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Modeling the Structural Equations of Mode Metacognition with a Tendency to Cyberspace Mediated by Self-efficacy in Gifted Students

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Abstract

Purpose: The purpose of the present study was to determine the structural relationships between mode metacognition and cyberspace with self-efficacy mediation in gifted students in Ghaemshahr, Babol, and Sari. There is a structure.

Methodology: The method was correlation using structural equation modeling. The statistical population of the study consisted of all 1000 gifted female high school students in three grades (first, second and third) of Ghaemshahr, Babol and Sari cities. For each observed variable (18 variables observed in the model), and considering the possibility of incomplete questionnaires, 350 people were selected as the sample size by census method. Jafari & Kalantari (2016) cyberspace questionnaire, Morris (2001) self-efficacy questionnaire and Onil & Abedi (1996) mode metacognition questionnaire were used to collect data. Data were analyzed using SPSS 18 and AMOS 23 software.

Findings: The results show that mode metacognition has a direct effect on the tendency of cyberspace in gifted students of Ghaemshahr, Babol and Sari.

Conclusions: Therefore, those who have learned poor cognitive adjustment strategies may be more susceptible to using high-risk behaviors as a means of alleviating negative cognition than others.

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1. Introduction

One of the obvious manifestations of the new age is the use of new technologies and technologies, and cyberspace is one of the most accessible media in the world and one of the most advanced new communication technologies that have access to a variety of resources Provides information (Li et al, 2016). Cyberspace is a new generation of social media space that, although not very old, has been able to open well in people's lives (Paul & Glassman, 2018). Many people of different ages and from different social groups have come together in cyberspace and communicate with each other from afar in the real world. Today, methods of communication with others from have increased through cyberspace (Jun & Choi, 2015). The main disadvantage of cyberspace communications is that cyberspace communication is essentially text-based and therefore lacks visual and auditory cues in face-to-face interactions (Chou & Lee, 2017).

Extreme cyberbullying, in addition to negatively affecting their family life, makes them spend less time with their families, increasing their sense of loneliness, depression, and lack of self-esteem. These individuals are also more susceptible to financial, physical, and cultural harm (He et al, 2014). The use of cyberspace has become a problem today that has faced most societies in various cultural, social and economic fields. Transformational psychologists believe that the use of cyberspace in the long run hinders the development of personality. And ultimately the real self does not grow. Therefore, in such circumstances, one's inner abilities and talents will not have the opportunity to grow and manifest. On the other hand, the research that has been done so far on the use of cyberspace has focused more on extra personal and interpersonal influencing factors such as social, media and communication factors and on intrapersonal factors such as identity and its formation. And most importantly, less attention has been paid to the family and its performance towards family members. In recent years, cyberspace has become the most important scientific and recreational tool for adolescents and adults around the world. Cyberspace has provided a fast and easy way to search for information and communicate with others, and due to its multimedia and interactive nature, it has affected a large part of today's human life; But what has led to the negative effects of cyberspace on the functioning of daily life, family relationships and emotional health of individuals is the lack of control over the use of this emerging technology and its pathological use (Schimmenti et al, 2017).

Continued use of virtual social networks can have dire consequences; one of these consequences is addiction, such as chat addiction, chat room addiction and pornography, which can destroy relationships, emotions, and ultimately people's psyche (Gunuc & Dogan, 2013). Today, Iranian families and educational learners in their cultural portfolio are faced with satellite networks, cyberspace, modern media, etc. The tools available in cyberspace provide access to information resources, representation of messages and ideas in the form of multimedia and deep reflection on previous learning and rethinking past experience and practice (Khodaveisi & Seraji, 2018). Studies by Allen, Kannis-Dymand & Katsikitis (2017) and Fergus & Spada (2017) have shown that one of the most decisive dimensions in the tendency of people to cyberspace is the level of cognition and metacognition. One of the cognitive constructs that affects the learning process and academic performance is metacognition (Baker, 2010). Metacognition refers to the psychological structures, knowledge, events, and processes involved in the control, correction, and interpretation of thought (Wells & Cartwright-Hatton, 2003). Metacognition affects human cognitive processing through processes such as control, monitoring, planning, and correction, and interacts with a person's emotional processing or mental health or vulnerability to mental disorders (Corcoran & Segal, 2008). Therefore, it is important to pay attention to metacognition as a structure on which a person's cognitive activities depend and can affect the occurrence of psychological disorders, learning and academic performance. Metacognitive mode is a type of metacognition proposed by Onil & Abedi (1996) and their definition of metacognition is derived from Henrich & Degrott in 1996 who defined metacognition as strategies for planning, monitoring and modifying cognition (Onil & Abedi, 1996).

