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ORIGINAL RESEARCH

Problem Solving Skills and Internet Addiction in Gifted Children

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Abstract

Objective: Internet addiction, which has become a problem of all ages, threatens the mental health of gifted children by affecting different developmental areas of their lives. However, the characteristic features of gifted children, such as high problem-solving skills, are a protective factor in the emergence of internet addiction behavior. In this direction, it is aimed to examine the effect of gifted children's problem solving skills on internet addiction.

Methods: Structural Equation Model was used in the study. The study group consists of 211 children with general abilities who attend the Science and Art Center in the Inner Aegean Region of Turkey. Internet Addiction Scale and Problem Solving Inventory for Children were used as data collection tools. The Pearson correlation coefficient was used to evaluate the correlation. To evaluate the fit of the Structural Equation Model, statistically insignificant Chi-square ($p>0.05$), Chi-square and degrees of freedom ratio being less than 2, the comparative fit index, the Tucker – Lewis Index and Incremental fit index greater than 0.95 and RMSEA value less than 0.08 were accepted.

Results: The model that met these conditions was accepted as a compatible model. According to the result of the structural equation model; high problem solving skills decreased internet addiction.

Conclusion: The results show that the problem solving skills of gifted children are effective on internet addiction.

Keywords: Internet Addiction, Problem Solving Skills, Gifted Children, Self-Control

INTRODUCTION

Social Developments in Internet technology are changing traditional lifestyles, bringing convenience to daily life, and thus the Internet is taking its place among the indispensable of life (1). The Internet is used for many different purposes such as education, information, health, communication, and entertainment, and also provides instant access to individuals (2). Although the Internet has contributed greatly to social, cultural, and economic development and has provided many conveniences to individuals, its excessive and dysfunctional use has led to problems such as Internet addiction (IA) (3).

Pioneering studies of IA began in the 1990s (4) and have evolved over time into IA models (5). Young (1996), who added IA to the literature, explained this addiction with diagnostic criteria for pathological gambling. In this regard, Young (1996) defined IA as: an impulse control disorder with a pattern very similar to pathological gambling that causes loss and problems in the person's social and occupational life, as in alcohol or drug addiction. Based on this definition over time, IA is defined as the intense use of the internet that creates psychological, social, school and / or professional difficulties in a person's life (5,6). Although these definitions of IA have gained an important dimension in the field of addiction and are the subject of research, IA has not yet been diagnosed in the fifth edition of The Diagnostic and Statistical Manual of Mental Disorders (DSM-5) (7). Although there is no explanation in this manuel, important diagnostic criteria

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for IA have been presented by researchers, especially by Young (1996). In general, these diagnostic criteria can be considered as preoccupation with the internet, the increasing need for internet use, failure and negative mood (restlessness, pessimism, depression, etc.) in attempts to control internet use, missing important opportunities (relationship, education, job or career, etc.) with more internet use than the designed time, lying about use (4,6).

When the literature is examined, IA is associated with problems such as loneliness (1), anxiety (8), low academic achievement (9), stress (10) and depression (11). The definitions of IA are compatible with the results of IA causing the person to have problems in psychological, social, school and/or professional areas (5,6). In addition, these results are consistent with the criterion of "using the Internet to escape from problems or to get rid of unpleasant moods (eg, helplessness, guilt, anxiety, depression) and to relax", considering the proposed diagnostic criteria for IA (4,6). In this respect, IA may be related to problem areas. The use of the Internet as a relaxation tool by addicted individuals also highlights their problem solving skills (PSS). Considering that the studies of IA in the literature are examined with different problem areas, it will make an important contribution to the subject to be examined with PSS. In addition, studies emphasize that the most sensitive group to IA is university students (11) and adolescent groups (12). However, considering that internet access is fast and easy, has a large user base, and can be used in all age levels and in different groups, one of these groups is gifted children (13). Focusing the current study on PSS and conducting it with gifted children can take a leading role in future studies in this field.

