Rahman Institute of Higher Education

Journal of Modern Psychology

Research Paper: Investigating the Relationship between Screen Time and Green Time with Academic Engagement and Academic Performance

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Citation: Ghaderi, D. (2024). Investigating the Relationship between Screen Time and Green Time with Academic Engagement and Academic Performance. *Journal of Modern Psychology, 4(3),* 13-26. https://doi.org/10.22034/jmp.2024.462315.1109

https://doi.org/10.22034/jmp.2024.462315.1109

Article info:

Received date:
05 May. 2024
Accepted date:
15 June. 2024

Keywords:
Academic Engagement, Academic Performance, Green Time, Screen Time

Abstract

Objective: This study investigated the relationship between screen time and green time with academic engagement and academic performance of secondary school students in Tabriz city.

Methods: The present study was part of cross-sectional and descriptive studies of the correlation and prediction type. Three hundred eighty-five people from Tabriz secondary school students were selected in the first semester of the 2022-2023 academic year by multi-stage cluster sampling based on Morgan's table. All sample members completed Reeve's academic engagement scale (AES) and Screen Time Questionnaire (STQ). The student's GPA was considered their academic performance and was evaluated by adding two questions to the research questionnaires of the green time variable. The collected data were analyzed using Pearson's correlation coefficient, simultaneous regression, and SPSS[23] statistical software.

Results: The results showed a negative and significant relationship between screen times, the dimensions of academic engagement, and the student's GPA. It was also found that there is a positive and significant relationship between green time and the dimensions of academic engagement (except the emotional involvement dimension) and students' GPA. Screen time and green time significantly contributed to explaining students' academic engagement and academic performance.

Conclusion: The results highlighted the importance of screen and green time in educational variables.

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1. Introduction

Education is one of the most important necessities of life. Without education, the continuation of life is at risk since schooling requires a lot of money and a large budget, so students' academic education aims to increase their academic performance. Governments allocate vast sums of national income to education, and families bear many expenses for their children's education. Increasing academic performance means academic success. Academic success means how successful the learners have been in reaching the goals of the educational course (Seyf, 2013; Bonilla-Rius, 2020). Another critical component in the field of education is academic engagement. During the past decade, researchers have shown increasing interest in academic engagement to increase student participation in school-related activities, foster success, and understand positive student development (Upadyaya & Salmela-Aro, 2013; Carter et al., 2012; Li & Lerner, 2011; Salmela Aro et al., 2021). Research has shown that the more students are involved in academic issues and learning tasks, the more academic success they achieve (Saber & Sharifi, 2013). *Academic* engagement is a structure proposed for the first time to understand and explain academic failure and was considered the basis for reformist efforts in education (Schlechty, 2005). Various definitions of academic engagement have been provided. Some believe that the learner is involved in academic tasks only when the functions in question require problem-solving and high-level thinking skills such as evaluation critical and creative thinking (Schlechty, 2005). By definition, it can be said that learners are not involved in learning, but they are involved in assignments and activities that lead to learning (Alhazmi & Rahman, 2014). Alhazmi and Rahman (2014) believe that in virtual social networks, academic engagement refers to the time and effort students spend in educational activities inside and outside the classroom.

One of the factors that has been determined to play a role in students' academic performance is *screen time* (Kumar & Shirley, 2020; Muppalla et al., 2023). Definitions of *screen time* vary, which raises numerous issues of coordination, measurement, and comparison. The Oxford English Dictionary (2020, p.251) defines *screen time* as "time spent using a device such as a computer, television or games console," while the latest World Health Organization (2019) guidelines focus on the issue of screen time. Moreover, it is "time spent passively watching screen-based entertainment (TV, computer, mobile devices). Sedentary behaviors, defined as sitting or lying activities, include energy expenditure from 0.1 to 1.5 of the basal metabolic equivalent (Pate & Lobelo, 2008). They considered it the fourth major risk factor for mortality worldwide (World Health Organization, 2010). Media use is the most prevalent leisure-time sedentary behavior among children and adolescents. Screen media use includes screen-based activities such as surfing the Internet, using a computer or cell phone, watching television, and playing video games (Marshall et al., 2006). On average, children and adolescents watch TV between 1.8 and 2.8 hours in their free

time, play video games for 40 minutes, and use computers for 34 minutes a day (Marshall et al., 2006). Overall, 28% of children and adolescents are involved in these screen-based activities for more than 4 hours daily, with a higher prevalence in boys than girls (30% vs. 25%) (Marshall et al., 2006).

