
Analysis of Internet Addiction Behavior and Its Dimension on the Academic Achievement of High School Students in Karawang, West Java, Indonesia

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ABSTRACT (Times New Roman, bold, 10)

This study aims to determine the extent to which internet addiction behavior and its dimensions affect academic achievement. A stratified random sampling procedure was used to obtain 246 respondents from high school students from a population of 8,000. Academic achievement is measured in a mathematics test developed from a question bank in the field of mathematics. The results showed that internet addiction, procrastination, and self-control were significant predictors of academic achievement in mathematics. Further findings, there are four significant latent structures of internet addiction behavior, namely neglect work, neglect of social life, excessive use, and lack of control based on exploratory factorial analysis.

Keywords (Times New Roman, bold, 9)

Keywords: internet addiction behavior; academic achievement; high school students

Introduction

The COVID-19 pandemic has had an impact on education, so that all schools in Indonesia do not carry out face-to-face learning in class but with internet-based online learning. The advancement of the internet brings many benefits but also has a negative impact if its use is inappropriate and excessive (Delgado, 2019). Online learning through video conference applications such as zoom meetings or the web that provides information is easier and more diverse, thereby increasing student interest in learning and increasing academic achievement (Sari & Setiawan, 2019). However, excessive internet use results in internet addiction behavior and a decrease in student academic achievement (Uğur Akpur; 2020; Jones & Blankenship, 2020). Several studies have stated that the behavioral dimensions of internet addiction (including procrastination, lack of self-control) are important for anticipating a decline in student academic achievement (Santillán, 2020; Joubert, 2015; Ismail & Zawahreh; 2017).

Literature Review

Internet Addiction Behavior and its Dimensions

Internet addiction behavior is the inability of individuals to control their internet use, which ultimately causes psychological, social, learning,

and work disorders in one's life (Chou & Hsiao, 2000, Akhter, 2013). The negative impacts of internet addiction among students such as weak emotional control, lack of self-control, inability to regulate activities, so that students experience difficulties in completing school assignments optimally and ultimately decrease academic achievement (Santillán, 2020; N Singh & K Barmola, 2015). Internet addiction behavior arises with abuse and lack of control when using the internet, this creates emotional dissonance, and interferes with adaptive behavior (Marco & Chóliz; 2013). Research findings state that there is a significant negative correlation between internet addiction behavior and academic achievement (Akhter, 2013; Usman, et al, 2013). Several previous studies have stated that the dimensions of internet addiction that affect academic achievement include: procrastination, lack of self control, neglect work, neglect of social life, feeling happy when connected to the internet, insomnia disorders (Berner & Santander, 2012; Faraci, at all, 2013; Santillán, 2020).

Procrastination

Procrastination is the behavior of delaying tasks or decisions that are intended to the point of subjective discomfort, students who procrastinate school assignments cause them stress and low academic achievement (Ferrari, J. et all., 1995; Zarick & Stonebraker, 2009). The use of several

social networking sites (eg Internet, Facebook, Twitter, and Instagram) contributes to procrastination (Phillip J. Moore, 2019). Academic procrastination is the behavior of students in delaying doing tasks that causes failure to achieve academic achievement. Several studies have stated that there are There is a significant relationship between procrastination and academic achievement, and it directly affects academic achievement because students procrastinate on homework, preparing projects and preparing for exams (Rozenal & Carlbring, 2014; Savithri, 2014; Reinecke et al., 2018) Based on Tuckman, BW (1991) procrastination is understood using temporal motivation theory as an explanation for procrastination behavior which consists of the interaction of four variables, namely expectations, values, impulsivity, and time.

