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Smartphone Addiction, Religiosity, and Academic Procrastination among College Students: The Mediating Role of Self-esteem and Self-regulated Learning

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Academic procrastination is a prevalent issue among college students. This study aims to investigate the correlation between smartphone addiction, religiosity, and academic procrastination by considering the mediating role of self-esteem and self-regulated learning (SRL). The Procrastination Scale, Religiosity among Muslim scale, Smartphone Addiction Scale-Short Version (SAS-SV), Rosenberg Self-Esteem Scale (RSE), and Academic Self-Regulated Learning Scale (A-SRL) were administered to 512 Muslim college students (42,19% males and 57,81% females; mean age=19,72, SD=1,36). The hypotheses were evaluated using Partial Least Squares (PLS) modeling. The results revealed that smartphone addiction, religiosity, self-esteem, and SRL were significantly correlated with academic procrastination. The structural equation model revealed that self-esteem and SRL mediated the correlation between religiosity and academic procrastination. In terms of the correlation between smartphone addiction and academic procrastination, only SRL acted as a mediator, while self-esteem did not. The findings are valuable for counselors and college educators, offering insights into the connections among smartphone addiction, religiosity, and academic procrastination. This knowledge can provide practical guidance for preventing and addressing academic procrastination issues in college students effectively.

Keywords: academic procrastination; smartphone addiction; religiosity; self-esteem.

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Зависимость от смартфонов, религиозность и академическая прокрастинация среди студентов колледжей: посредническая роль самооценки и саморегулируемого обучения

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Академическая прокрастинация — распространенная проблема среди студентов колледжей. Цель данного исследования — изучить взаимосвязь между зависимостью от смартфонов, религиозностью и академической прокрастинацией с учетом опосредующей роли самооценки и саморегулируемого обучения (СРО). Для исследования были использованы шкала прокрастинации, шкала религиозности среди мусульман, шкала зависимости от смартфонов — краткая версия (SAS-SV), шкала самооценки Розенберга (RSE) и шкала академического саморегулируемого обучения (A-SRL). Выборка составила 512 студентов мусульманских колледжей (42,19% юношей и 57,81% девушек; средний возраст = 19,72, SD = 1,36). Гипотезы оценивались с помощью моделирования методом частичных наименьших квадратов (PLS). Результаты показали, что зависимость от смартфона, религиозность, самооценка и СРО связаны с академической прокрастинацией. Модель структурного уравнения показала, что самооценка и СРО опосредованно связаны с религиозностью и академической прокрастинацией. Что касается корреляции между зависимостью от смартфона и академической прокрастинацией, то тут только СРО выступало в качестве опосредованной корреляции, а самооценка — нет. Полученные результаты представляют ценность для консультантов и преподавателей колледжей, поскольку дают представление о связях между зависимостью от смартфона, религиозностью и академической прокрастинацией. Эти знания могут способствовать профилактике и эффективному решению проблем академической успеваемости у студентов колледжа.

Ключевые слова: академическая прокрастинация; зависимость от смартфона; религиозность; самооценка.

Финансирование. Данное исследование проводилось без финансирования со стороны государственных, коммерческих или некоммерческих организаций.

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Introduction

Several fundamental issues related to student activities are often encountered in learning, including academic procrastination [36]. Procrastination is a widespread phenomenon in educational settings. In recent decades, different understandings and connotations of procrastination have emerged [11]. Academic procrastination refers to the inclination to postpone academic responsibilities, disregarding the possible unfavorable outcomes that may arise [36]. Academic procrastination refers to delayed assignments and actions linked to learning and acquiring knowledge [7]. Delaying a task may temporarily relieve anxiety, but stronger negative emotions will eventually arise, and students tend to blame themselves if they fail [33]. This concept has been studied from various theoretical perspectives, and numerous causes and consequences have been proposed.