The results of studies in the field of the relationship between show time and educational variables are controversial. The results of some studies indicate a negative relationship between screen time and academic performance (Paulich et al., 2021; Howie et al., 2020; Adelantado-Renau et al., 2019; Kanburoglu et al., 2014; Peiro´-Velert et al., 2014). Some studies have not found a significant relationship between show time and academic performance (Kumar & Shirley, 2020; Sinnarajah et al., 2019; Tarekegn & Endris, 2019). Sanders et al. (2019) have partially clarified this debate by distinguishing between active and passive components of screen time. They concluded that inactive screen time (e.g., television) was associated with worse outcomes, educational screen time (e.g., computers for homework) was related to positive academic outcomes, and had no negative relationship with other outcomes.

By reviewing several articles, Oswald et al. (2020) examined the effect of show time and green time on many variables of the studied samples at different levels of education, including academic progress. They found the effect of screen time negative and the impact of green time positive. They were evaluated positively. *Green time* is generally defined as the time spent in the environment, elements with natural content, or exposure to it. Improving the availability, accessibility, and quality of green space will likely positively impact adolescents' mental well-being (Zhang et al., 2020). Browning and Rigolon (2019) concluded in a review article that 28% of studies support the positive effect of green space, and 8% support its negative impact on academic achievement and performance. However, they ultimately needed more research on this issue. Moreover, they proclaimed different results in this field. The results of the study by Tuen Veronica Leung et al. (2019) indicated the positive effect of green time on the academic performance of English students.

Despite the increasing research that is done in the field of show time and green time and their relationship with educational variables outside of Iran, unfortunately, Iranian researchers have not yet investigated these variables; apart from the few investigations that have been carried out, one of the social problems is that the research background in this field is minimal. On the other hand, the results of the studies conducted by researchers in this field need to be more consistent and are controversial. Therefore, the present study investigates the relationship between show and green time on academic engagement and performance. This study examined the relationship between screen time and green time with academic engagement and academic performance of secondary school students in Tabriz city.

2. Methods

2.1. Research Design, Statistical Population, Sample, and Sampling Method

The current study is a cross-sectional descriptive study of a correlation and prediction type. Population, sample, and sampling method: The population of the present study includes all the male and female secondary school students of Tabriz, approximately 8000 people, who were studying when distributing the questionnaires. Three hundred eighty-five people from Tabriz secondary school students were selected in the first semester of the 2022-2023 academic year by multi-stage cluster sampling based on Morgan's Table.

2.2. Instruments

Reeve Academic Engagement Scale (AES): Academic Engagement Questionnaire was designed and compiled by Reeve (2013) to measure academic engagement. This questionnaire has 17 questions and 4 components of behavioral, agent, cognitive, and emotional involvement, measuring academic involvement based on the seven-point Likert scale. Each question has 7 points: 7 points for strongly agree and 1 point for strongly disagree. The questionnaire does not have a reverse score. By adding the score of each question, the score of each dimension is obtained, and the sum of the scores of all items is the total score of academic engagement. In this questionnaire, eight items were used to measure the dimension of cognitive engagement, four items were used to measure the dimension of emotional engagement, five were used to measure the dimension of behavioral engagement, and five were used to measure the dimension of affective engagement. Reeve (2013) reported Cronbach's alpha coefficient of 0.82 and 0.88, 0.75, and 0.86, respectively, for cognitive, behavioral, and functional aspects of the academic engagement questionnaire, indicating the reasonable validity of the questionnaire. Saber and Sharifi (2013) evaluated the validity of this questionnaire's content, form, and criteria. For this questionnaire, Cronbach's alpha coefficient calculated in Saber & Sharifi's research (2013) was estimated to be above 0.70.

