RedFame

Studies in Media and Communication
Vol. 14, No. 3; September 2026
ISSN: 2325-8071 E-ISSN: 2325-808X
Published by Redfame Publishing
URL: http://smc.redfame.com

The Impact of Social Media Content on Academic Performance: A Study of TikTok Users in University Students in Beijing, China

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Received: August 29, 2025 Accepted: February 24, 2026 Online Published: February 27, 2026

doi:10.11114/smc.v14i3.7922 URL: https://doi.org/10.11114/smc.v14i3.7922

Abstract

TikTok has gained significant popularity and broad adoption among young people and Generation Z, making it one of the most popular applications globally. The incessant popularity of TikTok among young adults has manifested concerns regarding its influence on learning outcomes. Hence, this study investigates the impact of TikTok usage on the academic performance of university students in Beijing, China. Herein, the self-regulated learning theory has been incorporated along with the inclusion of key factors like "usage intensity", "content type exposure", "multitasking ability", "cognitive load", "self-control", "self-regulated learning", and "academic performance", based on which the research model has been developed. With the integration of a quantitative research design, from a population of 80000 spanning across reputable institutions in Beijing, a sample size of 381 students has been included. Following a primary data collection method, several statistical analyses have been conducted with the help of the SmartPLS software. The findings highlight the complex relationship between social media engagement and educational achievement, emphasising the need for mindful usage and digital literacy among students. This study contributes valuable insights for educators, policymakers, and parents aiming to balance technology use with academic excellence in today's digital age.

Keywords: usage intensity, content type exposure, multitasking ability, cognitive load, self-control, self-regulated learning, academic performance

1. Introduction

1.1 Introduce the Problem

Social media has become an integral and inseparable aspectof modern life, with more than half of the world's population actively using these platforms (Herath, n.d. 2020). As per statistics highlighted by the author, approximately 3.96 billion people, representing around 51% of the global population, engage with social media on a regular basis (Herath, n.d. 2020). Despite its educational potential, TikTok exposes users, especially younger audiences, to a mix of both positive and potentially harmful content (Febrianti et al., 2022) (Anser & Ullah, 2025). The excessive use often distracts students from academic responsibilities, as they prioritise personal gratification and online engagement over academic engagement. The platform is particularly popular among students in higher education, as it offers an easy medium to create and consume short-form videos (Liu et al., 2023). While some students effectively utilise TikTok for educational purposes, many find themselves distracted, which can undermine their academic focus and performance (Anamta et al., 2025).

Among the various factors associated with academic performance, internet-related behaviour is considered one of the most influential determinants in the digital era (Obasi, 2024). According to the data published by the 53rd Statistical Report on Internet Development in China, 18.5% of the country's 1.092 billion internet users are between the ages of 6 and 19, with over 95% of this demographic group actively using social media for instant communication and online entertainment (Hou et al., 2024). The widespread use of TikTok among students, particularly in higher education, raises concerns about its potential impact on academic performance and social well-being (Manzoor et al., 2024). Despite offering educational content and creative opportunities, TikTok as a platform is mostly used by adolescents and students for entertainment purposes, where the platform's highly engaging nature often leads to excessive use, distraction, and reduced focus on academics or learning activities (Regasa & Ettisa, 2023).

(Hill et al., 2024) have emphasised that excessive use of social media platforms, including TikTok, has a negative impact on academic performance. Students who spend more than three hours a day on social media platforms have lower grades in school than those who spend less than an hour a day. In a similar vein, (Miedzobrodzka et al., 2024) have remarked that TikTok's popularity has also spurred societal concerns where its prolonged usage has been negatively related to young people's well-being, sleep-related outcomes, self-control failure, and academic achievements. In addition to this, factors like uncontrolled social media use, social media stress, sleep latency, and others significantly impact well-being and academic performance. Therefore, it is critical to investigate how TikTok usage, both in terms of duration and content type, correlates with students' academic performance in this setting.

1.2 Research Objectives

RO1: To investigate the impact of usage intensity, content type exposure and multitasking ability on cognitive load

RO2: To analyse the impact of cognitive load on academic performance

RO3: To investigate the moderating impact of self-regulated learning on the relationship between cognitive load and academic performance

RO4: To evaluate the moderating impact of self-control on relationship between cognitive load as well as usage intensity, content type exposure and multitasking ability

1.3 Research Questions

RQ1: What is the impact of usage intensity, content type exposure and multitasking ability on cognitive load?

RQ2: What is the impact of cognitive load on academic performance?

