Vol. 4, No. 1, 2024, pp. 16-25
DOI: https://doi.org/10.32698/017619

Asian Journal of Islamic Studies and Society
ISSN: 2807-2758 (Print) ISSN: 2807-3495 (Electronic)
Journal homepage: http://journal.redwhitepress.com/index.php/ajiss

Digital culture and anxiety among generation z: the mediating role of social media addiction

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Article Info

Article history:

Received Jan 14th, 2024
Revised Feb 20th, 2024
Accepted Jun 29th, 2024

Keyword:

Anxiety
Digital culture
Generation z
Islamic guidance and counseling student
Social media addiction

ABSTRACT

Digital culture now shapes how Generation Z communicates, studies, and manages everyday relationships, and concern about its psychological cost has grown alongside it. This study asks whether digital culture raises anxiety among Islamic Guidance and Counseling (BKI) students, and whether social media addiction accounts for part of that relationship. Working from Uses and Gratifications Theory, Media Dependency Theory, Social Comparison Theory, and a cognitive-behavioral perspective, we tested a mediation model with 220 BKI students (59.5% female; most aged 21 to 23) at Universitas Islam Negeri Sultan Syarif Kasim Riau, Indonesia. Participants completed a 45-item Likert questionnaire (15 items per construct) delivered online over four weeks. Analysis used partial least squares structural equation modeling (PLS-SEM) in SmartPLS 4, and the indirect effect was estimated through bias-corrected bootstrapping with 5,000 subsamples. The measurement model met all reliability and validity criteria, and the structural model fit the data well (SRMR = 0.052). Digital culture predicted social media addiction ($\beta = 0.650$, 95% CI [0.556, 0.744], $f^2 = 0.735$) and anxiety ($\beta = 0.298$, CI [0.174, 0.422]). Social media addiction predicted anxiety ($\beta = 0.462$, CI [0.342, 0.582]) and partially mediated the digital culture–anxiety link (indirect $\beta = 0.300$, CI [0.212, 0.388]), carrying about half of the total effect (50.3%). The model explained 42.3% of the variance in social media addiction and 51.8% in anxiety. For Islamic counseling, the pattern argues for interventions that address the cultural pressures behind compulsive use, not symptoms alone, with the principle of wasatiyyah (moderation) offering a culturally grounded frame for that work.

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Introduction

Generation Z, those born roughly between 1997 and 2012, grew up with smartphones, algorithmic feeds, and always-on messaging as ordinary features of daily life rather than novelties (Leal-Rodríguez et al., 2023; Kwilinski et al., 2024). Indonesia counts more than 167 million active social media users, and university students in the country report well over six hours of screen time per day (Nurain et al., 2024). For this generation, platforms are less a tool than an environment: a set of habits, expectations, and norms that organize how people talk to one another, present themselves, and gauge their own lives against what they see (Sobande et al., 2022). We treat digital culture, accordingly, as the everyday pattern of routine online interaction, digital-first communication, virtual participation, and reliance on digital tools. That definition is deliberate, because it maps onto the indicators the study actually measures and keeps the construct separate from the simple frequency of use.

Inside that environment, social media addiction has come to be understood as use that is excessive, compulsive, and hard to control, with real costs to functioning (Tandon et al., 2021; Al-Samarraie et al., 2022;

Sheinov, 2021). Two features of platform design feed it: the constant availability of social comparison, and the fear of missing out (FoMO) that comes from seeing others' curated lives in real time (Hayran & Anik, 2021; Bhalla et al., 2024). Both create conditions in which checking becomes habitual and worry follows.

Students in the Islamic Guidance and Counseling (BKI) program at Universitas Islam Negeri Sultan Syarif Kasim Riau make this tension concrete. They are trained to recognize and respond to psychological distress in others, yet they live inside the same digital culture as everyone else their age. Program staff have noted a recurring pattern among these students during advising and practicum supervision: trouble concentrating, sleep that is broken by late-night phone checking, and exam-period worry that students themselves connect to time spent online (Zatrahadi et al., 2023). The case matters because it sits at an intersection the international literature has mostly ignored, where religious identity, counseling training, and heavy digital immersion meet in the same person.