Academic performance: The grade point average at the end of the academic year was used to evaluate the student's academic performance. For this purpose, the image of the semester report card and the recorded GPA at the end of the semester were viewed and entered as the academic performance score.

Screen Time Questionnaire (STQ): This questionnaire was created by Vizcaino et al. (2019). The questionnaire has 18 questions designed to check the exposure of the examined subjects to television, devices related to television (such as game consoles), laptops/computers, smartphones, and tablets. The exact time spent using each item mentioned above will be recorded by noting the hours and minutes on an average weekday, weeknight, weekend day, and regular weekday. Based on the study of Vizcaino et al. (2019) about the reliability of the questionnaire that asks about the use of television, laptop/computer, smartphone, and

tablet during one day of the week and three questions related to the use of the screen, showing good to excellent reliability (ICCs = 0.61-0.90). Questions that probed screen use during a weeknight showed moderately high reliability (ICCs = 0.50–0.82). Questions about screen use during a weekend day showed excellent reliability (ICCs = 0.84-0.87), except for smartphone use (ICC = 0.16), reliability results for all screen types were good in different study periods. However, the measurement error was lower among items that inquired about TV, laptop/computer, smartphone, and tablet use during a weeknight program. Among the different screen types, devices connected to TV and laptop/computer use during the week and weeknight had the highest accuracy, while smartphone use during the weekend day showed the highest measurement error. In the current study, the internal validity of the questionnaire was checked, and Cronbach's alpha coefficient of the questionnaire was 0.78.

Green time: Based on what is customary in valid studies outside of Iran (for example, Camerini et al, 2021) and to evaluate green time some questions were added to the end of the screening time questionnaire by the researcher. In this questionnaire, the amount of time the subject spent in urban green spaces, including parks, forest parks, green spaces at the place of residence, and green spaces at the place of study, by mentioning hours and minutes on an average weekday, on an average weeknight, recorded on a weekend day and regular weekdays.

2.3. Implementation method

The present study was conducted in the school environment and on students. Research questionnaires were administered individually. Questionnaires were provided to the students by the researcher and his colleagues in the school environment and collected after their responses. Necessary permissions to implement the questionnaires were obtained from the university's academic vice-chancellor. After determining the target sample and with the help of several colleagues, the research questionnaires were examined at the disposal of the sample. They were collected immediately after the completion of the responses. After collecting data through the implementation of questionnaires, the raw data were described through the descriptive statistics of mean and standard deviation. After performing the statistical tests to determine the normality of the investigated data, Pearson's correlation coefficient and simultaneous regression statistical tests were used to check the hypotheses.

3. Results

First, the descriptive indices of the examined variables are displayed in Table. 1 through average, standard deviation, skewness, and Kurtosis statistics to check the normality of the data distribution. It should be noted that two indices of skewness and kurtosis were used to evaluate the normality of the data. According to Table. 1, the skewness values of the data are in the range of ±2, and the values of Kurtosis are in the range of ±3, indicating that the distribution of the research data is normal.

Table 1

Descriptive indices of research variables

Indicators Variables	Mean	standard of deviation	skewness	Kurtosis
Behavioral involvement	22.31	5.31	-1.055	0.082
Practical involvement	21.37	5.63	-0.774	0.703
Cognitive involvement	22.12	5.11	-0.671	-0.780
emotional involvement	23.26	6.64	-0.571	-0.497
green time	10.26	6.99	0.444	-0.128
screen time	17.37	17.92	1.11	1.30
GPA	18.30	1.45	1.11	-0.568

Pearson's correlation coefficient was used to check the relationship between the predictor variables and the criterion, and the results of the correlation matrix between the variables are shown in Table 2.

Table 2

Correlation matrix of research variables

Variables	1	2	3	4	5	6	7
Behavioral involvement	1						
Practical involvement	0.752**	1					
Cognitive involvement	0.756**	0.693**	1				
emotional involvement	0.694**	0.670**	0.648**	1			
green time	0.284**	0.387**	0.353**	0.155	1		
screen time	-0.371**	-0.307**	-0.340**	-0.206*	-0.368**	1	
GPA	0.694**	0.565**	0.613**	0.503**	0.225*	-0.373**	1

P≤0.01** P≤0.05*

Based on the results of Table 2, it was found that there was a negative and significant relationship between screen time, the dimensions of academic engagement, and the GPA of the students. It was also found that there was a positive and significant relationship between green time and the dimensions of academic engagement (except the emotional involvement dimension) and students' GPA.