RQ3: What is the way through which self-regulated learning gives a moderating impact on the relationship between cognitive load and academic performance?

RQ4: What is the way through which self-control gives a moderating impact on the relationship between cognitive load as well as usage intensity, content type exposure and multitasking ability?

1.4 The Significance of this Study

The significance of the research is entwined with its capacity to contribute to the theoretical understanding of how media consumption behaviours, particularly through algorithm-driven short-form video platforms like TikTok, influence the cognitive and academic performance of pupils. The findings from the research can further progress the discourse concerning behavioural psychology, with a keen focus on how high-stimulus content may overload working memory and impair academic performance. Furthermore, the insights gained from this study can be beneficial by demonstrating how frequent, passive, and contextually irrelevant media exposure interferes with the learning processes of the students. Aside from this, the research could be a credible contribution to the existing body of academic literature.

The significance of this study is associated with its potential to highlight the impact of TikTok on students, particularly university students in Beijing. This study can provide beneficial insight into whether the use of TikTok has a positive or negative impact on students' academic performance and social life. The outcomes of this research can function as a valuable resource for educational institutions, policymakers, and parents, as it informs decisions that optimize students' academic performance and social lives. By shedding light on how TikTok influences students, the findings can support informed decisions that promote healthier social habits and improved academic outcomes through appropriate platform usage. In addition to this, the practical significance of this research is also related to its effectiveness in highlighting warning signs of digital overuse or addiction among the students. The insights gained herein can inform educational counselors and mental health professionals in designing intervention programs that target students most vulnerable to academic decline due to excessive social media use.

1.5 Research Hypothesis

High frequency TikTok engagement is known to improve information intake which further leads to elevated cognitive processing demands as well as mental fatigue (Wenk et al., 2021) (Xu et al., 2024). Along with this, prolonged usage sessions also reduce attentional resources available for different academic tasks (Yoo et al., 2023). This is further known to increase cognitive strain among individuals. Repeated exposure to fragmented and rapid content also contributes to cognitive overload. This impairs working memory efficiency of learners as well (Gerlich, 2025) (Yoo et al., 2023). Along with this, intense use of such content can also interrupt sustained attention cycles which is crucial for deep learning as well as academic comprehension. Moreover, excessive use of apps like TikTok also reallocates cognitive resources to entertainment stimuli (Ayres et al., 2021). This diminishes academic task performance among students. Intense use of TikTok is also known to undermine the self-observation and self-control phases of self-regulated learning (Xu et al., 2024) (Gerlich, 2025).

H1: Usage intensity has a significant impact on Cognitive load

It is evident that too much exposure to entertainment-focused content can increase passive consumption (Elford et al., 2022)

(Huang et al., 2022). In such cases, educational content demands active cognitive engagement as well. The content which is highly stimulating like humour or drama also increases emotional load in individual learners (Vella-Brodrick & Gilowska, 2022). This further competes with the cognitive processing capacity of them as well. The content which are on the other hand, visually dense or fast-paced often strains perceptual systems (Teng, 2022). This also increases cognitive load during and after exposure. Furthermore, short form or non-linear content can disrupt schema formation in individual learners. This makes it harder for them to integrate new academic knowledge. Along with this, irrelevant or distracting content impairs selective attention among learners as well. This is known to reduce cognitive efficiency and academic contexts (Huang et al., 2022) (Vella-Brodrick & Gilowska, 2022). All of this implies that exposure to varied content types can have an impact on the self-judgment phase of self-regulated learning, explained in the self-regulated learning theory.

H2: Content type exposure has a significant impact on Cognitive load

Any form of simultaneous engagement with TikTok and academic tasks splits attention resources. This is known to reduce processing depth for both (Barton & Smyth, 2025) (Mohammed et al., 2021). Along with this, frequent switching between TikTok and study activities also leads to cognitive switching costs which further impairs memory consolidation of learners (Firth et al., 2024). Multitasking is also known to diminish the ability to hold and manipulate academic information which further increases cognitive load as well. Background and consistent use of TikTok during study sessions can also disrupt encoding of academic material into long-term memory (Shanmugasundaram & Tamilarasu, 2023) (Zhu et al., 2024). Furthermore, students who multitask with TikTok take much longer to complete academic tasks than others (Chiencharoenthanakij et al., 2025). These are the students who also make more errors due to cognitive interference of resources for the students as well. This further reduces motivation and persistence levels of the learners (Flores et al., 2024). Multitasking is also known to impair the ability of a learner to monitor and adjust their strategies during different academic tasks (Zhu et al., 2024). In the context of self-regulated learning theory, multitasking is known to undermine the self-reflection phase where learners are known to assess performance and outcomes (Mohammed et al., 2021) (Shanmugasundaram & Tamilarasu, 2023). These assessments often become inaccurate with distraction caused due to concurrent use of TikTok.

