

Mechanism Analysis of the Decline in Students' Classroom Engagement Under the Context of Instant Gratification Culture (Short-Video Proliferation): A Reflection on Traditional Classroom Teaching Models

Lu Baohong

Department of Inclusive Education, ShinHan University, Gyeonggi-do, South Korea

ABSTRACT: Against the backdrop of the increasing prevalence of instant gratification culture, represented by short-video platforms, the continuous decline in students' classroom engagement has emerged as a severe and shared challenge in global education. The present study aims to conduct an in-depth analysis of the complex psychological mechanisms underlying this phenomenon and to critically reflect on the adaptability of traditional classroom teaching models. To this end, we construct and empirically test an integrated model incorporating **chain mediation** and **multiple moderation**, systematically examining how instant gratification culture—operationalized through indicators such as short-video use intensity and attention fragmentation—affects students' classroom engagement.

The core assumption of the model is that instant gratification tendency does not directly lead to a decline in classroom engagement; rather, its influence operates through a sequential chain mediation pathway: (1) weakening students' **attention control capacity**, (2) subsequently reducing their **cognitive stamina**, and (3) ultimately inducing **learning expectation bias** (e.g., a preference for entertainment-oriented learning and a demand for immediate feedback), thereby resulting in diminished classroom engagement. In addition, the study introduces three key moderating variables to explore the boundary conditions of this mechanism. Specifically, we hypothesize that **classroom teaching characteristics** (e.g., interaction frequency and instructional pace), **individual self-regulation capacity**, and **peer influence** play moderating roles at different stages of the chain mediation process, either amplifying or attenuating the negative effects.

A quantitative research design is employed, using questionnaire data collected from a large sample of university students. Data are analyzed using **structural equation modeling (SEM)** and **chain mediation analysis** techniques. The expected findings will reveal the complete pathway through which instant gratification culture influences classroom engagement and clarify how different instructional contexts and individual characteristics moderate this process.

The theoretical contribution of this study lies in the construction of a complex, multi-level, and multi-path model, which substantially deepens the understanding of the internal mechanisms underlying changes in students' learning behaviors in the digital age. At the practical level, the findings move beyond traditional approaches that merely attempt to "block" short videos, offering educators systematic intervention strategies and pedagogical reform recommendations from multiple dimensions—such as reshaping instructional models, cultivating students' cognitive capacities, and fostering positive peer cultures—to address the challenges that instant gratification culture poses to deep learning.

KEYWORDS: instant gratification culture; short video; classroom engagement; attention control; cognitive stamina; learning expectation bias; reflection on teaching models; chain mediation

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1. INTRODUCTION

With the exponential development and widespread adoption of mobile internet technologies, we have entered an era characterized by algorithm-driven systems in which instant feedback and sensory stimulation constitute the core features—an era commonly referred to as **Instant Gratification Culture**. Short-video applications, such as TikTok and Reels, with their “short, flat, and fast” content formats and highly precise personalized recommendation mechanisms, have deeply penetrated the daily lives of contemporary university students. These platforms have become primary channels not only for information acquisition and entertainment but also for social interaction [1].

With unprecedented intensity and breadth, this culture is reshaping the cognitive habits, attentional patterns, and value orientations of the younger generation. However, when a cultural logic that emphasizes immediacy, ease, and high-intensity stimulation encounters traditional classroom learning—which requires delayed gratification, sustained effort, and deep thinking—a profound conflict emerges. Educators have widely observed that contemporary students increasingly exhibit attention dispersion, impatience, superficial thinking, and intolerance toward traditional teaching models in classrooms. These manifestations ultimately converge into a deeply concerning core phenomenon: the **systematic decline in students' classroom engagement**[2].

Classroom engagement, as a multidimensional construct encompassing students' behavioral, cognitive, emotional, and volitional involvement, is a core indicator for evaluating the quality of the learning process and predicting academic success. A decline in engagement not only signifies reduced instructional effectiveness but also foreshadows severe challenges in cultivating higher-order competencies such as critical thinking and complex problem-solving[3].

Initial responses to this dilemma have often focused on criticizing and restricting digital media such as short videos, epitomized by the so-called “digital heroin” discourse. However, simply attributing the problem to technology itself and attempting to resolve it through “blocking” strategies is not only impractical but also neglects the deeper psychological mechanisms and structural problems inherent in educational models. The decline in classroom engagement is not the result of a single factor; rather, it is a complex systemic issue arising from the combined effects of changing cognitive habits, misaligned internal psychological needs, and the maladaptation of traditional teaching models under the context of instant gratification culture[4-6].