Simultaneous regression was used to determine the contribution of each predictor

variable in predicting the criterion variables, the results of which are presented in Table 3.

Table 3

Summary of multiple regression model for predicting criterion variables through predictor variables

Variables		B	SE	Beta	R^2	Sig
Anticipate	criterion	0.130	0.072	0.171	0.163	0.07
green time	Behavioral	-0.091	0.028	-0.308		0.001
screen time	involvement	0.178	0.069	0.242	0.167	0.01
green time	Cognitive	-0.071	0.027	-0.251		0.009
screen time	involvement	0.087	0.095	0.092	0.050	0.36
green time	emotional	-0.64	0.037	-0.172		0.089
screen time	involvement	0.256	0.075	0.317	0.181	0.001
green time	Practical	-0.060	0.029	-0.190		0.04
screen time	involvement	0.021	0.020	0.101	0.148	0.28
green time	GPA	-0.027	0.008	-0.336		0.001
green time		0.130	0.072	0.171	0.163	0.07

According to the results of Table 3, the predictor variables can explain 16.3 percent of the changes in the behavioral involvement variable. Table 3 showed that screen time with a beta value of 0.30 was decisive in the regression model. According to the results of Table 3, predictor variables can explain 16.7 percent of the changes in the variable of cognitive involvement. Table 3 revealed that screen time with a beta value of 0.25 and green time with a beta value of 0.24 played a role in the regression model. We concluded that green time and screen time did not play a role in explaining emotional involvement. According to the results of Table 3, the predictor variables can explain 18.1% of the changes in the practical conflict variable. Table 3 indicated that screen time with a beta value of 0.19 and green time with a beta value of 0.31 played a role in the regression model. The predictor variables can explain 14% of the changes in the educational variable (Table 3). Based on Table 3, screen time with a beta value of 0.33 played a role in the regression model, and green time did not explain this model.

4. Discussion

This study investigated the relationship between screen time and green time with academic engagement and performance in students. Based on the results obtained, it was found that there was a negative and significant relationship between screen time, the dimensions of academic engagement, and the grade point average of the students. It was also found that there was a positive and significant relationship between green time and the dimensions of academic engagement (except for the emotional involvement dimension) and students' GPA. The results obtained in the present study are in line with

most of the findings in this field (Paulich et al., 2021; Howie et al., 2020; Adelantado-Renau et al., 2019; Kanburoglu et al., 2014; Peiro´-Velert et al., 2014). First, we examine the results of studies that scrutinized the relationship between screen time and academic engagement. In explaining these findings, it is necessary to mention several important points. First, exposure to the screen and showing more screen time mean losing time related to other things in life, including studies and academic activities. As mentioned, media use is the most prevalent leisure-time sedentary behavior among children and adolescents.

Screen media includes screen-based activities such as surfing the Internet, using a computer or mobile phone, watching television, and playing video games (Marshall et al., 2005). On average, children and adolescents watch TV between 1.8 and 2.8 hours in their free time, play video games for 40 minutes, and use computers for 34 minutes a day (Marshall et al., 2005). Overall, 28% of children and adolescents are engaged in these screen-based activities for more than 4 hours a day, the prevalence of which is higher in boys than in girls (30% vs. 25%) (Marshall et al., 2005). Getting involved in the screen can take away time that would be helpful for students' academic engagement. Next, it is expected to engage in screen time for non-academic activities. The latest guidelines of the World Health Organization (2020) focus on the issue of screen time and define it as "time spent watching screen-based entertainment (TV, computer, mobile). In this definition, devices do not include active screen-based games that require physical activity or movement. If the time spent with the screen requires involvement in entertainment and non-academic affairs, and if the participation in the screen is related to academic affairs, such results may not be obtained.

