Developing a model about Academic Performance, based on Screen time, metacognition and Mindfulness: The Mediating Role of Self-esteem, Self-regulation in high school

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ARTICLE INFORMATION	*ABSTRACT*

Background and Aim: Academic performance is considered one of the important variables in achieving job success and social acceptance in any society, so that sometimes academic performance is considered equivalent to academic success. The aim of the current research was to determine the formulation of the academic performance model based on the duration of using screens, metacognition and the conscious mind with the mediation of self-esteem and self-regulation in adolescents. **Methods:** The current research was of correlation and structural equations type. The statistical population of the research included second grade high school students in Tehran in the academic year 2020-2021, 517 of whom were selected by multi-stage cluster sampling. In order to collect the data required for this research, the Freiburg Mindfulness Questionnaire (2001), the Dortaj Academic Performance Questionnaire (2005), the Cooper Smith Self-Respect Questionnaire (2017), the Wells Metacognition Questionnaire (2004), and the questionnaire for the duration of using Tirgar screens (2018) and the self-regulation questionnaire of Miller and Brown (1992) was used. Data were analyzed using Pearson correlation test and path analysis. **Results:** The results showed that the direct paths of metacognition, mindfulness and the duration of using screens are significant with academic performance (P<0.01) and the indirect effect of metacognition, the duration of using screens and mindfulness with The mediation of self-respect is significant (P=0.20) and it showed its mediating role well, while although self-regulation has a direct effect on academic performance, it cannot indirectly affect academic performance as a mediating variable. Academic performance has an effect. **Conclusion:** It can be said that the duration of using screens and metacognition and mindfulness, along with other factors such as self-esteem and self-regulation, play a key role in academic performance, and it seems that the role of self-esteem is more important. Therefore, in order to increase academic performance, it is necessary to pay attention to these factors in improving the academic performance of students.

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Introduction

Academic performance is one of the criteria for evaluating the efficiency of educational systems, which plays an important role in the development of the country's future human resources (Qamri, 2022). Academic performance and the factors affecting it have always been the focus of psychologists and education specialists, and in recent years they are trying to identify variables that can improve academic performance (Yarahmadi Naderi et al., 2019).

Previous studies have shown that many psychological variables can affect a person's academic performance. Meanwhile, mindfulness is delicately related to academic performance. Mindfulness is a type of awareness that emerges through paying attention to real goals and being in the present, without judgment about experiences (McCanville et al., 2017). The results of some studies showed that mindfulness can have positive changes in the academic performance of children and adolescents (Bo et al., 2020). A high level of mindfulness can have a positive effect on increasing attention and concentration in students (Aghajan Pourian et al., 2022). As a result of this increase in concentration and attention, the capacity and ability to process information increases and causes homework to be done more efficiently and reduces academic anxiety in students (Yousfi et al., 2019). However, mindfulness can decrease under the influence of various factors. Meanwhile, the addictive use of electronic devices such as mobile phones, televisions and computers can play an important role in reducing mindfulness in students (Jones et al., 2022).

Electronic devices have changed human life and play an important role in obtaining equipment that has made human life easier. Also, these devices have been able to facilitate communication and provide suitable conditions for learning. In addition to the useful role of these electronic devices, sometimes these devices act like a double-edged sword. If used incorrectly or excessively, they may have a destructive effect on a person's social, professional, and academic life (Diaz & Victor, 2022). The results of some studies showed that the excessive use of electronic devices in the learning process affects students and negatively affects their academic performance (Davrpanah et al., 2020). According to Mirer and Renicke (2021), improper use of electronic devices causes negative effects on students' sleep, mental health, depression, and academic satisfaction. On the other hand, these devices can have a negative or positive effect on people's beliefs and knowledge about themselves and others.

Metacognitive beliefs are placed in two areas, positive and negative. Negative metacognitive beliefs are related to the uncontrollability and dangerousness of cognitive thoughts and experiences, and positive metacognitive beliefs have a positive perception of worry, rumination, threats, and similar strategies (Wells & Papageorgiou, 1999). Studies show that metacognitive skills create motivation in students and increase their ability to solve problems (Pradha & Parismita, 2021). Metacognition also helps learners identify their strengths and weaknesses, be realistic in choosing goals, and plan their activities better. Therefore, it seems that people with higher metacognition are better able to succeed in their jobs and studies. Achieving these successes increases a person's sense of satisfaction and self-esteem (Fran et al., 2022).

