

Can teenagers self-regulate their internet use? The effectiveness of self-regulation intervention

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Abstract

The internet has become an inseparable part of human life. The use of the internet that is unregulated can lead to addiction, therefore there is a need for preventive intervention. Unregulated internet use stems from normal but impulsive use, which is caused by lack of self-regulation. This study aims to design self-regulation intervention and examine its effectiveness by two means: 1) comparing the efficacy level of the participants regarding the internet use self-regulation before and after the intervention, 2) observing evidence of self-regulation skill during the intervention. The result shows that participants' self-regulated internet use efficacy after the intervention increases significantly compared to before the intervention. Self-regulation skill is also evidenced by 74% of the participants during the intervention.

Keywords: internet use; self-regulation; internet use self-regulatory efficacy; training

Introduction

The use of the internet is inseparable from human life to fulfill various needs, ranging from communication, transportation, education, to commerce. One research result from Indonesia's Internet Service Provider Association (Asosiasi Penyelenggara Jasa Internet Indonesia or APJII) in 2017 showed that the number of internet users in Indonesia had reached more than 143 million. It is equal to 54.86% of Indonesia's population. It is the fifth-largest in the world (Statista, 2018). The biggest penetration rate of internet users in Indonesia (75.5%) is among teenagers aged 13-18 years (APJII, 2017).

Unfortunately, internet use by teenagers is followed by various problems, one of which is internet addiction. A number of studies about teenagers' internet use in several regions in Indonesia resulted in quite alarming findings. One study in Semarang's high school found that 44% of the sample (79 students) had a high tendency towards social media addiction (Muna & Astuti, 2014). Another study conducted in Padang showed that most of the total sample of 240 students were categorized as having moderate (50%) and high internet addiction levels (43%) (Sari, Ilyas, & Ildil, 2018). In Jakarta, two studies conducted to 150-200 teenagers showed that around 90% of them were classified as having a mild internet addiction (Anisa, 2014; Patrichia, 2017). Internet addiction can cause various negative effects ranging from physical health problems (Choi, Park, Han, Kim, Lee, & Gwak, 2009), psychological well-being (Whang, Lee, & Chang, 2003; Choi et al., 2009; Messias, Castro, Saini, Usman, & Peeples, 2011; Kim, LaRose, & Peng, 2009), to impaired social functioning (Whang, Lee, & Chang, 2003; Choi et al., 2009).

However, among the people who are commonly considered having internet addiction, some do not show any pathological dependence that they can overcome it without professional help (LaRose, Lin, & Eastin, 2003). Rather than addiction, this group of people is more accurately described as lacking self-control that they use the internet out of habit. Habit is defined as an automatic sequence of situation-behavior without self-instruction (Triandis, 1980, in LaRose, Lin, & Eastin, 2003). In other words, they use the internet without full awareness and control. This behavior is called unregulated internet use.

Unregulated internet use, even though it has not reached addiction, could also cause various problems, including in school. Chou (2005)

argued that students' internet use should become school's attention because it is a major issue in students' life nowadays. Our interview with a number of teachers from one public middle school in Jakarta revealed that they tend to assume that one of the reasons students neglect school works is because they spend too much time with their gadgets at home. This assumption is consistent with Thatcher, Wretschko, and Fridjhon's (2008) findings that internet use could decrease productivity by means of procrastination. Other than that, students' lack of concentration in class is also associated with excessive gadget use. If this condition is ignored, it could end up in unsatisfactory grade because students spend more time on the internet than for studying, as found by Chou (2005). In another study to undergraduate students, it was found that unregulated internet use does correlate negatively with academic performance (Leung & Lee, 2012; Akhter, 2013; Islam, Malik, Hussain, Thursamy, Shujahat, & Sajjad, 2017). Some factors that are assumed to influence are that unregulated internet use negatively correlates with learning satisfaction (Chen & Peng, 2008) and gives distractions when studying, mainly from texting and social media (David, Kim, Brickman, Ran, & Curtis, 2014).

