

Factors Influencing Algorithmic News Apps Use and Its' Impact on Media Literacy

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Abstract: In the mobile Internet era, algorithmic news recommendation apps have become the primary means for many people to access news information, thanks to their personalized and accurate distribution methods. Previous research has mainly focused on the role of algorithms as “gatekeepers” in the news production and distribution processes, the ethics surrounding algorithm-recommended news, and the impact of such recommendations on users' viewpoints. However, there is a limited number of studies that examine the factors influencing users' engagement with these apps and their impact on media literacy from the user's perspective. This paper investigates the factors that affect the usage of algorithmic news recommendation apps, including the platforms' protection of users' rights and interests, content preferences, and other technological features.

Keywords: Algorithm news, Personalized recommendation, Media literacy

1. Introduction

In the mobile internet era, algorithms serve not only as technological tools but also as influential governing forces. Algorithmic news recommendation apps have become a primary way for many individuals to access news. By gathering users' interests and behavioral data, these apps utilize personalized recommendation systems to provide tailored news content, which effectively addresses users' informational needs, increases their engagement time, and generates traffic and revenue for news platforms.

2. Literature Review and Problem Statement

Previous research indicates that such mechanisms enhance users' satisfaction and loyalty, leading to more profound interactions between media platforms and their audiences. However, this approach also presents challenges, such as “filter bubbles” and “echo chambers,” which limit users' exposure to diverse perspectives. Existing studies primarily focus on the role of algorithms as “gatekeepers” in news production and distribution, the ethical concerns surrounding algorithmic news recommendations, and the impact of algorithm-driven news on users' viewpoints.

However, comparatively little attention has been given to the factors that influence users' adoption of these apps or their effects on users' media literacy from both user-centric and multidimensional perspectives. Therefore, this study focuses on platform users to explore how algorithmic news

recommendation apps shape users' behavior and influence media literacy through the lens of media technology.

2.1. Media technology and user experience

Huang Xiaomeng argues that digital media represents not only a technological paradigm and architecture but also an embedded media product designed to meet social and aesthetic needs that cannot be satisfied in the physical world. Yu asserts that digital media, particularly the Internet and algorithms, are instigating a communication revolution through technologies[1]. This transformation affects both media forms and communication rules. Traditional media platforms rely on algorithmic distribution to disseminate content, highlighting media technology's role in communication.

Media technology now functions as infrastructure, shaping new spaces and enhancing user experiences. Liu Yufan notes that media platform applications, as digital mediums, provide users with a new interactive environment[2]. However, Zhou Baohua raises concerns regarding algorithmic news recommendation apps, such as the emergence of “information cocoons,” “filter bubbles,” and “echo chambers.” These phenomena may restrict users' exposure to diverse viewpoints and ultimately affect their experience [3]. Additionally, algorithmic recommendation technology raises important questions about users' rights, including their right to privacy, the right to be informed, and the right to make autonomous choices.

The personalized recommendation mechanism of algorithms in news recommendation apps, the platforms' commitment to protecting users' rights and interests, and the design of platform interfaces all significantly affect user experience[4]. Understanding how algorithmic news apps operate is essential for ensuring news diversity and public discourse, making media technology's influence on user behavior a key research issue.

2.2. Algorithmic news recommendation apps and media literacy

In the age of new media, algorithmic news recommendation apps influence news dissemination, shape social values, and impact public opinion[5]. While algorithmic technology enhances personalized information distribution user experience, it also raises concerns about “information cocoons” and “filter bubbles.”[6] These phenomena can limit people's perspectives and understanding, potentially leading to the polarization of social attitudes and opinions. Additionally, Yang Liming highlighted that the opacity of algorithmic recommendations makes it difficult for users to grasp the underlying logic, further exacerbating information asymmetry[7].

Enhancing media literacy is crucial in addressing challenges posed by algorithmic technology. In 1997, Bu Wei introduced the Western concept of media literacy to China through his thesis. Zhang Zhian further defined media literacy as the ability to interpret and critique various forms of media information and utilize that information for personal and societal development[8]. As algorithmic technology becomes more prevalent, researchers have begun to explore its potential impact on public media literacy. Zhou Baohua investigated media literacy in China and found that the duration of media use does not significantly influence the ability to process media information; instead, the content users engage with plays a more critical role. Algorithmic news apps personalize content, shaping users' media consumption and information processing capabilities.