Self-esteem is an individual's self-attitude that is undetectable (or misdiagnosed) by introspection and is characterized by an individual's overall assessment of his or her own importance and value as a human being (Frotan et al., 2020). The research of Abdul Salem, Masroum and Zakaria (2019) showed that the level of self-respect has a direct relationship with Internet addiction and the amount of use of social networks. In such a way that people who had a lower level of self-esteem had higher anxiety and more internet addiction, devoted more hours to social networks and had lower academic performance. Therefore, people with high self-esteem have more confidence in themselves, and their sense of occupational and academic competence is higher. Therefore, they can tolerate anxiety and daily life events better and regulate their negative emotions well (Long, Yang, & Lee, 2020).

The findings of Sofia et al.'s research (2021) show that self-regulation skills predict academic performance and that learners must learn how to regulate their performance in order to achieve academic success. The conducted studies show that self-regulation has a great impact in predicting academic performance, whose positive dimension causes progress in education, and its negative dimension predicts academic failure (Sofia, 2021). Also, people who have

higher self-regulation can better face psychological problems related to education such as academic anxiety and academic burnout (Safari, Heydari, and Hassanzadeh, 2022). Therefore, these people can better manage themselves in stressful academic situations and experience less academic failure (Kaushik & Jena, 2021).

Therefore, considering the role of research variables on academic performance and the importance of the subject of learning and academic performance and the lack of similar research in Iran, factors that improve the academic performance of learners should be found and strengthened. Failure to pay attention to variables such as metacognition, self-respect, mindfulness and self-regulation of learners is one of the problems that arise in the field of academic performance and is manifested in the form of weakness in academic performance and ultimately leads to the learner's negative view of his abilities. Therefore, the purpose of the researchers in conducting this research was to answer the question whether self-esteem and self-regulation play a mediating role in the relationship between metacognition, the duration of using screens, and mindfulness with academic performance.

Method

The present research was applied in terms of purpose and descriptive in terms of collection method and correlation and structural equations. The statistical population of this research included male and female students of the second year of high school in Tehran in the academic year 2019-2020. Among the 600 distributed questionnaires, 517 people (260 boys - 257 girls) were selected by multi-stage cluster random sampling. In order to select the research sample, first, six regions (1-3-5-6-12-19-22) were randomly selected among the 22 districts of Tehran. Then 4 classes were randomly selected from each region and questionnaires were distributed among them. There is no theoretical consensus about the sample size in factor analysis and modeling studies, many researchers, including Gholami Shaharaki (2019), believe that a sample size of more than 200 people provides a suitable statistical possibility for data analysis. However, in order to increase the power and validity of the research, a much larger sample size was selected.

In the current research, the studied variables were first analyzed using descriptive statistics (mean, standard deviation, correlation matrix). In the following, the preparation and processing of the collected data was discussed, especially that the main assumptions of structural equation modeling (SEM) including missing values, normality, linearity, collinearity and homogeneity of dispersion were examined (Kline, 2005). Finally, to check the hypotheses of the research, a multivariate analysis was performed using structural equation modeling.

Materials

1. Academic Performance Questionnaire: This questionnaire was compiled by Dortaj (2013) and measures academic performance with 48 questions in 5 areas. Each question is scored on a five-point Likert scale from 1 (very little) to 5 (very much). A score less than 120 indicates poor academic performance, a score between 174-121 indicates average academic performance, and a score higher than 175 indicates strong academic performance. Dortaj (2014) showed that the questionnaire has acceptable internal consistency and calculated Cronbach's alpha coefficients for its subscales between 0.72 and 0.93. In this study, the Cronbach's alpha coefficient for the components of self-efficacy, emotional effects, planning, lack of control over the outcome, and motivation were obtained as 0.77, 0.40, 0.82, 0.55, and 0.70, respectively.

2. Cooper Smith Self Esteem Questionnaire (SEI): This questionnaire was created by Cooper Smith in 1967. This questionnaire has 58 two-choice questions with "yes" and "no" options that each person chooses one of the options according to their situation. The maximum score in the general scale is equal to 26 and in each of the other three scales is equal to 8. The maximum total score of self-respect is equal to 50. Broumand (2017) showed Cronbach's alpha coefficient for the whole scale as 0.81 and 0.79 respectively. In this study, Cronbach's alpha coefficient was obtained for general, family, social, and academic self-respect, respectively, 0.70, 0.61, 0.45, and 0.51.