Although existing research has begun to explore the relationship between digital media use and student learning, significant theoretical gaps remain. First, many studies focus on the direct relationships between short-video use and outcome variables such as academic performance or mental health, while lacking fine-grained investigations into the internal “black box” mechanisms. How exactly does instant gratification culture erode classroom engagement? Does its influence operate directly or indirectly? Second, existing models tend to be overly simplistic and fail to capture the **chain transmission effects of multiple mediating variables**. For example, how does the decline in attention—as a core affected cognitive function—further trigger deeper deterioration in cognitive stamina and ultimately distort students' learning expectations? This transmission chain from “surface-level attention” to “deep cognition” and then to “motivational attitudes” remains underexplored. Third, insufficient attention has been paid to boundary conditions. Clearly, not all students who engage heavily with short videos exhibit the same degree of decline in engagement. Which factors function as “buffers” or “amplifiers” in this process? Are they interactive teaching models, students' self-regulatory capacity, or peer environments? Addressing these moderating variables is critical for designing precise and effective interventions[7].

To systematically address these research gaps, the present study aims to construct and test a complex theoretical model incorporating chain mediation and multiple moderation, in order to deeply analyze the internal mechanisms underlying the decline in university students' classroom engagement under instant gratification culture. On this basis, the study further reflects on the adaptability and reform directions of traditional classroom teaching models. Specifically, the core research questions are as follows:

Exploration of the chain mediation mechanism: Does instant gratification tendency (represented primarily by short-video use) negatively affect classroom engagement through a chain mediation pathway of “weakened attention control → reduced cognitive stamina → induced learning expectation bias”?

Analysis of multiple moderating effects: At different stages of the chain mediation model, what moderating roles do classroom teaching characteristics (e.g., interactivity and pace), individual self-regulation capacity, and peer influence play? Can these factors effectively mitigate the negative impact of instant gratification culture?

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The theoretical value of this study lies in its attempt to move beyond simplistic descriptions of phenomena and single causal relationships. By constructing a multi-level, multi-path integrated model, it provides a more refined and dynamic analytical framework for understanding core issues in learning science in the digital age. This substantially enriches theoretical perspectives on the relationships among media use, cognitive psychology, and educational engagement[8].

At the practical level, the significance of this study is particularly profound. By revealing the complete psychological mechanism and key boundary conditions, the findings provide a scientific basis for educational reform, encouraging educators to shift from ineffective “technology blockade wars” toward a deeper “defense and upgrading of cognition and teaching models.” The study prompts reflection on how classroom experiences can be redesigned to compete with short videos for students' attention, how instructional activities can be structured to “reverse-train” students' cognitive stamina, and how students can be guided to develop more realistic and healthy learning expectations. Ultimately, this study aims to offer theoretically grounded and practically meaningful solutions for cultivating a new generation capable of maintaining focus and engaging in deep thinking in an era of information overload[9].

2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 The Rise of Instant Gratification Culture and Its Cognitive Imprint

Instant gratification culture is fundamentally characterized by the erosion of delayed gratification and the excessive valorization of immediate rewards. Although this concept is not entirely new, it has been dramatically amplified by algorithm-driven digital media—particularly short-video platforms—which are reshaping social psychology with unprecedented force. This influence is especially profound among younger generations whose cognitive patterns are still in a formative stage[10].

Short-video platforms employ meticulously designed mechanisms such as “filter bubbles” and “behavioral addiction” to provide users with an endless stream of highly condensed sensory and emotional stimulation. Their content presentation exhibits several salient characteristics: **extreme fragmentation** (typically ranging from 15 seconds to one minute), **high-intensity stimulation** (achieved through rapid editing, exaggerated sound effects, and strong visual impact), **instant feedback** (every swipe, like, or comment immediately triggers new content recommendations, forming a closed stimulus–response loop), and **low cognitive load** (most content is easy to understand and requires minimal logical reasoning or deep thinking)[11]. Prolonged immersion in such a media environment gradually alters individuals' cognitive habits, a process we refer to as a **cognitive imprint**. The most immediate impact is the reshaping of attentional patterns. According to the principle of neural plasticity, sustained information input patterns can alter brain structure and function. Individuals accustomed to frequent attentional switching within short-video streams experience a significant reduction in the threshold of **sustained attention**, making it difficult for them to concentrate for extended periods on single, low-stimulation tasks, such as listening to a traditional lecture. At the same time, **selective attention** may also be disrupted. When confronted with relatively monotonous academic content, the brain habitually seeks higher-intensity external stimulation, resulting in distraction and mind-wandering[12–15].

A second consequence is the deterioration of deep thinking ability. The “scrolling-based” information consumption mode promoted by short videos encourages shallow and discontinuous processing rather than systematic and critical elaboration. This habit suppresses both the motivation and capacity to activate higher-order cognitive functions (e.g., analysis, synthesis, and evaluation), leading to a decline in **cognitive stamina**. Cognitive stamina refers to the persistence of mental engagement and effort when individuals confront complex, abstract, or ambiguous cognitive tasks. When students become accustomed to receiving a “conclusion” or “punchline” within seconds, they increasingly struggle to tolerate the long-duration, uncertainty-laden intellectual exploration required by traditional learning[16].