Based on this context, this paper focuses on users of algorithmic news recommendation apps to investigate whether these apps impact users' media literacy. It poses the following two research questions: 1. Does the media technology aspect of algorithmic news recommendation apps affect users' behavior? 2. Does using algorithmic news recommendation apps influence users' media literacy?

3. Research Hypotheses

3.1. The influence of media technology attributes on users' frequency of use in algorithmic news recommendation apps

3.1.1. The Influence of Rights and Interests Protection in Algorithmic News Recommendation Apps on User Frequency

In the digital era, the protection of privacy, information, and other rights is increasingly important. Studies indicate that users' trust in digital platforms largely depends on the platforms' ability to safeguard users' privacy and information security[9]. Shi Chunxiu argue that while algorithmic technology facilitates accurate information delivery, it also limits the audience's exposure to diverse content. This can lead to the frequent consumption of homogenized content, ultimately threatening the audience's right to know[10]. As a result, users may experience aesthetic fatigue and engage in intermittent dropout behavior to reduce their usage of these apps. Yang Tangyuan found that some users experience privacy anxiety when using algorithmic news recommendation apps[11]. Based on this, this study explores the impact of user rights protection on the frequency of app usage and proposes the following hypothesis: H1: The protection of users' rights and interests by algorithmic news recommendation apps positively impacts the frequency of their use.

3.1.2. The Influence of Content Preference Characteristics on User Frequency in Algorithmic News Recommendation Apps

Algorithmic recommendations collect users' personal information, constructing profiles based on behavioral data such as likes, comments, retweets, and viewing completion rates. These systems sift through vast amounts of data to deliver content that best meets users' needs, thereby enhancing user satisfaction[12]. Research shows that personalized algorithmic recommendation systems can mitigate information overload, significantly improve users' click-through rates, and enhance overall reading satisfaction[13]. This paper conceptualizes content preference characteristics as: Personalized Recommendation Precision: The degree of match between recommended content and user interests. Depth: The extensibility of recommended content in particular areas. Breadth: The variety of different fields and topics covered by the recommended content. Thus, the second research hypothesis is: H2: The content preference characteristics of algorithmic news recommendation apps positively affect the frequency of user use.

3.1.3. The Influence of Interface Design Features on User Frequency in Algorithmic News Recommendation Apps

Research indicates that factors like typography and information quality impact the reading experience, while font size and line spacing influence reading fatigue, efficiency, and user satisfaction [14]. Zhao Liyan asserts that the user interface of news apps should be intuitive, simple, and easy to navigate, minimizing non-essential elements[15]. Therefore, we propose the following hypothesis: H3: The interface design features of algorithmic news recommendation apps positively impact user frequency of use.

3.2. The Influence of Algorithmic News Recommendation Apps on Users' Media Literacy

Yu demonstrate that algorithmic recommendations can heighten users' awareness of their interests and help them recognize disparities between their preferences and those of others[16], fostering critical thinking and improving media literacy. Studies have shown that individuals are more likely to detect bias in algorithm-generated results, prompting them to reflect and correct their

perceptions[17]. This research highlights the complex interplay between algorithmic technologies, user rights, content preferences, interface design, and the overall impact on media literacy.

4. Research Design and Implementation

4.1. Variables definition and measurement

4.1.1. Independent Variables

This study aims to analyze the factors affecting users' use of algorithmic news recommendation apps and the impact of using algorithmic news recommendation apps on users' media literacy. To address the issue of factors affecting users' use of algorithmic news recommendation apps, the study takes the protection of rights and interests, content preference, and interface design of algorithmic news recommendation apps as independent variables, including the protection of users' right to be informed, privacy and autonomy, as well as the precision and breadth of content recommendation. To address the issue of the impact of the use of algorithmic news recommendation apps on users' media literacy, the study takes whether to use algorithmic news recommendation apps as the independent variable and assigns the value of 1 if it has been used and assigns the value of 0 if it has not been used.