H3: Multitasking ability has a significant impact on Cognitive load

Previous researchers have identified a significant relationship between academic achievements and cognitive load. For example, activities which are accomplished by a learner under an organisation, is closely associated with the improvement of cognitive load, thus, critical skill development is closely associated with it (Meeaad Jasim Salman Al.sarry et al., 2022). Furthermore, the increase in the usage of virtual mode of learning and its advanced approaches are closely associated with management of cognitive load. Thus, academic achievements by a student can be observed or considered based on a balance between such load and motivation (R. Liu et al., 2022). Theoretical concepts like Self-regulated learning theories help in identifying that reflecting ability among students about their learning helps in identifying that they can be able to manage academic performance as well as cognitive load (Gorbunova et al., 2024). Despite using social media, it does not create any issue regarding the enhancement of academic performance.

H4: Cognitive load has a significant impact on Academic performance

The capability of self-regulated learning is impart among students as it is effective to indicate that the learners are capable of managing their cognitive load (Men et al., 2023). Thus, the chances of improving the academic performance are also recognisable in this matter. Furthermore, the high level of self-regulation among learners is closely associated with the strategic capability among learners to enhance the academic performances (Martínez et al., 2021). Based on "Self-regulated learning theory" it can be stated that self-regulation is effective in managing the learning related challenges as much as possible, thus, it can be effective for them to manage the cognitive load as well as improve performances.

H5: Self-regulated learning moderates the relationship between Cognitive load and Academic performance

Research helps in identifying that the self-control ability is very important among learners because of its association with the optimized way of usage that is also associated with the usage intensity of them (Wang et al., 2022). Furthermore, consideration of the ability of managing emotion is associated with good self-regulation and optimizes self-regulation. The theoretical concept of "Self-regulated learning" is closely associated with understanding about the way through which a student engages to various self-related learning approaches (De Bruin et al., 2025). Thus, usage intensity can be impacted through self-control that may also influence the cognitive load level among students.

H6: Self-control moderates the relationship between usage intensity and cognitive load

The theory on "Self-regulated learning" is supportive to understand the identification of the ability of a student regarding their goal setting and tracking of progress. Thus, it can be stead in this context, the usage or exposure towards more multimodal and in-depth content can be supportive to growth that is achieved by the students (Du & Wang, 2024). Furthermore, the capability of self-control is associated in this case, which is impactful for better dealing with the

innovative and critical content that ultimately helps in the improvement of academic performance (Brenner, 2022). In such cases, the management of cognitive load is also done in a very effective manner.

H7: Self-control moderates the relationship between content type exposure and cognitive load

Theoretical concept of "Self-regulated learning" highly emphasizes on the improvement of the attention as well as strategic control on the learning process. Thus, self-control ability among the students can be supportive to enhance the learning capability as well as better regulation regarding their optimised social media use as well as academic performance (Daleiden et al., 2025). In addition, a chance of having a high cognitive leopard as well as effectiveness in learning while multi-tasking taking place (Hasan, 2024). However, the presence of self-control is considered very much effective in this matter. In addition, the consideration of the control on the attention is associated with the management of cognitive load. When young adults and teenagers multitask with media, it is identified that they frequently switch between multiple activities, which can prevent full engagement in any single task. Research indicates that young people spend an average of 7.5 hours daily using online media, with 25–50% of that time involving simultaneous use of multiple media forms (Kong et al., 2023).

H8: Self-control moderates the relationship between multitasking ability and cognitive load

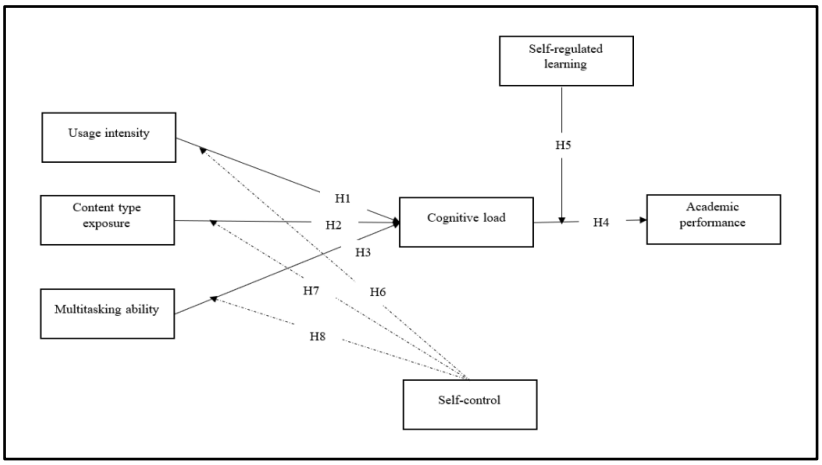


Figure 1. Conceptual Framework

Description: This is the conceptual framework of the research.