Academic procrastination poses a significant challenge within educational institutions. Almost all students have experienced postponing academic assignments to some extent. A study conducted by Fentaw et al. revealed that 80% of the 323 students engaged in academic procrastination [11]. Furthermore, several previous studies also support this survey. A study estimated that 46% of undergraduate students and 60% of graduate students regularly engage in academic procrastination behavior [30]. Similarly, a survey conducted by Rozental et al. as many as 62,2% of female students engaged in severe academic procrastination [32]. Moreover, 7,7% of the respondents reported experiencing a high level of academic procrastination [1]. These findings depict that academic procrastination is a prevalent issue in academic environments.

Previous research has identified various factors contributing to academic procrastination, among them being smartphone addiction [21; 23]. Smartphone addiction, characterized by compulsive and excessive smartphone use leading to various physical, psychological, and social impairments, is defined as the excessive and uncontrollable use of smartphones [35]. According to Sunday et al. individuals who experience smartphone addiction often face difficulties in managing, minimizing, or ceasing their excessive use of smartphones [35]. Prior analysis has consistently indicated a positive association between smartphone addiction and academic procrastination [21; 23]. Numerous prior studies have also examined the impact of religiosity on academic procrastination [31; 46]. Religiosity refers to individuals' choices, feelings, thoughts, and activities related to established or self-created religions [40]. Those who perceive surrendering to a higher power as a means of substitute control tend to mitigate self-regulation issues [46]. Individuals who strongly adhere to religious values tend to demonstrate self-control, enabling them to avoid procrastination [28]. Studies suggest that religious characteristics are negatively associated with academic procrastination [25].

Furthermore, academic procrastination is also affected by self-esteem [18; 43]. Self-esteem is defined as a sense of self-worth and self-respect, crucial for comprehending one's well-being and achievements [29]. A longitudinal study by Yang et al. revealed that self-esteem predicts academic procrastination [43]. Moreover, academic procrastination is affected by SRL, as evidenced by previous literature [22; 24]. SRL refers to the process through which students become proficient in managing their own learning [42]. Recent studies offer evidence supporting the idea that academic procrastination can be comprehended from a situational view, characterized by a breakdown in SRL [22].

Consistent with these findings, another study demonstrated a significant negative correlation between all components of SRL and academic procrastination [24].

Several studies have examined the mediating roles of SRL and self-esteem in the relationship between smartphone addiction and academic procrastination. For instance, an investigation by Eissa & Khlifa found a significant mediating effect of SRL between smartphone addiction and academic procrastination [8]. Similarly, Liu et al. identified that time control and strategic learning methods act as sequential mediators in the association between smartphone addiction and academic procrastination among Chinese students [23]. Based on these previous findings, we propose that SRL serves as a mediator between smartphone addiction and academic procrastination. Moreover, prior research has shown that excessive smartphone use diminishes self-esteem [4]. Low self-esteem, in turn, can trigger academic procrastination behavior [18; 43]. Kinik & Odaci provided evidence that self-esteem can serve as a mediating factor in the relationship between dysfunctional behavior and academic procrastination [18]. Additionally, other research found that self-esteem mediates the connection between social media addiction and academic engagement, with social media addiction negatively impacting self-esteem and subsequently reducing academic engagement [20].

Additionally, we propose that self-esteem mediated the association between religiosity and academic procrastination. This hypothesis is based on empirical studies that identify self-esteem as a predictor of academic procrastination [18; 43] and suggest that religiosity is associated with self-esteem [9; 17]. Therefore, our prediction is that self-esteem acts as a mediator in the relationship between religiosity and academic procrastination. Furthermore, several prior studies have investigated the mediating role of self-esteem in the relationship between religiosity and various psychological and emotional variables. An example is the study conducted by Craig et al. which revealed that self-esteem acts as a mediator in the connection between religiosity and mood [3]. Yoo discovered that self-esteem mediates the influence of existential well-being, a component of spiritual well-being, on depression [45].