4.1.2. Dependent variable

To address the issue of factors affecting users' use of algorithmic news recommendation apps, the study takes whether users use algorithmic news recommendation apps as the dependent variable. If the user has used the algorithmic news recommendation apps, the value is 1, and if the user has not used the algorithmic news recommendation apps, the value is 0. To address the issue of the impact of algorithmic news recommendation apps on users' media literacy, the study takes media use, media access, media dissemination, media creation, media participation, critical analysis of media content and critical understanding of media technology as the dependent variables, including the judgment of whether the user can skillfully use the media by himself or herself, and whether he or she can obtain the effective information through the media, etc.

4.1.3. Control variables

To control the differences in usage and media literacy caused by the heterogeneity of users' individual characteristics and education level, this paper mainly selects users' characteristics, including gender, age, education level, monthly income level, and household registration as control variables.

4.2. Questionnaire Design and Implementation

4.2.1. Questionnaire design

This study surveys mainstream algorithmic news app users, drawing on research by Yu Guoming and Yang Tingyuan. The questionnaire has three parts. The first collects demographic data, including gender, age, education, household registration, income, and app usage. The second examines how rights protection, content preference, and interface design influence app use, referencing studies by Yang Tingyuan, Shi Chunxiu, Yu Guoming, Wang Bin, and Zhao Liyan. The third assesses the impact of app usage on media literacy based on Xu Xiuli's scale. Responses in the second and third parts are quantified as 1 (yes) or 0 (no).

To ensure the standardization of the study and the quality of collected data, a small-scale pre-test of the questionnaire was conducted. The formal survey was distributed widely through online social platforms, including WeChat Moments, WeChat groups, and QQ groups, over one week. A total of

259 responses were collected, and after excluding questionnaires with abnormally fast completion times or patterned responses, 256 valid questionnaires were obtained, resulting in an effective response rate of 98.84%.

4.3. Reliability and validity test

The collected data were analyzed for reliability and validity by using SPSS 27.0 software. Reliability testing evaluates the consistency of the data, with higher reliability indicating greater trustworthiness. Cronbach's Alpha coefficient is commonly used as the reliability metric. Cronbach's Alpha coefficient for all dimensions is 0.814, exceeding the threshold of 0.7, indicating a high level of scale reliability.

For validity testing, the study utilized the KMO value and the p-value from Bartlett's test of sphericity as evaluation indicators. The results showed $KMO = 0.724 > 0.7$ ($p < .001$), both tests were successfully passed.

5. Empirical Analysis

5.1. Sample descriptive statistics

Table 1 presents the sample's descriptive statistics. Among 256 valid responses, 46.5% were male and 53.5% female. Age distribution was balanced. Educational attainment varied, with 13.7% having no formal education, 21.5% completing primary school, 18.4% junior middle school, 10.5% high school, 10.9% college, 5.9% bachelor's, 10.2% postgraduate, and 9.0% doctoral degrees. Urban registrants comprised 53.5%, exceeding rural registrants at 46.5%. The largest income group (47%) earned 3,000–8,000 yuan, while 10.9% earned below 3,000 yuan. The sample's diverse demographics meet the study's needs.

Table 1: Sample Descriptive Statistics

Basic Characteristics of the Sample	Category	Frequency	Percentage
Sex	1=Male	119	46.5%
	2=Female	137	53.5%
Educational attainment	1=Uneducated	35	13.7%
	2=Primary school	55	21.5%
	3=Middle school	47	18.4%
	4=High school	27	10.5%
	5=University college	28	10.9%
	6=Undergraduate	15	5.9%
	7=Graduate	26	10.2%
	8=Doctorate	23	9.0%
Household registration	1=Urban household registration	137	53.5%
	2=Rural household registration	119	46.5%
Age	1=Under 15 years old	26	10.2%
	2=15~20	30	11.7%
	3=21~25	39	15.2%
	4=26~30	36	14.1%
	5=31~40	36	14.1%
	6=41~50	42	16.4%

Table 1: (continued).

	7=51~60	21	8.2%
	8=Above 60	26	10.2%
Monthly Income Level	1=Below 3,000 yuan	28	10.9%
	2=3000-5000 yuan	74	28.9%
	3=5001-8000 yuan	72	28.1%
	4=8001-12000 yuan	34	13.3%
	5=12001-20000 yuan	24	9.4%
	6=More than 20000 yuan	24	9.4%

5.2. Correlation test

In this study, the Pearson correlation coefficient method was used to analyze the relationships between key variables. Significant correlations at the 0.01 level were found between the use of algorithmic news recommendation apps (like TOPBUZZ, Tencent News, and NetEase News) and the independent variables of rights and interests protection ($r = 0.52$, $p < .001$) as well as content preference ($r = 0.26$, $p < .001$). However, interface design showed no significant correlation ($r = 0.64$, $p = .306$).