Spada and Marino's research in this field has shown a significant relationship between mode metacognition and academic performance in students, and based on this, it has been found that conducting

research and educational activities in the field of metacognition and metacognitive abilities can improve learning and performance. Students' education is effective. Mental disorders and dysfunctional cognitions are characteristic of emotional problems (Spada & Marino, 2017). For this reason, in recent years, the relationship between cognition and emotion has been the subject of various researches in psychology. Many researchers have studied these two fields in relation to each other, and thus, cognition and excitement have been recognized and expanded as a field of study. The main purpose of this research is to find out the relationship between these two aspects in humans. In the meantime, various structures have been studied. For example, cognitive actions that leads to different emotions or different emotional modes that are involved in specific cognitions (LaBar, 2010). Therefore, the aim of the present study was to determine the structural relationships between mode metacognition with a tendency to cyberspace through self-efficacy mediation in gifted students.

2. Methodology

According to its purpose, this study was an applied research in terms of cross-sectional data collection method and their descriptive analysis and structural equation modeling (SEM) in particular regression equations. The statistical population of the present study consisted of all 1000 gifted female high school students in three grades (first, second and third) of Ghaemshahr, Babol and Sari. To be consistent with the pattern of structural equations, the number of samples must be at least 15 times the observed variables. In this study, to determine the sample size according to the number of observed variables and assign a coefficient of 15 for each observed variable (18 variables observed in the model), and taking into account the possibility of incomplete questionnaires of 350 people as a sample size by census method Took.

The Jafari & Kalantari (2016) cyberspace questionnaire had 20 questions based on the Likert scale. Respondents had to determine their answers based on the Likert scale and according to the amount of use of social networks as well as according to the type of use of social networks. In general, in this questionnaire, the two dimensions of the amount and type of use of social networks of the respondents were measured. Questions 1 and 2 had five options, with scores of 1 to 5 assigned to the options, respectively. Questions 3 to 6 were four-choice, with scores of 1 to 4 assigned to the options, respectively. Questions 7 to 20 were five-choice, with scores of 1 to 5 respectively. Questions 1 to 6 related to the amount and duration of using social networks, questions 7, 8, 9 related to the research dimension, questions 10, 16, 17, 20 related to the educational dimension, questions 11, 12, 13, 14 related to the communication dimension And questions 15, 18, 19 were related to the entertainment dimension. Content validity method was used to determine the validity of the questionnaire. After formulating the initial questions, a 25-question questionnaire was sent to 5 researchers and professors who had worked in the field of social networks and cyberspace, and they were asked to express their opinions and suggestions on the questions. All 5 experts reviewed the questionnaire, which had weak opinions about the 5 questions of this questionnaire, which the researcher deleted from these 5 questions. After collecting their modements, 20 questions were finalized, and everyone agreed that these questions could measure the amount and type of use of social networks. Using Cronbach's alpha statistical method, the validity of the questionnaire questions was calculated, which is 0.74 for the use of social networks and 0.71 for educational use, 0.73 for research use, 0.79 for communication use, 0.74 for recreational use, 0.68 for social use, respectively. The total was 0.83 (Jafari, 2019).

The Child and Adolescent Self-Efficacy Questionnaire (SEQ-C) was developed in 2001 by Morris based on the Bandura, Caprara, Barbaranelli, and Pastorelli self-efficacy questionnaire. The Children and Adolescents Effectiveness Questionnaire consisted of 23 items and was scored on a Likert scale from (1) to very high (7). Children and Adolescents Self-Efficacy Questionnaire (SEQ-C) consisted of three subtests: social self-efficacy (1-8), academic self-efficacy (16-9) and emotional self-efficacy (17-23) and the subject's ability in different situations Measured. The scores ranged from 23 to 115 for overall self-efficacy, from 8

