

Algorithm as a New Social Agent: A Sociological Study of the Influence of Content Recommendations on YouTube in Medan City

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ABSTRACT

This study analyzes the YouTube recommendation algorithm as a new social agent that influences user dependency in Medan City. The research focuses on the effects of YouTube usage intensity, content consumption patterns, algorithmic awareness, and digital habitus on YouTube dependency, with digital literacy positioned as a mediating variable. This study employed an explanatory quantitative approach with a cross-sectional survey design. The sample consisted of 400 YouTube users aged 18-45 years in Medan City selected through proportionate stratified random sampling. Data were collected using a structured questionnaire and analyzed through Structural Equation Modeling-Partial Least Squares (SEM-PLS). The findings show that usage intensity, content consumption patterns, algorithmic awareness, digital habitus, and digital literacy have positive and significant effects on YouTube dependency. Usage intensity and content consumption patterns also significantly affect digital literacy, whereas algorithmic awareness and digital habitus do not directly affect digital literacy. All indirect paths through digital literacy are significant, indicating that digital literacy functions as an ambivalent mediating mechanism: it improves digital competence while also strengthening attachment to the platform. These findings confirm that the YouTube

algorithm should not be understood merely as a technical feature, but as a sociotechnical actor that shapes users' digital habitus, choices, and dependency.

INTRODUCTION

The development of digital society has transformed how individuals obtain information, entertainment, and social references. In the platform ecosystem, media experience is no longer determined solely by users' conscious choices, but also by recommendation systems that rank, filter, and display content based on digital behavioral traces. YouTube has become one of the main spaces in this process because it functions not only as a video-sharing medium but also as a digital cultural infrastructure that directs users' attention, preferences, and patterns of information consumption (van Dijck et al., 2021; Poell et al., 2022).

In the Indonesian context, YouTube has become one of the dominant platforms used for entertainment, learning, information seeking, and the formation of digital identity. The high level of YouTube use indicates that this platform can no longer be understood as a passive medium, but rather as a social space mediated by algorithms. The YouTube recommendation system works by reading viewing history, watch duration, interactions, and user preferences to construct personalized content flows. Thus, viewing choices that appear to be free actually take place within an algorithmic architecture that has been pre-structured by the platform (Bucher, 2018; Kitchin, 2021).

This phenomenon is important to examine sociologically because recommendation algorithms have the capacity to act as non-human social agents. From the perspective of Actor-

Network Theory, technology can be understood as an actor that participates in shaping social action through network relations among humans, devices, code, data, and platform institutions (Latour, 2005). On YouTube, the algorithm regulates content visibility, encourages user engagement, and reinforces particular consumption patterns. This process shows that algorithms do not merely serve user preferences, but also shape those preferences through repeated exposure to content.

Moreover, repeated interaction between users and algorithms can form a digital habitus. Referring to Bourdieu (1977, 1990), habitus is a system of dispositions formed through the internalization of social structures and subsequently influences practices, tastes, and ways of judging reality. In the digital context, Airoidi (2022) explains that machine habitus is formed through reciprocal interaction between humans and machines. Among YouTube users, digital habitus appears in the automatic habit of opening the platform, comfort with certain types of content, routine viewing practices, and dependence on algorithmic recommendations.

This study is important because quantitative studies that position the YouTube recommendation algorithm as a new social agent in the local Indonesian context remain limited. Most previous studies discuss algorithms from technical perspectives, digital communication, or the general impact of platforms, but few have empirically tested the relationships among usage intensity, content consumption patterns, algorithmic awareness, digital habitus, digital literacy, and YouTube dependency within a single integrated model. Therefore, this article aims to analyze the direct and indirect effects of these variables on YouTube dependency among users in Medan City.

METHOD

This study employed a post-positivist paradigm with an explanatory quantitative approach. This approach was selected because the study aimed to empirically test relationships among variables through statistical measurement while also explaining the mechanisms through which YouTube recommendation algorithms influence user dependency. The research design used was a cross-sectional survey, in which data were collected during a specific period to capture respondents conditions at the time of the study.

The research population consisted of active YouTube users in Medan City aged 18-45 years. The respondent criteria included users who accessed YouTube at least three times a week, had used YouTube for at least one year, and used a Google account when accessing YouTube so that they were exposed to personalized recommendation algorithms. Based on the estimated productive-age population in Medan City, the study determined a sample size of 400 respondents. The sampling technique used was proportionate stratified random sampling so that the distribution of respondents reflected diversity in district, age, gender, education, and domicile.

