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Teaching Metacognitive Strategies on Metacognitive Behavior and Internet Self-Efficacy of Female Students at Risk of Internet Addiction during the COVID-19

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Abstract

Background: *Adolescents, for whom the internet is an indispensable part of their daily life, are the most significant group at risk of internet addiction. This study aimed to investigate the effectiveness of metacognitive strategies on metacognitive behavior and internet self-efficacy of female students at risk of internet addiction during the COVID-19.*

Methods: *The present study was a quasi-experimental one with a pretest-posttest design with a control group. The statistics population for the academic year 2020-2021 comprised all secondary schools' females in Tehran's 15 district. In this study, a purposeful sampling process was applied. Primarily, one school (Ebne Sina) was randomly selected from the secondary schools of region 15 in Tehran, in the second grade. Three classes were chosen from each grade in the form of lottery and among 360 students, 30 students who were most at risk for internet addiction were randomly selected and assigned in the experimental (n=15) and control (n=15) groups via shad application. The experimental group received metacognitive strategies training for 8 treatment sessions (90 minutes for each session). The data were analyzed with SPSS23 software and analysis of covariance (ANCOVA).*

Results: *Mean and standard deviation of age in the experimental and the control groups were 15.87±0.734 and 16±0.816, respectively. Moreover, our findings showed that the experimental and control groups differ significantly in their metacognitive behavior (Pvalue=0.01and F=55.349) and internet use self-efficacy during pretest control (Pvalue=0.01 and F=43.573).*

Conclusions: *The result showed that metacognitive strategies had significant effects on metacognitive behavior and internet self-efficacy of female students at risk of internet addiction during the COVID-19. Therefore, psychological group therapy could be suggested to improve metacognitive behavior and increase internet self-efficacy and thus reduce behavioral and social damages.*

Keywords: Teaching metacognitive strategies, Metacognitive behavior, Internet self-Eefficacy, Female students, Internet addiction.
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Introduction

A novel coronavirus outbreak caused by 2019 (COVID-19) prompted many countries to implement quarantines and isolate their citizens at home. Since many students are obligated to interact with their homeroom teachers, smartphones have become popular as a communication tool. In addition, smartphones facilitate internet access for many people, which leads to internet addictions and attention deficit disorders.[1] While no precise definition of internet addiction has yet been established, it is generally understood to mean that a person cannot control the amount of time they spend on the internet, which may lead to neurological impairments, psychological distress, and a decreased sense of social connection over time.[2] In addition, behavioral addictions could create issues during lock-downs, and hence, teens may be at risk for behavioral addictions in the future.[3] Research conducted by Lin, involving a sample of 1060 junior high school students from Taiwan, revealed that 24.4% of students were addicted to the internet during this period.[4] Also, another study showed young people are increasingly using the internet to do their schoolwork, play games online, shop, watch movies, and research health issues. However, the internet has some severe consequences as well, despite its advantages.[5]

A person's metacognition consists of their beliefs and knowledge about themselves and their cognitions, emotions, and coping mechanisms to cope with such experiences. Research has shown that three types of negative metacognitive, beliefs about the need to control thoughts, lack of cognitive confidence, and negative beliefs about the uncontrollability and danger of worry are markers of psychological distress in addictive behaviors.[6,7] These beliefs may contribute to heightened levels of problematic internet behavior (i.e., internet, social media, and games) are reported in adult samples.[8,9] Nonconstructive metacognition leads to nonadoptive coping methods, including the problematic use of the internet.[10] Negative metacognitions inhibit any effective attempts to stop gaming and/or provoke negative emotional responses that cause a person to persist in gaming, which in turn can increase the risk of developing a full-fledged addictive behavior.[11,12] Spada et al. found a positive correlation between problematic internet use and all dimensions of metacognition. The results suggest that metacognitive theory may be relevant to understanding problematic internet use.[13]