The mediating effect of SRL in the relationship between religiosity and procrastination has received limited attention. However, previous findings have shown religiosity to be a predictor of SRL [14; 28], which, in turn, affects lower academic procrastination [22; 24]. Based on these studies, our prediction is that SRL may mediate the relationship between religiosity and academic procrastination. Furthermore, previous research has shown that self-regulation serves as a mediating factor in the association between religiosity and punctuality [38]. Furthermore, several other studies have discovered that SRL acts as a mediator in the relationship between religiosity and various individual psychological aspects. Zong & Cheah discovered that religious commitment is connected to increased levels of self-regulation, which subsequently contributes to more positive psychological adjustment [50]. Additionally, Zarzycka et al. discovered that religious individuals, by viewing their issues as under God's control, gain an alternative form of control, lessening self-regulation challenges and aiding in overcoming procrastination [46].

Prior studies have indicated that there is a negative relationship between smartphone addiction, religiosity, and academic procrastination, with self-esteem and SRL playing crucial roles. However, limited research has explored the mediating role of self-esteem and SRL in this relationship, and previous studies have yet to examine these variables simultaneously. Hence, the objective of this analysis is to offer fresh understandings into the mediating effects of self-esteem and SRL on the association between smartphone addiction and academic procrastination among students. Furthermore, while some studies have examined religiosity in the context of procrastination, this research may be one of the few studies considering the role of Muslim religiosity in academic procrastination.

The purpose of the current study was to investigate the relationship between smartphone addiction, religiosity, self-esteem, SRL, and academic procrastination. Additionally, we will

examine how self-esteem and SRL mediate the association between smartphone addiction, religiosity, and academic procrastination.

Method

Study Design and Participants

A cross-sectional survey research design was employed in this study. Convenient sampling was employed to select a total of 534 Muslim students from the 2019 to 2022 cohorts at the State Islamic Institute of Kerinci, Indonesia. However, only 521 students returned the questionnaires, resulting in a response rate of 97,56%. Ultimately, 512 valid responses were used for data analysis. Before collecting data, all participants provided informed consent, and measures were taken to guarantee their confidentiality. This research adhered to the principles outlined in the Helsinki Declaration and obtained approval from the Institutional Review Board (IRB) of the State Islamic Institute of Kerinci. All participants were 18 years of age or older.

Table 1 displays the distribution of respondents based on gender, age, daily internet usage, and residential area. Of the respondents, 296 (57,81%) were female, while 216 (42,19%) were male. The age distribution was as follows: 124 individuals (24,22%) were 18 years old, followed by 19 years old (23,83%), 20 years old (21,29%), 21 years old (17,19%), and 22 years old (13,47%). The majority of respondents reported using a smartphone for 4—6 hours (41,41%), followed by 7—9 hours (38,67%), 1—3 hours (17,38%), and more than 9 hours (2,54%).

Data collection tools

Procrastination scale

We utilized the Procrastination Scale developed by Tuckman [37]. This extensively employed measure encompasses an assessment of task postponement inclinations, aversion to unpleasant tasks, and a tendency to attribute personal distress to external factors. Comprising 16 items rated on a four-point Likert scale (1=Strongly Disagree, 4=Strongly Agree), the scale demonstrated robust internal consistency with a reported Alpha coefficient of 0,90 [37]. Subsequently, a cross-cultural adaptation was conducted for the Indonesian population. The Indonesian version of the scale exhibited a high reliability coefficient of 0,978.

The smartphone addiction scale — short version (SAS-SV)

SAS-SV is a research tool specifically created to evaluate smartphone addiction [19]. The SAS-SV was developed based on the original Smartphone Addiction Scale (SAS). The final 10 questions for the SAS-SV were selected based on content validity. The internal consistency of the SAS, as measured by Cronbach's alpha, was found to be 0,911 [19]. To adapt it for adult respondents in Indonesia,

Table 1

The characteristics of the respondents

Variables	Type	Frequency	Percentage
Gender	Male	216	42,19
	Female	296	57,81
Age	18 Years	124	24,22
	19 Years	122	23,83
	20 Years	109	21,29
	21 Years	88	17,19
	22 Years	69	13,47
Daily internet usage time	1—3 hours	89	17,38
	4—6 hours	212	41,41
	7—9 hours	198	38,67
	>9 hours	13	2,54

we translated the content into Indonesian and subsequently carried out internal consistency testing using Cronbach's Alpha, resulting in a satisfactory score of 0,941.