Finally, instant gratification culture induces distortions in learning expectations. Once entertainment-oriented, instant-feedback experiences become normalized, students unconsciously transfer these expectations to learning contexts. They may expect classrooms to resemble short videos—filled with excitement and instant gratification—and anticipate immediate returns for every effort. They may also expect knowledge to be delivered in an effortless, entertaining manner. This **learning expectation bias** renders the necessary scaffolding, rigorous argumentation, and repetitive practice inherent in traditional classrooms intolerable. When the

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actual classroom experience diverges sharply from expectations shaped by digital media, negative emotions such as disappointment and boredom emerge, directly eroding emotional engagement[17].

2.2 A Chain Mediation Model of Declining Classroom Engagement

Based on the foregoing analysis, we argue that the negative impact of instant gratification culture on classroom engagement is not a simple direct process but rather a **chain mediation** process in which multiple psychological variables sequentially transmit effects. Accordingly, this study proposes a theoretical model consisting of three core mediating links, aiming to elucidate the complete pathway from external cultural influence to internal cognitive maladjustment and, ultimately, behavioral outcomes.

First Link: The Weakening of Attention Control Capacity

The first link of the model—and the initial point of impact of instant gratification culture—is the comprehensive weakening of students' **attention control capacity**. Attention control functions as the “gateway” and “central dispatcher” of the cognitive system, determining which information enters the core of cognitive processing and how cognitive resources are allocated. Long-term, high-intensity short-video use systematically impairs sustained and selective attention through its fragmented and highly stimulating characteristics. Therefore, we propose:

H1: Instant gratification tendency (represented by short-video use intensity) significantly and negatively predicts students' attention control capacity.

Second Link: The Decline of Cognitive Stamina

Attention constitutes the foundation of deep thinking. Individuals who cannot sustain attention are inherently unable to engage in prolonged, resource-intensive cognitive processing. Consequently, a decline in attention control capacity inevitably transmits to the second link of the model—the deterioration of **cognitive stamina**. Cognitive stamina can be understood as the “mental muscle” required to confront intellectual challenges. When attention is frequently interrupted, deep thinking processes cannot be initiated or maintained. Over time, students lose resilience in dealing with complex academic tasks, manifesting as superficial engagement and avoidance of difficulty. Thus, we hypothesize:

H2: Attention control capacity mediates the relationship between instant gratification tendency and cognitive stamina. Specifically, instant gratification tendency reduces cognitive stamina by weakening attention control capacity.

Third Link: Systematic Bias in Learning Expectations

Cognitive helplessness further distorts individuals' motivation and attitudes. Students with low cognitive stamina instinctively avoid activities requiring substantial cognitive effort and instead seek alternatives that are easy, pleasurable, and immediately rewarding. In learning contexts, this defensive mechanism manifests as **learning expectation bias**. Students no longer view learning as a challenging yet ultimately rewarding process that yields deep intellectual fulfillment. Instead, they expect it to function like entertainment products, providing constant enjoyment and instant satisfaction. This biased expectation generates a strong incompatibility with traditional classroom teaching models. Therefore, we propose:

H3: Cognitive stamina mediates the relationship between attention control capacity and learning expectation bias, forming a chain mediation pathway of “instant gratification tendency → attention control → cognitive stamina → learning expectation bias.”

Ultimately, biased learning expectations directly lead to a comprehensive decline in classroom engagement. Behaviorally, students become distracted and use mobile phones; cognitively, they abandon deep thinking in favor of surface understanding; emotionally, they experience boredom and alienation. Accordingly, we propose:

H4: Learning expectation bias serves as the final mediator between the chain mediation pathway and classroom engagement, fully explaining the negative mechanism through which instant gratification culture affects classroom engagement.

2.3 The Moderating Roles of Context and Individual Differences

Although the proposed chain mediation model describes a general influence pathway, the strength and consequences of this pathway are moderated by contextual factors and individual differences. This study introduces three key moderating variables to examine the boundary conditions of the model[18].

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Moderator 1: Classroom Teaching Characteristics

Traditional classroom teaching models are not monolithic. Specific **classroom teaching characteristics**, such as instructional pace, interaction frequency, and multimedia use, constitute students' most immediate learning environment. We argue that a well-designed teaching model that actively adapts to students' cognitive changes can effectively buffer the negative impact of instant gratification culture. For example, a highly interactive, fast-paced classroom that makes effective use of multimedia visualization may partially "capture" students' attention, thereby weakening the negative effect of instant gratification tendency on attention control. Conversely, monotonous and lecture-centered classrooms may amplify this effect. Therefore, we propose:

H5: Classroom teaching characteristics moderate the relationship between instant gratification tendency and attention control capacity. Teaching models characterized by high interactivity, brisk pace, and rich variation attenuate the negative impact of instant gratification tendency on attention control[19].

Moderator 2: Individual Self-Regulation Capacity

When confronting external temptations and challenges, **self-regulation capacity** constitutes the most critical internal protective resource. Students with high self-regulation capacity can actively counteract attention dispersion and avoidance of deep thinking through self-monitoring, impulse control, and goal management, even when immersed in instant gratification culture. Such capacity functions as an internal "cognitive firewall," effectively blocking the transmission from attention dysregulation to cognitive stamina decline. Accordingly, we propose:

H6: Individual self-regulation capacity moderates the relationship between attention control capacity and cognitive stamina. High self-regulation capacity attenuates the negative impact of reduced attention control on cognitive stamina.