3. Self-regulation Questionnaire (SRQ): The self-regulation scale was created by Miller and Brown (1992) and consists of 63 items and has 7 subscales. The scoring of the questionnaire is in the form of a 5-point Likert scale. To get the overall score of the questionnaire, the scores of all the items are added together. Razavi Nematollahi et al. (2012) tested the reliability of the self-regulation questionnaire using Cronbach's alpha method. For the subscales of receiving appropriate information, evaluating information and comparing it with norms, directing changes, searching for options, planning, implementing the program, evaluating the effectiveness of the program, and the whole questionnaire, respectively, were equal to: 0.79, 0.60, 0.63, 0.77, 0.76, 0.66, 0.72 and 0.91 were obtained. In this research, Cronbach's alpha coefficient for acceptance, evaluation, start-up, review, planning, implementation and measurement was equal to: 0.50, 0.60, 0.51, 0.68, 0.61, 0.61, 0.64 have been obtained.

4. Mindfulness Questionnaire (FMI): This scale was created by Bachheld, Grossman and Wallach

(2001). This questionnaire has 14 items and the subject was asked to answer the questions on a Likert scale from always (1) to rarely (4). It is worth mentioning that statement number 13 is scored in reverse. The minimum score in this questionnaire is 14 and the maximum score is 56. A higher score indicates higher mindfulness. Reliability during a survey conducted in the country by Ghasemi et al. (201) and Cronbach's alpha coefficient was 0.92. In this study, Cronbach's alpha coefficient for mindfulness was 0.91.

5. Metacognitive Beliefs Questionnaire (MCQ): The 30-item version of this questionnaire was created in 2004 by Wells and Cartwright Hutton, which has five subscales: 1. Positive beliefs about worry 2. Negative beliefs about uncontrollability and risk 3. Beliefs about lack of certainty Cognitive 4. Cognitive self-awareness 5. Negative beliefs about superstitious thinking, punishment and responsibility. The score of each question is 0-1 and the total score of the questionnaire is 30. Its creators reported reliability coefficients by Cronbach's alpha method for components from 0.73 to 0.87 and by test-retest method from 0.76 to 0.89 (Wells, 2004). In Iran, this questionnaire was standardized by Sabet (2011) and the results showed that the reliability coefficient of the test using Cronbach's alpha method was 0.896 for the whole group, 0.902 for boys and 0.858 for girls. In the present study, the reliability coefficient of the questionnaire using Cronbach's alpha method for the whole test was 0.82.

6. The scale of the duration of using display screens: this questionnaire was made by Tirgar (2018). The questionnaire has 10 items that are completed by the students. The total duration of technology use (hours per day) is reported by students as the average time spent on activities such as watching TV, movies, using computers, using video games, and using social networks during weekdays. Subjects were asked to answer questions on a Likert scale ranging from never (0) to 11 hours or more.

Implementation

Researchers have tried to observe all ethical principles in research. For this purpose, the researchers first obtained the approval of this department to conduct the research through numerous correspondences with the Department of Education. After the final selection of the samples, the researchers explained the research objectives to the students with references to the classrooms. They were also assured that all ethical principles in the research, such as confidentiality and non-disclosure of names, will be observed. Also, the participants have the right to withdraw from cooperation at any stage of the research. Among the most important inclusion criteria were living in Tehran, informed consent to participate in the research, not suffering from acute mental disorder (through examination of the academic record and referring to the school principal and counselor) and studying in the second level of secondary school. Also, withdrawing from the research at any stage, losing any of the inclusion criteria during the research, and not answering the questions in the questionnaires correctly were among the most important exclusion criteria from the research. The data from this research was collected by the researcher between the second half of 1998 and the first half of 1999. The data were analyzed using descriptive statistics (mean, standard deviation, frequency and percentage) and inferential statistics (Pearson correlation and structural equation modeling) by 24 Amos and 24 SPSS software. To check the overall fit of the model, absolute, relative and parsimonious fit indices were used.

Results

The results of the demographic characteristics of the participants in this research showed that 50.3% of the participants were boys and 49.7% were girls. 32.3% of the participants were 16 years old and 67.7% were 17 years old. 32.5% were in the 11th grade and 67.5% were in the 12th grade. Also, mathematics, experimental and humanities fields constituted 45.1, 43.9 and 11% of the participants in the research, respectively.