Religiosity among Muslims Scale

In this study, we utilized the Muslim Religiosity Scale developed by Mahudin et al. as a measure of religious beliefs and practices [27]. The final scale consists of a single factor with 10 items. The scale ranged from 1 (Strongly Disagree) to 4 (Strongly Agree) [27]. Reliability analysis revealed a Cronbach's alpha of 0,92 [27]. For the purposes of this study, we made adaptations to tailor it to the Indonesian population. Cronbach's alpha was used to assess the internal consistency of the scale. Our tests indicated that the scale yielded a high Alpha score (α=0,901).

Rosenberg self-esteem scale (RSE)

The Rosenberg Self-Esteem Scale (RSE) is a research scale developed by Morris Rosenberg in 1965 to measure self-esteem. The scale comprises 10 items with four Likert scale response choices (1=strongly agree — 4=strongly disagree). The RSE demonstrates high internal consistency, with a Guttman scale reproducibility coefficient 0,92 [15]. We translated this scale into Indonesian. Moreover, the adaptation process for the Indonesian population, conducted through internal consistency testing using Cronbach's Alpha, yielded a satisfactory score (α=0,964).

Academic self-regulated learning (A-SRL)

The Academic Self-Regulation Scale (A-SRL) is grounded in Zimmerman & Martinez-Pons' self-learning framework [26]. Comprising 55 items rated on a four-point response scale where participants indicate their agreement level from strongly agree (4) to strongly disagree (1), the scale demonstrated internal consistency with Cronbach's Alpha scores ranging from 0,73 to 0,87 [26]. In line with other research scales, adaptations were made to tailor it to the Indonesian population, resulting in a Cronbach's Alpha score of 0,983 for the scale in Indonesian.

Data Analysis

Descriptive analysis was conducted to determine the mean and standard deviation of each variable. Additionally, Spearman's non-parametric correlation test was employed to examine the relationships among the study variables (refer to Table 2). A correlation was deemed statistically significant if the p-value was ≤0,05. Spearman correlation analysis was chosen due to the non-normal distribution of several variables (refer to Table 3). Normality was assessed using the Kolmogorov-Smirnov test, a method utilized to evaluate whether a data sample adheres to a specific distribution. Rejection of the null hypothesis occurs when the p-value from the Kolmogorov-Smirnov test is below the designated significance level (<0,05), indicating a deviation from the assumed distribution.

In this study, Partial Least Squares Structural Equation Modeling (PLS-SEM) was employed to assess the developed structural model. PLS-SEM is utilized to evaluate hypotheses concerning relationships among latent variables. The study utilized the SmartPLS application version 3.2.9. The measurement model stage covers internal consistency, convergent validity, and discriminant validity. Cronbach's alpha values between 0,70 and 0,90 are considered satisfactory [13]. Convergent validity can be assessed by examining the average variance extracted (AVE), which is deemed acceptable if its value is ≥0,5 [13]. Discriminant validity can be tested by examining cross-loadings and using the Heterotrait-Monotrait Ratio (HTMT), ensuring the HTMT value is less than 1 [13]. After meeting all requirements, hypothesis testing is conducted to analyze the relationship between variables. Hypotheses are considered supported if the p-values are less than 0,05 or if the t-value exceeds 1,96 [13].

Results

The correlation among variables

Table 2 indicates the relationships between variables. Academic procrastination is positively linked to smartphone addiction (r=0,231, p=0,000) while exhibiting a negative association with self-esteem (r=–0,281, p=0,000). Notably, significant negative correlations are observed

between academic procrastination and various dimensions of SRL. Additionally, the SRL dimensions display positive associations with one another, as well as with self-esteem and religiosity, but exhibit negative correlations with smartphone addiction and academic procrastination. Furthermore, there is a significant negative correlation between smartphone addiction and self-esteem (r=–0,211, p=0,000). The correlations between all dimensions of religiosity and academic procrastination are also highly significant: Islam (r=-–0,267, p=0,000), Iman (r=–0,283, p=0,000), and Ihsan (r=–0,317, p=0,000). Furthermore, all dimensions of religiosity significantly and positively correlated with self-esteem. Therefore, it is expected that high scores on smartphone addiction, religiosity, self-esteem, and SRL will predict a strong relationship with academic procrastination among students in this study.