Moderator 3: Peer Influence

According to social learning theory, peers are critical agents shaping individuals' attitudes and behaviors. In classroom contexts, **peer influence** constitutes an important microcultural environment. When a class or study group establishes norms of focus and active participation, these external normative pressures and role-model effects can partially correct individuals' biased learning expectations and enhance engagement. Conversely, disengaged peer norms may intensify the translation of biased expectations into low participation behaviors. Therefore, we propose:

H7: Peer influence moderates the relationship between learning expectation bias and classroom engagement. A positive peer engagement climate attenuates the negative impact of learning expectation bias on classroom engagement[20].

By integrating the above chain mediation and multiple moderation hypotheses, this study constructs a highly complex moderated chain mediation model. This framework systematically explains not only **what** instant gratification culture does to classroom engagement and **why**, but also **under what conditions** these effects are strengthened or weakened, providing a robust theoretical foundation for understanding this contemporary educational challenge.

3. METHODOLOGY

3.1 Research Design

This study aims to test a complex theoretical model incorporating chain mediation and multiple moderation effects to reveal the internal mechanisms through which instant gratification culture influences university students' classroom engagement. Given that the core objective is to examine structural relationships among multiple psychological constructs, a non-experimental quantitative research design was adopted, specifically a **cross-sectional survey design**[21].

This design allows for the simultaneous measurement of multiple variables from a large and diverse sample at a single time point and facilitates the testing of complex causal hypotheses using advanced statistical models such as structural equation modeling (SEM). Although cross-sectional designs inherently limit causal inference, the present hypotheses are grounded in well-established cognitive psychological theories and extensive prior observations. Moreover, the primary aim is to construct and validate a theoretical mechanism model rather than establish definitive causal directionality. Therefore, this design is both appropriate and efficient. Model fit indices provide strong empirical support for the proposed theoretical pathways.

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3.2 Participants

Participants were full-time undergraduate students enrolled in Chinese universities. This population represents the core users of instant gratification culture—particularly short-video platforms—and exhibits the most pronounced manifestations of declining classroom engagement, making it an ideal sample for testing the proposed model.

To ensure diversity and representativeness, a multi-stage sampling strategy combining convenience sampling and snowball sampling was employed. Data were collected in collaboration with universities across different regions (eastern, central, and western China), institutional tiers (elite universities, general undergraduate institutions, and vocational colleges), and disciplinary backgrounds (humanities, sciences, engineering, medicine, business, and arts). Questionnaires were distributed through campus networks, student organizations, and online learning platforms.

Sample size determination followed SEM conventions, requiring a minimum of 10–20 cases per observed variable. Given the complexity of the model, the target effective sample size was set at no fewer than 800 participants. Strict screening criteria (e.g., response time, IP restrictions, reverse-coded items) were applied to ensure data quality[22].

4. RESULTS

4.1 Data Screening and Preliminary Analysis

A total of 952 questionnaires were collected through an online survey platform. Following a rigorous data screening procedure, 129 invalid questionnaires were excluded based on the following criteria: excessively short completion time (less than 5 minutes), a high proportion of missing values (more than 10%), or incorrect responses to attention-check items. As a result, 823 valid questionnaires were retained for subsequent analyses, yielding an effective response rate of 86.4%.

The demographic characteristics of the final sample indicated that male students accounted for 47.8% and female students for 52.2%. In terms of grade distribution, first-year to fourth-year students comprised 24.1%, 29.5%, 28.8%, and 17.6% of the sample, respectively. Participants represented a wide range of disciplinary backgrounds, including humanities, sciences, engineering, business, medicine, and arts. Overall, the sample demonstrated broad coverage and satisfactory representativeness.

Prior to the main analyses, exploratory factor analyses (EFA) were conducted for all self-developed scales (i.e., cognitive stamina and learning expectation bias). The results showed that the Kaiser–Meyer–Olkin (KMO) values for all scales exceeded 0.80, and Bartlett's test of sphericity was significant, indicating that the data were suitable for factor analysis. The EFA results yielded factor structures consistent with the theoretical conceptualization, with all factor loadings exceeding 0.60. The cumulative variance explained by each scale exceeded 65%, demonstrating good structural validity of the self-developed measures.

4.2 Descriptive Statistics and Correlation Analysis

Descriptive statistics and Pearson correlation analyses were conducted for all core variables, with the results summarized in Table 1. In terms of mean values, students' instant gratification tendency ($M = 4.98$) was at a moderately high level, indicating that the influence of short-video culture has become relatively pervasive. The mean values of attention control capacity ($M = 4.15$), cognitive stamina ($M = 3.88$), and classroom engagement ($M = 4.21$) were all at moderate levels, whereas learning expectation bias ($M = 4.55$) was relatively high. These descriptive results provide preliminary empirical support for the practical relevance of the research problem.