Furthermore, the study examined the impact of these apps on users' media literacy. Significant but weak correlations were found between app usage and media literacy dimensions, including media use ($r = 0.191$, $p = .002$), media access ($r = 0.176$, $p = .005$), media dissemination ($r = 0.197$, $p = .002$), critical content analysis ($r = 0.131$, $p = .036$), and critical technology understanding ($r = 0.197$, $p = .002$). No significant correlation was found for media creation ($p = .246$) or media participation ($p = .084$).

5.3. Regression Analysis

5.3.1. Covariance test

Considering that there may be covariance between the variables, the covariance test between the variables needs to be conducted. Combining all the test results, the tolerance of all independent variables is greater than 0.5, and the value of variance inflation factor (VIF) is below 2, so the degree of covariance between independent variables is within a reasonable range, and further regression analysis can be carried out.

Table 2: Linear regression: Factors Influencing the Use of Algorithmic News Recommendation Apps

Model		Unstandardized coefficients		Standardized coefficients	t	Sig.	Cointegration statistics	
		B	Std.Error	Beta			Tolerance	VIF
1	(Constant)	-.227	.119		-1.907	.058		
	Guarantee of rights and interests	.955	.111	.489	8.636	.000	.891	1.123
	Content preference	.173	.089	.111	1.933	.054	.870	1.150

Table 2: (continued).

	Interfacial design	-.050	.094	-.029	-.535	.593	.949	1.053
		R2				.281		
		Adjusted R2				.273		
		F				32.856		
		P				.001		
		D-W value				.418		

Table 3: Linear Regression: The Effect of the Use of an Algorithmic News Recommendation App on Media Literacy

Regression analysis													
Model		Unstandardized coefficients		Standardized coefficients	t	Sig.	Cointegration statistics		R ²	Adjusted R ²	F	P	D-W value
		B	Std.Error	Beta			Tolerance	VIF					
1	(constant)	.707	.037		19.121	.000							
	Media use	.134	.043	.191	3.094	.002	1.000	1.000	.036	.033	9.575	.002	1.820
2	(constant)	.733	.035		21.101	.000							
	Media access	.116	.041	.176	2.848	.005	1.000	1.000	.031	.027	8.113	.005	1.900
3	(constant)	.714	.037		19.454	.000							
	Media dissemination	.138	.043	.197	3.201	.002	1.000	1.000	.039	.035	10.243	.002	1.894
4	(constant)	.779	.036		21.502	.000							
	Media creation	.049	.042	.073	1.163	.246	1.000	1.000	.005	.001	1.352	.246	1.802
5	(constant)	.793	.034		23.070	.000							
	Media participation	.070	.040	.108	1.737	.084	1.000	1.000	.012	.008	3.018	.084	2.012
6	(constant)	.764	.034		22.162	.000							
	Critical analysis of media content	.085	.040	.131	2.105	.036	1.000	1.000	.017	.013	4.432	.036	1.801
7	(constant)	.767	.032		23.922	.000							
	Critical unders tanding of me dia technology	.120	.038	.197	3.203	.002	1.000	1.000	.039	.035	10.259	.002	1.671

5.3.2. Regression analysis of influential factors on the use of algorithmic news recommendation apps

The data from the questionnaire were entered into SPSS27.0 software for linear regression analysis, in which the three variables of rights and interests protection, content preference, and interface design were taken as independent variables, and whether to use algorithmic news recommendation apps were taken as the dependent variable. From the table, it can be seen that the protection of rights and interests has a significant positive effect on whether users use algorithmic news recommendation apps (standardized regression coefficient is $\beta_{\text{protection of rights and interests}} = .489$, $p < .001$), content preference has a positive effect on whether users use algorithmic recommendation news apps with a near-significant level (standardized regression coefficient is $\beta_{\text{content preference}} = .111$, $p = .054$), and the interface design has no significant effect on the use of apps. This suggests that rights protection and content preference have a more significant positive impact on influencing users' use of algorithmic news recommendation apps, while interface design is not associated with it.