Table 1. Mean and standard deviation of research variables		
Variable	Mean	SD
Efficacy	22/84	5/576
Emotional effects	22/57	4/467
planning	44/33	9/404
Lack of outcome control	13/13	3/279
motivation	39/07	7/973
Duration of use of screens	7/94	3/754
the reception	29/15	5/038
Assessment	29/77	4/942
Setting up	29/98	4/992
Check	30/15	5/622
planning	26/87	4/53
Performance	28/93	5/182

Evaluation	30/04	5/726
General	14/66	4/068
family	4/73	1/849
social	5/15	1/69
educational	4/47	1/758
Positive belief to worry	14/42	3/587
Cognitive process of self-awareness	16/44	3/396
Uncontrollable	14/62	3/531
Cognitive uncertainty	12/89	3/667
Thought control	13/85	3/307
Mindfulness	35/52	6/179

In Table No. 1, the descriptive characteristics of the research variables, including the mean and standard deviation, are reported, in which the highest average score is related to the planning subscale (44.33) and the lowest average is related to the family subscale (4.73).

The results of the correlation test of research variables showed that the relationships between academic performance and variables of mindfulness, the duration of using screens, self-esteem, self-regulation and metacognitive beliefs are significant. Also, the highest correlation was between planning with academic self-efficacy (0.649) and planning with academic motivation (0.726). According to the data in Table No. 2, in the final model, the ratio of the chi-square index to the degree of freedom is equal to (2.52), if this ratio is less than 3 or between 3 and 5, it indicates

the fit of the model. The RMSEA index is equal to 0.054, which, considering the residuals and errors, the lowness of this index indicates the suitability of the model. The GFI index is equal to 0.915 and the AGFI index is equal to 0.889. If the GFI index and AGFI index are equal to or greater than 0.9, it indicates the suitability of the model. The CFI index is equal to 0.925. If these indices are equal to or greater than 0.9, it indicates the suitability of the model. The findings showed that the direct path coefficient between positive metacognitive beliefs and positive academic performance is significant at the 0.05 level ($p < 0.05$, $\beta = 0.582$). This finding indicates that by increasing one standard deviation on the scores of positive metacognitive beliefs, 0.582 standard deviations increase on the academic performance scores.

Table 2. Model fit indices		
Index	Value	Cut-off point
X^2 **Df**	2/52	< 5
RMSEA	0/054	< 0.08
GFI	0/915	> 0.9
AGFI	0/889	> 0.9
CFI	0/925	> 0.9

The results of direct coefficients between research variables are reported in Table No. 3. According to this table, the direct path coefficient between negative metacognitive beliefs and negative academic performance is significant at the 0.05 level ($p < 0.05$, $\beta = 0.369$). This finding indicates that by increasing one standard deviation on the scores of negative metacognitive

beliefs - 0.369, the standard deviation of academic performance scores decreases. The coefficient of the direct path between the duration of using screens and academic performance is negative and insignificant ($p < 0.05$, $\beta = 0.032$). There is no direct relationship between screen time and academic performance.

Table 3. Direct coefficients between research variables in the structural model				
Independent variable	b	SE	β	p
Mindfulness-academic performance	0/056	0/036	0/080	0/142
Duration of use of screens-academic performance	0-/037	0/059	-0/032	0/526
Positive metacognitive beliefs-academic performance	1/412	0/415	0/581	0*/023
Negative metacognitive beliefs-academic performance	1/159	0/258	-0/369	0*/020

Self-esteem-academic performance	0/385	0/093	0/307	0**/009
Self-regulation-academic performance	-0/275	0/146	-0/231	0*/031
Mindfulness-self-respect	0/133	0/028	0/239	0**/006
Mindfulness-self-regulation	0/030	0/033	0/051	0/363
The duration of use of screens-your dignity	-0/183	0/045	-0/201	0**/007
The duration of using self-adjusting display pages	0/027	0/052	0/028	0/859
Positive metacognitive beliefs - self-esteem	0/599	0/135	0/309	0**/011
Positive metacognitive beliefs - self-regulation	1/479	0/225	0/726	0*/026
Negative metacognitive beliefs - self-esteem	-0/764	0/126	-0/418	0*/021
Negative metacognitive beliefs - self-regulation	-0/741	0/142	-0/386	0*/021

