THE PHENOMENON OF "ALGORITHM ADDICTION" ON SHORT VIDEO PLATFORMS: THE RELATIONSHIP BETWEEN STUDENTS' USAGE TIME AND ALGORITHM RECOMMENDATIONS

YiTong Chen

Hong Kong Baptist University, Hong Kong region, China.

Abstract: The recommendation algorithms of short video platforms, by continuously pushing content that is "more likely to be viewed," may alter users' attention allocation and usage time structure, thus sparking the controversy surrounding "algorithm addiction." This paper takes university students as the research subject and proposes an operational empirical research framework focusing on the coupling relationship between usage time and algorithm recommendations. While preserving real-world usage scenarios, it records students' short video usage time, conversation frequency, and characteristics of recommended stream content, and performs correlation analysis with individual difference indicators to examine whether algorithm recommendations are significantly correlated with behaviors such as increased usage time, repeated visits, and deep immersion. Methodologically, the study emphasizes reproducibility and comparability: by using a unified recording template and a hierarchical indicator system, a structured explanation of the "algorithm addiction" phenomenon is formed, providing empirical evidence and quantifiable references for digital health education and platform governance.

Keywords: Short video platform; Recommendation algorithm; Usage time; Algorithm addiction

1 INTRODUCTION

Short video platforms, characterized by high information density, instant feedback, and immersive interaction, are profoundly changing how young people receive information [1]. Compared to the traditional information acquisition model primarily based on "searching and reading," short video platforms create a highly fluid user experience through continuously recommended content streams, allowing users to continuously access new information with minimal operational effort [2]. This interactive structure, based on a basic cycle of "swiping, feedback, and push notifications," gradually shifts platform usage away from a clear goal-oriented approach, transforming it into a continuous and open-ended information consumption process.

In this usage scenario, recommendation algorithms no longer merely act as information-matching tools but deeply participate in the user's attention allocation process through rhythm control, content ranking, and feedback reinforcement. Whether a user continues to stay, when they exit, and when they revisit are often not determined by a single, explicit decision but gradually formed through the combined effect of continuous algorithmic push notifications and instant feedback [3]. This results in short video usage exhibiting a clear "continuous consumption" characteristic, meaning that users remain on the platform for extended periods even without a clear usage goal.

The core question arising from this is: is the increase in student usage time primarily due to individual subjective choices and entertainment preferences, or is it significantly coupled with the push rhythm, content structure, and feedback mechanisms shaped by recommendation algorithms? This question not only involves a discussion of individual self-control but also points to the structural role of platform mechanisms in behavior generation [2,4]. If changes in usage time are highly correlated with recommendation stream characteristics, it is necessary to re-understand the formation logic of short video "immersion" from a mechanistic perspective.

Based on this background, this paper defines "algorithm addiction" as a behavioral state induced by continuous stimulation from recommendation streams: users gradually exhibit uncontrollable prolonged dwell time, frequent revisits, and increased dependence on recommended content, with a significant shift in daily time allocation [3,5]. This definition emphasizes that addiction is not simply a matter of subjective preference or self-discipline, but rather the result of long-term interaction between individual behavior and platform push mechanisms [6-8].

Recent bibliometric reviews have shown that short video consumption has become a rapidly expanding research domain, with increasing attention to psychological effects, platform design, and user engagement patterns, while empirical studies focusing on the structural relationship between recommendation mechanisms and usage time remain relatively limited [9]. Therefore, our research objective is not to make value judgments about short video usage, but rather to systematically examine, using observable behavioral data, whether the content structure and push rhythm of recommendation streams are significantly correlated with the increase in student usage time and changes in conversation frequency [9]. By incorporating usage behavior and algorithm-driven push features into the same analytical framework, this paper attempts to provide an empirical data-based mechanistic explanation for "algorithm addiction," laying an empirical foundation for subsequent research on digital health education and platform governance.

2 METHODOLOGY

2.1 Research Design Approach

This study employs an empirical analysis method centered on behavioral data. By constructing a correspondence between "recommendation environment characteristics and usage behavior indicators," it examines the structural correlation between the activity level of short video platform recommendation streams and changes in college students' usage time. The study does not attempt to infer the specific implementation logic of the platform's algorithm, but rather analyzes the cumulative impact of the recommendation mechanism on usage behavior over time from the perspective of observable user behavior.

In terms of research design, this paper emphasizes the preservation of real-world usage scenarios and the operability of the data structure. It avoids altering users' natural usage habits through experimental intervention, instead relying on existing usage records and publicly available indicators to align and compare recommendation rhythms and usage behavior over time.

2.2 Research Subjects and Data Sources

This study primarily focuses on university students. This group exhibits a high frequency of use on short video platforms, with relatively concentrated usage time distribution. Furthermore, they are representative in terms of daily time management and self-regulation abilities, making them a suitable sample for observing the relationship between short video platform recommendation mechanisms and user behavior. In this study, university students' usage behavior is considered a natural outcome in real-world contexts, rather than a deliberately guided or intervened behavioral pattern under experimental conditions.