According to Lin et al.[4], the higher internet use time, higher positive outcome expectancy, and lower refusal self-efficacy correlated positively with internet addiction. Since self-efficacy refers to individuals' perception of control over their lives and

predicts the achievement of their goals, Craparo et al demonstrated that self-efficacy was associated with excessive internet use and, in particular, with lost control of daily life.[14] A person's adaptive self-efficacy is determined by how well they can gather, organize, and evaluate information about themselves, as well as how well they think critically and form commitments. In addition, individuals with self-efficacy are thoughtful, flexible, and skeptical about their own opinions. Interested in learning about themselves and willing to evaluate and correct their identities based on inconsistent feedback.[15] Chuang et al. identified significant relationships among social adjustment in virtual networks and self-efficacy resources in social networks in students.[16] An understanding of students' preferences towards constructivist internet-based learning environments is crucial for effective internet-based instruction, but students can avail themselves its benefits only if they have self-efficacy towards the internet.[17]

Metacognitive treatment strategies for internet efficacy, thus, become an important part of its treatment package.[7] Several studies have examined various aspects of internet usage in problematic ways, but metacognitive processes have not been directly studied. In conclusion, Leili Mosalanejad and Mohammed Amin Ghobadifar's thesis shows that negative metacognitive beliefs lessen emotional self-regulation, which serves as a prerequisite for over-involvement in internet communication.[18,19] The authors of Spada et al. demonstrated that metacognitive abilities play a role in emotional regulation and behavior. Metacognitive abilities influence manifestations of negative emotions, which are, in turn, preconditions for problematic internet use.[13] Metacognitions involve self-regulation and reflection of cognition. They are a function of the ability to "think over thinking".[11,20] Therefore, the current study aimed to investigate the teaching metacognitive strategies on metacognitive awareness and self-efficacy belief of female students at risk of internet addiction during the COVID-19.

Materials and Methods

The present research was a quasi-experimental one with a pretest-posttest design with a control group. The statistics population for the academic year 2020-2021 comprised all secondary schools' females in Tehran's 15 district. In this study, a purposeful sampling process was applied. Primarily, one school (Ebne Sina) was randomly selected from the secondary schools of region 15 in Tehran, in the second grade. Three classes were chosen from each grade in the form of lottery and among 360 students, 30 students who were most at risk for internet addiction were randomly selected and assigned in the experimental (n=15) and control (n=15) groups via shad application. Based on the present study design, we used the below formula to calculate the sample size:[21]

$$n = \frac{(z_{1-\frac{\alpha}{2}} + z_{1-\beta})^2(\sigma_1^2 + \sigma_2^2)}{(M_1 - M_2)^2}$$

With a test power of 0.80, alpha=0.05, $M_1 - M_2 = 8$, and $\sigma_1^2 + \sigma_2^2 = 60$ it should be noted that in order to prevent loss of samples, we selected 15 students for each group.

Analysis sessions in table 1[22] were allocated to the experimental group as 90-minute sessions for two months while no intervention was received by the control group. At the time of the exercise, the procedure was carried out by the first author at the school. Ethical approval was received from research deputy of Azad university of Tehran research Committee (IR. AZUT.REC.99.055). All the participants obtained oral and written information regarding the goals of the work. They were made clear that their engagement was voluntary and all the data will remain confidential.

Inclusion criteria included female high school students, students who were most at risk for addiction, consent to participate in research in the age group of 15 to 18 years, and exclusion criteria included dissatisfaction to participate in the study. In the training sessions, the exclusion requirements included more than two absences, and not completing conscious consent or the questionnaires. The form of informed consent was assigned by the participants before conducting the research. It is necessary to remind that all process was done online via what's app. Metacognitive strategies training sessions[8] group was then trained through 8 sessions of 90 minutes once a week. The control group was not given any pieces of training. After all the meeting sessions were implemented, the two groups were tested in the same conditions. To observe the ethical principles in the study for the control group, after the post-test implementation of the experimental group, the training sessions were also considered for the control group.