Measurement model

Table 3 displays the descriptive statistics for all variables, along with the results pertaining to their validity and reliability. The composite reliability value exceeds 0,7, signifying a notably high level of reliability for the constructs examined in the model. Furthermore, the assessment of convergent validity utilized the Average Variance Extracted (AVE). The AVE values acquired for all variables surpassed 0,5, indicating a substantial correlation between the indicators and the measured constructs in contrast to other latent factors [13].

Furthermore, the HTMT values between constructs were examined to assess discriminant validity. It is important to ensure that HTMT values are below 1 to maintain discriminant validity. Based on Table 4, the HTMT values for each correlation between constructs were below 1, indicating that the research model exhibits good validity.

Structural model

The results revealed a significant association between smartphone addiction and academic procrastination (β=0,124, p<0,01) as well as SRL (β=–0,337, p<0,001), while no significant correlation was observed with self-esteem (β=–0,065, p>0,05). SRL exhibited a significant correlation with academic procrastination (β=–0,386, p<0,001), along with religiosity (β=-0,200, p<0,001) and self-esteem (β=–0,444, p<0,001). Religiosity displayed a significant correlation with SRL (β=0,344, p<0,001) and self-esteem

Table 2

Correlation coefficients between variables (N=512)

	1	2	3	4	5	6	7	8	9	10	11	12	13
SA	1												
IS	–.212***	1											
IM	–.236***	.324***	1										
IH	–.245***	.288***	.311***	1									
SE	–.211***	.302***	.302***	.278**	1								
MS	–.225***	.232***	.214***	.267***	.322***	1							
GS	–211***	.212***	.256***	.232***	.278***	.278***	1						
SEV	–.289***	.233***	.220***	.219***	.298***	.323***	.267***	1					
SAS	–.277***	.276***	.209***	.278**	.319**	.321***	.323***	.288***	1				
LR	–.221***	.234***	.201***	.319***	.255***	.329***	.289***	.276***	.367***	1			
O	–.245***	.287***	.211***	.223***	.276***	.315***	.311***	.257***	.245***	.210***	1		
EST	–.255***	.235***	.246***	.216***	.336***	.289***	.223***	.269***	.302***	.223***	.331***	1	
AP	.231***	–.267***	–.283***	–.317***	–.281**	–.311***	–.317***	–.311***	–.283***	–.378***	–.278***	–.315***	1

Notes: SA = Smartphone Addiction; IS = Islam; IM = Iman; IH = Ihsan; SE = Self-Esteem; MS = Memory Strategy; GS = Goal Setting; SEV = Self Evaluation; SAS = Seeking Assistance; LR = Learning Responsibility; O = Organizing; EST = Environment Structuring; AP = Academic Procrastination; * — p<0,05; ** — p<0,01; *** — p<0,001.

Table 3

Descriptive statistics, normality test, construct validity, and reliability (N=512)

Variables	M	SD	Kolmogorov-Smirnov test	Composite Reliability (CR)	Average Variance Extracted (AVE)
Smartphone addiction	23,972	6,704	0,011	0,949	0,630
Religiosity	35,307	3,372	0,113	0,922	0,603
Self-esteem	35,602	4,967	0,061	0,967	0,549
Self-regulated learning	162,041	28,474	0,125	0,984	0,526
Academic procrastination	30,514	12,972	0,035	0,980	0,756

Table 4

Discriminant validity testing: Heterotrait-Monotrait ratio (HTMT)