Research gap and contribution

Three gaps motivate the study. First, much research uses "social media use" and "digital culture" interchangeably, although the first is a behavior and the second a broader orientation; few studies operationalize digital culture as a measurable construct distinct from how often someone logs on. Second, evidence on whether social media use raises anxiety is genuinely mixed. Some studies report a direct effect, while others find the link weakens or disappears once compulsive use is taken into account, which points to an unexamined mechanism rather than a simple direct path (Sun & Zhang, 2021). Third, almost all of this work comes from Western, largely secular settings. The Indonesian Islamic higher-education context is close to absent from the international record (Zatrahadi et al., 2023).

This study responds on three fronts. It operationalizes digital culture as a multidimensional construct rather than a usage count. It positions social media addiction as the mechanism that connects cultural immersion to anxiety, and tests that role directly. And it reads the findings through the lens of Islamic counseling, where the concept of wasatiyyah, or moderation, offers a culturally grounded way to interpret and address compulsive engagement. The Islamic context here is not only a place to collect data; it supplies an interpretive and practical frame that existing models leave out.

Theoretical framework

Four theories anchor the model, and they are most useful read as one chain rather than four separate accounts. Uses and Gratifications Theory describes the entry point: people turn to platforms to meet needs for belonging, information, and self-expression, and when a culture treats constant connectivity as normal, those gratifications stop feeling optional (Tandon et al., 2021). Media Dependency Theory takes the next step, explaining how repeated reliance hardens into dependency once stepping away carries a social cost (Bekman, 2022). Social Comparison Theory specifies what that dependency keeps exposing users to, namely a stream of upward comparisons that wears down self-evaluation (Shabbir, 2023). The cognitive-behavioral view closes the loop by showing how those comparisons and the fear of missing out settle into recurring anxious thoughts (Groenestein et al., 2024; Zhu et al., 2024). Sun and Zhang's (2021) synthesis of addiction models supports the central move of the study, which is to treat compulsive use as the pivot between cultural exposure and psychological strain.

Hypotheses

Because digital culture normalizes constant availability, students immersed in it carry a stronger internalized pressure to stay connected, which we expect to surface as compulsive use. Compulsive use, in turn, repeatedly exposes people to upward comparison and interrupts rest and attention, the conditions the cognitive-behavioral literature ties to anxious rumination. Cultural immersion may also raise anxiety on its own, through always-on expectations and identity-management pressure that operate even short of clinically compulsive use. If addiction is the main route from culture to anxiety, its indirect path should carry a substantial share of the total effect. These expectations yield four hypotheses:

H1. Digital culture positively influences social media addiction among Generation Z students.

H2. Social media addiction positively influences anxiety among Generation Z students.

H3. Digital culture positively influences anxiety among Generation Z students.

H4. Social media addiction mediates the relationship between digital culture and anxiety among Generation Z students.

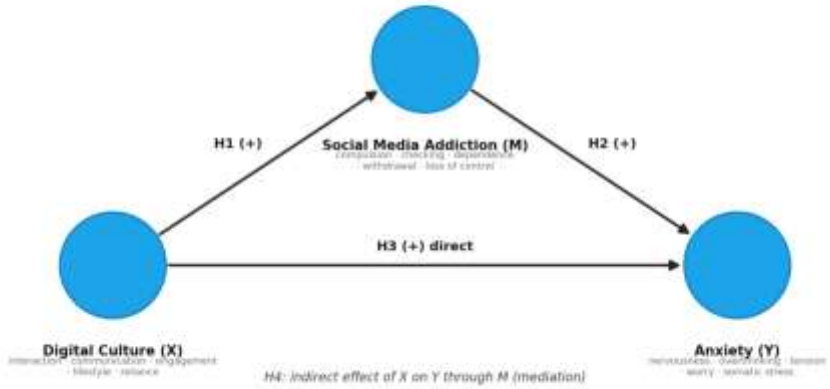

Figure 1. Conceptual framework: constructs, indicators, and research hypotheses (SmartPLS diagram style).