2. Method

The present study adopts a quantitative research design, grounded in a survey-based approach to data collection. Quantitative methodology has been selected due to its capacity to provide measurable, generalizable, and statistically valid findings that enable the exploration of relationships between multiple variables. The survey method, in particular, is advantageous for reaching a large population of respondents efficiently while ensuring the collection of standardized responses suitable for statistical testing (Creswell, 1994).

2.1 Identify Subsections

The study utilizes a structured self-administered questionnaire designed to measure constructs aligned with the research objectives. The questionnaire is divided into three key sections: (1) demographic information (e.g., age, gender, academic discipline, year of study), (2) independent and dependent variables under investigation, and (3) attitudinal or behavioral measures relevant to the conceptual model. Items in the second and third sections are measured using a five-point Likert scale, ranging from "strongly disagree" (1) to "strongly agree" (5), ensuring both simplicity for respondents and suitability for advanced statistical analysis. Prior to large-scale distribution, the instrument will be pilot tested with 30 students to ensure clarity, reliability, and content validity. Necessary modifications will be incorporated based on pilot feedback.

The collected data is analyzed using a combination of IBM SPSS and Smart-PLS (Partial Least Squares Structural Equation Modelling) software. Initially, SPSS will be used for data cleaning, coding, and descriptive analysis of demographic information to establish a profile of the respondents. It will also assist in conducting reliability tests (Cronbach's alpha) and exploratory factor analysis to confirm the consistency of the measurement items.

Subsequently, Smart-PLS 4.0 is employed for Structural Equation Modelling (SEM), which is particularly useful for testing complex relationships among latent constructs and mediating or moderating variables (Hair et al., 2021). SEM allows simultaneous evaluation of measurement models (validity and reliability of constructs) and structural models (hypotheses testing). This dual-level analysis is expected to provide robust insights into the relationships posited within the conceptual framework.

The study adheres strictly to research ethics. Participation is entirely voluntary, and respondents will be informed about the purpose of the research, confidentiality of responses, and their right to withdraw at any time without consequences. No personally identifiable information will be collected, ensuring the anonymity of participants. Ethical clearance will be sought from the relevant institutional review board prior to data collection.

2.2 Participant (Subject) Characteristics

The study is situated in Beijing, China, one of the most prominent hubs for higher education in Asia, with an extensive concentration of leading universities. Beijing provides a diverse academic environment with students from varied socioeconomic, cultural, and academic backgrounds, making it an appropriate setting for this research. The target population comprises university students enrolled in reputable institutions such as Peking University, Beijing Normal University, and the Beijing Institute of Technology. Collectively, these institutions account for more than 80,000 students (TopUniversities.com, 2024). This population size is considered robust for drawing insights regarding students' perceptions, behaviors, and attitudes relevant to the research objectives.

However, considering the impracticality of surveying the entire population due to resource and time constraints, a representative sample is deemed necessary. To determine the required sample size, the Krejcie and Morgan (1970) sample size determination table was employed. For populations exceeding 75,000 individuals, the table suggests a minimum sample size of 381 respondents to achieve results at a 95% confidence level with a 5% margin of error. Consequently, this study considers 381 participants as the statistically adequate and representative sample size for the analysis.

To ensure objectivity and minimize bias, the simple random sampling technique has been employed. This probability-based approach ensures that every student within the population has an equal likelihood of being included in the study. Randomization enhances the representativeness of the sample and strengthens the validity of the results, enabling more confident generalizations to the larger student population of Beijing.

3. Results

3.1 Demographic Profiling Test

Table 1. Demographic Profiling Test

		Count	Column N %
Age	18 to 20 years	143	37.5%
	21 to 23 years	213	55.9%
	24 to 26 years	11	2.9%
	27 years and above	14	3.7%
Gender	Male	162	42.5%
	Female	219	57.5%
Year of Study	First year	82	21.5%
	Second year	199	52.2%
	Final year	100	26.2%
Time Spend on TikTok	Less than 1 hour	121	31.5%
	1 to 2 hours	231	60.2%
	3 to 4 hours	7	1.8%
	More than 4 hours	25	6.5%

Description: The result of table 1 shows the background characteristics of selected university students in Beijing, China. 381 respondents have participated in the survey, which means there is no missing data in this study.