The scale of self-assessment of metacognitive behavior: This technique was required to assess the following metacognitive strategies:[19] 1) strategic planning (planning, monitoring and evaluation of activities); 2) Formulation of questions (conscious formulation of questions addressed to gaps in a particular field of knowledge); 3) Conscious decision-making (predicting the effect and consequences of each choice); 4) Differentiated assessment (reflective assessment of one's own actions according to various criteria); 5) Comprehension of achievements (correlation of subjectively assessed achievements with objective feedback); 6) Overcoming subjective limitations (awareness of the possibilities of solving complex problems and persistent conscious search for solutions); 7) Paraphrasing and summarizing the information received (rethinking of incoming ideas); 8) Designation of cognitive behavior (definition of the used cognitive strategies and their significance for solving the problem); 9) Definition of terminology (wording of precise definitions of initially vague, ambiguous, or poorly understood terms); 10) Role-playing games (playing the position of a communication partner, a mental dialogue with him); 11) Keeping diaries (writing down your own thoughts); 12) Modeling (building mental representations of experience). Respondents rated the statements on a five-point Likert's scale ranging from 1 (very rarely) to 5 (very often). The summarizing scale of the questionnaire "overall level of metacognitive behavior", Cronbach's alpha is 0.74319. In this study Cronbach's alpha was 0.68.

Internet use self-efficacy questionnaire: The internet use self-efficacy questionnaire was developed by Eastin and

LaRose[20] and then revised by Luo et al.[21]. This instrument aims to assess individuals' confidence in their ability to use the internet to produce overall attainments. The questionnaire comprises 9 items rated on a 4-point Likert's scale: 1 (''strongly disagree''), 2 (''disagree''), 3 (''agree''), and 4 (''strongly agree''). The scores are obtained by summing the items and total scores can range from 9 to 36, with higher scores being indicative of higher degrees of internet use self-efficacy. In the present study, the Cronbach's alpha for the questionnaire was 0.905. According to Cronbach's alpha method, the predictive validity and confirmation structure, and reliability of the study, were both 0.83.

Young internet addiction questionnaire (YIAQ): This questionnaire has 20 items on a Likert scale and the reliability and validity of YIAQ is measured and validated by several studies in Iran.[22] In addition, the Persian version of the questionnaire is validated by the backward-forward translation method and published in our recent article. Also, the reliability of Persian YIAQ was calculated at 0.917.[23] Respondents should select one of the alternatives in each item from the five-point Likert's scale varied from rarely; 1) occasionally; 2) frequently; 3) often; 4) always; 5) The sum of scores of items calculates the internet addiction score and the higher score shows a greater level of internet addiction. The scores varied between 20 to 100 and were categorized in three levels including 20 -39 as online users with complete control on usage, 40 -69 as users with frequent problems due to internet usage, and 70-100 as severe addiction that the internet is causing significant problems.[24] In the present study, reliability using Cronbach's alpha was 0.83.

Analysis of covariance (ANCOVA) was employed for data analysis. The collected data were analyzed through SPSS.[23] The Kolmogorov-Smirnov test was applied to evaluate the normality of pre-test distributions. Levin statistical test was conducted for homogeneity of variances. According to demographic analyses of research units, the age range of research samples was 15 to 18 years old.

Table 1. Summary of metacognitive strategies training sessions

Session 1: Welcoming and getting to know each other, introduction and familiarity with the basic concepts, goal statement, talking about group principles, rules, motivation, commitment, expectations, and tasks
Session 2: Talk about the purpose of education, talk about the problems of students' over-dependence on the internet.
Session 3: Defining planning from the learner's point of view, defining planning from the learner's point of view, explaining about planning, its purpose, factors affecting it, and its obstacles, students are asked to plan for one of their exams so that they can control the duration of internet use and how successful they have been in this planning.
Session 4: In this session, strategies training helps in restructuring negative metacognitive beliefs. For instance, individuals may indulge themselves in detached mindfulness which is a novel metacognitive technique that focuses on memory, increases metacognitive awareness, and detaches oneself from predisposed thinking.
Session 5: Request explanations from students about how they study, schedule explanations about the purpose of the study, provide explanations about how to use the internet properly in successful students. Keep notes of how long you have been using the internet.
Session 6: Provide explanations on how to monitor the use of the internet, provide explanations on how to control and monitor when the Internet is used.
Session 7: The engagement phase mainly focuses on attentional modification and challenging metacognitive beliefs concerning internet use.
Session 8: During this phase, one may indulge in situational attentional refocusing, which impedes the patterns of set attention, maintains perceptions that are menacing, and enables inconsistent metacognitive beliefs.