The wide ranges of negative impacts caused by unregulated internet use bring up a strong urgency to do a preventive intervention. Because this behavior is rooted in the lack of self-regulation, it is believed that the intervention should be developed based on self-regulation theory. Self-regulation is defined as the capability to control behavior through 4 phases: forethought, self-observation, self-evaluation, and self-reaction (Bandura, 1991; Zimmerman, 2000). A number of researches have proved the relationship between internet use and self-regulation, but only a few of them discuss how self-regulation theory can be developed into intervention design to prevent internet addiction.

This self-regulation intervention will be conducted for early teenagers aged 12-15 years old because the cognitive capacity of children in this age range is adequate to support the self-regulation process which consists of planning, monitoring, evaluating, and decision-making (Santrock, 2011). From self-control point of view, teenagers are also able to consider consequences from their behavior and control impulses (Bergin & Bergin, 2015). At the same time, this period is believed to be the ideal time to give personal smartphones, hence increasing their access to the internet significantly (Brooks, 2018).

In the context of intervention, the final target of change is supposed to be internet use behavior. However, according to the Theory of Planned Behavior (TPB), every behavior is preceded by intention, which is determined by one's attitude about the behavior, subjective norm, and perceived behavioral control which is also known as efficacy (Ajzen, 2006). Behavior change is a complex process that requires a considerable amount of time: 7 weeks on average (Hardeman, Johnston, Johnston, Bonetti, Wareham, & Kinmonth, 2010), but any behavior-change intervention could firstly be targeted to one or combinations of its three determinants (Ajzen, 2006).

Among the three determinants, efficacy is a central concept that plays a substantial role (Bandura, 1991). If one does not believe that he could achieve the expected result through his action, he would not have any reason to act, not to mention persist through obstacles (Bandura, 1982). Bandura (2006) argued that efficacy is the main determinant of intention. The role of efficacy to predict behavior has also been proved in various researches in the sports field (Davis, Figueredo, Fahy, & Rawiworakul, 2007), health (Lucidi, Zelli, Mallia, Grano, Russo, & Violani, 2008), parenting (Dumka, Gonzales, Wheeler, & Millsap, 2010), to academic field (Zuffianò et al., 2013; Dixon, Ysel, McConnell, & Hardin, 2014). Therefore, besides the self-regulation skill itself, our intervention focuses on developing self-regulatory efficacy in the context of internet use, which is defined as one's belief in his capability to regulate oneself when faced with various challenges (Davis, 2007).

According to Bandura (1997), efficacy resulted from information regarding the judgment of one's ability. This information could be obtained from mastery experience, observation of others who master the behavior, social persuasion, as well as physical and emotional state (Bandura, 1997). Among these sources of efficacy, Bandura (1997) argued that mastery experience is the most significant one because it gives concrete information that one has what it takes to succeed. This argument is proved by Tschannen-Moran and McMaster (2009). They examined 4 professional development methods to increase teaching efficacy and found that coaching gives the strongest and most lasting impact on efficacy because it creates mastery experience. Therefore, in this study, we aim to increase the internet use self-regulatory efficacy by providing a facilitating situation for mastery experience to happen.

In conclusion, this study aims to examine the effectiveness of self-regulation intervention by two means. The first one is by measuring changes in participants' self-regulatory efficacy before and after the intervention is conducted, as well as two weeks later to make sure of its consistency. The second one is by assessing participants' self-regulation skills indicated by self-regulation behavior during the intervention.

Methods

Research Design

This research uses one group design. There are two variables measured: 1) internet self-regulatory efficacy, which score will be compared before and after the intervention (pretest-posttest), and 2) self-regulation skill, which will be observed once during the intervention (posttest only).

Participants

A total of 19 teenagers (aged 12-15 years old) participated in this study are regular internet users from one public middle school located in Bekasi (X Middle School). They are selected based on convenience sampling method.

Procedures

1. Construction of the measurement

In this study, we use 2 measurements: Internet Use Self-Regulatory Efficacy Scale (IUSRES) and Self-Regulation Skill (SRS) Observation Guide. The SRS was constructed solely from the theory, while the IUSRES was constructed based on field data. This step refers to the construction of the IUSRES. For a week, we conducted a number of interviews and surveys using both online and offline methods to a group of teenagers with the same criteria and took place in the same school as the participants. For the offline method, we selected 1 class from grade 7, 8, and 9 to distribute the survey based on schedule availability. Out of the students in each chosen class, we random-picked 6 students to interview. These students did not fill out the survey. From these data, we constructed the initial version of IUSRES which went through readability test by students from 2 tutoring centers (*bimbel*) in Bekasi. After revising the items based on their input, we conducted an online tryout.