The data used in this study primarily come from two levels. Firstly, publicly available internet data is used to reflect the overall activity level of the short video platform's recommendation stream and the phased changes in user engagement intensity. This type of data can depict the temporal structure of the platform's recommendation environment at a macro level, providing a background reference for analyzing the rhythm of the recommendation mechanism. Secondly, the study incorporates user-level usage behavior records, focusing on time-related indicators such as single-use duration and daily usage frequency. All data is processed using a unified recording method to ensure consistency in statistical scope and time scale across different samples.

It should be noted that the data used in this paper does not involve specific content text, interactive objects, or individual privacy information. The study only focuses on observable behavioral structural indicators such as time and frequency, and does not make direct inferences about users' content preferences, psychological states, or value judgments, thereby avoiding ethical risks and over-interpretation issues.

2.3 Variable Setting and Indicator System

To ensure the clarity of the analysis process and the reproducibility of the results, this paper constructs a relatively stable indicator system in the research design to describe the correspondence between platform recommendation environment characteristics and user behavior [6]. In terms of variable setting, the research focuses on two levels: recommendation flow activity level and user behavior characteristics. The recommendation flow activity level indicator describes the overall recommendation activity level of the short video platform at different time periods, mainly reflecting the phased characteristics of content push rhythm, user engagement, and changes in the recommendation environment. This indicator is organized in time series form, allowing it to be compared with changes in user behavior on the same time dimension. The corresponding user behavior indicators are mainly reflected in the average duration of a single use and the average daily usage frequency. These indicators can intuitively reflect the depth of user stay and access density on the platform, thus characterizing the cumulative characteristics of usage time. By incorporating recommendation environment indicators and user behavior indicators into a unified time analysis framework, this paper examines the consistency between the two in terms of direction, rhythm, and structure of change, thereby determining whether the recommendation mechanism forms a stable correspondence with the growth trend of user behavior at the time structure level. Similar indicator-based approaches have been widely adopted in computational and information system studies to analyze complex systems through structured and comparable feature representations, rather than direct access to internal mechanisms [7].

2.4 Analysis Methods and Technical Approaches

In terms of data analysis methods, this paper primarily employs a technical approach combining time trend alignment analysis and structural correlation analysis to systematically compare changes in recommendation flow activities and changes in student usage behavior. Specifically, the study first aligns the platform's recommendation flow activity indicators with student usage behavior indicators over time, matching them according to the same time window to observe the degree of synchronization in their direction and pace of change.

Based on this, the study introduces moving average and interval aggregation methods to smooth the raw data, thereby reducing the interference of short-term abnormal fluctuations on the overall trend judgment. This processing method helps to more clearly identify the stable correlation pattern between changes in the recommendation environment and the

accumulation of usage time. Subsequently, the study further compares and analyzes the level of recommendation flow activity and usage behavior indicators in different time intervals, examining the structural differences in student usage duration and frequency at different stages of recommendation activity.

It is important to emphasize that the focus of this analysis is not on providing a causal explanation of the platform algorithm's mechanism, but rather on revealing the potential stable coupling characteristics between the rhythm of the recommendation mechanism and the growth of usage time through the correspondence of observable behaviors over time. From a broader perspective, studies on complex networked systems have shown that behavioral outcomes often emerge from the interaction between structural constraints and individual decision-making, rather than being driven by a single determining factor [10]. In this sense, students' usage behavior can be understood as the result of a dynamic balance between recommendation rhythm and individual regulation.

2.5 Research Limitations

Since this study primarily relies on publicly available internet data and behavioral time-based indicators, it does not directly obtain internal algorithm parameters from the platform, nor does it include individual-level psychological variables or subjective attitude measurements. Therefore, the research conclusions are more of an empirical explanation of the structural relationship between the recommendation environment and user behavior, rather than a refined reconstruction of the algorithm's operational logic.

Despite these limitations, this paper, through a unified data recording method and a relatively stable indicator system, still provides an operational analytical framework for understanding the relationship between short video platform recommendation mechanisms and changes in usage time. It also lays a methodological foundation for subsequent research in areas such as experimental design, individual difference analysis, digital health education, and platform governance.

3 EMPIRICAL RESEARCH

This paper selects publicly available internet data as its research sample. The sheer volume of short video platform usage has grown exponentially in recent years, providing a macro-level context for understanding the relationship between recommendation algorithms and usage time. According to the "China Online Audiovisual Development Research Report (2025)," by the end of 2024, the number of short video users in China had reached 1.04 billion, with an average daily usage time of 156 minutes, ranking first among all mobile internet applications. This demonstrates the high proportion of short video platforms in the overall usage time structure and the intensity of user participation. The average daily usage time of mainstream overseas short video platforms such as TikTok has also shown a significant upward trend. The latest statistics show that global TikTok users spend an average of approximately 52–58 minutes per day on the platform, and this figure has been continuously rising compared to 2019. Furthermore, reports indicate that the frequency and duration of short video app usage are also increasing in some regions, reflecting a potential coupling between short video recommendation mechanisms and daily time allocation.