Results

According to table 2 in the post-test phase, compared to the pre-test phase, by the effect of metacognitive strategies training, metacognitive behavior, and internet use self-efficacy increased

Table 2. Descriptive findings of the studied variables by experimental and control groups

Variables	Groups	Experimental Mean±SD	Control Mean±SD
Metacognitive behavior	Pre-test	18.23±2.50	16.53±1.09
	Post-test	25.20±3.19	16.90±1.69
Internet use self-efficacy	Pre-test	31.16±3.09	27.33±1.04
	Post-test	39.33±3.64	27.66±1.38

As can be seen in table 3, the assumption of equal variance of scores in the experimental and control groups was confirmed. Therefore, the assumption of homogeneity of variances is observed in all major variables of the study, and it is possible to use an analysis of covariance.

As shown in table 4, the assumption of normal distribution of scores in the pretest and both experimental and control groups

Table 3. Levin test results on the assumption of equality of variances of scores research variables

Variables	F	Df1	Df2	Pvalue
Metacognitive behavior	1.76	1	58	0.22
Internet use self-efficacy	0.58	1	58	0.45

was confirmed.

Table 4. Results of the Kolmogorov-Smirnov test on the default normality of the distribution of scores research variables

Variables	Groups	Kolmogorov-Smirnov		
		Statistic	DF	Pvalue
Metacognitive behavior	Experimental	0.633	1o	0.723
	Control	0.767	1o	0.423
Internet use self-efficacy	Experimental	0.743	1o	0.476
	Control	0526	1o	0.602

As can be seen in table 5, by pre-test control, the significance levels of all tests indicate that there is a significant difference between the experimental and control

groups in terms of at least one of the dependent variables (Pvalue=0.01; F=52.95).

The experimental and control groups differ significantly in their metacognitive behavior, as shown in table 6 (Pvalue=0.01 and F=55.349). By comparing the mean of the experimental group with the mean of the control group, metacognitive strategies training increased the metacognitive behavior of the experimental group. The results in table 6 clearly show that the experimental and control groups differ significantly regarding internet use self-efficacy during pretest control (Pvalue=0.01 and F=43.573). Metacognitive strategies training increased internet use self-efficacy among the experimental group because the mean internet use self-efficacy levels were higher than those of the control group.

Table 5. Analysis of covariance (ANCOVA)

Model	Test	Value	F	Hypothesis df	Error df	Pvalue
Group interaction and pre-test	Pillai's Trace	0.75	52.95	52	3	0.01
	Wilks' Lambda	0.25	52.95	52	3	0.01
	Hotelling's Trace	2.99	52.95	52	3	0.01
	Roy's Largest Root	2.99	52.95	52	3	0.01

Table 6. Results of one-way analysis of covariance on the mean posttest scores of experimental and control groups with pre-test control

Variables	Source of change	Sum of square	Degree of freedom	Mean Square	F	Pvalue
Metacognitive awareness	Pre-test	1308.218	1	1308.218	28.429	0.01
	Group	637.094	1	26.078	55.349	0.01
	Error	681.102	55	36.43	0.01	
Internet use self-efficacy	Pre-test	1338.346	1	1338.346	30.631	0.01
	Group	1525.212	1	1525.212	43.573	0.01
	Error	2091.787	55	77.474		

Discussion

In the current study, the researchers aimed to investigate the effectiveness of teaching metacognitive strategies on metacognitive behavior and internet self-efficacy of female students at risk of internet addiction during the COVID-19. In fact, in this study, the researchers wanted to improve metacognitive behaviors and internet self-efficacy for proper use of internet technology by using metacognitive strategies. According to the results of the conducted analysis, the experimental participants' metacognitive behavior and internet use self-efficacy increased after learning metacognitive strategies. The literature review indicated no studies that met our objectives, but various novel findings could serve as a basis for a preventative intervention that leverages metacognitive components. Unfortunately, considering the direct and indirect relationships among variables of this study, which were supported by the literature review, no intervention has been done to improve them in adolescents at risk of internet addiction.