The results of the Sobel test in Table 4 showed that the coefficient of the indirect path between the duration of using screens and academic performance with the mediation of self-esteem is negative and significant at the 0.01 level (p < 0.01, β = -0.062). Therefore, self-respect mediates the relationship between screens and academic performance in a negative and significant way. Therefore, the fourth hypothesis of the research is confirmed. The coefficient of the indirect path between the duration of using screens and academic performance is negative and significant at the 0.05 level (p<0.05, β=0.068). The indirect path coefficient between the duration of using screens and academic performance with the mediation of self-regulation is negative and non-significant (p<0.05, β=0.07). Therefore, self-regulation does not mediate the relationship between screens and academic performance. The path coefficient between mindfulness and academic performance

is positive and non-significant (p<0.05, β=0.080). There is no direct relationship between mindfulness and academic performance. The indirect path coefficient between mindfulness and academic performance is positive and significant at the 0.05 level (p<0.05, β=0.062). The coefficient of the indirect path between mindfulness and academic performance with the mediation of self-esteem is positive and significant at the 0.01 level (β=0.074, p<0.01). Therefore, self-esteem positively and meaningfully mediates the relationship between mindfulness and academic performance. The coefficient of the indirect path between mindfulness and academic performance with the mediation of self-regulation is negative and non-significant (p<0.05, β=0.012). Therefore, self-regulation does not mediate the relationship between mindfulness and academic performance.

Table 4. Sobel test results for the role of mediating variables			
Independent	Standard Paramet	Statistics	p
The use of self-esteem screens for academic performance	-0/062	0/927	0**/003
The use of self-regulation screens of academic performance	-0/07	0/508	0/611
Positive metacognition of self-esteem of academic performance	0/096	3/034	0**/002
Positive metacognition of self-regulation of academic performance	-0/17	1/810	0/070
Negative metacognition of self-esteem of academic performance	-0/13	3/428	0**/001
Negative metacognition of self-regulation of academic performance	0/093	1/770	0/076
Mindfulness, self-respect, educational performance	0/074	3/140	0**/001
Mindfulness, self-regulation of academic performance	-0/012	0/801	0/422

It mediates the relationship between screens and academic performance in a negative and significant way. Therefore, the fourth hypothesis of the research is confirmed. The coefficient of the indirect path between the duration of using screens and academic performance is negative

and significant at the 0.05 level (p<0.05, β=0.068). The indirect path coefficient between the duration of using screens and academic performance with the mediation of self-regulation is negative and non-significant (p<0.05, β=0.07). Therefore, self-regulation does

not mediate the relationship between screens and academic performance. The path coefficient between mindfulness and academic performance is positive and non-significant ($p < 0.05$, $\beta = 0.080$). There is no direct relationship between mindfulness and academic performance. The indirect path coefficient between mindfulness and academic performance is positive and significant at the 0.05 level ($p < 0.05$, $\beta = 0.062$). The coefficient of the indirect path between mindfulness and academic performance with the mediation of self-esteem is positive and significant at the 0.01 level ($\beta = 0.074$, $p < 0.01$). Therefore, self-esteem positively and meaningfully mediates the relationship between mindfulness and academic performance. The coefficient of the indirect path between mindfulness and academic performance with the mediation of self-regulation is negative and non-significant ($p < 0.05$, $\beta = 0.012$). Therefore, self-regulation does not mediate the relationship between mindfulness and academic performance.

Conclusion

The purpose of this study was to model the structural relationships of metacognition, mindfulness and the duration of using screens and academic performance through the mediation of the role of self-esteem and self-regulation. The findings of the research show that self-respect is the mediator of the effect, metacognition, mindfulness and the duration of using screens on academic performance and has shown its mediating role well. While self-regulation is the mediator of the effect, metacognition, mindfulness and the duration of using screens on academic performance and has not shown its mediating role well.

The results of structural model evaluation also showed that positive metacognition could significantly predict academic performance both directly and through self-esteem. However, negative metacognition only directly affects academic performance. This result is in line with the findings of Saina (2019), which showed that metacognition is effective on students' academic performance. Also, in the alignment results, Danker et al. (2014) and Zhou, Lam and Zhank (2022) showed that metacognition is one of the most important variables in predicting academic performance in adolescents. In explaining this finding, it can be said that metacognitive beliefs have two positive and negative areas. Positive

metacognitive beliefs (thought control and positive worry belief) are related to the usefulness of engaging in cognitive activities, and the area of negative beliefs is related to thought control and cognitive uncertainty and uncontrollability (Wells & Papageorgiou, 1999). Teaching students to effectively use the ability of metacognition improves their performance and makes them more motivated to learn more and more effectively.