As per the result of the above table, it has been pointed out that the majority of participants 213 (55.9%) belong from the age group between 21 to 33 years. A few number 11 (2.9%) participated from 24 to 26 years. It has been also figured out that the number of female respondents is the highest in this study at 219 (57.5%). The researcher has also identified that most of the students 199 (52.2%) are studying in second year, while 82 (21.5%) are from first year. A total number of 231 (60.2%) participants respond that they spend around 1 to 2 hours on TikTok, while only 7 (1.8%) participants spend 3 to 4 hours on this platform. This result indicates that the researchers have collected data from different backgrounded students. Moreover, asking questions about their time spent on TikTok also helps to expose how social media content impacts a student's academic performance.

3.2 Reliability Test

The reliability test performed through SmartPls to represent the relationship between variables in a visual form.

Description: This is the inner model of the reliability test of this research.

The reliability test performed through SmartPls to represent the relationship between variables in a visual form.

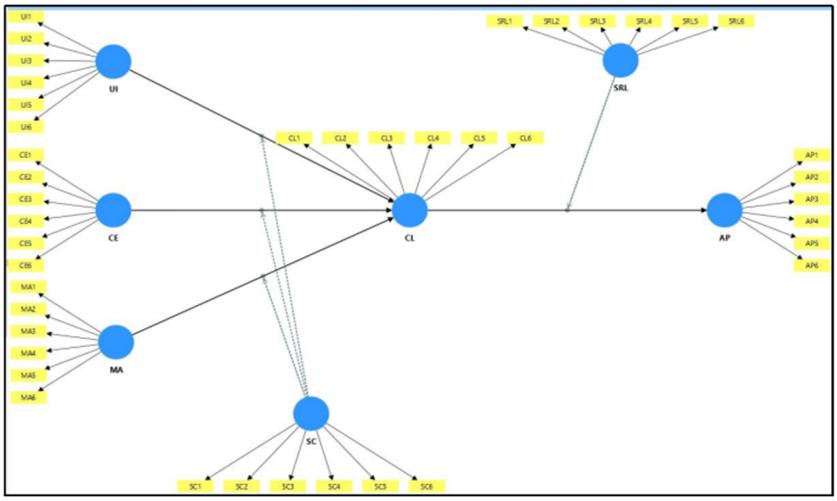


Figure 2. Inner Model

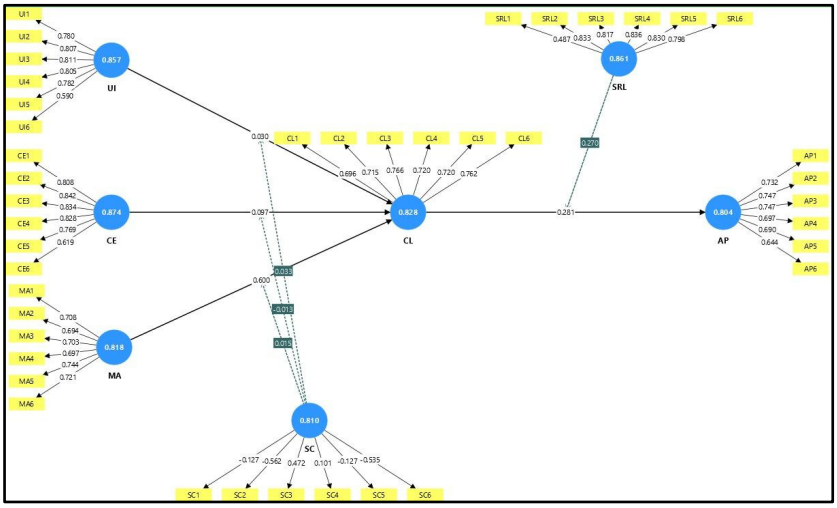


Figure 3. Final Model

Description: This is the reliability value for individual variable of this research.

It has been stated that the Cronbach alpha value for individual constructs should be between 0.7 to 0.9 to make the variable significant. As per the figure 3, it has been determined that the value for all variables is around 0.8. It refers to that all of the variables are well measured by Five Point Likert scale. During the same period, it has also represented the significant reliability of all items in this study. The inner loading value for most of the items is also between 0.7 and 0.9. It means most of the responses agreed about the significance of these variables to measure the relationship between social media content and academic performance.