Thus, no evidence was found in the alignment and non-alignment of the results obtained. Therefore, in this section, the relationships between the mentioned variables and the explanation of the findings are discussed. Researchers have studied the effects of internet addiction on a person's life by exploring the work of Zhou et al.[25], Lee et al.[26], Geng et al.[27], and Wu et al.[28]. Conclusively, these experiments show an increase in online activities that mistakenly neglect the health status, the absence of significant daily activities to accommodate an online application, reduced social relationships, and ignoring family and friends.[25-28] According to metacognitive theory, the disorder of internet addiction is due to defective cognitions or defective cognitive processing, so treatment should be planned based on the correction of metacognitive processes. Activities in the behavioral domain are regulated by metacognitive processes.[29]

They are responsible for evaluating, interpreting, and controlling behavior. Metacognitive strategies such as focusing on one's thoughts, fantasies, and problematic experiences can be part of a unified symptom complex with signs of Internet addiction.[11] Metacognition is a treatment strategy that emphasizes mindfulness, develops metacognitive awareness, and dissociates individuals from predisposed thinking. Also, changes people's beliefs about how they use the internet and changes their attentional processes. Metacognition strategy helps individuals to maintain menacing perceptions and creates inconsistent metacognitive beliefs.[5,6] Therefore, turning students into strategic learners with metacognitive abilities is one of the important goals in teaching metacognitive strategies; because such learners can use metacognitive strategies to guide and control the process of useful use of the internet.[30]

Some studies research on internet self-efficacy indicated an important role of metacognitive strategies (Bogdanovskaya et al;[11] Liang and Tsai).[31] Using metacognitive strategies, students gain self-confidence and increase their capacity for learning by regulating and controlling their cognitive processes through implementing learning strategies to deal with tasks or challenges in the classroom. This belief refers to an optimistic attitude about dealing with numerous challenging situations and tasks. The student's self-efficacy determines how they process learning activities, how much effort they will devote, and how long they will maintain efforts under troublesome circumstances. Using the internet and performing well in an internet-assisted learning environment correlate with student self-efficacy.[31] By using metacognitive strategies, the learner tries to become aware of his / her cognitive system, explore ways to overcome barriers to learning, establish optimal

learning methods, and have comprehensive self-regulation.[32] In sum, higher internet self-efficacy may not only foster student preferences about internet-based instruction but also better attitudes, searching strategies, and learning outcomes toward using the internet. Therefore, the enhancement of metacognitive behavior and internet self-efficacy is an important task for educators.

There were several limitations to this study. Using self-reporting methods to measure student research variables, this study emphasizes the issue of individual bias. We conducted this research on female learners and were unable to extend it to male learners. Another weakness of our analysis was the lack of follow-up; generalizing to other populations should be done with caution. Hopefully, future studies will validate the results of the following course.

Evaluating the role of metacognitive strategies on metacognitive behavior and internet self-efficacy of female students at risk of internet addiction during the COVID-19 is a new topic that has not yet been fully studied. It is critical to demonstrate the impact of metacognitive strategies on metacognitive behavior and internet self-efficacy of female students at risk of internet addiction during the COVID-19 since this identifies the intermediate component responsible for internet addiction. However, given the limitations of our study of follow-up time and some individuals, more research is needed to demonstrate such an effect. Therefore, to make effective interactions, increase responsible behavior and commitment, reduce behavioral impairments, and prevent any mental disorders, counselors and officials should implement this treatment approach through group therapy with careful and continuous planning. Metacognitive strategies were found to have a positive effect on metacognitive behavior and internet self-efficacy of female students at risk of internet addiction during the COVID-19. Therefore, psychological group therapy could be suggested to improve metacognitive behavior and increase internet self-efficacy and thus reduce behavioral and social damages.