The problem is the mental and physical difficulties experienced by the obstacles encountered while forming the behaviors in line with the goals of the individuals. At the same time, it is the fact that the individual does not give instant responses to the problem, but can reach a solution by choosing among alternative solutions (14). In other words, the problem presents a situation that can be discussed and researched, and reflexes can be developed against the events encountered (15). The problem is a complex process and occurs in areas such as organizational, personal, economic, social or technological (16). The problem is a process that is encountered throughout life and includes the solution process. However, the problem involves examining available information and making predictions about its solution (17). The healthy solution of the problem is based on the problem solving skill developed by the observations and experiences of the individuals (16,18). Problem solving skill consists of the steps of understanding the problem, making a plan, implementing the plan and rechecking the problem solving process (18). Problem solving skill is a cognitive, affective and behavioral skill used to find suitable solution alternatives to the problems encountered and to cope with the problem (19). This skill is also associated with past experiences. The problem is defined and evaluated through past experiences and a solution is created (20). In addition, problem solving skill is an important skill for the development of skills and needs to be learned effectively (16). Being aware of the problem allows to bring effective solutions to the problem and to cope with addiction problems such as the internet (21). Therefore, IA may be a variable related to PSS.

IA, which has become a problem that individuals of all ages may encounter, can reach threatening dimensions on their mental health by causing gifted children to experience loss of function in different areas of their lives. Therefore, the study of IA in gifted children may be a necessary area of research. Thus, identifying the variables that cause and are associated with IA in gifted children can support both a better understanding of this problem, the remedial and preventive mental health studies to be carried out. Studies on IA have been conducted with different variables and groups. However, according to the literature review, no research was encounter which IA was examined together with gifted children and PSS. Accordingly, this study examined the effect of gifted children's PSS on IA. The Structural Equation Model (SEM) was used in the study to examine the effect of gifted children's PSS on IA. Figure 1 illustrates the complete hypothesized structural model guiding this study.

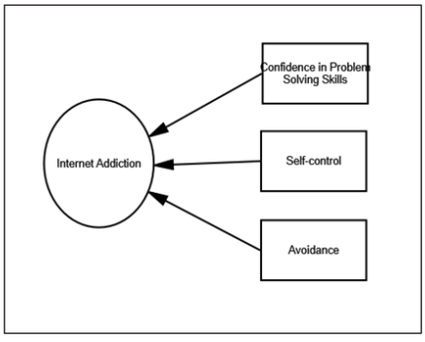


Figure 1. Hypothesized SEM connecting PSS (Confidence in Problem Solving Skills, Self control, Avoidance) to IA

METHODS

Study Group and Sampling

The study group consists of children with general talents who are attending a Science and Art Center (an institution where gifted children are educated) in the Inner Aegean region of Turkey during the 2022-2023 school year. The size of the study group was determined by power analysis with the Gpower program. In the power analysis, the sample size was found to be 178 participants, with medium effect size, 80% power and 5% margin of error. No sampling was used to include all students of the Science and Art Center in the study. All elementary and middle school students (211 gifted students) at the Science and Art Center were included in the study.

The median age of the participants was 10 (max. 13, min. 8), and the median grade of the participants was 5 (max. 8, min. 4); 51.2% were female, 48.8% were male. 59.7% of the participants use the internet for 1 hour or less, 22.3% use the internet between one and two hours, 9.5% between two and three hours, and 8.5% use the internet for more than three hours. Regarding the purpose of Internet use, 27.0% watch videos, 26.1% play games, 19.0% do homework and study, 16.1% do research, 6.6% using social media, and 5.2% do other things (listen to music, text, etc.).