2. Participant Recruitment

Bringing the final version of the IUSRES, we went back to X Middle School and entered 3 classes consisted of grade 7, 8, and 9. We administered the IUSRES to all students in each class but selected only those who meet the criteria for intervention: the score is below 5.5/10, stated the need for intervention, and got permission from their parents. The initial number of selected participants is 23 students.

3. Intervention

The intervention consists of 6 sessions and was conducted in the course of 1 week with 3 face-to-face meetings (2 hours each). On day 1, we conducted session 1-2. The next day, we conducted session 3-4. Session 5 was conducted without meeting from day 1 to 7 (5 days of homework). The participants' homework is the data source to fill out the SRS observation guide. The last meeting to conduct session 6 took place on day 8. (See appendix for detailed intervention description).

4. Follow-up data collection

The follow-up data were collected 1 week and 2 weeks after the intervention. We contacted each of the participants to fill out the IUSRES online. The total number of participants who completed these 2 follow-up procedures is 19 students.

Measurement

1. Internet Use Self-Regulatory Efficacy Scale (IUSRES)

We construct the IUSRES based on Bandura's (2006) guide about the development of self-efficacy measures as well as two examples of self-regulatory efficacy scale in other contexts by Davis et al. (2007) and Lucidi et al. (2008). Firstly, we conducted interviews and survey to a group of teenagers to study what situations are perceived as supporting and challenging to them when it comes to regulating their internet use. From this interview and survey results, we determined 10 most frequently mentioned situations and develop them into IUSRES items (e.g. *I can refrain myself from spending time online the whole day even though I'm on holiday*). To each item, participants are asked to rate their confidence that they can self-regulate their internet use in the following situation on a scale of 1 (not sure at all) to 10 (very sure). After conducting a tryout, we decided to eliminate 3 items that have poor item-total correlation, leaving 7 items in the final version. This measurement have good internal reliability ($\alpha = 0,87$) and validity ($r_{it} > 0.3$).

Table 1. Wilcoxon Signed-Rank Test Result

	N	Mdn	Std. Deviation	Min.	Max.	T	z	sig.
Before	19	3.7	1.02	2.1	5.4	171	3.72	0.00
After	19	6.7	1.80	3.1	9.1			

Table 2. Friedman's ANOVA Result

	N	Mdn	Std. Deviation	Min.	Max.	χ^2	df	sig.
Immediate	19	6.7	1.80	3.1	9.1	1.31	2	0.52
1 week	19	6.1	2.04	2	9.6			
2 weeks	19	6.6	2.11	2.6	9.1			

Table 3. Self-Regulation Skill Observation Result

	Fore-thought	Self- monitoring	Judgment	Self-reaction	Donedaily	Self-regulation skill
Participant 1	✓	✓	✓	✓	✓	Yes
Participant 2	✓	–	0	0	0	No
Participant 3	✓	✓	✓	✓	✓	Yes
Participant 4	✓	✓	✓	✓	✓	Yes
Participant 5	✓	✓	✓	✓	✓	Yes
Participant 6	✓	✓	✓	✓	✓	Yes
Participant 7	✓	✓	✓	✓	–	No
Participant 8	✓	✓	✓	✓	✓	Yes
Participant 9	✓	✓	✓	✓	✓	Yes
Participant 10	✓	✓	✓	✓	–	No
Participant 11	✓	✓	✓	✓	–	No
Participant 12	✓	✓	✓	✓	✓	Yes
Participant 13	✓	–	–	–	–	No
Participant 14	✓	✓	✓	✓	✓	Yes
Participant 15	✓	✓	✓	✓	✓	Yes
Participant 16	✓	✓	✓	✓	✓	Yes
Participant 17	✓	✓	✓	✓	✓	Yes
Participant 18	✓	✓	✓	✓	✓	Yes
Participant 19	✓	✓	✓	✓	✓	Yes
Percentage of participant who displays self-regulation skill						73,68%