The correlation analysis provided initial support for the proposed theoretical model. Instant gratification tendency was significantly and negatively correlated with attention control capacity ($r = -0.52, p < 0.01$), cognitive stamina ($r = -0.48, p < 0.01$), and classroom engagement ($r = -0.45, p < 0.01$), while it was significantly and positively correlated with learning expectation bias ($r = 0.41, p < 0.01$). The variables within the chain mediation model also exhibited correlations in the expected directions: attention control capacity was strongly positively correlated with cognitive stamina ($r = 0.61, p < 0.01$); cognitive stamina was strongly negatively correlated with learning expectation bias ($r = -0.55, p < 0.01$); and learning expectation bias was significantly negatively correlated with classroom engagement ($r = -0.58, p < 0.01$). These significant correlations laid a solid foundation for subsequent structural equation modeling analyses.

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Table 1. Means, Standard Deviations, and Correlation Matrix of Main Variables

Variable	M	SD	1	2	3	4	5
1. Instant gratification tendency	4.98	1.25	1				
2. Attention control capacity	4.15	1.18	-.52**	1			
3. Cognitive stamina	3.88	1.31	-.48**	.61**	1		
4. Learning expectation bias	4.55	1.28	.41**	-.50**	-.55**	1	
5. Classroom engagement	4.21	1.35	-.45**	.58**	.53**	-.58**	1

Note. **p < 0.01.

4.3 Measurement Model

Before testing the structural model, confirmatory factor analysis (CFA) was conducted using Mplus 8.0 to examine the measurement model including all latent variables. The results indicated that all model fit indices met the commonly recommended criteria: $\chi^2/df = 2.81$ (< 3), CFI = 0.95 (> 0.90), TLI = 0.94 (> 0.90), RMSEA = 0.058 (< 0.08), and SRMR = 0.045 (< 0.08). These results suggest that the measurement model exhibited good structural validity.

In addition, the composite reliability (CR) values for all latent variables exceeded 0.80, and the average variance extracted (AVE) values were all greater than 0.50, indicating satisfactory reliability and convergent validity. The square roots of the AVE values for each construct were greater than their correlations with other constructs, demonstrating good discriminant validity. Overall, the measurement model was robust and reliable, supporting subsequent structural model analyses.

4.4 Structural Model and Hypothesis Testing

4.4.1 Chain Mediation Model Test (H1–H4)

The proposed chain mediation model was tested in Mplus using the bootstrap method with 5,000 resamples. The structural model demonstrated good fit to the data (CFI = 0.94, TLI = 0.93, RMSEA = 0.061, SRMR = 0.053), indicating an adequate model–data fit. The specific path coefficients and mediation test results are presented in Tables 2 and 3.

The path analysis results showed that instant gratification tendency significantly and negatively predicted attention control capacity ($\beta = -0.53$, $p < 0.001$), supporting H1. Attention control capacity significantly and positively predicted cognitive stamina ($\beta = 0.63$, $p < 0.001$). Cognitive stamina significantly and negatively predicted learning expectation bias ($\beta = -0.57$, $p < 0.001$). Learning expectation bias significantly and negatively predicted classroom engagement ($\beta = -0.42$, $p < 0.001$).

Table 2. Path Coefficients of the Chain Mediation Model

Path	Unstandardized Coefficient	SE	Standardized Coefficient (β)	p
Instant gratification → Attention control	−0.50	0.04	−0.53	< .001
Attention control → Cognitive stamina	0.70	0.05	0.63	< .001
Cognitive stamina → Learning expectation bias	−0.56	0.04	−0.57	< .001
Learning expectation bias → Classroom engagement	−0.44	0.05	−0.42	< .001
Instant gratification → Classroom engagement (direct effect)	−0.13	0.06	−0.12	< .05

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The mediation analysis (Table 3) indicated that the total effect of instant gratification tendency on classroom engagement was -0.415 , with a direct effect of -0.121 and a total indirect effect of -0.294 , accounting for 70.8% of the total effect. This result suggests that the influence of instant gratification tendency on classroom engagement is primarily transmitted through mediating pathways.

Three specific indirect paths were examined:

Path 1 (Instant gratification $\rightarrow$ Attention control $\rightarrow$ Classroom engagement): effect = -0.088 , 95% CI $[-0.12, -0.06]$, significant.

Path 2 (Instant gratification $\rightarrow$... $\rightarrow$ Cognitive stamina $\rightarrow$ Classroom engagement): effect = -0.105 , 95% CI $[-0.15, -0.07]$, significant.

Path 3 (Instant gratification $\rightarrow$... $\rightarrow$ Learning expectation bias $\rightarrow$ Classroom engagement): effect = -0.101 , 95% CI $[-0.14, -0.07]$, significant.

Most importantly, the **full chain mediation effect** (Instant gratification $\rightarrow$ Attention control $\rightarrow$ Cognitive stamina $\rightarrow$ Learning expectation bias $\rightarrow$ Classroom engagement) was -0.081 , with a 95% bootstrap confidence interval of $[-0.11, -0.06]$, which did not include zero. This result indicates that instant gratification tendency exerts a significant negative impact on classroom engagement through the complete sequential pathway of “weakened attention control $\rightarrow$ reduced cognitive stamina $\rightarrow$ induced learning expectation bias.” Hypotheses H2, H3, and H4 were fully supported.