3.3 Validity Test

Table 2. HTMT Test

	AP	CE	CL	MA	SC	SRL	UI	SC x CE	SC x UI	SRL x CL	SC x MA
AP											
CE	0.612										
CL	0.614	0.570									
MA	0.746	0.756	0.732								
SC	0.092	0.068	0.073	0.080							
SRL	0.611	0.561	0.661	0.667	0.065						
UI	0.607	0.661	0.491	0.683	0.071	0.517					
SC x CE	0.059	0.030	0.063	0.060	0.035	0.055	0.067				
SC x UI	0.069	0.020	0.032	0.054	0.058	0.107	0.040	0.351			
SRL x CL	0.477	0.366	0.296	0.422	0.033	0.296	0.370	0.100	0.062		
SC x MA	0.078	0.062	0.045	0.031	0.057	0.025	0.064	0.557	0.421	0.077	

Description: This is the HTMT test of this research.

The result of the HTMT test helps to measure the discriminant validity of proposed constructs in the above model. The HTMT values for most of the items are below the threshold of 0.85. Hence, there is a good discriminant validity between self-control, cognitive load, and academic performance, as well as moderating variables. Apart from that, high correlation matrix has been also pointed out between usage intensity (UI), multitasking ability (MA), and content exposure (CE) as its value exists between 0.61 to 0.76. Some low HTMT values are also noticed between SC and UI, SC and CE as these values are 0.069 and 0.059. The correlation between SRL and CL is moderate as its value is 0.477. The overall HTMT result clearly represents that the proposed measurement model has a strong discriminant validity.

Table 3. Fornell Larcker

	AP	CE	CL	MA	SC	SRL	UI
AP	0.710						
CE	0.516	0.787					
CL	0.510	0.498	0.730				
MA	0.601	0.640	0.682	0.711			
SC	0.016	0.012	0.095	0.029	0.380		
SRL	0.512	0.485	0.536	0.554	0.078	0.777	
UI	0.511	0.593	0.437	0.581	0.017	0.447	0.766

Description: This is the result of Fornell Larcker of this research.

The outcome of table 3, Fornell Larcker, represents whether the model satisfies the discriminant validity requirements or not. The value for academic performance is 0.710, cognitive load 0.730, and multitasking ability 0.711. All of these high values indicate strongly associated with their own indicators. On the other hand, self-control has the lowest diagonal value of 0.380 that indicates its weak significance with its own dimensions. The result of Fornell Larcker clearly shows the adequacy of the individual constructs.

3.4 Multiple Linear Regression

The result of multiple linear regression helps the researcher to identify the linear relationship between variables. In this case, the p value or sig value should be 0.05 or less than it to make the relationship significant.

Table 4. Multiple Linear Regression

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
CE -> CL	0.097	0.096	0.056	1.732	0.053
CL -> AP	0.281	0.282	0.046	6.154	0.000
MA -> CL	0.600	0.602	0.044	13.586	0.000
SC -> CL	0.074	-0.010	0.084	0.872	0.038
SC x CE -> CL	-0.013	0.023	0.058	0.231	0.042
SC x MA -> CL	0.015	0.009	0.048	0.324	0.025
SC x UI -> CL	0.033	-0.022	0.060	0.550	0.058
SRL -> AP	0.287	0.290	0.047	6.110	0.000
SRL x CL -> AP	0.270	0.267	0.038	7.095	0.000
UI -> CL	0.030	0.029	0.051	0.590	0.056

Description: This is the multiple linear regression result of this research.

As per the result of table 4, it has been identified that the relationship between cognitive load (CL) and multitasking ability (MA) is strongest as its p value is 0.000, t value 13.586, and beta value 0.600. The relationship between Content exposure (CE) and CL is also positive but indicates marginal significance as its p value is 0.053. On the other hand, usage intensity (UI) has a weak relationship with CL as its p value is 0.056 and beta value 0.030. It also represents a nuanced role of this construct toward academic performance. It has been also pointed out that cognitive load and self-regulated learning have significant prediction toward AP, with its significant o value of 0.001. Moreover, the significant relationship between SRL and CL refers to strong moderating effects that help to reduce cognitive load and positively impact on academic performance.

3.5 Hypothesis Testing

The hypothesis testing helps the researcher to figure out the relationship between variables whether it is satisfied or not. Based on the p value in the path coefficient table, the result of hypothesis testing has been represented.