Measures

Internet Addiction Scale (IAS): The IAS, which was developed by Hahn and Jerusalem (2001) to determine the IA levels of individuals, was adapted into Turkish by Şahin and Korkmaz (2011). The scale consists of 19 items in a five-point Likert type. It has three factors: "Loss of Control", "Excessive online time" and "Negativity in Social Relationships". The scale is evaluated between 19 and 95 points. The internal consistency coefficients of the scale's reliability calculated by the adaptations are 0.90 for loss of control, 0.88 for the excessive online time more, and 0.92 for negativity in social relations. In addition, the internal consistency coefficient for the overall scale was found to be 0.85. The increase in the scores obtained from the scale indicates that the individuals' IA levels are also high (22). In this study, the Cronbach's Alpha (α) reliability coefficient of the scale was determined as 0.82, 0.84, and 0.79 for the sub-dimensions, respectively, and 0.90 for the total scores of the scale. Addiction levels were evaluated according to Table 1.

Table 1. IA Levels by Scale

	Low	Moderate	High
Internet Addiction	19,00-44,33	44,34-69,67	69,68-95,00
Loss of Control	7,00-16,33	16,34-25,67	25,68-35,00
Excessive online time	3,00-7,00	7,01-11,00	11,01-15,00
Negativity in Social Relationships	8,00-18,66	18,67-29,33	29,34-40,00

Problem Solving Inventory For Children: The Problem Solving Inventory for Children was developed by Serin et al., (2010) in order to determine the level of self-perception of primary school children in PSS. The scale consists of 24 items in five-point Likert type and is evaluated between 24 and 120 points. The scale has three factors: "Confidence in PSS", "Self-control" and "Avoidance". Internal consistency coefficients were determined by Serin et al., (2010) as 0.85 for confidence in PSS; 0.78 for self-control and 0.66 for avoidance. The increase in the total scores obtained from this scale indicates that primary school children have higher PSS (23). In this study, the Cronbach's Alpha (α) reliability coefficient of the scale was determined as 0.87, 0.80, and 0.64 for the sub-dimensions, respectively, and 0.88 for the total scores of the scale.

Personal Information Form: The personal information form was created within the scope of this research in order to provide information about the gender, age, class level, daily internet use (in hours) and the reason for using the internet of the children in the research group.

Data Collection

Data were collected from gifted children in the fall semester of the 2022-2023 academic year. Afterwards, verbal consent was obtained from the school administration where the data would be collected, from the teachers and from the parents of the children. Children were informed about the study, data collection tools were distributed to the children, and how to fill them in was explained. Filling in each data collection tool took approximately 15 minutes for each child.

Ethical Approval

Ethics committee approval was received from Afyon Kocatepe University Social and Human Sciences Scientific Research and Publication Ethics Committee (Decision Date: 26.10.2022; Decision: 2022/321; Meeting: 10; Number of Papers: 136535). Volunteer participation in the study was based on informed consent. Informed consent was obtained from parents and individuals prior

to participation in the study. In addition, the principle of confidentiality was observed when collecting the data and the subjects were informed regarding this issue. The data collection process in the study took approximately thirty days.

Analysis of Data

Statistical analyzes were performed with PAWS statistic 18 and AMOS 18 programs. In descriptive statistics, grouped data were presented as percentage frequency, and continuous data as mean and standard deviation. The p value of 0.05 was accepted as the limit value for the statistical significance level. The Pearson correlation coefficient was used to evaluate the correlation. Amos uses a maximum likelihood method for obtaining estimates of the parameters. To evaluate the fit of the Structural Equation Model, statistically insignificant Chi-square (p>0.05), Chi-square and degrees of freedom ratio (Chi-square ratios CMIN/DF) being less than 2, the comparative fit index (CFI), the Tucker – Lewis Index (TLI) and Incremental fit index (IFI) greater than 0.95 and RMSEA value less than 0.08 were accepted (Kline, 2016). The model that met these conditions was accepted as a compatible model.