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Conflict of Interest

The authors declare that they have no conflict of interest.

References

1. Yi J, Chen IH, Lin CY, Li CC, Liao XL, Wei ZH, Gamble JH. The effect of primary and middle school teachers' problematic internet use and fear of covid-19 on psychological need thwarting of online teaching and psychological distress. In Healthcare 2021;9:1199. doi:10.3390/healthcare9091199

2. Servidio R, Bartolo MG, Palermiti AL, Costabile A. Fear of COVID-19, depression, anxiety, and their association with Internet addiction disorder in a sample of Italian students. Journal of Affective Disorders Reports 2021;4:100097. doi:10.1016/j.jadr.2021.100097

3. Kar SK, Arafat SY, Sharma P, Dixit A, Marthoenis M, Kabir R. COVID-19 pandemic and addiction: Current problems and future concerns. Asian Journal of Psychiatry 2020;51:102064. doi:10.1016/j.ajp.2020.102064

4. Lin MP. Prevalence of internet addiction during the COVID-19 outbreak and its risk factors among junior high school students in Taiwan. International Journal of Environmental Research And Public Health 2020;17:8547. doi:10.3390/ijerph17228547

5. Varma R, Das S, Singh T. Cyberchondria amidst COVID-19 pandemic: Challenges and management Strategies. Frontiers in Psychiatry 2021;12:399. doi:10.3389/fpsyt.2021.618508

6. Wells A. Advances in metacognitive therapy. International Journal of Cognitive Therapy 2013;6:186-201. doi:10.1521/ijct.2013.6.2.186

7. Akbari M. Metacognitions or distress intolerance: The mediating role in the relationship between emotional dysregulation and problematic internet use. Addictive Behaviors Reports 2017;6:128-33. doi:10.1016/j.abrep.2017.10.004

8. Spada MM, Marino C. Metacognitions and emotion regulation as predictors of problematic internet use in adolescents. Clinical Neuropsychiatry 2017;14:59-63.

9. Monacis L, Griffiths MD, Limone P, Sinatra M, Servidio R. Selfitis behavior: Assessing the Italian version of the Selfitis behavior scale and its mediating role in the relationship of dark traits with social media addiction. International Journal of Environmental Research And Public Health. 2020;17:5738. doi:10.3390/ijerph17165738

10. Marci T, Marino C, Sacchi C, Lan X, Spada MM. Problematic internet use in early adolescence: The role of attachment and negative beliefs about worry. Journal of Behavioral Addictions 2021;10:194-200. doi:10.1556/2006.2021.00001

11. Bogdanovskaya I, Koroleva N, Khodakovskaia O, Provorova A, Uglova A, Alekhin A. Metacognitive Strategy of Students with Problematic Internet Use 2020:350-61.

12. Caselli G, Marino C, Spada MM. Modelling online gaming metacognitions: The role of time spent gaming in predicting problematic Internet use. Journal of Rational-Emotive & Cognitive-Behavior Therapy 2021;39:172-82. doi:10.1007/s10942-020-00365-0

13. Spada MM, Langston B, Nikčević AV, Moneta GB. The role of metacognitions in problematic Internet use. Computers in Human Behavior 2008;24:2325-35. doi:10.1016/j.chb.2007.12.002

14. Craparo G, Messina R, Severino S, Fasciano S, Cannella V, Gori A, et al The relationships between self-efficacy, internet addiction and shame. Indian Journal of Psychological Medicine 2014;36:304-7. doi:10.4103/0253-7176.135386

15. Asdolahzadeh P, Sadeghi J, Abbasi Esfajir A. Modeling the structural equations of mode metacognition with a tendency to cyberspace mediated by self-efficacy in gifted students. Iranian Journal of Educational Sociology 2021;4:14-23.