Method

Research design

The study uses an explanatory, cross-sectional quantitative design analyzed with PLS-SEM. The method suits the work for several reasons: the model is a mediation chain with a latent mediator, Likert data of this kind rarely meet multivariate normality, the sample is moderate, and the aim is both to explain and to predict rather than to confirm a fixed covariance structure (Hair et al., 2022). PLS-SEM has been applied to comparable social-science questions in the Indonesian setting (Wingdes, 2019; Nazaina et al., 2023; Lumbanraja & Lumbanraja, 2023). All analyses were run in SmartPLS 4.

Population, sampling, and participants

The study was conducted in the BKI program of the Faculty of Dakwah and Communication at UIN Sultan Syarif Kasim Riau, which enrolled approximately 540 active students across cohorts at the time of data collection. Participants were drawn by purposive sampling against five inclusion criteria: active enrollment in the BKI program, membership in Generation Z (operationally, birth years 1997 to 2012), active social media use, daily use of a digital device, and voluntary consent. Of 286 students who opened the questionnaire, 241 submitted responses (an 84.3% response rate), and 220 complete cases were retained after 21 responses were removed for being incomplete or showing careless patterns such as straight-lining or a failed attention check.

The final sample of 220 comfortably exceeds the relevant minimums for PLS-SEM. The ten-times rule based on the largest number of structural paths pointing at any construct gives a floor of 20, and an inverse-square-root power calculation for a smallest expected path of 0.2 at 80% power and $\alpha = .05$ requires about 155 cases (Hair et al., 2022). Respondent characteristics appear in Table 2.

Table 1. Research variable framework, dimensions, and indicators.

Variable	Dimensions	Indicators	Items
Digital Culture (DC, exogenous)	Online interaction intensity; digital communication habits; virtual engagement; digital lifestyle; reliance on digital interaction	DC1–DC3 frequency of online social interaction; DC4–DC6 preference for digital communication; DC7–DC9 virtual community participation; DC10–DC12 digital-first lifestyle; DC13–DC15 reliance on digital tools	15 (Likert 1–5)

Variable	Dimensions	Indicators	Items
Social Media Addiction (SMA, mediator)	Compulsive use; excessive checking; emotional dependence; withdrawal; loss of control	SMA1–SMA3 inability to control frequency; SMA4–SMA6 repetitive checking; SMA7–SMA9 emotional reliance; SMA10–SMA12 discomfort when access is restricted; SMA13–SMA15 failure to regulate duration	15 (Likert 1–5)
Anxiety (ANX, endogenous)	Nervousness; overthinking; emotional tension; worry; somatic stress	ANX1–ANX3 nervousness and restlessness; ANX4–ANX6 persistent intrusive thoughts; ANX7–ANX9 physical and emotional tension; ANX10–ANX12 worry about the future; ANX13–ANX15 somatic stress responses	15 (Likert 1–5)

Table 2. Respondent demographic characteristics (n = 220).

Characteristic	Category	n	%
Gender	Male	89	40.5
	Female	131	59.5
Age	18–20 years	74	33.6
	21–23 years	112	50.9
	24–25 years	34	15.5
Academic year	1st–2nd year	98	44.5
	3rd–4th year	122	55.5
Daily social media use	< 3 hours	31	14.1
	3–6 hours	103	46.8
	> 6 hours	86	39.1
Primary platform	Instagram / TikTok	143	65.0
	WhatsApp / Telegram	55	25.0
	Twitter (X) / YouTube	22	10.0
Total		220	100

Instrumentation

The questionnaire contained 45 self-report items answered on a five-point Likert scale, with 15 items per construct. Items for digital culture were adapted from Leal-Rodríguez et al. (2023) and Kwilinski et al. (2024); items for social media addiction were drawn from Tandon et al. (2021) and Dalvi-Esfahani et al. (2019); and the anxiety items were developed from the generalized-anxiety symptom domains of nervousness, intrusive worry, and somatic tension within the cognitive-behavioral framework that informs the study (Groenestein et al., 2024; Zhu et al., 2024).