Variables	1	2	3	4	5
Religiosity					
Academic procrastination	0,817				
Smartphone addiction	0,849	0,891			
SRL	0,834	0,868	0,794		
Self-esteem	0,888	0,894	0,858	0,819	

(β=0,166, p<0,01). Furthermore, the relationship between smartphone addiction and academic procrastination, mediated by SRL, was found to be significant (β=0,070, p<0,001), as was the mediation of the relationship between religiosity and academic procrastination by SRL (β=0,087, p<0,001) and self-esteem (β=0,101, p<0,001). However, the research did not yield significant evidence supporting self-esteem as a mediator in the relationship between smartphone addiction and academic procrastination (β=0,017, p>0,05) (refer to Table 5).

Table 5

Path Coefficient and Hypothesis Assessment of Direct and Indirect Paths

Path	Direct effect		Indirect effect	
	β	t–value	β	t–value
SRL → AP	–0,386	9,163**		
SE → AP	–0,444	8,636***		
SA → AP	0,124	2,806**		
RSY → AP	–0,200	4,909***		
SA → SRL	–0,337	6,011***		
SA → SE	–0,065	1,347		
RSY → SRL	0,344	5,970***		
RSY → SE	0,166	2,820**		
SA → SRL → AP			0,070	3,705***
SA → SE → AP			0,017	1,315
RSY → SRL → AP			0,087	4,166***
RSY → SE → AP			0,101	4,322***

Notes: SA = Smartphone addiction; RSY = Religiosity; SE = Self-esteem; SRL = Self-regulated learning; AP = Academic procrastination; ** — p<0,01; *** — p<0,001.

Discussion

The hypothesis testing conducted in this study confirmed a significant negative relationship between SRL and academic procrastination. Procrastination, as identified by Zhao et al. is a widespread issue related to a deficiency of self-regulation, leading to delays in the completion of crucial tasks [49]. A study also revealed a negative correlation between goal setting, decision making, designated study areas, learning procedures, and procrastination [39]. Previous research has shown that procrastinating students lack time management and goal-setting skills in the forethought phase [42]. Additionally, studies have linked procrastination to maladaptive motivation and behavioural characteristics described in the SRL literature [22].

This study highlights the relationship between self-esteem and academic procrastination. High self-esteem is associated with a lower likelihood of academic procrastination [43]. Another study found that self-esteem negatively predict academic procrastination [2]. Yang et al. also discovered that self-esteem negatively predicts initial levels of academic procrastination and positively predicts the increasing trend, while a negative trend in self-esteem predicts the increasing trend of academic procrastination [43]. Self-esteem was measured as positive self-assessment, and a negative relationship with academic procrastination was found in another study [18]. Individuals with high self-esteem and belief in their abilities tend to have lower levels of academic procrastination [11].

This research also investigates the relationship between smartphone addiction and academic procrastination. Prior analyses have indicated that individuals with smartphone addiction tend to have higher levels of academic procrastination [21; 23]. Excessive smartphone use may affect time management and prioritization of academic tasks. Correlation analysis has also found a positive association between the two variables [21]. Internet addiction has been related to academic procrastination, as the internet can distract from the learning process [6; 10]. Furthermore, smartphone addiction is associated with other procrastination behaviors and impairs the quality of life. Smartphone addiction is associated with bedtime procrastination, leading to delayed sleep [44].

This study demonstrates that religiosity has a significant negative relationship with academic procrastination. Previous research consistently indicates that individuals with higher levels of religiosity manage to engage in less academic procrastination [46]. Specifically, Madjid et al. conducted a study that elucidated how religious characteristics, such as discipline, responsibility, and respect for time, can aid in reducing academic procrastination [25]. Religion provides immediate motivation and encouragement to complete academic tasks [16]. The influence of religious values on fulfilling responsibilities and adhering to moral principles explains why individuals may feel compelled by their beliefs to avoid procrastination [12].