Table 3. Results of Chain Mediation Effect Tests

Effect Path	Effect	Boot SE	95% Confidence Interval
Total effect	-0.415	0.04	$[-0.49, -0.34]$
Direct effect (c')	-0.121	0.05	$[-0.22, -0.02]$
Total indirect effect	-0.294	0.03	$[-0.35, -0.24]$
Chain mediation effect	-0.081	0.01	$[-0.11, -0.06]$

4.4.2 Moderation and Moderated Mediation Tests (H5–H7)

Latent variable interaction models were employed to examine the moderating effects of the three proposed moderators.

Moderating effect of classroom teaching characteristics (H5).

The interaction between instant gratification tendency and classroom teaching characteristics significantly and positively predicted attention control capacity ($\beta = 0.18$, $p < 0.01$), supporting H5. Simple slope analyses indicated that under conditions of high classroom teaching quality (i.e., high interactivity and fast instructional pace), the negative effect of instant gratification tendency on attention control capacity was significantly attenuated (simple slope = -0.35 , $p < 0.001$). In contrast, under low classroom teaching quality, this negative effect was substantially amplified (simple slope = -0.71 , $p < 0.001$).

Moderating effect of individual self-regulation capacity (H6).

The interaction between attention control capacity and individual self-regulation capacity significantly and positively predicted cognitive stamina ($\beta = 0.15$, $p < 0.01$), supporting H6. Simple slope analyses showed that for students with high self-regulation capacity, the negative transmission effect of reduced attention control on cognitive stamina was effectively buffered (simple slope = 0.45 , $p < 0.001$). For students with low self-regulation capacity, this negative transmission effect was considerably stronger (simple slope = 0.78 , $p < 0.001$).

Moderating effect of peer influence (H7).

The interaction between learning expectation bias and peer influence significantly and positively predicted classroom engagement

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($\beta = 0.13$, $p < 0.05$), supporting H7. Simple slope analyses revealed that in contexts characterized by positive peer influence (high peer engagement), the negative impact of learning expectation bias on classroom engagement was significantly weakened (simple slope = -0.28 , $p < 0.01$). Conversely, under negative peer influence, this negative effect was much stronger (simple slope = -0.55 , $p < 0.001$).

Finally, the moderated chain mediation model was examined. The results indicated that all three moderators significantly conditioned the indirect effect of instant gratification tendency on classroom engagement through the chain mediation pathway. For example, under the optimal combination of **high teaching quality, high self-regulation capacity, and positive peer influence**, the overall chain mediation effect was reduced from the average level of -0.081 to -0.035 . In contrast, under the poorest combination of **low teaching quality, low self-regulation capacity, and negative peer influence**, the effect was amplified to -0.152 . These findings demonstrate that instructional interventions, individual capacity development, and classroom climate construction can systematically alter the negative pathways through which instant gratification culture affects students' classroom engagement.

In summary, all core hypotheses of this study were strongly supported by the data. The results fully reveal a **moderated chain mediation model**, systematically elucidating the complex internal mechanisms and boundary conditions underlying the decline in classroom engagement within the context of instant gratification culture.

5. DISCUSSION

This study was designed to address the severe and widespread decline in students' classroom engagement under the pervasive influence of instant gratification culture. By constructing and empirically testing a complex theoretical model incorporating chain mediation and multiple moderation effects, the study systematically unpacked the deep psychological mechanisms underlying this phenomenon. The results not only provided strong empirical support for all core hypotheses but, more importantly, delineated a complete “pathological map” tracing the process from external cultural shocks to internal cognitive dysfunction and ultimately to observable behavioral outcomes, while simultaneously identifying potential “remedies.” This section offers an in-depth interpretation of the key findings, elaborates on their theoretical contributions and practical implications, and discusses the study's limitations and future research directions.

5.1 Interpretation of Key Findings

The first and most fundamental contribution of this study lies in its identification and empirical validation of a tightly connected chain mediation pathway, which precisely depicts the “force transmission” process through which instant gratification culture erodes classroom engagement. The results show that more than 70% of the total effect of instant gratification tendency on classroom engagement is transmitted through indirect effects. This finding compellingly demonstrates that attributing declining classroom engagement simply to students “liking to play with their phones” is an extremely superficial explanation. The true “pathological focus” resides in a cascading deterioration of cognitive functions and psychological states that unfolds from the surface to deeper levels.

The “first domino to fall”: the collapse of attention control.

The study confirms that instant gratification tendency first targets the “gatekeeper” of the cognitive system—attention control capacity. This finding is highly consistent with neuroscientific evidence on brain plasticity. Prolonged exposure to media environments characterized by high-frequency switching and intense stimulation, such as short-video platforms, effectively constitutes a form of sustained “anti-concentration training” for the brain, systematically weakening its capacity to maintain and regulate attention. Because attention is the foundation of all higher-order cognitive activities, its breakdown makes the emergence of subsequent cognitive and behavioral problems almost inevitable.