5.3.3. Regression analysis of the impact of the use of algorithmic news recommendation apps on users' media literacy

This study explored the impact of the use of algorithmic news recommendation apps on users' media literacy. The collected data were entered into SPSS27.0 software for linear regression analysis, with whether to use algorithmic news recommendation apps as the independent variable, and media use, media access, media dissemination, media creation, media participation, critical analysis of media content and critical understanding of media technology as the dependent variables. The results suggest that using algorithmic news recommendation apps has a significant impact on users' media use (standardized regression coefficient of $\beta_{\text{media use}} = .191$, $p < .01$), media access (standardized regression coefficient of $\beta_{\text{media access}} = .176$, $p < .01$), media dissemination (standardized regression coefficient of $\beta_{\text{media dissemination}} = .197$, $p < .01$), and critical analysis of media content (standardized regression coefficient $\beta_{\text{critical analysis of media content}} = .131$, $p < .05$) and critical understanding of media technology

(standardized regression coefficient $\beta_{\text{critical understanding of media technology}} = .197$, $p < .01$) had a significant positive effect, whereas for user's media creation (standardized regression coefficient $\beta_{\text{media creation}} = .073$, $p = 0.246 > 0.05$), media engagement (standardized regression coefficient $\beta_{\text{media engagement}} = .108$, $p = 0.084 > 0.05$) were not significantly affected.

6. Conclusions and Recommendations

6.1. Conclusion of the study

This study examines factors influencing users' engagement with algorithmic news recommendation apps, focusing on media technology attributes and media literacy. The findings show that certain media technology attributes positively impact app usage. Notably, protecting user rights significantly increases trust and engagement, while interface design has no significant effect. When platforms prioritize user rights, trust grows, leading to higher usage. Conversely, privacy violations reduce engagement.

Content preference also plays a key role, as users are drawn to content that aligns with their interests, boosting click-through rates and satisfaction.

Additionally, using algorithmic news apps improves media engagement, including media access, communication, critical analysis, and understanding of media technology. Algorithms enhance information filtering, reduce irrelevant content, and encourage user interaction through sharing and commenting. Exposure to diverse perspectives fosters critical thinking.

In conclusion, algorithmic news apps enhance users' ability to search, disseminate, and critically evaluate content and technology, contributing to improved media literacy.

6.2. Suggestions

The study puts forward the following recommendations from the aspects of platform optimization, user relationship maintenance, user media literacy improvement, and standardized regulatory measures:

6.2.1. Platform level: optimization of algorithmic news recommendation apps

Platforms should provide transparent data privacy policies and develop a data management center to return data control to users. They should also use advanced data protection technology and establish a user feedback mechanism to optimize news content. User feedback is crucial for improving news quality. The platform should offer diversified content to avoid a single information flow while

ensuring the accuracy of news sources. Users should have space for personalized content selection to prevent an “information cocoon.” A transparent recommendation mechanism should inform users of the logic behind recommendations to enhance trust. Additionally, users should be able to customize content preferences or block specific information, improving their ability to critically engage with media.

6.2.2. User level: Improve their media literacy

Users should take the initiative to contact a variety of information sources, explore diversified functions, reduce reliance on algorithmic recommendations, and break the information cocoon, to improve the diversity and comprehensiveness of information sources.

Users should understand the principles of the algorithmic recommendation mechanism and enhance their judgment and screening ability of the recommended content. At the same time, in the process of using the platform, users also need to actively think about the authenticity and objectivity of the recommended information.

6.2.3. Regulator Level: Promote the establishment of industry norms

Develop comprehensive data privacy protection norms and regulations, requiring algorithmic news recommendation app platforms to ensure the legitimacy and transparency of data collection and usage practices. Simultaneously, establish unified policy guidelines and oversight mechanisms to regulate platform behavior. Create a standardized complaint channel to safeguard users’ rights and interests, encouraging users to report any violations of their rights.

6.3. Expectation

The study collected samples and data through questionnaires, but there are still limitations. Future research can explore the influence of other factors of media technology on users’ usage and build a framework to study the relationship between platforms and users. At the same time, future research can be devoted to exploring the specific mechanism and causality of the impact of users’ use of algorithmic news recommendation apps on users’ media literacy, to study the specific relationship between the two and provide richer theoretical support for the overall optimization of the platform media ecology.

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