Self-Control

Self-control is defined as the self-initiated regulation of thoughts, feelings, and actions when eternally cherished goals conflict with more momentarily satisfying goals. (Angela et al, 2019). There are three indicators of self-control that affect academic achievement, namely; self monitoring. evaluation and self-reinforcement (Akin et al 2012). Students who have high self-control can avoid inappropriate and excessive internet use so that they get good learning achievements (Nurhanifa et al, 2020). While several studies state that there is a significant correlation and influence of self-control on academic achievement (Adlya et al, 2020). The results of the research by Honken et al (2016) stated that self-control predicts 42% of academic achievement. While Lack of self-control is individual behavior that shows a lack of controlling behavior, controlling thoughts and controlling decisions according to situations and conditions that can lead individuals to negative consequences. (Akin et al, 2015). Lack of self-control is a contributing factor to internet addiction and psychological disorders, Lack of control over one's internet consumption can lead to decreased physical and psychological well-being, with associated symptoms such as distress, anger, loss of control, social withdrawal, family conflicts and others pushing people towards isolation (Quaglio, 2020). The results of Quaglio's

(2020) research show that lack of self-control is a big risk for internet addiction. Negative effects on a child's cognitive development can be damaged by prolonged internet use, including the development of memory skills, attention span, ability for critical reasoning, language acquisition, reading and learning.

Academic Achievement

Academic Achievement is the result of a formal education experience that makes a difference in the quality of academic achievement among students at the local, regional, national and global levels. Differences occur between academic achievement of students from one school to another influenced by culture, socio-economic structure, psychological behavior and personal characteristics of students (Kocak, Omer et al, 2021; Sudarman, 2020). Several studies state that academic achievement in mathematics is predicted by student behavior in carrying out learning tasks. Students who have good achievement are active in carrying out assignments, while students who are poor achievers are associated with procrastinating on assignments (Hughes et al, 2008). Previous research found that there was a significant correlation and effect of procrastination on academic achievement (Savithri, 2019). Further findings state that self-control affects math achievement, if students have high self-control then students will study more diligently, can evaluate themselves and plan something better, actively interact with the learning environment so as to obtain good math achievement (Hasan, et al, 2021).

Objectives

The main objective of this study was to investigate Internet addiction, procrastination and self-control behaviors that affect academic achievement. The second objective is to find the latent structure of internet addiction. The assumption of this research is that academic achievement is influenced by internet addiction, procrastination, and self-control (Joubert, 2015; Ismail & Zawahreh, 2017; de Mooij, 2019). Research questions: (1) Is there any influence of internet addiction, procrastination and self-control on academic achievement at SMA Negeri Karawang, West Java, Indonesia. (2) How is the

internet addiction level of high school students, and is there a latent structure that influences it.

Hypothesis

H1: There is a simultaneous effect of internet addiction, procrastination, self-control on academic achievement

H2: There is a latent structure of high school students' internet addiction

Methods

Population

The target population in this study were public high school students in Karawang for as many as 26,400 students from 30 public high schools.

Samples and Sampling Procedures

According to Navarro & Maldonado (2007), sample size, confidence level and confidence interval for a random sample, from a population of 26,400 high school students were accessible. Multistage sampling technique was used in the selection of samples by initial stratification of the area into urban, suburban and rural areas. A purposive sampling technique was used to select 8,000 students in grade 10 from each school. While proportional random sampling technique was used to select a sample size of 260 students, and 246 students could be analyzed.

Instrument

The instrument used in the study included four tests, namely three psychological tests and one academic achievement test as follows: (1) The Internet Addiction Test (TAT) from Young (1998) consisted of 20 items with a Likert scale (1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always) with a Cronbach Alpha value of 0.85. Based on Young (1998) the interpretation of the internet addiction score is divided into three namely; (a) a score of 0-49 indicates a regular internet user and is still in control, but sometimes does too much. (b) a score of 50-79 is an addicted user experiencing psychological problems; (c) a score of 80-100 indicates the user is experiencing serious problems in social life. (2) Academic Procrastination Test adapts the Tuckman Procrastination Scale (TPS) with 35 items (Tuckman, 1991) with a Cronbach Alpha score of 0.83. Indicators used are like: I ignore schoolwork to spend more time online, When I have a deadline, I wait until the last minute, I always

manage to find an excuse not to do something. (3) the self-control test instrument adopted the Self-Control and Self-Management Scale (SCMS), there were 16 items with a Cronbach alpha value of 0.84. Based on Mezo, Peter (2008) self-control measurement consists of 3 indicators, namely; self monitoring as many as 6 items such as: when I do something, I give my full attention; self-evaluating 5 items such as: When I set important goals for myself, I usually don't achieve them; self reinforcing as many as 5 items like I congratulate myself when I make some progress. (4) The academic achievement test instrument in mathematics was taken from the question bank developed by the mathematics teacher as many as 8 structured essay questions with a total score of 100, with a Cronbach Alpha value of 0.79.