Another important thing is that screen time is not just a time of the student's interaction with the screen; it is dependent on and related to the same specific time. The fact is that other students' time will also be affected by the show time, and usually, students need help managing the time between the show time and the time to deal with academic affairs. Another thing is that screen time is more related to negative variables, which can ultimately reduce students' academic involvement to its minimum. Many studies have reported a positive relationship between screen time and depression (e.g., Stiglic & Viner, 2019; Madhav et al., 2015), which in turn could be due to poor sleep quality caused by screen time. Inactivity and lack of activity are caused by screen time and the inability to face the stress of life, and these factors can, in turn, cause problems in the level and quality of academic engagement of students.

Based on the obtained results, it was found that there was a negative and significant relationship between screen time and the GPA of the students. The results obtained in the present study were consistent with some of the findings in this field. For example, Paulich et al. (2021), in a study that was partially dedicated to examining the relationship between screen time and academic performance, concluded that an increase in screen time was associated with a

decrease in academic performance. Howie et al. (2020), in a study on Australian students, part of which examined the relationship between screen time behavioral guidelines and academic performance, concluded that compliance with screen time guidelines and higher academic performance and better scores in language and math were associated. Sedentary behaviors during screen time were associated with lower academic performance. Kanburoglu et al. (2014) conducted a study to reach the optimal display time concerning academic progress. They concluded that increased television viewing is associated with more significant declines in academic achievement. The academic progress of students who spent less than an hour of their daily time on the computer and who went to the cinema at least once a month was higher. Peiro´-Velert et al. (2014), in the study entitled "Screen media use, sleep time and academic performance in adolescents: clustering analysis of self-organizing maps", concluded that adolescents with higher academic performance spend less time on screens. They were inactive. It was also found that teenagers who spent more than 5.5 hours on TV had a lower academic performance.

Moreover, the results obtained in the present study were different from some of the findings in this field. For example, Kumar, Shirley (2020), in a study that aimed to investigate the relationship between the duration of the show and the academic performance of Indian students, stated that there was no statistically significant relationship between the duration of the show and the combined academic performance and the academic performance in mathematics, science and language do not exist. Sinnarajah et al. (2019), in a study conducted to investigate the relationship between screen time and students' academic performance, concluded that there was no significant relationship between screen time and students' academic performance. Tarekegn and Endris (2019) investigated the relationship between the amount of television viewing as one of the examples of screen time and academic progress. They concluded that there was no significant relationship between the hours of television viewing and the academic progress of students. Based on this, they concluded that television itself may not have a significant effect on students' academic achievement. Adelantado-Renau et al. (2019) examined the relationship between screen time and academic performance among children and adolescents and concluded that overall screen time was not related to academic performance. However, time spent watching television was negatively associated with academic performance, language learning and mathematics. In the analysis of subgroups, it was found that only in children watching TV, it was inversely related to language learning, and only in teenagers watching TV and video games it was related to composite scores.

This disparity of results can have many reasons which can be effective among the methodological differences of various studies conducted in this field. In different studies that are carried out in diverse populations, different tools are used to measure variables. This disparity in the present study, which

could be more noticeable, can be the basis of other studies in this field.

In explaining the negative relationship between screen time and academic performance in the present study, it is necessary to mention some crucial points. As for academic engagement, the first thing is that being exposed to the screen and having more screen time means losing time related to other things in life, including education. In particular, media use is the most prevalent leisure-time sedentary behavior among children and adolescents. Using screen media includes screen-based activities such as surfing the Internet, using a computer or mobile phone, watching television, and playing video games (Marshall et al., 2006). On average, children and adolescents watch TV between 1.8 and 2.8 hours in their free time, play video games for 40 minutes and use computers for 34 minutes a day (Marshall et al., 2006). Overall, 28% of children and adolescents are engaged in these screen-based activities for more than 4 hours a day, the prevalence of which is higher in boys than in girls (30% vs. 25%) (Marshall et al., 2006). Getting involved in the screen can take away time that would be helpful for students' academic engagement. The next is that it is expected to engage in screen time for non-academic activities. The latest guidelines of the World Health Organization (2019) focus on the issue of screen time and define it as "time spent watching screen-based entertainment (TV, computer, mobile, p.58)". In this definition, devices do not include active screen-based games that require physical activity or movement. If the time spent with the screen requires involvement in entertainment and non-academic affairs, and if the involvement with the screen is related to academic affairs, such results may not be obtained.