RESULTS

The study was conducted to examine the effect of gifted children's PSS on IA. IA and problem solving levels of gifted children and the relationship between IA and problem solving were presented in Table 2. The SEMthat evaluates the predictors of IA by the sub-dimensions of confidence in PSS, self-control, and avoidance was shown in Figure 2.

Table 2. Correlation Between IA and Social PSS of Gifted Children

	1	2	3	4	5	6	7
1. Confidence in problem solving skills	-	0.369*	0.426*	-0.450*	-0.278*	-0.374*	-0.442*
2. Self-control		-	0.572*	-0.497*	-0.375*	-0.464*	-0.528*
3. Avoidance			-	-0.436*	-0.308*	-0.465*	-0.484*
4. Loss of Control				-	0.613*	0.630*	0.892*
5. Excessive online time					-	0.580*	0.793*
6. Negativity in Social Relationships						-	0.879*
7. Internet Addiction							-
Mean	46.01	27.15	21.38	10.43	4.52	11.88	26.83
Sd	9.31	5.74	3.38	2.21	1.37	2.09	4.24

The correlation between the variables obtained from the scale and the mean standard deviations are presented in Table 2. The scores of the participants in the Problem Solving Inventory for Children were: confidence in PSS 46.01±9.31, self-control 27.15±5.74, avoidance 21.38±3.38. From the sub-dimensions and total of the IA Scale administered simultaneously: Loss of Control 10.43±2.21, excessive online time 4.52±1.37, negativity in social relations 11.88±2.09, and total IAS 26.83 ±4.24 (Table 2). When the IAS scores are evaluated, the average scores obtained are low in Loss of Control, moderate in being online excessively, low in negative social relations and low in total IAS.

When the relationship between the scores obtained from the Problem Solving Inventory for Children and the IAS is examined; "Confidence in PSS" with "Loss of Control" (r=-.450, <0.01), "Excessive online time" (r=-.278, <0.01), "negativity in social relationships" (r=-.374, <0.01), and "IA scale total score" (r=-.442, <0.01); Loss of Control with Self-Control (r=-.497, <0.01) Excessive Online time (r=-.375, <0.01), negative social relationships (r=-.464, <0.01) and IA scale total score (r=-.528, <0.01); Loss of Control with Avoidance (r=-.436, <0.01) Excessive online time (r=-.308, <0.01), negative social relationships (r=-.465, <0.01) and IA scale total score (r=-.484, <0.01) was found to have a statistically significant negative correlation (Table 2).

The SEM evaluating the predictors of confidence in PSS, self-control and avoidance, which are sub-dimensions of the Problem Solving Inventory, on IA, is presented in Figure 2. SEM was found to be a compatible model (Chi-square ($\chi 2$) value=11.44, p =.076, CMIN/DF=1.907, CFI =.988, TLI= .970, IFI=.97, RMSEA = .066, SRMR =.029). When the SEMis examined, the PSS of the Problem Solving Inventory for Children (β=-.267, p<0.001), self-control (β =-.364, p<0.001) and avoidance (β =-.203, p<0.008) sub-dimensions affect IA negatively. When the coefficient of determination (R2) of the model is examined; Sub-dimensions of the Problem Solving Inventory, which are predictors of IA, explain 44.8% of its variance (Figure 2).

