов, существует ряд угроз, например, снижение успеваемости, снижение вовлеченности и стремление избежать работы, повышение депрессии и тревожности (Daumiller и др., 2021; Srivastava и др., 2021), а также школьное выгорание (Salmela-Aro и др., 2022). Поскольку предыдущие исследования, посвященные синдрому выгорания студентов, занимались преимущественно традиционным очным обучением, существует большая потребность в разработке инструмента, способного измерять симптомы выгорания студентов в режиме онлайн. Целью данного исследования было изучить целесообразность использования шкалы выгорания при онлайн-обучении в подростковой популяции. Шкала выгорания при онлайн-обучении (E-Learning Burnout Scale, E-SBS) была разработана специально для измерения истощения и трудностей в обучении, вызванных закрытием школ во время пандемии COVID-19. Синдром выгорания при онлайн-обучении, который определяется как пятимерная модель, фиксирует мысли, чувства и поведение, связанные с трудностями в обучении, которые испытывают студенты-подростки во время онлайн-занятий. Результаты подтвердили психометрическую надежность E-SBS в отношении пятифакторной структуры, валидности содержания и дискриминативной валидности. Таким образом, шкала E-SBS продемонстрировала потенциал для использования в различных областях образования.

Ключевые слова: синдром выгорания при электронном обучении, подростки, образование, психометрическая валидизация