Data Analysis

The first stage is tabulation of the list of public high schools and the number of high school students in Karawang, there are 30 public high schools with a sample size of 260 students, and 246 students can be analyzed. The second stage is to distribute the internet addiction test instrument with 20 items, the Tuckman Procrastination Scale (TPS) with 35 items, the Self-Control and Self-Management Scale (SCMS) with 16 items and the Instrument test for academic achievement in mathematics with 8 items. The questionnaire was distributed via a digital form platform. The third stage is data analysis which is carried out using multivariate analysis of covariance (MANCOVA) and Exploratory Factor Analysis (EFA) methods, the data is tested based on Kolmogorov Smirnov's normality. Chi-Square Test with Bartlett's Test of Sphericity. Hypothesis testing using multiple linear regression summary model, Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO MSA) and initial eigenvalues with the help of SPSS version 23.

Results

Table 1. shows that there is a significant negative relationship between internet addiction and mathematics ($r = -.776$; $p < .000$) and there is a negative relationship between procrastination and mathematics ($r = -.792$; $p < .000$) while self

control with mathematics had a significant positive relationship ($r = .796$; $p < .000$). This is still in line with previous research which states that internet addiction and procrastination have a

negative relationship with academic achievement (Akhter, 2013; Usman, et al, 2013; Santillán, 2020; N Singh & K Barmola, 2015; Reinecke et al., 2018).

Table 1. Descriptive statistic and correlations among variables

	Score Range	M	SD	Skew	Kurt	1	2	3	4
1. Internet Addiction	20-100	53,06	19,44	,570	-,485	1			
2. Procrastination	35-175	100,81	47,31	,128	-1,530	,660**	1		
3. Self Control	16-80	49,19	18,10	,062	-1,319	-,624**	-,750**	1	
4. Math	0-100	69,98	15,98	-,233	-1,029	-,776**	-,792**	,796**	1

Table 2. explains that internet addiction behavior, procrastination and self-control significantly predict academic achievement in mathematics, as evidenced by the standard coefficients of multiple regression analysis: internet addiction behavior ($\beta = -.368$, $p < .000$); procrastination ($\beta = -.283$, $p < .002$); and self-control ($\beta = .355$, $p < .000$). The standard predictive equation for observed mathematical achievement is as follows: Mathematics academic achievement = $-.0.368$ (Internet Addiction) $-. 0.283$ (Procrastination) 0.355 (Self Control). This finding is still relevant to several studies showing that internet addiction

affects and predicts academic achievement in mathematics, the lower the internet addiction the higher the mathematics achievement (Akhter, 2013; Usman, et al, 2013). Like procrastination, when students procrastinate on math assignments, achievement decreases (Rozenal, & Carlbring; Savithri, 2014). Likewise, self-control becomes important when the dimensions of self-control are carried out by individuals such as controlling, evaluating and strengthening themselves to achieve mathematical achievement (Akın et al, 2012).