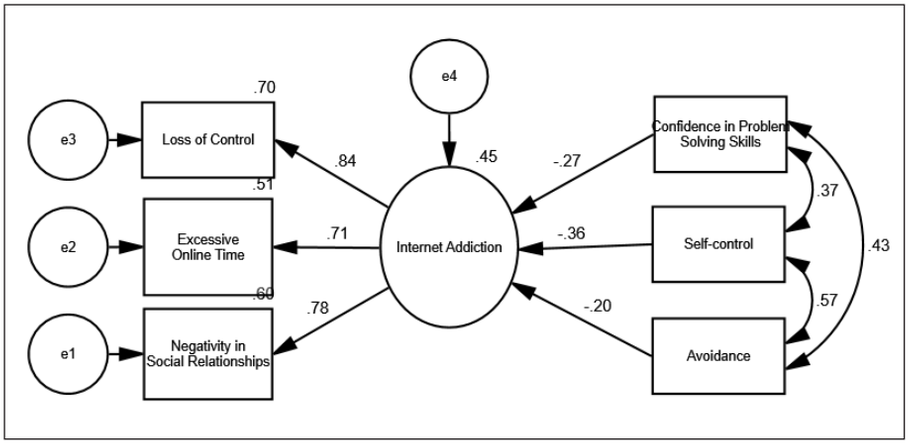


Figure 2. Result for IA Model

DISCUSSION

Gifted children question the events they experience, think in detail and deal with universal problems. These features highlight PSS. Gifted children use information technologies to solve problems. Excessive use of information technologies increases the time spent on the internet and can cause IA. In this direction, it is aimed to examine the effect of gifted children's PSS on IA.

In previous studies with gifted children, PSS were found to be high (24,25). In this study, children's PSS are also high. This result shows that gifted children can manage the cognitive and emotional processes for problem solving adequately. In addition, individuals with high PSS have original, creative thinking skills, and high social competence and self-confidence (26). Special talented children in the study group receive training on social skills, problem solving techniques, group work techniques and social activities within the supportive education (27). This may be related to high PSS.

In the study, gifted children got low or moderate scores from the IA Scale. The fact that gifted children do not have high IA is an indication that they do not use the internet excessively and that they are not affected by this process individually and socially. The Internet offers gifted children the opportunity for originality and autonomy. In the Internet environment, children can orient themselves according to their learning speed and conduct in-depth research on their interests (28). Although this is seen as increasing the time they spend on the internet, it can be thought that they do not enter the addiction process because they use the internet for their own development and purpose. In a study on the IA levels of gifted children, it was seen that 12.11 % of the children were at the addiction limit, and the level of addiction was high in those who used the internet only for games without any purpose (29). Internet use is not the main cause of addiction, but the most important factor is the purpose of using the Internet (30). In the current study, the low IA of gifted children supports the view in the literature that the characteristics of gifted children are a protective factor in the emergence of IA behavior (31).

Another sub-problem of the study is to examine the effect of gifted children's PSS on their IAs. In the current study, high PSS of gifted children prevent IA. PSS include self-control, confidence in PSS and avoidance behaviors. Self-control is the ability of individuals to control their own behaviors, thoughts and emotions (32). Self-control is goal-oriented and controlled by feedback (33). Individuals who do not postpone their responsibilities, complete them on time and are not affected by external influences have high self-control (34). Gifted children have high self-control (35). The actions of gifted children towards realistic expectations that result in success are possible with metacognitive process and high self-control (36). Self-control is one of the most important features that distinguishes gifted children from others. Self-control refers to behavioral and emotional elements and contributes to the lives of gifted children. Self-control is effective from overcoming addictions to anger management and eliminating other maladaptive behaviors (37). Self-control is effective on controlling behaviors and awareness of the effects of behaviors on other individuals (38). Problems in this awareness cause negative behaviors (39) and IA (40). In a study, individuals with problematic internet use had difficulty in quitting internet use and controlling

themselves, which was associated with Bandura's (1991) insufficient self-control (41). In a study conducted with university students, a negative relationship was found between self-control and the level of IA. This means that the higher the self-control, the lower the level of IA and vice versa. In this study, it was concluded that self-control is a factor that reduces IA. In this direction, it can be concluded that gifted children with high self-control are able to control themselves and their behaviors and are resistant to harmful behaviors such as IA.