to 40 for social and academic self-efficacy, and from 7 to 35 for emotional self-efficacy. A higher score meant more self-efficacy. In the original version, three factors of social, educational and emotional questionnaire were confirmed in examining the factor structure of the self-efficacy questionnaire. In addition to the convergent and divergent validity of the scale, the reliability of the subscale of social self-efficacy was 0.78, emotional self-efficacy was 0.80 and academic self-efficacy was 0.87. In Tahmassian (2007) study, the internal consistency coefficient of the whole scale was 0.73, social self-efficacy 0.66, emotional self-efficacy 0.84 and academic self-efficacy 0.74. Test-retest reliability was reported for the whole scale of 0.89, social self-efficacy 0.81, emotional self-efficacy 0.88 and academic self-efficacy 0.87 (Tahmassian, 2007).

The minimum acceptable value for the CVI index is 0.79, and if the CVI index is less than 0.79 items, that item should be removed. To determine the CVI of the questionnaire, the designed questionnaire was given to 10 experts in this field and after calculating the CVI, it was found that all items of the questionnaire obtained an acceptable value of 0.79. MAXQDA software was used for content analysis. Data were analyzed using descriptive statistics (frequency, percentage, mean, variance of a sample) and inferential statistics (statistical analysis, exploratory and confirmation of the second stage, T-test).

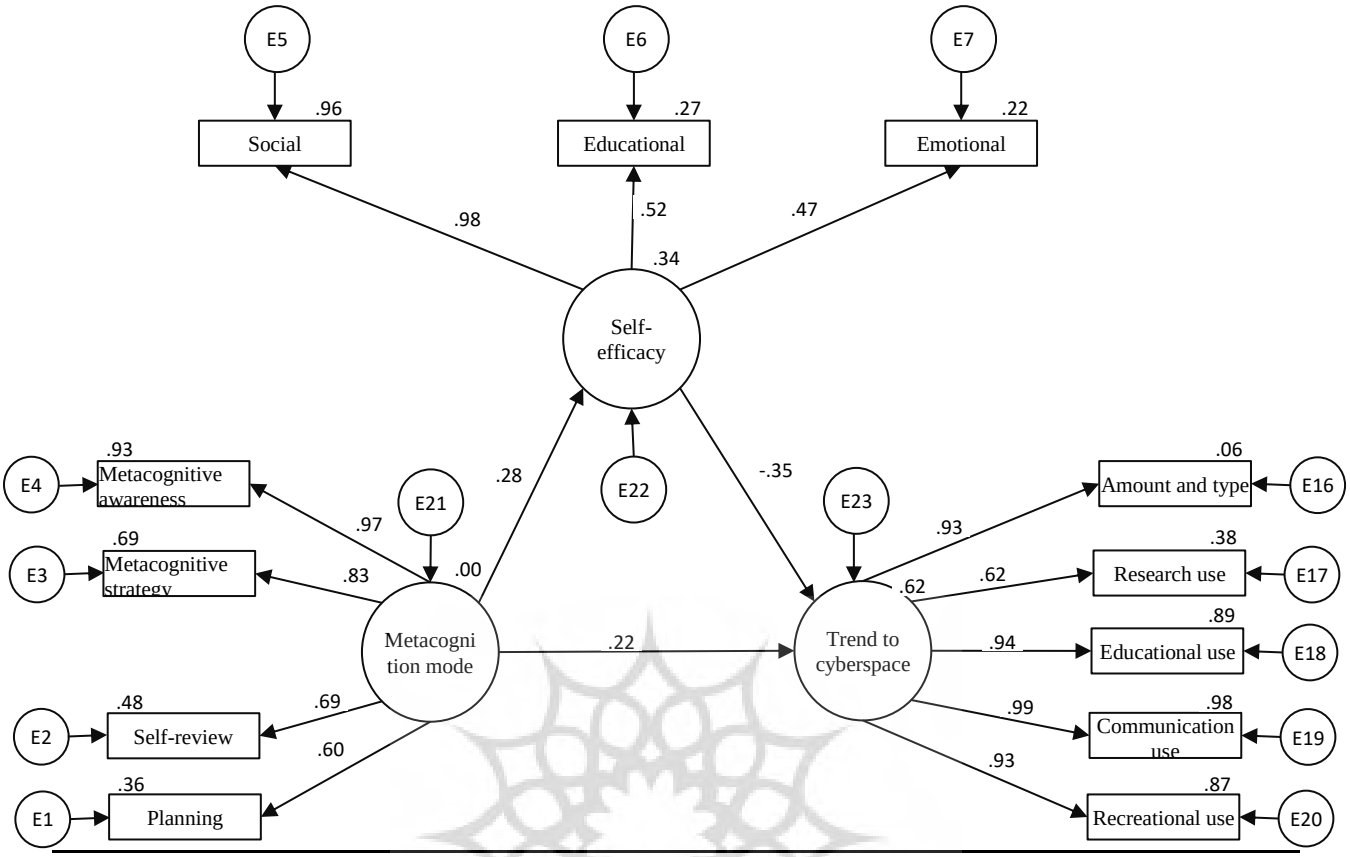
The Onil & Abedi questionnaire (mode metacognition) was developed in (1996) and three principles (brevity, validity and ability) were considered for its compilation. The subjects were eighth to twelfth grade students and associate degree students, and the results of exploratory factor analysis identified four components of metacognitive awareness, cognitive strategies, planning, and self-review, with five questions for each component. This test had 20 terms and 4 subscales of self-awareness, cognitive strategies, planning and self-examination. To each of the subscales, 5 phrases are assigned and the subject must have a 4-point Likert scale (basically: 1 point, sometimes: 2 points, usually: 3 points, very high: 4 points), approval or disapproval rate He identified himself with each of the phrases. Three principles (brevity, validity and ability) were considered for compiling this questionnaire. To examine the validity of the structure, the relationship between metacognitive mode measures and academic achievement was considered by the constructors and the correlation between these two variables showed that the questionnaire had sufficient validity. The set of evidence presented about the validity of the structure and theoretical and practical considerations in compiling the questionnaire indicated that this questionnaire was a useful tool for assessing the metacognitive mode. To determine the components of metacognitive mode, factor analysis method was used and reliability coefficients were calculated by Cronbach's alpha method. The coefficients obtained for metacognitive awareness components were 0.72, cognitive guidance 0.81, planning 0.85, self-review 0.87 and total 0.91. Metacognitive awareness questions: 15, 11, 8, 4, 3, 20. Metacognitive strategy questions: 14, 13, 12, 6, 5. Self-review questions: 18, 16, 7, 2, 1. and question planning Included: 19, 17, 10, 9. Also Salari and Pakdaman (2009), the reliability was calculated by Cronbach's alpha method that the coefficients obtained for the components of metacognitive awareness were 0.79, cognitive strategy 0.83, planning 0.81, self-review 0.82 and total 0.94 (Salari Far & Pakdaman, 2009).