Another important thing is that screen time is not just a time of the student's interaction with the screen; it is dependent and related to the same specific time. The fact is that other students' time will also be affected by screen time, and students usually need help managing the time between screen time and the time to deal with academic affairs. Another thing is that screen time is more related to negative variables, ultimately reducing students' academic performance. Many studies have reported a positive relationship between screen time and depression (e.g., Stiglic & Viner, 2019; Madhav et al., 2015), which in turn could be due to poor sleep quality caused by screen time. Inactivity and lack of activity caused by screen time and the inability to face the stress of life caused by screen time factors can, in turn, cause problems in the academic performance of students and its quality.

Based on the obtained results, it was found that there was a positive and significant relationship between green time and the dimensions of academic engagement (except for emotional involvement) and students' GPA. This finding is in line with the findings of this field. For example, Oswald et al. (2020), in a review of the studies conducted about the effects of screen time and green time on various variables, as a part of their results reported that the effects of screen time on academic performance are adverse. Moreover, the effects of green time on academic performance are positive.

Browning and Rigolon (2019) concluded that 28% of studies support the positive effect of green space, and 8% support the negative effect of green space on academic achievement and performance. However, they ultimately needed more research on this issue.

Moreover, they announced different results in this field. The results of the study by Tuen Veronica Leung et al. (2019) indicated the positive effect of green time on the academic performance of English students. The results of the study by Tuen Veronica Leung et al. (2019) under the title "What is the Relationship between Green Spaces and Students' Academic Performance in English and Mathematics?" indicated the positive effect of green time on the academic performance of English-speaking students.

Green time is generally defined as time spent in or exposed to natural environments, elements, or content. A person can study in the green space, and in general, the choice of green space, which is considered part of a person's green time, can be for curricular and non-curricular studies. In addition, the presence of green spaces in educational environments plays a role in improving students' academic performance and student engagement. Tuen Veronica Leung et al. (2019) stated that more greenery in the environment contributes to better academic performance in English and mathematics in students of all grades. This finding can be used as a reference for making changes in the school environment and green landscape design, especially in the vicinity of school areas. This finding can be used as a reference for making changes in the school environment and green landscape design, especially in the vicinity of school areas. Therefore, another positive effect of green space on academic performance and involvement is due to the nature of green space and its positive effects on the body and mind of people there.

Another thing is that green spaces are usually used as a space for rest and renewal of physical and mental strength after daily and academic affairs. By creating environmental diversity and freshness, these spaces can renew physical forces and relieve physical and mental fatigue caused by academic performance. Studies have reported that green time is associated with favorable psychological outcomes (Oswald et al., 2020). The favorable psychological consequences provide a reasonable basis for more academic engagement and better academic performance. Academic engagement and optimal academic performance require the right atmosphere, environment, and mental health. During the green time, the student can study in favorable weather conditions and with a favorable mindset, and the desired academic performance can be predicted for her/ his.

5. Conclusion

The present study's findings highlighted the importance of screen time and green time in explaining students' academic engagement and academic performance.

Acknowledgments

We are incredibly grateful to all those who started, continued, and finished this study, especially my dear students.

Conflicts of Interest

The authors declare that there is no conflict of interest with any organization. Also, this research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

References

Adelantado-Renau, M., Moliner-Urdiales, D., Cavero-Redondo, I., Beltran-Valls, M. R., Martínez-Vizcaíno, V., & Álvarez-Bueno, C. (2019). Association Between Screen Media Use and Academic Performance Among Children and Adolescents: A Systematic Review and Meta-analysis. *JAMA pediatrics*, *173*(11), 1058–1067. https://doi.org/10.1001/jamapediatrics.2019.3176

Alhazmi, A.K., & Rahman, A.A. (2014). *A Framework for Student engagement in Social Networking sites*. Pacific Asia Conference on Information Systems (PACIS). http://aisel.aisnet.org/pacis2014/50