Table 2. Coefficients of Standard Linear Regression of Mathematics Scores

Model	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
	Beta	Std. Error	Beta	t	Sig.	Tolerance	VIF
(Constant)	80,284	3,656		21,962	,000		
Internet Addiction	-,303	,033	-,368	-9,108	,000	,526	1,902
Procrastination	-,095	,016	-,283	-5,919	,000	,377	2,650
Self Control	,313	,041	,355	7,726	,000	,409	2,448

Table 3. and Figure 1. describe the first to present the results of the KMO and Bartlett's Sphericity test. The values obtained are: KMO .892, Chi2 7970.233 with 190 df and $p=.000$ which indicates that factorial analysis can be performed according to these data. Furthermore, the results of the exploration factorial analysis (EFA) based on initial eigenvalues and Extraction Sums of Squared Loadings obtained four dominant factors or components, namely; Factor 1 neglect work (Eigenvalues = 10.913), factor 2 Neglect social life (Eigenvalues = 1.967), factor 3 Excessive use (Eigenvalues = 1.505), factor 4 Lack of control (Eigenvalues = 1.196). According to the recommended criteria Eigenvalues > 1). These

factors explain 77.9% of the total variance regarding internet addiction. The research findings are in accordance with previous research, namely there are four internet addiction factors from the extraction of the main components (Young, 2011; Mustafa et al, 2020). Based on table 3, the weight of the first factor is known to be different from the other three factors, namely 10.913 for the highest and 1.196 for the lowest, therefore it is considered necessary to rotate the matrix orthogonally using the Varimax method (see Table 4) to identify the highest weight of each each factor allowing simplification in the interpretation of each component. In this study the data matrix allows

the extraction of four dominant factors as shown in table 3.

Tabel. 3 Initial Eigenvalues dan Kaiser-Meyer-Olkin Measure of Sampling Adequacy

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			KMO MSA	
	Total	% of variance	% of accumulatif	Total	% of variance	% of accumulatif	Bartlett's Test	
1	10,913	54,564	54,564	10,913	54,564	54,564	KMO	,892
2	1,967	9,835	64,399	1,967	9,835	64,399	Chi-Square	7970,233
3	1,505	7,527	71,926	1,505	7,527	71,926	Df	190
4	1,196	5,982	77,908	1,196	5,982	77,908	Sig.	,000

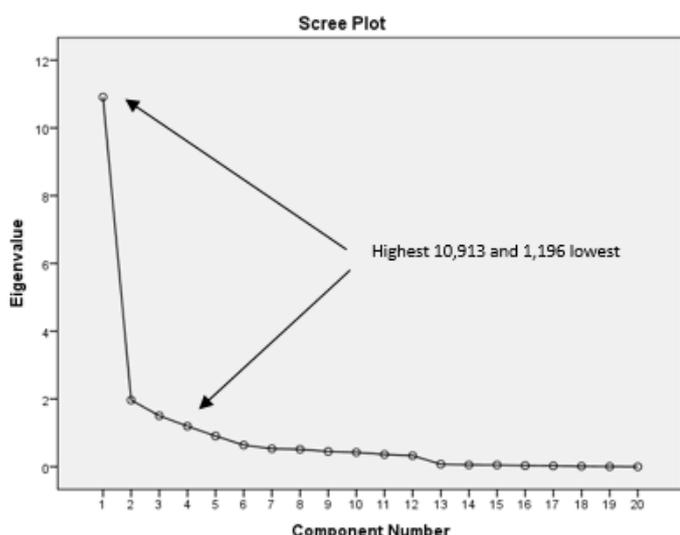


Figure 1. Eigenvalues greater than 1

Figure 2. shows the four factors extracted by the Varimax rotation method (weight > 0.5). The results obtained are as follows: Factor 1 neglect work has 10 items (X1. How often do you neglect household chores to spend more time online?; X2. How often do your grades or school work suffer because of the amount of time you spend online?;X6, How often do you check your email before something else that you need to do? ; X7. How often does your job performance or productivity suffer because of the Internet?; X11. How often do you feel preoccupied with the Internet when off-line, or fantasize about being online?;X13. How often do you find yourself saying "just a few more minutes" when online?;