This study discovered that SRL has a significant role in the relationship between smartphone addiction and academic procrastination. This result is compatible with several previous investigations. For instance, a study on 228 students with disabilities found that SRL mediated the relationship between smartphone addiction and academic procrastination [8]. Specifically, time management and learning strategies were identified as mediators between smartphone addiction and academic procrastination among college students [23]. Dysfunctional behaviors were also found to have an indirect effect on academic procrastination through self-esteem [18]. Students who excessively use smartphones tend to procrastinate on their academic tasks and struggle with organizing their learning [8]. Moreover, SRL has been found to mediate the relationship between smartphone addiction and other factors such as sleep quality and academic achievement [48].

In contrast, we found no evidence that self-esteem mediates the relationship between smartphone addiction and academic procrastination. The absence of self-esteem's role in the relationship between smartphone addiction and academic procrastination may be attributed to

various reasons, one of which is that other factors may exert a stronger impact on this relationship. In a separate study, it was observed that academic self-efficacy partially acts as a mediator in the link between smartphone addiction and academic procrastination [21]. However, previous studies propose that self-esteem could serve as a mediator in the connection between smartphone addiction and depressive as well as hyperactive temperament [47].

Our study also established the significant mediating role of self-esteem between religiosity and academic procrastination. Existing research has consistently shown that higher levels of religiosity are negatively correlated with academic procrastination, indicating that individuals with stronger religious beliefs tend to show more increased levels of self-esteem [9; 17]. Conversely, investigations have indicated a negative association between high self-esteem and academic procrastination, indicating that individuals with higher levels of self-esteem tend to engage in lower levels of academic procrastination [18; 43]. The mediating role of self-esteem in the relationship between religiosity and other psychological variables has also been observed in prior studies. For instance, Craig et al. revealed that self-esteem mediates the relationship between spirituality and positive and negative affect [3].

We also established that SRL mediates the relationship between religiosity and academic procrastination, which aligns with previous research findings. A study involving university employees demonstrated that self-regulation significantly mediates the association between religiosity and punctuality [38]. Additionally, locus of control, prayer style, and self-regulatory processes may mediate the relationship between religiosity and academic procrastination [46]. The study suggests that individuals with religious beliefs may view their challenges as under God's control, offering them an alternative sense of control that helps reduce self-regulation difficulties and overcome procrastination [46]. Furthermore, existing literature highlights the crucial role of self-regulation in mediating various procrastination-related relationships. For example, self-regulation has been recognized as a mediator in the connection between emotional balance, self-regulatory competence, and procrastination tendencies [5]. Additionally, self-regulation serves as a mediator between attitudes toward time and procrastination, with individuals adjusting their behavior according to their anticipations of future outcomes [41].

This research has several limitations. The measurements were conducted cross-sectional, providing only a snapshot of the respondents' conditions without capturing long-term effects. Future studies should consider longitudinal measures for more comprehensive results. Furthermore, this research exclusively concentrated on investigating the correlation between smartphone addiction, self-esteem, SRL, and academic procrastination. It is crucial to explore the relationship between academic procrastination with learning achievement, competitive spirit, inferiority complex, and intention to quit school for a more comprehensive understanding. Additionally, there may be other mediating factors not considered in this study.

Conclusion and Implications

This research is designed to investigate the impact of smartphone addiction and religiosity on academic procrastination mediated by self-esteem and SRL. The results confirmed that self-esteem and SRL act as mediators between religiosity and academic procrastination. SRL also mediates the relationship between smartphone addiction and academic procrastination, whereas the mediating effect of self-esteem in these relationships is not significant. In addition to theoretical contributions, this study provides practical insights for campus counselors and college educators to address academic procrastination. Counselors should prioritize interventions focusing on smartphone addiction among college students. Furthermore, religious approaches, particularly in Indonesia where Islamic practices are effective, can be utilized [31]. The research underscores the role of self-esteem and SRL as mediators in the relationship between religiosity and academic procrastination, highlighting the need for intervention programs that enhance these factors among students.

Data Availability

The researchers ensure the availability of the research data. The dataset underpinning the findings of this study is publicly accessible on Mendeley Data at http://doi.org/10.17632/46rrkz8jky.1 [34].

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