2. Self-Regulation Skill Observation Guide (SRS)

The SRS was constructed based on self-regulation theory from Bandura (1991) which is later developed by Zimmerman (2000). This observation guide consists of 5 items, 4 of which reflects the 4 phases of self-regulation: forethought, self-monitoring, judgment, and self-reaction. The other 1 item checks whether the participant did the self-regulation process daily during the intervention. Because these 5 items all represent an essential part of the self-regulation theory, participants are considered having self-regulation skills only when they completed all of them.

Data Analysis

To test the significance of the change in the internet use self-regulatory efficacy score before and after the intervention, we use the Wilcoxon Signed Rank Test. For the self-regulation skill, we sum up the total score of each participant and then count the percentage of participants who achieve the targeted score.

Results and Discussion

Results

From 19 participants in this study, 5 of them are in grade 7, 10 of them are from grade 8, and the remaining 4 are from grade 9. These 19 participants are divided into 4 groups for the intervention sessions. The number of female participants are 13, while 6 others are male.

The table above shows that participants' internet use self-regulatory efficacy after the intervention ($Mdn = 6,7$) is significantly higher than before the intervention ($Mdn = 3,7$), $z = 3,72$, $p < 0,001$, $r = 0,85$. According to Cohen's standard (Gravetter & Wallnau, 2013), the effect size of 0.85 is classified as a large effect.

According to Friedman's ANOVA statistical test of the internet use self-regulatory efficacy score which was taken immediately after the intervention, 1 week afterward, and two weeks afterward, we can conclude that there is no significant difference $\chi^2(2) = 1,31$, $p = 0,52$. In other words, the participants' internet self-regulatory efficacy is relatively stable in the course of 2 weeks after the intervention.

The table above indicates that among 19 participants, 14 of them evidence all 5 indicators of self-regulation skills during the intervention. Therefore, the percentage of participants who are able to self-regulate is 74%.

Discussion

The findings of this study prove that the self-regulation intervention is effective to increase self-regulatory efficacy and self-regulation skill in the context of internet use. These results were achieved by means of facilitating mastery experience in doing self-regulation. Mastery experience serves as a concrete and reliable source of information to an individual that they have the capability needed for success (Bandura, 1997). In this study, the role of experience to provide feedback for

performance is reflected from the comments of some participants such as “I didn’t expect that I can live without my gadget” or “I’m speechless.. turns out I can do this”. However, Bandura (1977) argued that in some cases, mastery experience does not impact or even decrease efficacy level, because the more important factor is how the individual perceives personal and situational contributions to achieve the result. This argument was later proved by Salanova, Martinez, and Llorenz’s (2012) study where one’s perception about the cause of his success, or known as causal attribution, was found to influence future performance. In line with that finding, some variations of causal attribution were also seen as part of the participants’ dynamic during the intervention. Some participants show internal attribution (“my determination and willingness make me able to do this”, “I have to hold on to myself”), and some others indicated that they succeed because they happened to have a lot of works from school so they had no time to waste on the internet. It will be useful to take into account causal attribution for future studies to provide a more detailed explanation about how mastery experience influences efficacy.

Even though mastery efficacy is a dominant source of efficacy, not all mastery experience can increase efficacy and vice versa (Bandura, 1997). This study also supported that. Despite the fact that not every participant are successful in achieving their target, the efficacy score of each one of them is higher than before. This finding could be explained by another argument from Bandura (1997) that the changes in efficacy are more affected by cognitive reconstruction about the information resulted from experience than the experience itself. In this study, the cognitive reconstruction process is done in session 6 in which participants reflected and evaluated their self-regulation exercise. Through this session, all participants went through the same process to reach the final conclusion that their experience resulted in meaningful feedback about what helps and hinders them to achieve their target, despite their performance. Because of this feedback, they feel more assured that the next time they try to self-regulate, they know what it takes to succeed. This interpretation is assumed to be the one thing that causes an increase in all participants’ efficacy. However, this assumption needs to be studied further.