3. Findings

Stretching and skewing, Kolmogorov-Smirnov Pert data were identified, and then Perth data were deleted using Mahalanobis test. AVE) shows that all subscales of mode metacognition, cyberspace orientation and self-efficacy in the model for measuring the values obtained are greater than the standard limit of 0.5, which indicates convergent validity, as well as composite reliability. (Structural reliability) indicates that the values obtained from the components are higher than the standard limit of 0.07 and therefore the subject of AVE and CR of the questionnaires is confirmed.

Table1. Correlation matrix between mode metacognition variables, self-efficacy with cyberspace orientation

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15



Metacognitive awareness	1														
Metacognitive strategy	79**	1													
Self-examination	71**	51**	1												
planning	55**	58**	29**	1											
Mode Metacognitive	94**	85**	79**	69**	1										
Social	58**	38**	35**	36**	51**	1									
Educational	21**	17**	13**	27**	23**	51**	1								
Emotional	21**	14**	18**	18**	22**	45**	37**	1							
Self-Efficacy	35**	24**	24**	30**	34**	70**	70**	80**	1						
Amount and Type	45**	44**	21**	32**	43**	33**	24**	11**	24**	1					
Research Use	25**	12**	12**	14**	17**	14**	12**	18**	16**	19**	1				
Educational Use	29**	24**	15**	18**	25**	14**	14**	17**	15**	21**	57**	1			
Communication Use	29**	26**	21**	17**	28**	14**	13**	11**	15**	22**	61**	73**	1		
Recreational Use	25**	22**	17**	18**	25**	15**	14**	08**	14**	18**	59**	57**	72**	1	
Tendency to Cyberspace	35**	31**	21**	24**	34**	20**	19**	14**	20**	42**	73**	83**	64**	81**	1