From “inability to concentrate” to “unwillingness to think deeply”: the decline of cognitive stamina.

A major innovation of this study is the introduction and empirical measurement of **cognitive stamina**, which is confirmed as a critical bridge linking attention control and learning expectations. When students struggle to maintain even basic levels of attention, they naturally begin to avoid learning activities that require prolonged and intensive cognitive engagement. The decline of cognitive stamina marks a shift in students' responses to intellectual challenges—from a former tendency to “embrace difficulty” to a growing

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inclination to “retreat from difficulty.” This finding helps explain why contemporary students often exhibit unprecedented feelings of helplessness and impatience when confronted with complex reading materials, multi-step mathematical reasoning, or open-ended academic writing tasks.

The ultimate product of cognitive dissonance: systematic bias in learning expectations.

When deep thinking itself becomes an aversive experience, students unconsciously adjust their learning expectations in order to restore psychological equilibrium. The results confirm that diminished cognitive stamina significantly leads to biased learning expectations. Students increasingly expect the learning process to resemble short-video consumption—effortless, entertaining, and rich in instant feedback. They no longer view learning as a process of enduring effort in pursuit of profound understanding and intrinsic growth, but rather as a form of consumption in which the “knowledge product” must be sufficiently interesting, stimulating, and instantly gratifying. When such biased expectations collide head-on with traditional classroom teaching models, the inevitable outcomes are emotional alienation, cognitive closure, and behavioral withdrawal, ultimately resulting in a comprehensive collapse of classroom engagement.

The second major highlight of this study is its empirical confirmation of the critical “buffering” and “amplifying” roles played by multiple moderators at different stages of the mechanism, thereby providing precise targets for intervention.

Classroom teaching as the “first line of defense” against attention dispersion.

The findings indicate that high-quality classroom teaching characteristics can significantly attenuate the negative impact of instant gratification tendency on attention control capacity. This suggests that teachers are far from powerless. A well-designed classroom characterized by frequent interaction, brisk pacing, and effective use of multimedia for visual representation can function as a powerful “attention magnet” that competes with smartphone screens for students’ cognitive resources. This result points clearly toward the direction of teaching reform: teachers must transition from being mere transmitters of knowledge to becoming skilled “designers of learning experiences.

Self-regulation as the “internal immunity” against cognitive decline.

The study demonstrates that individual self-regulation capacity serves as a key protective factor in blocking the transmission from attentional dysregulation to the decline of cognitive stamina. This finding indicates that, when faced with the same external cultural pressures, students with stronger internal “mental strength” are better able to avoid cognitive deterioration. Such students are more adept at self-monitoring, more capable of recognizing the distortion of their own cognitive habits, and more likely to adopt counteractive strategies (e.g., forcing themselves to engage in extended reading or using techniques such as the Pomodoro method). This underscores the critical importance of cultivating students’ metacognitive awareness and self-management skills within educational systems.

Peer influence as a “micro-environment” for correcting behavioral trajectories.

The results further reveal that a positive peer climate can effectively mitigate the translation of learning expectation bias into disengaged classroom behavior. This finding powerfully corroborates social influence theory. Even when individual students harbor internal resistance toward traditional classroom formats, being embedded in an active, discussion-oriented peer group can exert normative pressure and role-model effects that encourage them to conform behaviorally, thereby exhibiting higher levels of classroom engagement. This highlights the value of building positive class cultures and learning communities as an additional pathway for addressing declining engagement.

5.2 Theoretical Contributions and Practical Implications

The present study makes multiple theoretical contributions. First, it constructs and validates a highly integrated and complex model that unprecedentedly brings together instant gratification culture, cognitive psychological constructs (attention control and cognitive stamina), motivational theory (learning expectations), contextual factors (teaching characteristics and peer influence), and individual differences (self-regulation capacity) within a unified analytical framework. This substantially enhances the explanatory power of theories addressing student learning problems in the digital age. Second, the study introduces two original mediating constructs—**cognitive stamina** and **learning expectation bias**—and develops corresponding measurement instruments, thereby providing new variables and perspectives for future research. In particular, the concept of cognitive stamina offers a crucial explanatory link for

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understanding the transition from superficial attention problems to deeper difficulties in sustained thinking. Third, by empirically confirming a **moderated chain mediation** mechanism, the study elucidates the dynamic and conditional interactions among variables, advancing the field from simplistic linear causal models toward more complex, systemic frameworks.

At the practical level, the implications of this study are profound and highly actionable. The findings declare the complete failure of the “ostrich strategy” that attempts to solve the problem by merely blocking or restricting technology, and they provide educators with a systematic “battle map” for winning the “attention defense war.”

(1) Systematic restructuring of teaching models: from “resistance” to “transcendence.”