Besides the structured mastery experience, the characteristics of the participants are also assumed to play important roles in the effectiveness of the intervention. The participants are selected based on several criteria. The first one is their initial self-regulatory efficacy score should be in the ‘low’ category, which is defined as 5.5 or below (from the scale of 1-10). The average score is 3.8. In other words, these participants were initially lack of confidence in their self-regulation skill regarding internet use. The increase in their average score after the intervention serves as a prove of Ajzen’s (2006) argument that an intervention is more potentially successful if there is a considerable room for change regarding the targeted behavior. Even though high levels of efficacy generally leads to better performance (Bandura, 1997), but in the context of training, efficacy correlates negatively with performance due to the little amount of allocated resources (Vancouver, Thompson, & Williams, 2001). Someone who already has high confidence in his ability will utilize fewer resources to learn and tend to be less serious so they do not perform well.

The second criterion when selecting the participants is that they stated a need to self-regulate their internet use. Perceived need is assumed to be another contributing factor, as found by Payne (2004). In his research regarding healthy-eating behavior, Payne (2004) found that one’s perception of the need to eat healthily correlates significantly with all components of behavior in the Theory of Planned Behavior

(TPB). This includes one’s attitude about the healthy-eating behavior, subjective norm, perceived control, intention, as well as the behavior itself. In this study, the participants’ need to regulate their internet use made them more receptive to the substance of the intervention and more cooperative to do the whole intervention activities.

The practical implication of the above-mentioned findings is that when targeting a behavior change, even though the target is not confident yet in their ability to do the behavior, the intervention could still be effective as long as they have the need to change. The most important thing to give as an initial step is the experience to do the behavior. They do not even have to be successful when doing the behavior because the efficacy is more affected by the cognitive reconstruction of the experience as a learning process. By believing that the experience serves as a source of learning, one will be more confident that they can do the behavior better the next time.

Theoretically, efficacy in one specific context of behavior could increase motivation to do the actual behavior (Bandura, 1982). However, in this study, the increase in efficacy was not followed by the intention to continue doing the behavior. In the last session, when the participants were asked whether they intend to continue self-regulating their internet behavior, only a few of them said so. Most of the participants only exercised self-regulation because they were instructed to do so. According to TPB (Ajzen, 1991), the intention to do an actual behavior is determined not only by efficacy or perceived control but also by attitude and subjective norm. These two other determinants have not been targeted in this intervention, which might explain why the intention is not formed yet.

This study supports one previous study by Hardeman et al. (2010) which found that behavior change is a complex and long process. In order to grow intention, we need to target participants’ attitudes and subjective norms about the behavior as well. There are two possible developments from this limitation. The best one is to modify the intervention design by aiming to change these two other determinants of behavior. Attitude could be aimed by investing more time for discussions about various consequences from unregulated internet use, while subjective norm could be targeted by giving educational sessions for parents and teachers so that they could give influence to the students as well. Another alternative for longer-term involvement is in the form of internet home regulations from parents and self-development programs from the school’s guidance and counseling department. By including these variables as other targets of the intervention, the effectiveness indicators should also be adjusted. The second development alternative from this study is to include the measurement of attitude, subjective norm, and intention without modifying the intervention. Both of these alternatives could make the result more comprehensive to explain the process behavior change.

Even though we have not included all components of behavior, the findings from this study provide a number of insights on the process of behavior change by means of increasing efficacy and skills, which serves as a guide to the development of the intervention or any other intervention. Previous researches mostly discuss the bigger view of the process of behavior change using the Theory of Planned Behavior (TPB) framework, but only on a conceptual level. This research serves as a practical complement by doing an intervention. Other than that, this study also explores a significant and inseparable area of behavior from teenagers today that is still relatively little studied, which is the internet use self-regulation. Educational institutions or psychology practitioners who are interested to develop a program regarding

teenagers' internet use could use this research as a reference. The self-regulation intervention conducted in this study could be readily implemented to the wider group of teenagers.

There are a number of limitations in this research that should be considered for further research. First, due to practical reasons, we could not measure the self-regulation skill before and after the intervention. Therefore, we were not able to examine the causal relationship between the intervention and the self-regulation skill. Our conclusion is limited to the fact that participants display self-regulation skills during the intervention, which could or could not be caused by the intervention itself. Our suggestion for future studies is to employ a pre-posttest method for this variable as well in order to examine whether the intervention cause changes in self-regulation skill.