Also, the findings of the research showed that self-esteem is related to academic performance. This finding is in line with the findings of Aghajani, Khormaei, Rajabi and Rostam Oghli (2012), who showed that self-esteem is an important variable in academic performance and the level of academic anxiety in students. According to the theoretical and research bases that confirm the connection between self-esteem and academic performance, in explaining these findings, it can be said that those who have high self-esteem always try to evaluate their abilities at a high level. Therefore, students who have better self-esteem and have a good understanding of themselves and their abilities make more efforts for higher academic success and have a high motivation to progress, and their level of academic anxiety is also lower (Aghajani et al., 2012).

Another finding of the present study was that self-regulation has a direct effect on academic performance, while as a mediating variable, it cannot affect academic performance indirectly. From this finding, it is inferred that self-regulation as an individual factor has been able to act as a framework in the form of behavioral patterns to increase academic performance. These results are in line with the research of Brown, Peterson and Yao (2016), who concluded that there is no significant relationship between self-regulation learning and academic performance. However, it is not in line with the findings of the study of Jab, Friez and Brenker (2015) who showed that self-regulation has an effective role in the academic performance of students. This difference can be due to the use of self-assessment tools and it is better for researchers to use other tools to examine the research results from other angles. About the mediating role of self-regulation, it can be suggested that self-regulation regulates social action through four main processes, i.e., motivation, cognition, feeling, and behavior (Rickman, 1997). Self-regulation can be seen as

a skill that can be taught to increase academic performance.

Based on the analysis of the findings of this research, it was concluded that mindfulness could significantly predict academic performance both directly and with the mediating role of self-esteem. The findings of the present research are in line with the findings of Ashrafi et al. (2015) and Ghasemi Joyneh et al. (2016), who showed that cognitive regulation and mindfulness are effective on students' academic performance. Mindfulness helps to study and understand material by creating awareness and concentration in a person. If the students get enough knowledge about their abilities and evaluate their situations correctly, they can strengthen their motivation to succeed. They can continue to study in identifying a situation that increases motivation, and they have a greater ability to understand the demands of others, and they can understand peer pressure well.

On the other hand, the excessive use of electronic devices only directly affects the academic performance of students. Rather, self-respect has an indirect mediating role between the use of these devices and academic performance. The findings obtained from the present study are in line with the results of the studies of Atdakht et al. (2014) and Lee, Lepp and Barkley (2015). They showed that the use of electronic devices and social networks can have an effective role in the academic performance of students and that addictive use can interfere with the academic progress of students. In explaining this alignment, it can be said that due to the attractiveness of electronic devices, many students neglect to pay attention to its negative aspects and lose useful study time, dependence on electronic devices and anxiety caused by it. These factors can lower academic performance. Excessive use of devices that have display screens causes a kind of dependence, and in extreme cases of dependence, it affects the daily life of students. This dependence gradually becomes a habit and as a result leads to some kind of addiction in students.

This research, like any other research, has some limitations. The first limitation of the current research is that, considering that this research was conducted on girls and boys of the second year of high school in Tehran, it is not possible to generalize these findings to other cities and educational courses. Another limitation is that

the present research was conducted in public schools in Tehran. Therefore, its findings cannot be generalized to other types of schools such as non-profit schools, Shahid, gifted centers, etc. On the other hand, since the research data was collected in the form of self-report, therefore, there is a possibility of bias in the answers. Therefore, the interpretation of the results should be done with caution. In order to solve the existing limitations, it is suggested that similar researches be carried out in other cities of the country that have different cultural, religious and linguistic contexts. Also, in order to further generalize the results, it is better to implement these variables in other educational levels and ages.

In a general conclusion, it can be said that the duration of using screens, metacognition and mindfulness, along with other factors, including self-esteem and self-regulation, play a key role in academic performance. Based on the results of the present research, it is suggested that counselors and psychologists working in schools and teachers introduce students to the areas of metacognitive beliefs and mindfulness by organizing educational sessions in the style of workshops, group and individual consultations. Also, determine its role in academic performance and teach them how to use metacognitive beliefs, mindfulness and the use of electronic devices properly and positively. If the goal of education is to train students who can take responsibility for their own learning, it is necessary to have this feature in their academic performance. In addition, in order to reduce the negative effects of excessive use of electronic devices on the academic performance of students, it is necessary to give the necessary awareness about the negative effects of excessive use of these devices on academic performance.

Conflict of Interest

According to the authors, this article has no financial sponsor or conflict of interest.

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