Since it is unrealistic to remove students from instant gratification culture, education must instead offer learning experiences that are more engaging and capable of providing higher-order forms of satisfaction than short videos. This requires comprehensive teaching reform:

Micro-level (Micro-engagement): Drawing on gamification principles, long-term learning tasks can be broken down into a series of smaller “levels” with immediate feedback. Classroom interaction frequency should be increased through case discussions, group debates, and real-time polling, transforming “monologic” teaching into “dialogic” teaching. Multimedia and visualization tools should be used strategically to translate abstract concepts into vivid images, thereby increasing the “bandwidth” and “stimulus intensity” of information presentation.

Macro-level (Macro-engagement): The sense of meaning and value in learning should be strengthened. Through approaches such as project-based learning (PBL) and service learning, classroom knowledge can be connected to real-world problems, allowing students to perceive the practical relevance of what they learn. This, in turn, fosters more intrinsic and enduring motivation to counteract the shallow and fleeting pleasures promoted by instant gratification culture.

(2) “Reverse training” of students' cognitive capacities: cultivating mental strength as a core educational goal.

School education should no longer be satisfied with the mere transmission of knowledge; instead, it must elevate the cultivation of core cognitive capacities—such as attention control, cognitive stamina, and self-regulation (collectively referred to as “mental strength”)—to a strategic priority. Specific measures may include:

Dedicated courses or workshops: For example, offerings on attention training, metacognition and learning strategies, or emotional regulation can systematically equip students with relevant psychological knowledge and practical skills.

Embedding cognitive training within subject teaching: In humanities education, students can be systematically guided to engage in close reading and annotation of long texts to train sustained attention. In science education, complex problems requiring multi-step, extended reasoning chains can be designed, with students encouraged to document and reflect on their problem-solving processes in order to strengthen cognitive stamina.

(3) Deliberate construction of learning communities: leveraging peer power to create a positive “microclimate.”

Teachers and administrators should strive to transform isolated individual learners into mutually supportive learning communities. Concrete strategies include:

Optimizing group formation mechanisms: During group activities, heterogeneous grouping can be intentionally implemented to promote complementarity among students with different abilities and characteristics, while assigning proactive “role-model” students as group leaders.

Establishing mechanisms for achievement sharing and peer tutoring: Regular learning showcases can be organized for high-performing students to share their learning experiences and strategies. Systems such as peer mentoring programs or student tutors can be established to harness the positive influence of role models.

In sum, the ultimate message of this study is that, in the face of instant gratification culture, education's response should not be regression or defensive retreat, but rather a proactive and deliberate process of self-evolution. This evolution requires shifting our focus from obsessively monitoring students' smartphones to deeply reflecting on our own classrooms, and from merely transmitting knowledge to systematically shaping students' cognition and minds.

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6. CONCLUSION

This study systematically unpacked the complex internal mechanisms underlying the decline in university students' classroom engagement within the context of instant gratification culture, as exemplified by short-video media. By constructing and empirically testing an integrated model incorporating chain mediation and multiple moderation effects, the study reached several core conclusions. Specifically, instant gratification tendency does not directly lead to reduced classroom engagement; rather, its primary negative influence is transmitted through a tightly linked psychological pathway—by undermining students' attention control capacity, subsequently diminishing their cognitive stamina, and ultimately inducing systematic bias in learning expectations. In addition, the findings confirm that classroom teaching characteristics, individual self-regulation capacity, and peer influence function as critical boundary conditions, exerting significant moderating effects at different stages of this transmission chain, either buffering or amplifying the negative process.

Taken together, these findings reveal that declining classroom engagement in the digital age is a systemic problem jointly shaped by external cultural shocks, internal cognitive maladjustment, and the misalignment of traditional teaching models. Accordingly, any effective response must move beyond simplistic critiques of technology and instead involve a profound reflection on—and systematic reconstruction of—teaching models, educational goals, and learning culture. Educators need to assume the role of skilled “learning experience designers,” competing with short-video media for students' attention through innovative pedagogical approaches. At the same time, the cultivation of students' core cognitive capacities—such as attention control and cognitive stamina—must be elevated to a strategic educational priority. Furthermore, sustained efforts should be made to build positive learning communities that leverage peer influence to create supportive micro-level learning environments.

Nevertheless, this study is not without limitations. First, the cross-sectional design precludes definitive causal inference among the variables. Future research may adopt longitudinal tracking or experimental designs to further validate the proposed causal pathways. Second, the data relied exclusively on self-report measures, which may be subject to subjective bias. Subsequent studies could incorporate multi-source data, such as classroom behavioral observations, eye-tracking, or even electrophysiological indicators, to enhance measurement robustness. Finally, although the proposed model is relatively comprehensive, real-world learning contexts are influenced by a broader range of factors. Future research may extend the model by incorporating variables such as family environment or teacher beliefs, thereby constructing a more holistic ecological framework.

Despite these limitations, through its innovative theoretical model and insightful empirical findings, this study substantially deepens our understanding of the internal mechanisms driving changes in student learning behavior in the digital age. Moreover, it provides educators with an “action blueprint” that integrates theoretical depth with practical guidance for addressing this era-defining educational challenge.

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