Figure1. Basic model of standardized paths to cyberspace in direct and indirect paths by the variables of mode metacognition, positive and negative emotions, self-efficacy

The values obtained from regression weight statistics to determine the effect values (B) are observed according to the significance level obtained from the critical ratio, which indicates the significant effect values of subscales on the overall variable and the exogenous variable (mode metacognition, emotions). Positive and negative and self-efficacy) on the final endogenous variable (tendency to cyberspace)

Table2. Weight regression statistics and critical ratios of research variables

b	β	t	P	Exogenous Variale	Direction	Endogenous Variable
0/324	0/284	6/364	0/000	Mode Metacognitive	→	Tendency to Cyberspace
0/214	0/186	3/031	0/009	Self-Efficacy	→	Tendency to Cyberspace

Table 2 shows the standardized and non-standardized values of the prediction paths of the exogenous research variables on the endogenous variable with each other with respect to the value of t obtained in the model. In general, all values obtained are significant and represent a significant prediction. Investigating direct paths: 1. Mode metacognition has a direct effect on the tendency to cyberspace. 2. Self-efficacy has a direct effect on the tendency to cyberspace. Investigating indirect paths: 3. Mode metacognition has an indirect effect on the tendency to cyberspace through self-mediated effect on gifted students in Ghaemshahr, Babol and Sari. According to Table 3, as can be seen, the indirect paths considered according to the standardized values (β), obtained, the indirect path, mode metacognition with self-mediated effect on the tendency to cyberspace with Bootstrap estimation method was approved.

Table2. Indirect estimation of the model using the bootstrap method

B	Upper line	Lower line	Sig	Variable
0/284	0/265	0/213	0/000	Mode Metacognitive with mediation of Self-Efficacy on Tendency to Cyberspace