X14. How often do you try to cut down the amount of time you spend online and fail?; X18. How often do you try to hide how long you've been online?; X19. How often do you fear that life without the Internet would be boring, empty, and joyless?;20. How often do you feel depressed, moody or nervous when you are off-line, which goes away once you are back online). Factor 2 Neglect social life there are 4 items (X 5. How often do you prefer the excitement of the Internet to intimacy with your partner? ;8. How often do you form new relationships with fellow online users?;X12. How often do you snap, yell, or act annoyed if someone bothers you while you are online?;X17. How often do you choose to spend more time online over going out with others?). Factor 3 Excessive use there are 3 items (X3. How often do you find that you stay online longer than you intended?; X9. How often do others in your life complain to you about the amount of time you spend online?; X16. How often do you lose sleep due to being online?). Factor 4 Lack of control has 3 items (X4. How often do you become defensive or secretive when anyone asks you what you do online?; X10. How often do you block out disturbing thoughts about your life with soothing thoughts of the Internet?; X15. How often do you find yourself anticipating when you will go online again?).

	Component				Component			
	1	2	3	4	1	2	3	4
X1	,642	,122	,233	,252	,642			
X2	,665	,111	,303	,250	,665			
X3	,275	,218	,896	,197			,896	
X4	,312	,185	,223	,889				,889
X5	,299	,898	,193	,162		,898		
X6	,740	,270	,125	,242	,740			
X7	,656	,226	,057	,205	,656			
X8	,278	,906	,186	,169		,906		
X9	,278	,199	,906	,213			,906	
X10	,328	,197	,222	,887				,887
X11	,646	,321	,151	,128	,646			
X12	,306	,904	,183	,149		,904		
X13	,503	,221	,353	,336	,503			
X14	,565	,306	,327	,149	,565			
X15	,381	,194	,223	,853				,853
X16	,276	,204	,902	,210			,902	
X17	,304	,890	,182	,174		,890		
X18	,659	,216	,329	,238	,659			
X19	,664	,207	,226	,125	,664			
X20	,741	,272	,122	,241	,741			

Figure 2. Rotated Component Matrix

Table 5. Internet Addiction Rate based on Young's scale.

	0-49	Score 50-79	80-100	N
Sums	123	96	27	246
% According to score	50,00%	39,02%	10,98%	100%

Hypothesis Testing

H1: There is a simultaneous effect of internet addiction, procrastination, self-control on academic achievement. Multiple regression analysis and summary model show that: There is a significant effect of internet addiction, procrastination, self-control behavior on mathematics academic achievement (R square = 0.792; F = 306.888, p = .000) so hypothesis 1 is accepted.

H2: There is a latent structure of high school students' internet addiction. Based on the results of the KMO test using Bartlett's Sphericity and Measure of Sampling Adequacy (MSA) methods which are useful for determining the feasibility of internet addiction variable data, whether internet addiction data can be processed further using factor analysis. The values obtained are: KMO .892, Chi2 7970.233 with 190 df and p < .000 which indicates that factorial analysis is suitable for this data. The result is the KMO value of 0.892

Table 5. explains that the level of internet addiction of high school students was found as many as 230 people or 50% of the 246 respondents at the addiction level of 0-49 points, while as many as 96 people or 39.2% at the addiction level of 50-79 points, and as many as 27 people or 10.98% at the level of 80-100 points. This finding shows that as many as 50% of students are regular internet users and are still controlled, but sometimes do too much, while 39.02% of students are slightly addicted internet users and suffer from psychological problems, lastly as many as 10.92% of students are addicted to the internet and experience mental health problems. serious problems in social life. This finding is in line with the results of Young's (1998) study.

> 0.50 with p < .000 then hypothesis 2 can be accepted and four factors of the latent structure of internet addiction are obtained, namely component 1 factor Neglect work ((Eigenvalues 10,913 **), component 2 factor Neglect social life (Eigenvalues 1,967 * *), component 3 is Excessive use (Eigenvalues 1,505 **), component 4 is Lack of control (Eigenvalues 1.196 **).