16. Chuang SC, Lin FM, Tsai CC. An exploration of the relationship between internet self-efficacy and sources of internet self-efficacy among Taiwanese university students. Computers in Human Behavior 2015;48:147-55. doi:10.1016/j.chb.2015.01.044

17. Kaur M, Kaur A. Construction and standardization of internet self-efficacy scale for secondary school students. Int J Edu Sci 2019;20:1-8. doi:10.1080/09751122.2017.1408453

18. Mosalanejad L, Ghobadifar MA. Analysis of internet addiction and its relation to metacognitive beliefs among university students. Middle East Journal of Psychiatry and Alzheimer 2013;4:13-9. doi:10.5742/MEJPA.2013.43317

19. Karpov AA, Karpov AV, Karabushchenko NB, Ivashchenko AV. The interconnection of learning ability and the organization of metacognitive processes and traits of personality. Psychology in Russia 2017;10:181. doi:10.11621/pir.2017.0105

20. Eastin MS, LaRose R. Internet self-efficacy and the psychology of the digital divide. Journal of Computer-Mediated Communication 2000;6:JCMC611. doi:10.1111/j.1083-6101.2000.tb00110.x

21. Yang SY. Effects of Self-efficacy and Self-control on internet addiction in middle school students: A social cognitive theory-driven focus on the mediating influence of social support. Child Health Nursing Research 2020;26:357-65. doi:10.4094/chnr.2020.26.3.357

22. Mohammadsalehi N, mohmmadbeigi A, Jadidi R, Anbari Z, Ghaderi E, Akbari M. Psychometric properties of persian language version of yang internet addiction questionnaire; an explanatory factor analysis. International Journal of High Risk Behaviors and Addiction 2015;4:e21560. doi:10.5812/ijhrba.21560

23. Dargahi H, Razavi S. Internet addiction and its related factors: A study of an Iranian Population. Payesh 2007;6:265-72.

24. Young KS. Internet addiction: The emergence of a new clinical disorder. Cyber Psychology & Behavior 2000;5:151-9. doi:10.1089/cpb.1998.1.237

25. Zhou H, Dang L, Lam LW, Zhang MX, Wu AM. A cross-lagged panel model for testing the bidirectional relationship between depression and smartphone addiction and the influences of maladaptive metacognition on them in Chinese adolescents. Addictive Behaviors 2021;120:106978. doi:10.1016/j.addbeh.2021.106978

26. Lee SY, Kim MS, Lee HK. Prevention strategies and interventions for internet use disorders due to addictive behaviors based on an integrative conceptual model. Current Addiction Reports 2019;6:303-12. doi:10.1007/s40429-019-00265-z

27. Geng J, Han L, Gao F, Jou M, Huang CC. Internet addiction and procrastination among Chinese young adults: A moderated mediation model. Computers in Human Behavior 2018;84:320-33. doi:10.1016/j.chb.2018.03.013

28. Wu CY, Lee MB, Liao SC, Chang LR. Risk factors of internet addiction among internet users: an online questionnaire survey. PloS One 2015;10:e0137506. doi:10.1371/journal.pone.0137506

29. Dou K, Wang LX, Li JB, Wang GD, Li YY, Huang YT. Mobile phone addiction and risk-taking behavior among Chinese adolescents: A moderated mediation model. International Journal of Environmental Research and Public Health 2020;17:5472. doi:10.3390/ijerph17155472

30. Aloqleh AM, Teh KS. The effectiveness of metacognition on academic achievement among the jordanian universities students. International Journal of Prof. Dr. Murat İSKENDER Academic Research in Business and Social Sciences 2019;9:460-78. doi:10.6007/IJARBSS/v9-i9/6315

31. Liang JC, Tsai CC. Internet self-efficacy and preferences toward constructivist Internet-based learning environments: A study of pre-school teachers in Taiwan. Journal of Educational Technology & Society 2008;11:226-37.

32. Cera R, Mancini M, Antonietti A. Relationships between metacognition, self-efficacy and self-regulation in learning. Journal of Educational, Cultural and Psychological Studies (ECPS Journal) 2013;4:115-41. doi:10.7358/ecps-2013-007-cera