The English source items were translated into Indonesian and back-translated by two bilingual experts, and the two versions were reconciled by the research team. Five expert judges, three counseling academics and two psychometricians, rated each item for relevance and clarity. Items were retained when Aiken's V reached 0.80 or above, and the overall content validity index was 0.92. A pilot with 30 students not included in the main sample produced Cronbach's alpha above 0.80 for every construct. Sample items read, for digital culture, "I prefer to communicate through social media rather than face to face"; for social media addiction, "I check my social media accounts even when I know there is nothing new"; and for anxiety, "I feel restless when I think about the things I still have to do."

Data collection and ethical procedures

Data were collected over four weeks in March and April 2025 through an online form distributed in class group chats with the permission of the relevant lecturers. The median completion time was about eleven minutes. To reduce self-report and common-method bias, the form opened with a neutral cover statement, guaranteed anonymity, separated the predictor and outcome blocks, and included reverse-worded and attention-check items, following established procedural remedies. The study was approved by the research ethics committee of the Faculty of Dakwah and Communication at UIN Sultan Syarif Kasim Riau (approval no. [INSERT]). Consent was obtained on the first screen, participation was voluntary, and responses were anonymized and stored securely.

Data screening and analysis

Because the online form required an answer to every item, the dataset had no missing values. Mahalanobis distance flagged no extreme multivariate outliers beyond the careless responses already removed, and the data departed from normality as expected for Likert measures, which is consistent with the choice of PLS-SEM. The two-stage protocol of Hair et al. (2022) was applied. In the measurement stage, indicators were required to load at 0.708 or higher, composite reliability and Cronbach's alpha at 0.70 or higher, and average variance extracted (AVE) at 0.50 or higher; discriminant validity was checked with the Fornell-Larcker criterion, the heterotrait-monotrait ratio (HTMT < 0.85), and an inspection of cross-loadings. In the structural stage, collinearity was assessed by VIF (< 3.3), path coefficients were estimated by two-tailed bootstrapping with 5,000 subsamples at $\alpha = .05$, and the model was evaluated with R^2, effect sizes (f^2), predictive relevance (Q^2 from blindfolding), and approximate fit (SRMR < 0.08). Mediation was tested through the indirect effect with a 95% bias-corrected confidence interval, and the proportion of the total effect carried by the indirect path was computed. Common-method bias was examined with full-collinearity VIF and Harman's single-factor test.

Results and Discussions

Measurement model

The measurement model met every criterion. All 45 indicator loadings fell between 0.803 and 0.872, above the 0.708 threshold, and each indicator loaded most strongly on its own construct in the cross-loading matrix. Composite reliability and Cronbach's alpha were high for all three constructs, and AVE exceeded 0.50 in each case, confirming convergent validity. Table 3 summarizes these results, and the full per-item loadings are reported in Appendix A.

Table 3. Measurement model: reliability and convergent validity.

Construct	Items	Loading range	CR	Cronbach's α	AVE
Digital Culture	15	0.803–0.864	0.963	0.960	0.683
Social Media Addiction	15	0.812–0.872	0.972	0.970	0.726
Anxiety	15	0.805–0.861	0.960	0.957	0.665

Discriminant validity held under both standards in current use. In the Fornell-Larcker matrix (Table 4), the square root of each construct's AVE on the diagonal exceeded its correlations with the other constructs. The HTMT ratios (Table 5) were all well below the conservative 0.85 cutoff. Together these results show that the three constructs are empirically distinct, which matters here because digital culture and social media addiction are conceptually close and a reader could reasonably worry they are the same thing measured twice. They are not.

Table 4. Discriminant validity: Fornell-Larcker criterion.

	DC	SMA	ANX
Digital Culture (DC)	0.826		
Social Media Addiction (SMA)	0.650	0.852	
Anxiety (ANX)	0.598	0.656	0.815

Note. Diagonal values (bold in the final version) are the square root of AVE; off-diagonal values are latent-variable correlations.

Table 5. Discriminant validity: heterotrait-monotrait ratio (HTMT).

	DC	SMA	ANX
Digital Culture (DC)	—		
Social Media Addiction (SMA)	0.731	—	
Anxiety (ANX)	0.614	0.688	—

Common-method bias did not appear to be a serious concern. Full-collinearity VIF values stayed below 3.3, and Harman's single-factor test attributed 34.7% of the variance to the first unrotated factor, under the 50% guideline. The complete outer model is shown in Figure 2.