Secondly, we did not include other variables that are theoretically predicted to contribute in the process of efficacy development such as interpretation of experience (Bandura, 1991; Lee, Cohen, Edgar, Laizner, & Gagnon, 2006) and causal attribution (Salanova, Martinez, & Llorenz, 2012). The reason why we did not include these variables is that the context in this research, which is internet use self-regulation, is very specific and relatively little discussed in previous studies. Because of that, the measurement of related variables is still limited, meanwhile the discussion of efficacy should be context-specific (Bandura, 2006). Future studies could be improved by including these variables to better explain efficacy is formed and whether mastery experience could predict it. These variables should also be considered to modify the intervention design.

Another limitation of this study is that we only use quantitative measurement to answer the research questions. The measurement of the internet use self-regulatory efficacy is self-report, which makes the data prone to bias. The measurement of self-regulation skills is also limited to a very simple observation guide. Both of these measurements have a relatively big room for improvement. Further studies could also apply mixed-method design by adding qualitative measurement by interviewing participants during the relatively long intervention time. This improvement could result in much more fruitful findings.

Conclusion

This study aims to examine the effectiveness of self-regulation intervention to increase self-regulatory efficacy and self-regulation skill in the context of internet use. The results show that the self-regulation intervention, which consists of 6 sessions and conducted in the course of 1 week, is effective to increase the internet use self-regulatory efficacy. This is indicated by the significant increase of the Internet Use Self-Regulatory Efficacy Scale (IUSRES) score after the intervention compared to before. The self-regulation skill is also evidenced by 74% of the participants during the intervention as indicated from the Self-Regulation Skill (SRS) observation guide, which can be concluded that the intervention is effective to grow self-regulation skills.

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Appendix 1. Intervention Description

The main objective of the self-regulation intervention conducted in this study is to increase internet use self-regulatory efficacy and self-regulation skill. This objective is aimed by 6 sessions below:

- Session 1: Through an interactive lecture, participants are challenged to think about various functions of several kinds of stuff, including the positive and negative ones. This activity serves as an analogy to raise their awareness that any stuff, including the internet, could be used both in a good and bad way. The impact of internet use is under their control as the user.
- Session 2: In groups, participants discuss the potential positive and negative impacts of the internet. After that, they list their daily activities and the duration of each, identify which ones are offline and online activities, pick an emoji sticker to each activity that represents how they feel about it, and then sum up the total duration of their offline and online activities. By evaluating the balance of their offline and online activities, participants are directed to the realization that they need to regulate their online activities or internet use.
- Session 3: Participants evaluate their internet use habits by writing down all the online activities that they do daily, identify which ones are useful and not useful as well as their reason, pick an emoji sticker to each of the activity, and then count the total duration of the 'useful' and 'not useful' category. Through this session, the participants are expected to realize the need to change their internet use habits. The first three sessions serve as the *forethought* phase of self-regulation.
- Session 4: Participants set a target of change regarding their internet use by using SMART (Specific, Measurable, Attainable, Realistic, Time-bound) guide, e.g. limit Instagram scrolling to maximum of 30 minutes per day, reduce time spent for playing games to a maximum of 1 hour per day. We make sure that the participants set a target that could be achieved in order to facilitate mastery experience in doing self-regulation.
- Session 5: This session is conducted in the form of 5 days of homework. Participants are asked to record their online activities every day along with its duration (*self-monitor*), write down the surrounding situation when they do each activity including the triggers and following consequences, and categorize each activity into the 'useful' or 'not useful' group (*self-judgment*). They also monitor whether their target is achieved every day (*self-judgment*) and pick an emoji sticker to describe their feeling regarding that (*self-reaction*). This session is aimed to facilitate the participants to try self-regulating their internet use.
- Session 6: In groups, participants share their experience and insights for the past 5 days trying to self-regulate their internet use. After that, they fill out an evaluation sheet to recap their target achievement each day and identify what are the supporting and challenging factors.