High self-control is also associated with PSS. PSS is the process of choosing and deciding the appropriate one among a series of reactions in situations encountered in order to adapt to society (14). In order for PSS to be healthy, PSS must be trusted (17). Individuals who trust their PSS do not give up on solving problems easily and are determined to solve the problem (23). Individuals who do not trust their PSS do not produce appropriate behaviors to solve problems in a positive way and their anxiety levels increase (42). High self-control is also associated with PSS. PSS is the process of choosing and deciding the appropriate one among a series of reactions in situations encountered in order to adapt to society (14). In order for PSS to be healthy, PSS must be trusted (17). Individuals who trust their PSS do not give up on solving problems easily and are determined to solve the problem (23). Individuals who do not trust their PSS do not produce appropriate behaviors to solve problems in a positive way and their anxiety levels increase (42). Since gifted children focus on solving problems, do not give up and are persistent, they also have high confidence in their PSS. In addition, since gifted children focus on a rich solution process rather than solving the problem (43), it can be thought that their confidence in PSS is high. Confidence in PSS negatively affects IA in the study. According to this result, as the confidence of gifted children in their PSS increases, their IA decreases.

The behavior of avoiding problem solving also affects PSS. In avoidance behavior, when faced with a problem, instead of solving the problem, a tendency to delay, ignore, fail to confront, and run away from the real problem is observed. In the study, it was observed that avoidance behavior increased IA. Internet becomes an escape route to avoid problems (44). The Internet can provide social support (45) and success (46) to avoid emotional problems. This situation causes children to spend more time on the Internet instead of solving their problems (48). Gifted children may encounter many social-emotional problems such as stress, anxiety, and adjustment problems (48). They cannot always solve these problems and may engage in avoidance behavior (49). However, gifted children, unlike children with typical development, show avoidance behavior in a cognitive way, not emotionally and behaviorally (50). For this reason, the fact that it does not tend to behavioral addictions such as the increase in internet use is compatible with the result of the study.

To determine the environments that will negatively affect the special talented children who will play a leading role in the development of our society in the realization of their potential; Finding a relationship between IA and PSS of gifted children is an important result. Especially when the dynamics in PSS weaken, addiction becomes easier. Problems arise when faced with social, emotional or cognitive tasks that require the integration of emotional and communicative elements that occur with IA (51). However, gifted children are characterized by a high level of intelligence in social – emotional (self-control, self-regulation, and emotion control) and cognitive ability (logical-mathematical, problem-solving) (52). With these features, gifted children can easily protect themselves against addiction types such as IA. Research on this subject shows that children who cannot control the time they spend on the Internet have problems in self-control and confidence in their PSS (53). In the literature, as the internet and game addiction of gifted children increases, their social competence weakens, their antisocial behaviors (54), the fragility of individuals (55), and other behavioral disorders 56) increase. In addition, in studies conducted with children with typical development, IA negatively affects children's self-esteem and makes difficult to cope with problems (57), there is a negative relationship with constructive PSS (58) and a positive relationship with PSS (59). When these results are evaluated, it can be concluded that individuals with social behavior problems are prone to addictions due to the fact that IA is acquired later. These results suggest that the success of gifted children in solving the problems they encounter in daily life has a protective effect against IA and is consistent with the results obtained from the current study.

The results show that the PSS of gifted children are effective on IA. Gifted children are aware of the problems and can cope with IA problems before they occur. Although the IA levels of gifted children were low in the study, it is noteworthy that even low-level addiction affects the PSS of gifted children. Therefore, in order to prevent IA, which is a problem experienced by all individuals, gifted children should develop their PSS.

Since the children in the study group also spend a lot of time with digital games, researches on digital game

addiction can be planned in future studies. In this study, the effect of PSS on IA was evaluated. In addition, the effect of IA on quality of life and social emotional development may be evaluated. Only gifted children were included in the study. IA and PSS of typically developing children and gifted children may be compared. Training may be organized to increase PSS and the effect of this training on children's IA levels may be evaluated.

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Design of the study: MES, FBŞ, YŞ, SK.
Acquisition of data for the study: MES, FBŞ, YŞ, SK.
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