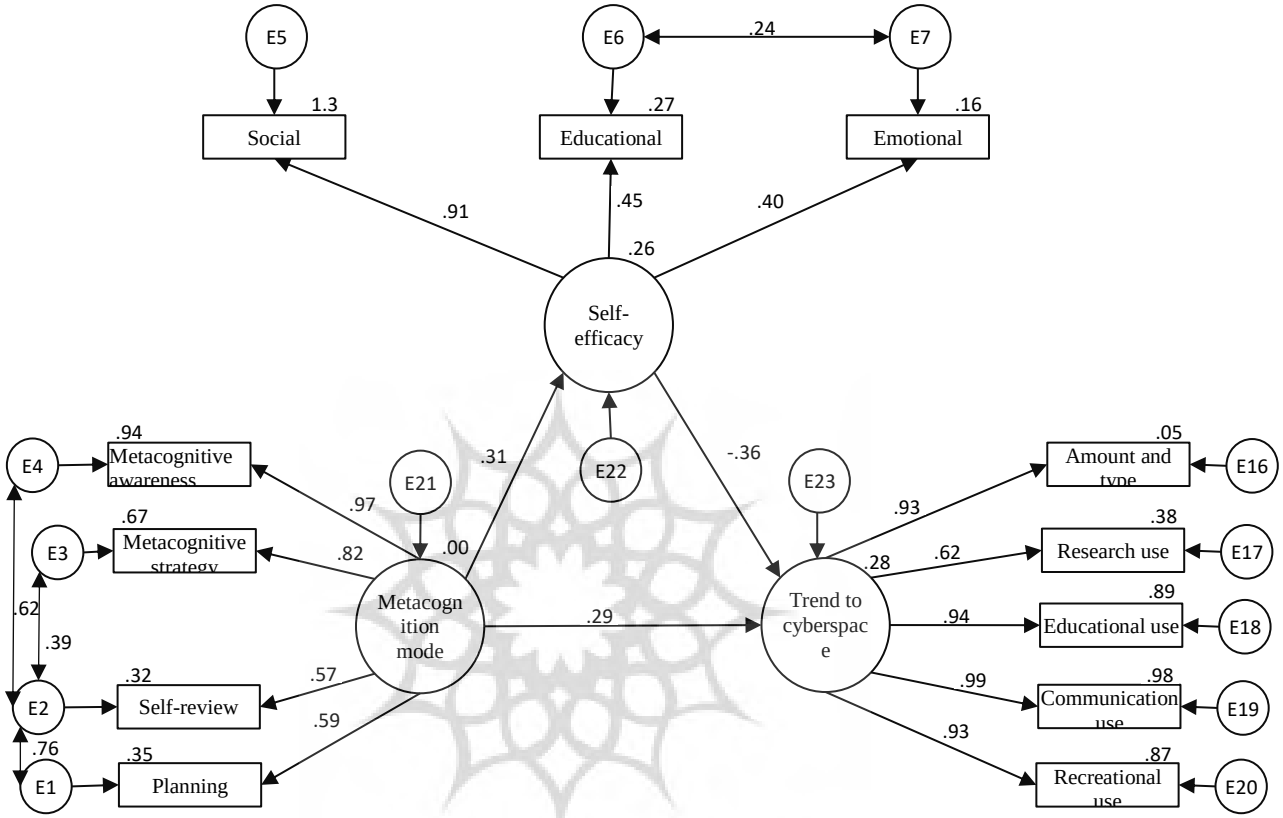


Figure2. The basic model of standardized paths to cyberspace in direct and indirect paths by mode metacognition variables, self-efficacy

4. Discussion

Mode metacognition has a direct effect on the tendency to cyberspace in gifted students of Ghaemshahr, Babol and Sari. According to the results of the analysis, mode metacognition has a direct effect on the tendency to cyberspace in gifted students of Ghaemshahr, Babol and Sari. . These results are in line with the relationships of these variables with each other in line with the findings of Allen, Kannis-Dymand & Katsikitis (2017), Fergus & Spada (2017), Spada & Marino (2017), Garrison & Akyol (2015) and Chuang, Lin & Tsai (2015). Cognitive modes refer to the psychological structures, knowledge, events, and processes involved in the control, correction, and interpretation of thought (Wells & Cartwright-Hatton, 2003). Moods affect human cognitive processing through processes such as control, monitoring, planning, and correction, and interact with a person's emotional processing or vulnerability to mental disorders (Corcoran & Segal, 2008). Therefore, it is important to pay attention to cognitive modes as a structure on which a person's cognitive activities depend and can affect the occurrence of psychological disorders, addiction and performance.

Babol and Sari have a direct effect. According to the results of the analysis, the second hypothesis of self-efficacy research on the tendency to cyberspace in gifted students in Ghaemshahr, Babol and Sari has a direct effect, and these results are in line with the relationship between these variables. Consistent with the findings

of Paul & Glassman (2018), Chou & Lee (2017), Jafari (2019), Chuang, Lin & Tsai (2015), According to socio-cultural theories, the most important achievement in adolescence is self-efficacy against loss. The goal is to become an adult who has a cohesive self-concept and a valuable role in society. This crisis of lack of self-efficacy is rarely fully resolved during adolescence, and identity issues arise over and over again in adulthood. According to Erickson, gangsterism and intolerance of differences are both prominent features of adolescence that are in fact defenses against identity loss (Chou & Lee, 2017). Also, in the theory of anomaly, which is rooted in Emil Durkheim's theories, the main factors of weakening social norms and norms are discussed and it is argued that the weakness of socio-cultural values and norms leads people to spaces devoid of displaying all features. Rapid industrial and economic developments and, consequently, rapid and widespread social changes such as urbanization, modernization, the emergence of mass society, the weakening of beliefs, values, values and cultural, religious, national and hereditary, the shaky structure of the family, from one The bias and inconsistency of individuals, especially adolescents, in obtaining information based on emotional cognitive processing, on the other hand, all change the self-efficacy of individuals and cause their responsible behavior to change. According to Bandura's theory, individuals with adaptive self-efficacy search, process, and evaluate information about themselves before resolving identity conflicts and forming commitments by thinking and reflecting, and they are introspective, open-minded, and skeptical of their own views. Interested in learning new things about themselves and willing to evaluate and correct their identities due to inconsistent feedback.