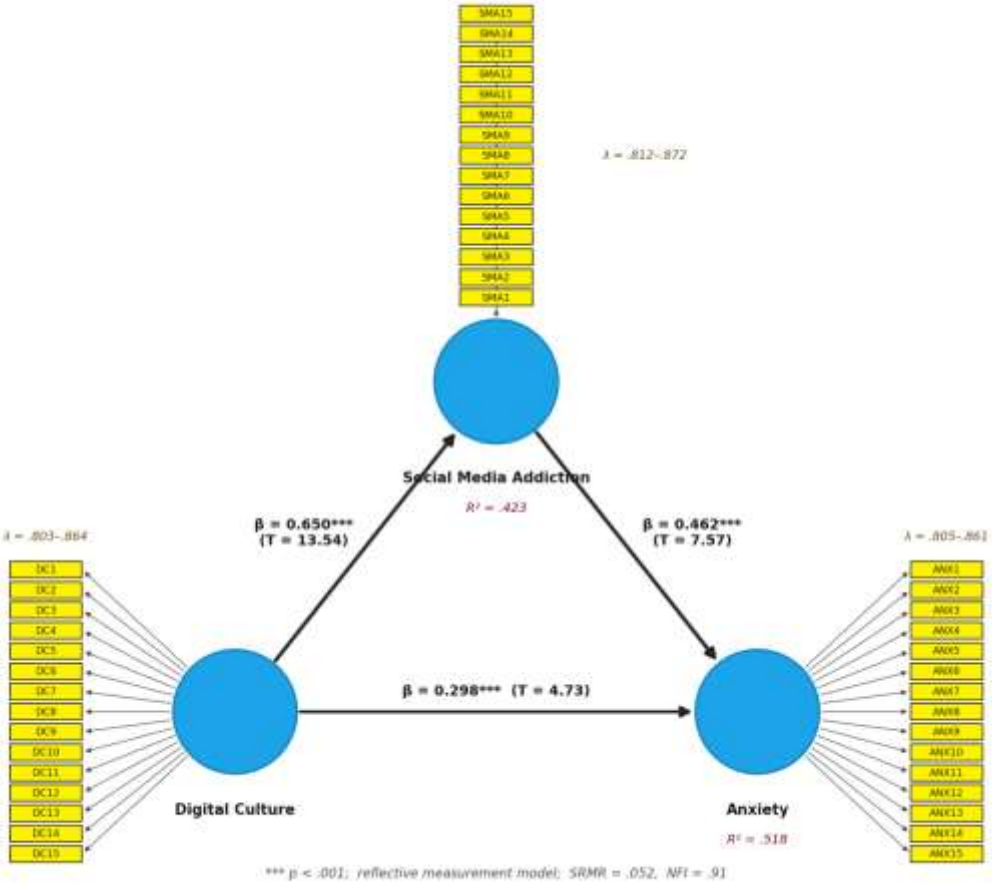

Figure 2. SEM-PLS path model: standardized coefficients, outer loadings, R^2, and hypothesis labels.

Structural model

Collinearity among predictors was low, with inner VIF values between 1.73 and 2.14. The model explained a meaningful share of variance in both endogenous constructs, and blindfolding returned positive Q^2 values, indicating predictive relevance (Table 6). Effect sizes told a clear story about where the action is: digital culture had a large effect on social media addiction ($f^2 = 0.735$), social media addiction had a medium-to-large effect on

anxiety ($f^2 = 0.236$), and the direct effect of digital culture on anxiety was small-to-medium ($f^2 = 0.118$). In other words, the strongest single relationship in the model is the cultural push toward compulsive use, not the direct cultural push toward anxiety.

Table 6. Coefficient of determination (R^2) and predictive relevance (Q^2).