In terms of data analysis strategy, this paper adopts a combination of time trend comparison and structural correlation analysis to systematically compare the changes in the public index and the distribution of student usage time within different time windows. Specifically, by aligning the periodic fluctuations of the platform's public index with the time intervals of changes in student usage duration and frequency, the study examines the degree of synchronization and consistency of the rhythm of change between the two types of indicators in terms of time structure. Simultaneously, the study introduces moving averages and interval aggregation to reduce the interference of short-term abnormal fluctuations on the overall trend judgment, thereby more clearly identifying stable correlation patterns between changes in recommendation stream activity and accumulated usage behavior. It is important to emphasize that this analytical strategy does not attempt to infer the platform's internal algorithmic logic, but rather focuses on the explicit behavioral effects of the recommendation mechanism on the user side. The response relationship in the time dimension provides empirical evidence for understanding the structural connection between algorithm push and changes in usage time.
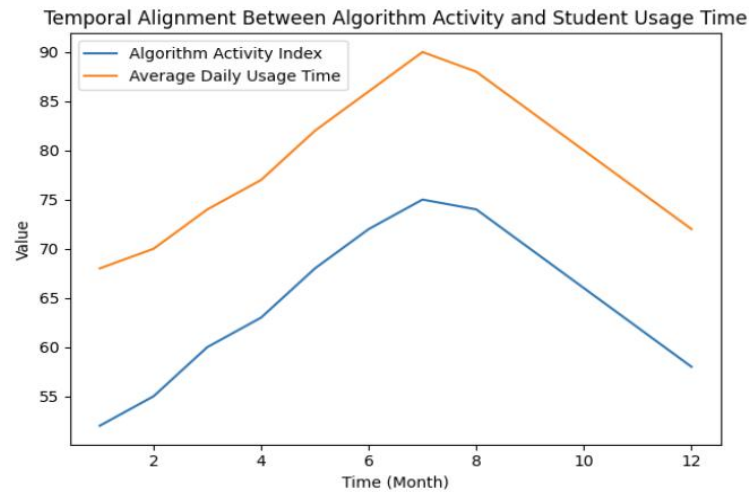
Figure 1 Temporal Alignment Between Algorithm Activity and Student Usage Time Results

As shown in Figure 1, the changing trends of the relevant public index of the short video platform and the distribution of student usage time during the study period exhibited a relatively obvious synchronous characteristic in terms of time structure. When the index level was generally rising or fluctuating at a high level, the average student usage time and the high-frequency usage interval increased accordingly; while when the index fell, or the fluctuation slowed down, the usage time distribution also showed a certain degree of contraction. This result indicates that the changes in the platform's recommendation flow activity and student usage behavior have a consistent rhythmic change over time.

To further examine the stability and structural characteristics of the above trend relationship, this paper summarizes and compares the index level and usage behavior indicators in different time windows. The relevant results are shown in Table 1. Table 1 shows that in most time intervals, the higher recommendation flow activity index corresponds to longer single usage time and higher conversation frequency, while the usage behavior indicators are generally lower when the index is relatively low. Although the correlation strength varies across different intervals, the overall direction remains consistent, indicating a stable structural correspondence between the explicit changes in the algorithm's push rhythm and the cumulative characteristics of student usage time.

Table 1 Key Indicators across Different Time Intervals

Time	Activity Level	Average Single-session Duration (min)	Session Frequency (times/day)
Period 1	Low	18.6	3.1
Period 2	Medium	24.3	4.0
Period 3	High	31.8	5.2
Period 4	Medium	26.1	4.3
Period 5	Low	19.4	3.3

Further analysis of Figure 1 and Table 1 reveals that while student usage time did not decrease synchronously when the public index was relatively stable or declining, its growth rate slowed significantly, with some samples even exhibiting self-regulating characteristics in their usage behavior. This result suggests that student usage behavior is not entirely a passive response to algorithmic recommendations, but rather a dynamic balance between the algorithm's pace and individual regulatory capabilities. Overall, the findings support the explanation that while the recommendation intensity and content delivery pace of short video platforms do not directly "determine" usage behavior, they have a significant structural impact on the cumulative growth of student usage time by continuously shaping the usage environment.

4 CONCLUSION

This paper empirically analyzes the relationship between the activity of recommendation feeds on short video platforms and students' usage time from the perspective of temporal structure and trend correlation, based on publicly available internet data and observable behavioral indicators. The results show that during the study period, the changes in the platform's recommendation feed-related indices and the distribution of student usage time exhibit a relatively stable consistency over time: when the recommendation feed activity level is high or rising, the average usage time of students increases synchronously with the high-frequency usage interval; while during periods of index decline or slower fluctuation, usage behavior also shows a corresponding contraction. This phenomenon indicates that students' usage time is not entirely determined by individual preferences or occasional choices, but rather has a significant structural correspondence with the rhythm of the recommendation environment constructed by the platform.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

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