Mode metacognition has an indirect effect on the tendency to cyberspace through self-mediation in gifted students in Ghaemshahr, Babol and Sari, According to the results of the analysis of the second hypothesis of mode metacognition research on the tendency to cyberspace through self-mediation. It has been confirmed to have an indirect effect on gifted students in Ghaemshahr, Babol and Sari, and these results are in line with the relationship between these variables in line with the findings of Chou & Lee (2017), Paul & Glassman (2018), Chuang, Lin & Tsai (2015), Allen, Kannis-Dymand & Katsikitis (2017), Fergus & Spada (2017), Spada & Marino (2017), and Garrison & Akyol (2015). Metacognition is another type of metacognition that is transient. And the individual variable is defined in rational situations that have different intensities at different times and include planning, monitoring, self-correction, cognitive-emotional strategies and self-awareness (Onil & Abedi, 1996).

Metacognitive mode affects students' goal setting, self-regulation and planning, which can affect cognitive-behavioral motivations as well as performance in various situations, including the use of cyberspace. Therefore, metacognitive mode will help to improve the level of students' performance. On the other hand, one of the cognitive processes involved in the learning process in humans is problem solving. Problem solving as a higher level cognitive process interacts with many other cognitive processes, such as abstraction, search, learning, decision making, inference, and analysis (Salari Far & Pakdaman, 2009). One of the cognitive goals of education in any educational field is problem solving. Problem solving is also one of the most valid and therefore the most appropriate learning activity that students can use. In general, self-efficacy and metacognitive modes as a function of the level of love, companionship and attention of family members, friends and other people in this is a sensitive age range. Some see social support as a social reality and some as a result of one's perception. Real support is the type and frequency of specific supportive interactions in which a person in social relationships receives instrumental, emotional, and informational help from others, and individuals, based on social relationships and the type of connections they have, use support resources to resolve. They use their needs, so that the wider the social relations, the greater the access to support resources, and possibly these social support resources can improve metacognitive modes and improve efficiency or self-efficacy, and acts as a protective umbrella against stressors at this time (Chuang, Lin & Tsai, 2015).

Effective metacognitive modes are self-efficacy and include three objective or instrumental dimensions, information and emotion. Objective or instrumental self-efficacy implies the existence of physical coherence. Information effectiveness involves gaining and trying to understand a problem and implies information that a

person can use in the face of personal and environmental issues. Emotional or emotional impact refers to resources related to having people you can turn to for comfort and confidence. People who have enough emotional resources typically feel that they have others they can turn to when dealing with problems, which seems to be one of the main motivations in cyberspace and the tendency to achieve it. Effectiveness is better, but support that is apparently useful to the individual and will not actually have a positive effect on the individual, but given the perception that social support is associated with cyberspace, sooner and easier and with less responsibility Is obtained (Allen, Kannis-Dymand & Katsikitis, 2017).

In this regard, it can be said that self-efficacy has always been in the tendency to different behaviors in different situations, even tendency has been named as a mechanism for emotion regulation, as well as cognitive regulation strategies are the most important determinants of response. Individuals are self-reliant, and increased use of maladaptive strategies is associated with pathology and the development and persistence of disorders, which result from effective metacognitive modes. According to Fergus & Spada (2017), individuals with poor cognitive regulation strategies may be more likely than others to use high-risk behaviors as a tool to alleviate negative cognition. Research Limits this seems to be limiting the statistical population to the gifted student. Second high school girl in three grades (first, second and third) in Ghaemshahr, Babol and Sari. Failure to consider demographic characteristics such as ethnicity and ethnic culture as a control variable could indicate more accurate results. Considering that the effect of mode metacognition on the tendency to cyberspace was significant, it is suggested that students 'cognitive modes be studied in the education system of Sharp Intelligences schools and in raising students' cognitive levels towards identification and gaining intellectual independence and Attitudes in the education process are confirmed, And teachers and parents have a decisive role in behavioral goals in the use of duct space in this regard due to direct contact with students during the constructive years of life and also significant influence on their thoughts. Considering that the educational system or the formal education system in any society has the most important role in increasing self-efficacy, excitement and scientific progress of individuals through curricula, educational materials, ceremonial activities, support and also how And the method of communication between teachers and learners of this process takes place. According to the researches done on other variables such as the level of socio-economic class, which affect the level of people's behaviors, if possible, subsequent researchers are recommended to include them in their research. Based on this research, it is suggested that similar researches be conducted in other regions and other educational levels related to the subject, similar researches with other effective and subject-related variables.

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