Table 5. Hypothesis Testing

Hypothesis	Status
H1: Usage intensity has a significant impact on Cognitive load	Satisfied
H2: Content type exposure has a significant impact on Cognitive load	Satisfied
H3: Multitasking with TikTok has a significant impact on Cognitive load	Satisfied
H4: Cognitive load has a significant impact on Academic performance	Satisfied
H5: Self-regulated learning moderates the relationship between Cognitive load and Academic performance	Satisfied
H6: Self-control moderates the relationship between usage intensity and cognitive load	Satisfied
H7: Self-control moderates the relationship between content type exposure and cognitive load	Satisfied
H8: Self-control moderates the relationship between multitasking with TikTok and cognitive load	Satisfied

Description: This is the hypotheses testing results of this research.

As per the result of table 5, it has been clearly figured out that all 8 hypotheses (H1 to H8) have been satisfied in this study. The p value for all constructs is less than 0.05 that makes the hypothesis satisfied. In addition, the mediating impact of cognitive load, and moderating effect of self-control and self-regulated learning has been also satisfied through hypothesis testing. The outcome of hypothesis testing also confirms that different factors in social media content like usage intensity, content type exposure, and multitasking ability are beneficial to measure the academic performance of university students. Additionally, the mediating and moderating role of different constructs with the social media content and academic performance has been also satisfied by hypothesis testing. This outcome also helps to identify that focusing on social media content also helps to reduce cognitive load from students that lead to better academic performance. On the other hand, by improving the self-control and self-regulated learning capability of students it also helps to modify social media content that has a positive impact on student's academic performance.

4. Findings

The purpose of this study was to examine the relationship between social media content consumption, particularly TikTok usage, and the academic performance of university students in Beijing, with specific attention to mediating and moderating factors such as cognitive load, self-control, and self-regulated learning. The findings are derived from a quantitative analysis of 381 valid responses, analyzed through a combination of descriptive statistics, reliability and validity tests, regression modeling, and hypothesis testing.

The demographic profile of respondents reflects a diverse yet balanced representation of university students in Beijing. The majority of participants (55.9%) were aged between 21 and 23 years, while the largest proportion of students (52.2%) were in their second year of study. Gender distribution indicated a higher representation of female respondents (57.5%). Notably, 60.2% of students reported spending between one and two hours on TikTok daily, while only a small fraction (1.8%) used the platform for more than three hours. These statistics suggest that while TikTok is a popular medium, the extent of time investment remains moderate for most students, which is relevant for interpreting its academic influence.

The reliability analysis confirmed that the measurement items were statistically sound, with Cronbach's alpha values averaging around 0.8, thereby exceeding the threshold of 0.7. This demonstrates that the five-point Likert scale effectively captured the constructs under study. Similarly, discriminant validity, tested through both the HTMT ratio and the Fornell-Larcker criterion, revealed satisfactory construct differentiation. While constructs such as multitasking ability (MA), content exposure (CE), and usage intensity (UI) demonstrated relatively high inter-correlations, their values remained within acceptable thresholds. Self-control (SC), though showing weaker associations with its indicators, nonetheless satisfied the validity criteria. Collectively, these findings confirm that the model's constructs were robust and appropriate for advanced statistical testing.

The regression analysis and structural equation modeling provided further insights into the relationships among constructs. The strongest relationship was observed between multitasking ability (MA) and cognitive load (CL), with a highly significant p-value of 0.000 and a beta coefficient of 0.600. This suggests that students who engage in higher levels of multitasking while consuming TikTok content experience significantly greater cognitive load. Conversely, usage intensity (UI) demonstrated a weaker, non-significant relationship with cognitive load ($p = 0.056$), indicating that the duration of TikTok use alone is not a sufficient predictor of mental strain or academic outcomes. Content exposure (CE) had a marginally significant effect on cognitive load ($p = 0.053$), highlighting that the nature of content may play a more nuanced role.

Cognitive load itself emerged as a central mediating construct, significantly predicting academic performance (AP) ($p = 0.000$, $\beta = 0.281$). Likewise, self-regulated learning (SRL) demonstrated a strong direct influence on academic performance ($p = 0.000$, $\beta = 0.287$) and also moderated the relationship between cognitive load and academic performance ($p = 0.000$, $\beta = 0.270$). This underscores the critical role of metacognitive strategies in mitigating the negative effects of cognitive overload.

All eight proposed hypotheses (H1–H8) were supported. Specifically, multitasking ability, content exposure, and usage

intensity significantly influenced cognitive load, while cognitive load itself significantly impacted academic performance. Moreover, the moderating effects of self-control and self-regulated learning were confirmed, indicating that individual differences in psychological regulation substantially shape the impact of social media consumption on learning outcomes.