Data were collected using a structured questionnaire based on a 1-5 Likert scale. The research variables consisted of YouTube usage intensity (X1), content consumption patterns (X2), algorithmic awareness (X3), digital habitus (X4), digital literacy (Z), and YouTube dependency (Y). Usage intensity was measured through frequency, duration, and time of use; content consumption patterns through reliance on recommendations, content variation, engagement, and binge-watching; algorithmic awareness through understanding of personalization, filter bubbles, data use, and algorithmic bias; digital habitus through consumption dispositions, perception schemes, internalized preferences, and viewing routines; digital literacy through technical skills, information evaluation, ethics, security, and self-regulation; while YouTube dependency was measured through salience, mood modification, tolerance, withdrawal, conflict, and relapse.

Data analysis was conducted using Structural Equation Modeling-Partial Least Squares (SEM-PLS) with SmartPLS. The stages of analysis included evaluation of the outer model to test construct validity and reliability, evaluation of the inner model to test the explanatory power of the model, and bootstrapping to test the significance of direct and indirect effects. The evaluation criteria included outer loading, Average Variance Extracted (AVE), Cronbach's Alpha, Composite Reliability, rho_a, Heterotrait-Monotrait Ratio (HTMT), SRMR, NFI, R-square, f-square, path coefficients, t-statistics, and p-values.

RESULT & DISCUSSION

Descriptive Overview of Research Variables

The descriptive results show that YouTube dependency was the variable with the highest mean score, namely 3.46, and was categorized as high. Meanwhile, YouTube usage intensity had a mean of 3.40, content consumption patterns 3.28, algorithmic awareness 3.26, digital habitus 3.33, and digital literacy 3.36, all of which were categorized as moderate. This pattern reveals an important gap: user dependency had already reached a high level, while algorithmic awareness was the variable with the lowest mean score. This condition strengthens the argument that strong user attachment to YouTube is not always accompanied by critical awareness of how algorithmic recommendations work.

Table 1. Summary of Mean Scores of Research Variables

Variable	Mean	Category
YouTube Usage Intensity (X1)	3.40	Moderate
Content Consumption Patterns (X2)	3.28	Moderate
Algorithmic Awareness (X3)	3.26	Moderate
Digital Habitus (X4)	3.33	Moderate
Digital Literacy (Z)	3.36	Moderate
YouTube Dependency (Y)	3.46	High

Measurement Model Evaluation

The outer model evaluation showed that all indicators had outer loading values above 0.90. These values far exceeded the minimum threshold of 0.70, indicating that all indicators were valid in representing their latent constructs. AVE values ranged from 0.895 to 0.916, meaning that all constructs fulfilled convergent validity because they exceeded the threshold of 0.50.

Construct reliability was also very strong. All values of Cronbach's Alpha, Composite Reliability (rho_a), and Composite Reliability (rho_c) were above 0.97. These results indicate that the research instrument had high internal consistency. In addition, all HTMT values were below 0.90, indicating that discriminant validity was fulfilled. The model fit values also supported the feasibility of the model, with an SRMR of 0.020 and an NFI of 0.921. Thus, the measurement model was considered suitable for further structural model testing.

Structural Model and Direct Effects

The inner model evaluation showed that the R-square value for digital literacy was 0.220 and the R-square value for YouTube dependency was also 0.220. This means that the model was able to explain 22.0% of the variation in digital literacy and 22.0% of the variation in YouTube dependency. This explanatory power is limited, but it remains relevant in the context of survey-based social research because digital dependency behavior is also influenced by other factors, such as self-regulation, social pressure, psychological conditions, and personality characteristics.

The direct hypothesis testing showed that YouTube usage intensity had a positive and significant effect on both digital literacy and YouTube dependency. This finding indicates that the more frequently and the longer users interact with YouTube, the higher their competence in using the platform, but at the same time the stronger their tendency toward dependency. In other words, intensive usage experience has a dual function: it improves digital competence while deepening attachment to the platform.

Content consumption patterns also had positive and significant effects on digital literacy and YouTube dependency. Users who were accustomed to consuming content through recommendations, autoplay, and repeated viewing patterns not only became more familiar with the structure of digital content, but also became more easily attached to the content flow provided by the algorithm. This finding is in line with the concepts of filter bubbles and echo chambers, in which recommendation systems reinforce exposure to similar content so that users become more comfortable within a homogeneous content ecosystem (Pariser, 2011; Harambam et al., 2021).

Algorithmic awareness did not significantly affect digital literacy, but it had a positive and significant effect on YouTube dependency. This finding indicates that knowing the existence of algorithms does not necessarily make users more critical in managing their digital experiences. For many users, algorithmic awareness remains at the cognitive level and has not yet been transformed into self-regulation. In fact, the understanding that YouTube can personalize content may strengthen users' belief that the platform is relevant to their needs.

Digital habitus also did not significantly affect digital literacy, but it had a positive and significant effect on YouTube dependency. This means that the habit of opening YouTube, comfort with familiar content, viewing routines, and closeness to certain communities or creators do not necessarily improve users' reflective competence. Instead, digital habitus reinforces automatic and repetitive usage patterns, so that dependency is formed through dispositions that have been internalized in users' everyday lives.