Endogenous construct	R^2	Adjusted R^2	Q^2	Interpretation
Social Media Addiction	0.423	0.420	0.287	Moderate
Anxiety	0.518	0.513	0.332	Moderate to strong

The structural model showed acceptable approximate fit, with SRMR = 0.052 (below the 0.08 guideline) and NFI = 0.91. All four hypotheses were supported (Table 7). The path from digital culture to social media addiction was strong ($\beta = 0.650$, $T = 13.542$, $p < .001$), the path from social media addiction to anxiety was substantial ($\beta = 0.462$, $T = 7.573$, $p < .001$), and the direct path from digital culture to anxiety remained significant ($\beta = 0.298$, $T = 4.730$, $p < .001$). Each confidence interval excluded zero.

Table 7. Path coefficients and hypothesis testing.

H	Path	β	SE	T	p	95% CI	Decision
H1	DC → SMA	0.650	0.048	13.542	< .001	[0.556, 0.744]	Supported
H2	SMA → ANX	0.462	0.061	7.573	< .001	[0.342, 0.582]	Supported
H3	DC → ANX	0.298	0.063	4.730	< .001	[0.174, 0.422]	Supported
H4	DC → SMA → ANX	0.300	0.045	6.667	< .001	[0.212, 0.388]	Supported

Mediation analysis

The mediation test confirmed that social media addiction carries much of the relationship between digital culture and anxiety. The indirect effect was positive and significant ($\beta = 0.300$, 95% CI [0.212, 0.388]), and because the direct effect stayed significant, the result is partial rather than full mediation (Table 8). The indirect path accounted for 50.3% of the total effect (0.300 of 0.598). Reading those numbers substantively, roughly half of digital culture's influence on anxiety travels through compulsive use, while the other half reaches anxiety by routes the model does not name. The figure 3 presents the bootstrapped mediation paths.

Table 8. Mediation analysis (bootstrapping, 5,000 subsamples).

Effect	β	SE	T	95% CI lower	95% CI upper
Direct (DC → ANX)	0.298	0.063	4.730	0.174	0.422
Indirect (DC → SMA → ANX)	0.300	0.045	6.667	0.212	0.388
Total (DC → ANX)	0.598	0.051	11.725	0.498	0.698
Mediation type	Partial				

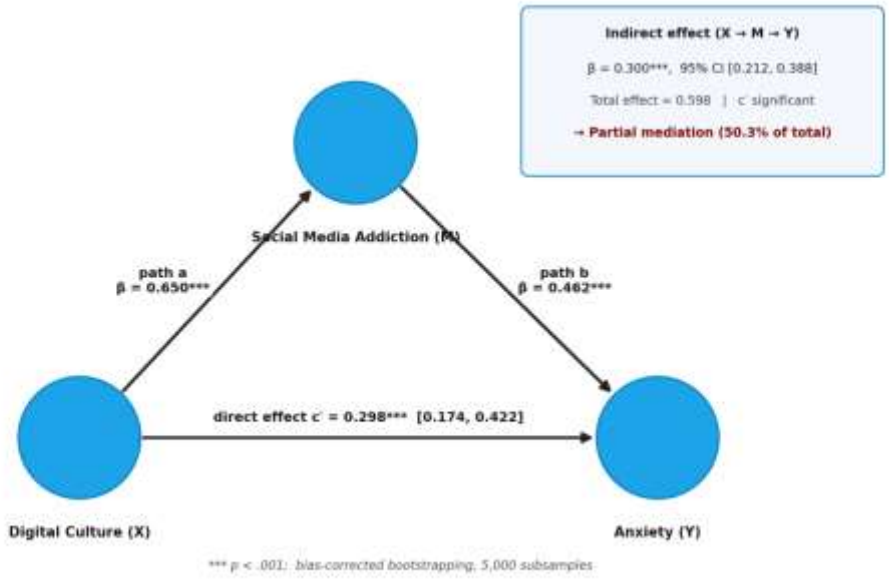

Figure 3. Mediation analysis: bootstrapped path coefficients, indirect effect, and confidence interval (5,000 subsamples).