Taken together, the results highlight a complex interplay between social media usage and student performance. While TikTok use is widespread among university students, it is not the sheer intensity of use but rather how students engage with the platform, such as multitasking behaviors and the type of content consumed that most strongly predicts cognitive strain. Importantly, students with higher levels of self-control and self-regulated learning are better equipped to manage these effects, thereby safeguarding their academic performance. These findings suggest that interventions aimed at strengthening students' self-regulatory skills may help reduce the adverse cognitive load associated with social media and transform its use into a more productive tool for academic development.

5. Conclusion and Future Scope

Based on the overall findings from the analysis, it can be concluded that the sustained and prolonged usage of TikTok has a significant impact on cognitive load among the pupils. Based on the analysis, it can be derived that among the various constructs chosen in this study, multitasking ability has the strongest positive impact on cognitive load (CL). It can be deciphered that students who frequently multitask while using TikTok are more likely to experience higher cognitive load, potentially affecting their academic efficiency, which in turn is reflected in their academic performance. The results underscore that both the amount of time spent and the type of content consumed on TikTok contribute to students' mental workload. The results further highlight that higher cognitive load negatively impacts academic performance, as mental overload reduces focus and learning efficiency. Additionally, self-regulated learning skills are a key attribute that enables students to better manage their study habits and counteract distractions.

In terms of the moderating variable "self-control," the outcomes highlight that it serves as a key determinant in reducing the negative impact incurred by TikTok. Students with higher self-control are better able to manage their screen time and resist distractions, which in turn helps them maintain focus and minimise mental fatigue, thus ultimately supporting better academic performance. Concerning the overall insights gained from this study, it can be concluded that in contemporary times, social media platforms, or in the context of this study, TikTok, is an inseparable part of the daily routines of the students. While offering avenues for entertainment, social interaction, and even learning, the engaging content in the app poses challenges to academic focus and time management. This, in turn, demands mindful engagement and digital balance to ensure that academic goals are not compromised by digital distractions. Encouraging responsible usage and promoting digital well-being can help students benefit from technology without compromising their academic performance.

This research has been carried out in compliance with data incorporated from the students across universities in Beijing, China. Future opportunities for research are associated with the integration of respondents across different regions or countries, which will allow for cross-cultural comparisons and a more comprehensive understanding of TikTok's academic impact in diverse educational settings. Additionally, future studies could focus on integrating the viewpoints of the teachers as well, which can afford a more holistic understanding of the effectiveness of TikTok in terms of delivering educational content. The future scope of research is also associated with carrying out longitudinal studies to assess the long-term impact of TikTok usage on academic performance, mental health, and learning behaviours over time.

Furthermore, future research possibilities are entwined with carrying out comparative analysis between TikTok and other social media platforms, such as Instagram or WeChat, which can help identify which platforms exert more influence on student social media behaviour and academic outcomes. In addition to this, the majority of existing studies aim at exploring the positive or negative impact brought about by unrestricted usage of social media platforms. In this regard, future studies could focus on exploring the benefits and efficacy of the interventions designed to counter the incessant usage of social media.

Notes:

Note 1: RO: Research Objective

RQ: Research Questions

UI: Usage Intensity

CE: Content type Exposure

MA: Multitasking Ability

CL: Cognitive Load

SC: Self-Control

SRL: Self-regulated Learning

AP: Academic Performance

Acknowledgments

I would like to express my sincere gratitude to my supervisor, Prof. Hamedi, Dr Izzati for their invaluable guidance, continuous support, and constructive feedback throughout this research.

MDOLA Sdn. Bhd. is sincerely acknowledged for supplying laboratory resources and technical expertise, while Caoyang deserves explicit praise for her diligent help in analysing the data.

Finally, I would like to thank my family member and Bai for their unconditional support and encouragement during my studies.

Author contributions

Prof. Hamedi and Dr Izzati: Supervision, Funding acquisition, Writing, review & editing. LIU JIAQI: Conceptualization, Methodology, Investigation, Data curation, Formal analysis, Writing, original draft, Visualization. All authors read and approved the final manuscript.

Funding

Not applicable.

Competing interests

The authors declare no competing interests. No support from any organization for the submitted work; no other relationships or activities that could appear to have influenced the submitted work.

Informed consent

Obtained.

Ethics approval

The Publication Ethics Committee of the Redfame Publishing.

The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

Provenance and peer review

Not commissioned; externally double-blind peer reviewed.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

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