Discussions

The results of the analysis of research data are interesting to discuss about the correlation between internet addiction, procrastination, lack of self-control variables with academic achievement. There was a significant negative relationship between internet addiction and math achievement (r = -.776; p < .000) and there was a negative relationship between procrastination and math achievement (r = -.792; p < .000). This finding is still in line with previous research stating poor mathematics achievement in students

who are addicted to the internet (Garmah & Rida, 2020; Akhter, 2013; Usman, at all, 2013; Reinecke et al., 2018; Badri et all, 2011). A significant negative correlation was found in procrastination and academic achievement in mathematics, a significant difference was also found in the level of procrastination and mathematics achievement, with low procrastinators performing better than medium and high procrastinators. Results further revealed subjects procrastinated in the same way regardless of their gender. The implications of procrastination on academic achievement of students at all levels in general and some effective ways to correct procrastination are suggested (Akinsola & Tella, 2007). Meanwhile, there is a positive correlation between self-control and learning achievement ($r = .796$; $p < .000$), and is still in accordance with previous studies such as; Peter G. Mezo,(2008); Olga Stavrova et.all,(2020). The effect of internet addiction, procrastination and self-control variables on mathematics achievement has been proven based on multiple regression analysis and summary model ($R = 0.890$, $R^2 = 0.792$, Adjusted $R^2 = 0.789$. $P < .000$; $F = 306.888$, $p < .000$). The results of this study are in accordance with the work of Rozental, & Carlbring (2014); Savithri, (2014); Akin et al (2012).

The results obtained regarding the latent structure of high school students' internet addiction. First, the internet addiction instrument shows internal consistency and reliability. Then the KMO value was obtained. After that, the sample adequacy size was determined with the aim of evaluating the dimensions that underlie the scale used, obtaining a KMO value of .892, and the Barlett Sphericity test with a χ^2 value of 7970.233 with 190 df and $p < .000$ which indicates the feasibility of carrying out EFA and component extraction, there are four factors of the latent structure of internet addiction, namely component 1 factor Neglect work (Eigenvalues = 10,913 **), component 2 factor Neglect social life (Eigenvalues = 1,967 **), component 3 factor Excessive use (Eigenvalues = 1.505 **), component 4 Lack of control factors (Eigenvalues = 1.196 **) This finding is relevant to previous research (Widyanto & McMurrin, 2004; Young, 2011; Mustafa et al, 2020). Several

other studies such as; two factors (Barke et al., 2012), three factors (Beranuy et al, 2009), five factors (Alavi et al., 2010), and six factors (Santillán, 2020) Regarding students' internet addiction level scores as shown in table 5. it was found that 223 people or 50% of the 246 respondents at 0-49 points, according to Young (1998) means that they are ordinary internet users but sometimes present problems with internet addiction. While as many as 96 people or 39.2% at the level of addiction 50-79 points, they are addicted and have psychological problems, and a group of 27 people or 10.98% at the level of 80-100 points they are classified as severely addicted, have problems psychologically and experiencing serious problems in social life. This finding is in line with the results of Young's (1998) study.

Conclusion

This study analyzes the behavior of internet addiction, procrastination and self-control its influence on academic achievement in mathematics and analyzes the latent structure of internet addiction. Research findings show that internet addiction, procrastination, and self-control are predictors of math achievement. The second research finding is that there is a latent structure in internet addiction which consists of four factors, namely: Neglect work, Neglect social life, Excessive use, and Lack of control. The third finding is the level of students' internet addiction in three levels, namely; as many as 223 people or 50% of the 246 respondents in the position of regular internet users but sometimes present problems with internet addiction; as many as 96 people or 39.2% at the level of addiction suffered from psychological problems, and as many as 27 people or 10.98% in the position of severe addiction, they had psychological problems and experienced serious problems in social life. Based on the observations in this study, the supervision of students' internet use by teachers and parents is very low, resulting in inappropriate, excessive use of the internet, and spending a long time connecting to the internet.

Limitations and Future Studies

This study was selected by participants from class 10 high school students, this would be complete if

the researcher involved all students in grade 11 and grade 12, both male and female. an opportunity to explore the factors of students' mathematical achievement developing the latent structure of internet addiction in an effort to reduce the level of internet addiction of students who experience psychological problems in social life.

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