Digital culture as a driver of compulsive use

The large effect of digital culture on social media addiction is the clearest finding in the study, and it extends earlier work in a specific way. Most prior research links discrete behaviors, such as time spent or number of logins, to addiction (Tandon et al., 2021; Al-Samarraie et al., 2022). The present result suggests that the broader cultural orientation sits upstream of those behaviors: the shared expectation that one is always reachable and that important social life happens online appears to be a stronger antecedent of compulsive use than usage frequency alone. Uses and Gratifications Theory makes sense of this, because once a culture defines platforms as the normal channel for belonging and identity, the gratifications they offer become expected, and falling short of them produces the FoMO-driven discomfort that pulls users back (Hayran & Anik, 2021; Bhalla et al., 2024). Media Dependency Theory adds that, in such a setting, dependency is partly a rational adaptation: stepping away has social costs (Bekman, 2022). The Indonesian evidence on compulsive digital behavior among young people is consistent with this reading (Djamhari et al., 2024).

Social media addiction and anxiety

Social media addiction predicted anxiety substantially, in line with previous findings (Groenestein et al., 2024; Sheinov, 2021). The cognitive-behavioral account fits the mechanism well. Compulsive use means repeated exposure to algorithmically amplified upward comparison (Shabbir, 2023), which erodes self-efficacy and feeds anxious rumination, while the emotional-dependence dimension crowds out healthier coping. The interesting wrinkle in this sample is that BKI students are trained to spot exactly these processes in clients, yet the data show they are not exempt from them. That gap between professional knowledge and personal experience is itself worth attention, since it suggests that awareness of a mechanism does not, on its own, protect against it (Zatrahadi et al., 2023).

The mediating role of social media addiction

Partial mediation is the theoretically honest result here, and it says two things at once. First, compulsive use is a real and sizeable conduit: about half of digital culture's effect on anxiety runs through it. Second, the retained direct effect means culture also reaches anxiety by other routes, plausibly the cognitive load of fragmented attention (Zhu et al., 2024) and the chronic pressure of managing an online identity (Sobande et al., 2022). It would be tidier to claim full mediation, but the data do not support that, and the partial result is more useful for practice because it implies that reducing compulsive use will help without being a complete fix. The mixed direct-effect findings in the wider literature (Sun & Zhang, 2021) make more sense in light of this: studies that did not model the mediator were estimating a blend of these routes and getting unstable answers.

Limitations of inference

Three features of the design bound what can be claimed. The cross-sectional data cannot establish temporal order, so the causal language above describes the theorized model rather than demonstrated causation. The reliance on self-report leaves room for common-method variance, although the procedural remedies and the Harman result suggest it is limited. And the single-institution, single-program sample means the estimates describe BKI students at one university rather than Generation Z in general, which is the population the constructs ultimately concern.

Conclusions

Returning to the gaps that opened the study, the results offer a clear answer to each. Digital culture, operationalized as a measurable orientation rather than a usage count, does raise anxiety among BKI students at UIN Sultan Syarif Kasim Riau, and social media addiction carries about half of that effect as a partial mediator. The mixed direct-effect findings in earlier work look less puzzling once the mediator is in the model, which is the study's main theoretical contribution: it locates compulsive use as the pivot between cultural immersion and psychological strain, and shows the value of separating digital culture from frequency of use.

The practical contribution is specific to Islamic counseling. Because the strongest lever in the model is the cultural pressure toward compulsive use, interventions that treat only symptoms will leave the upstream driver untouched. More promising is a layered approach: brief psychoeducation that names social comparison, FoMO, and algorithmic design so students can recognize them; cognitive-behavioral techniques to interrupt anxious rumination; and a framing built on wasatiyyah, the Islamic principle of moderation, which gives students a values-based reason to set limits rather than an externally imposed rule. Digital behavior change methods provide a usable template for delivering such programs at scale (Martín-Martín et al., 2021; Zhang et al., 2024). For BKI students specifically, building digital well-being content into the counseling curriculum would let them work on their own use while learning to help clients with theirs.

Future research should test these claims with stronger designs. Longitudinal data would let researchers establish the temporal order the present study can only assume, and multi-source data, for example screen-time logs alongside self-report, would reduce common-method concerns. Theoretically relevant moderators left out here, in particular religiosity, offline social support, and academic self-efficacy, deserve direct examination, since they may buffer the paths the model describes. Finally, intervention studies should evaluate whether wasatiyyah-framed digital well-being programs actually lower compulsive use and anxiety in this population, which is the question that matters most for practice.

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