Bonilla-Rius, E. (2020). Education Truly Matters: Key Lessons from Mexico's Educational Reform for Educating the Whole Child. In: Reimers, F.M. (eds) Audacious Education Purposes. Springer, Cham. https://doi.org/10.1007/978-3-030-41882-3_5

Browning, M. H. E. M., Rigolon, A. (2019). School Green Space and Its Impact on Academic Performance: A Systematic Literature Review. *International Journal of Environmental Research and Public Health*; *16*(3):429. https://doi.org/10.3390/ijerph16030429

Camerini, A. L., Albanese, E., Marciano, L., & Corona Immunitas Research Group (2022). The impact of screen time and green time on mental health in children and adolescents during the COVID-19 pandemic. *Computers in human behavior reports*, *7*, 100204. https://doi.org/10.1016/j.chbr.2022.100204

Carter, C. P., Reschly, A. L., Lovelace, M. D., Appleton, J. J., & Thompson, D. (2012). Measuring student engagement among elementary students: pilot of the Student Engagement Instrument--Elementary Version. *School psychology quarterly: the official journal of the Division of School Psychology, American Psychological Association*, *27*(2), 61–73. https://doi.org/10.1037/a0029229

Howie, E. K., Joosten, J., Harris, C. J., Straker, L. M. (2020). Associations between meeting sleep, physical activity or screen time behaviour guidelines and academic performance in Australian school children. *BMC Public Health*, *20*, 520. https://doi.org/10.1186/s12889-020-08620-w

Kanburoglu, M. K and et al. (2014). Optimal Screen and Study Time for Achievement of High Academic Performance in Adolescents. *Turkish Journal of Pediatric; 3*, 129-136. http://dx.doi.org/10.12956/tjpd.2014.70

Kumar SS, Shirley SA. (2020). A study on correlation between screen time duration and school performance among primary school children at Tamilnadu, India. *International Journal of Contemporary Pediatrics; 7*, 117-21. https://doi.org/10.18203/2349-3291.ijcp20195738

Li, Y., & Lerner, R. M. (2011). Trajectories of school engagement during adolescence: implications for grades, depression, delinquency, and substance use. *Developmental psychology*, *47*(1), 233–247. https://doi.org/10.1037/a0021307

Madhav, K. C., Sherchand, S. P., & Sherchan, S. (2017). Association between screen time and depression among US adults. *Preventive medicine reports*, *8*, 67–71. https://doi.org/10.1016/j.pmedr.2017.08.005

Marshall, S. J., Gorely, T., & Biddle, S. J. (2006). A descriptive epidemiology of screen-based media use in youth: a review and critique. *Journal of adolescence*, *29*(3), 333–349. https://doi.org/10.1016/j.adolescence.2005.08.016

Muppalla, S. K., Vuppalapati, S., Reddy Pulliahgaru, A., & Sreenivasulu, H. (2023). Effects of Excessive Screen Time on Child Development: An Updated Review and Strategies for Management. *Cureus*, *15*(6), e40608. https://doi.org/10.7759/cureus.40608

Oswald, T. K., Rumbold, A. R., Kedzior, S. G. E., & Moore, V. M. (2020). Psychological impacts of "screen time" and "green time" for children and adolescents: A systematic scoping review. *PloS one*, *15*(9), e0237725. https://doi.org/10.1371/journal.pone.0237725

Oxford University Press. Oxford English Dictionary (2020); *Oxford University Press*: Oxford, UK.