Digital literacy itself had a positive and significant effect on YouTube dependency. This finding is paradoxical because digital literacy is often understood as a protective factor. In this study, digital literacy has an ambivalent character. Digitally literate users are indeed more capable of using features, evaluating content, and understanding platform settings, but these abilities also make them more skilled in utilizing YouTube, thereby increasing engagement and dependency.

Table 2. Summary of Direct Effects

Path	Coefficient	p-value	Decision
X1 -> Z	0.183	0.000	Significant
X1 -> Y	0.137	0.005	Significant
X2 -> Z	0.180	0.000	Significant
X2 -> Y	0.154	0.001	Significant
X3 -> Z	0.038	0.428	Not significant
X3 -> Y	0.274	0.000	Significant
X4 -> Z	0.065	0.181	Not significant
X4 -> Y	0.163	0.000	Significant
Z -> Y	0.223	0.000	Significant

Indirect Effects through Digital Literacy

The indirect effect testing showed that all mediation paths through digital literacy were significant. YouTube usage intensity, content consumption patterns, algorithmic awareness, and

digital habitus were proven to have indirect effects on YouTube dependency through digital literacy. This finding confirms that digital literacy is not merely an outcome variable of media experience, but also a mechanism that translates such experience into stronger attachment to the platform.

In the usage intensity pathway, repeated experience makes users more skilled in navigating YouTube features, but this skill may also extend usage duration. In the content consumption pathway, structured and repeated exposure allows users to recognize the content ecosystem more clearly, while also strengthening comfort with similar recommendation flows. In the algorithmic awareness pathway, understanding content personalization does not always create critical distance; rather, it can strengthen the perception that YouTube matches users' preferences. In the digital habitus pathway, internalized routines and usage dispositions make the platform part of everyday life, so that digital literacy can strengthen such attachment.

Table 3. Summary of Indirect Effects through Digital Literacy

Mediation Path	Coefficient	p-value	Decision
X1 -> Z -> Y	0.041	0.019	Significant
X2 -> Z -> Y	0.040	0.014	Significant
X3 -> Z -> Y	0.008	0.001	Significant
X4 -> Z -> Y	0.015	0.010	Significant

Sociological Interpretation

Sociologically, the findings of this study show that the YouTube recommendation algorithm has functioned as a new social agent. Algorithmic agency is visible in its ability to direct attention, construct choice architecture, and reproduce content consumption patterns. From the perspective of Actor-Network Theory, the algorithm becomes a non-human actor that is not neutral because it helps determine what content is visible, when it appears, and how users are encouraged to remain engaged with the platform.

The findings on digital habitus strengthen the argument that YouTube dependency occurs not only because of access intensity, but also because of the gradual formation of dispositions through everyday digital practices. Users do not always feel forced by the platform; rather, they develop comfort, routines, and preferences that make YouTube the main choice for entertainment, information, and emotional escape. In this context, digital dependency operates subtly through the normalization of habit.

The most important finding is the ambivalence of digital literacy. Digital literacy does not automatically protect users from dependency. If literacy is oriented only toward technical skills, users may become more proficient in using the platform without becoming more critical of the algorithmic mechanisms that bind them. Therefore, digital literacy needs to be directed toward algorithmic literacy, digital self-regulation, and critical awareness of the attention economy operating behind recommendation systems.

CONCLUSION

This study shows that the YouTube recommendation algorithm can be understood as a new social agent that influences user dependency in Medan City. YouTube usage intensity, content consumption patterns, algorithmic awareness, digital habitus, and digital literacy were proven to have positive and significant effects on YouTube dependency. Meanwhile, usage intensity and content consumption patterns had significant effects on digital literacy, whereas algorithmic awareness and digital habitus did not directly and significantly affect digital literacy.

All indirect paths through digital literacy were significant. This indicates that digital literacy functions as an important mediating variable, but it is not always protective. In the YouTube context, digital literacy can improve users' ability to access, understand, and manage the platform, but this competence can also strengthen attachment to the algorithmic ecosystem. Therefore, digital literacy needs to be developed not only as a technical skill, but also as critical awareness of algorithmic personalization, filter bubbles, the attention economy, and digital self-regulation.

The practical implication of this study is the need for digital literacy programs that emphasize digital well-being, algorithmic transparency, and the ability to limit content consumption. Governments, educational institutions, digital communities, and technology platforms need to encourage users not only to be competent in using YouTube, but also to understand how recommendation systems work and how they influence choices, habitus, and digital dependency. Future research is recommended to use longitudinal designs and add variables such as self-regulation, psychological conditions, social pressure, and personality characteristics in order to improve the explanatory power of the model regarding digital dependency.

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