Pate, R. R., O'Neill, J. R., & Lobelo, F. (2008). The evolving definition of "sedentary". *Exercise and Sport Sciences Reviews*, *36*(4), 173–178. https://doi.org/10.1097/JES.0b013e3181877d1a

Paulich, K. N., Ross, J. M., Lessem, J. M., & Hewitt, J. K. (2021). Screen time and early adolescent mental health, academic, and social outcomes in 9- and 10- year old children: Utilizing the Adolescent Brain Cognitive Development (ABCD) Study. *PloS one*, *16*(9), e0256591. https://doi.org/10.1371/journal.pone.0256591

Peiró-Velert, C., Valencia-Peris, A., González, L. M., García-Massó, X., Serra-Añó, P., & Devís-Devís, J. (2014). Screen media usage, sleep time and academic performance in adolescents: clustering a self-organizing maps analysis. *PloS one*, *9*(6), e99478. https://doi.org/10.1371/journal.pone.0099478

Reeve, J. (2013). How students create motivationally supportive learning environments for themselves: The concept of agentic engagement. *Journal of Educational Psychology, 105*, 579–595. DOI: 10.1037/a0032690

Saber S, Sharifi HP. (2013). Predicting dimensions of academic engagement by identity styles in first grade girl students of Tehran state high school. *Res Curricul Plan*; *10*(11):72-85. https://sanad.iau.ir/en/Article/897671

Salmela Aro, K., Tang, X., Symonds, J., & Upadyaya, K. (2021). Student engagement in adolescence: A scoping review of longitudinal studies 2010–2020. *Journal of Research on Adolescence*, *31*(2), 256–272. https://doi.org/10.1111/jora.12619.

Sanders, T., Parker, P. D., Del Pozo-Cruz, B., Noetel, M., & Lonsdale, C. (2019). Type of screen time moderates effects on outcomes in 4013 children: evidence from the Longitudinal Study of Australian Children. *The International Journal of Behavioral Nutrition and Physical*

Activity, *16*(1), 117. https://doi.org/10.1186/s12966-019-0881-7

Schlechty, PC. (2005). *Creating create schools: Six critical systems at the heart of educational innovation*. Sanfrancisco: Jhonwiley and Son.

Seyf A. (2013). *Modern educational psychology*. 7nd ed. Tehran: Duran Publishers.

Sinnarajah, K., Balachandran, K., Thuraisingham, T. (2019). Association of screen time with academic performance and behaviour among primary school children of Kandy district Sri Lanka. *Open Journal Pediatric Child Health*, 4(1), 047-052. https://dx.doi.org/10.17352/ojpch.000020

Stiglic, N., & Viner, R. M. (2019). Effects of screentime on the health and well-being of children and adolescents: a systematic review of reviews. *BMJ open*, *9*(1), e023191. http://dx.doi.org/10.1136/bmjopen-2018-023191

Tarekegn, A., Endris, S. (2019). The Relationship between Hours of Television Watching and Academic Achievement of Secondary School Students: The Case of Some Selected Secondary Schools in Harer City. IJELS,7(3), 61-66. http://dx.doi.org/10.7575/aiac.ijels.v.7n.3p.61

Tuen Veronica Leung, W., Yee Tiffany Tam, T., Pan, W. C., Wu, C. D., Candice Lung, S. C., & Spengler, J. D. (2019). How is environmental greenness related to students' academic performance in English and Mathematics? *Landscape and Urban Planning*, *181*, 118-124. https://doi.org/10.1016/j.landurbplan.2018.09.021

Upadyaya, K., & Salmela-Aro, K. (2013). Development of school engagement in association with academic success and well-being in varying social contexts: A review of empirical research. *European Psychologist*, *18*(2), 136-147. https://doi.org/10.1027/1016-9040/a000143

Vizcaino, M., Buman, M., DesRoches, C. T., & Wharton, C. (2019). Reliability of a new measure to assess modern screen time in adults. *BMC public health*, *19*, 1-8. https://doi.org/10.1186/s12889-019-7745-6

World Health Organization. (2010). *Global Recommendations on Physical Activity for Health*. Geneva, Switzerland.

World Health Organization. (2019). Guidelines on Physical Activity, Sedentary Behaviour and Sleep for Children under 5 Years of Age. Available online: https://iris.who.int/handle/10665/311664%20(accessed%20on%2017%20April%202020)

Zhang, Y., Mavoa, S., Zhao, J., Raphael, D., & Smith, M. (2020). The Association between Green Space and Adolescents' Mental Well-Being: A Systematic Review. *International journal of environmental research and public health*, *17*(18), 6640. https://doi.org/10.3390/ijerph17186640