Gray Digital towards Digital Media Usage Behavior of Older Adults

Shen Shuaizhi, Ahlam Binti Abdul Aziz*, Ireena Nasiha Ibnu
Universiti Teknologi MARA, Malaysia;
[2]Guilin University of Aerospace Technology, China
ahlam@uitm.edu.my

Received Date: 23/12/2024 *Accepted Date: 24/1/2025* *Published Date:30/4/2025*

Abstract

As an increasing number of older adults utilize digital media, the digital access gap between the elderly and the younger generation is gradually narrowing. However, owing to individual differences, a significant disparity exists in digital media usage behavior within the elderly population. This study focused specifically on the so-called "gray digital divide" ， a usage divide among older adults aged 60+ years. Based on a representative survey in China (N = 394), it was found that nearly 61.42% of older adults perceive themselves as having a moderate level of digital media usage behavior. Through analysis of variance, it was showed that older adults with varying levels of education and financial status exhibited significant differences in their levels of digital media usage behavior. And gender differences did not lead to disparities in the levels of digital media usage behavior. To further analyze the factors influencing the digital media usage behavior of older adults, a multilevel hierarchical regression analysis revealed that education was a key determinant. the level of education and financial status positively influenced digital media usage behavior among older adults. Regarding attitudes and behaviors towards media, the digital media usage attitude did not directly affect their usage behavior. However, there was a significant positive relationship between digital media usage capability and usage behavior; the higher the media capability, the higher the level of digital media usage behavior.

Keywords: *Digital Divide; Older Adults; Media Usage Behavior; Media Usage Attitude; Media Usage Capability*

1.0 Introduction

Digital media, as a crucial medium and tool for social engagement, greatly empowered older adults in their social lives [1]. Portable and flexibly accessible digital media became the primary technological intermediary for elderly individuals to communicate with the outside world. Digital technology played a significant role in increasing access to information resources, expanding discourse space, and enhancing individual capabilities [2]. Within the elderly population, digital media served as an advantageous tool for technological empowerment. The information resources provided through digital media facilitated cognitive activities, enhanced communication channels for social activities, helped them perform daily tasks more efficiently, and enriched their leisure and entertainment activities [3].

However, in reality, the level of digital media usage among older adults varied greatly. According to the

e-ISSN 2821-3394

55th Statistical Report on Internet Development in China, which were released by the China Internet Network Information Center (CNNIC). As of December 2024, the number of internet users in China reached 1.108 billion, an increase of 16.8 million compared to December 2023, with an internet penetration rate of 78.6%. Internet users aged 60 and above accounted for 156 million, or 14.1% of the total internet users. However, older adults were the group with the lowest level of digital skills among all demographics [4]. The increased academic focus on the older population is justified by the fact that older adults are becoming increasingly comfortable with technology and are recognizing the benefits of using digital media services [5]. It is important to note that the older population is also considered a highly vulnerable group when engaging in online activities [6]. While numerous studies have highlighted the benefits of digital media on the lives of older adults, emphasizing its potential to enhance social connections, reduce feelings of loneliness, and improve overall well-being [7], there is still a lack of comprehensive research on the divide among older adults using digital media. This study aimed to empirically analyze the current status of digital media usage among older adults, explore the differences in digital media usage within the elderly population, and identify the fundamental reasons for intergenerational digital divides, providing insights for digital survival.

2.0 Literature Review

Media usage referred to the information behavior of audiences, encompassing all activities in which audiences engaged to determine information needs, collect, use, and transmit information [8]. On digital media platforms, the cost of information dissemination and reception was reduced, eliminating the need to meet the standards set by traditional mass media gatekeepers. Individual users could publish information on digital media platforms at no cost, shifting the control of information dissemination from traditional mass media to individual users within the platform [9]. Simultaneously, as recipients of information on these platforms, users considered the credibility of information as one of the key factors in deciding whether to accept it [10]. Users' past forwarding behavior, frequency and periodicity of information posting on media platforms, originality of information content, and relevance of information content to user interests, among other online cognitive experiences, formed the basis for subsequent cognitive behaviors such as forwarding, liking, and commenting [11]. In these subsequent cognitive behaviors, users' liking and commenting on information represented their interactive behaviors with information, while individual users' publication of original content or reposting others' content typified information dissemination behaviors in the digital media environment [12].

Numerous studies on digital media usage among elderly, however, indicated that older adults were typically behind younger cohorts in terms of percentage of digital media users and types of uses [13]. This problem, commonly called the age divide, was reflected in at least three levels of digital divide between young and old digital media users.

The first level of the digital divide known as the "access divide," primarily concerned discrepancies in accessing digital technologies such as computers and the internet. This level focused on variations in physical access to technology and ownership of devices. Disparities in access methods, autonomous usage, internet proficiency, social support, and usage purposes manifested as forms of the "access divide" among the elderly [14]. Compared to younger individuals, the elderly faced significant disparities in accessing internet-related infrastructure at the material level, including both hardware and software aspects. The proportion of elderly individuals using non-mobile internet and mobile internet was notably lower than that of younger people. Moreover, the elderly tended to have lower ownership and access rates of electronic devices, with simpler functionalities that often failed to cover essential applications in modern daily life. The purchase price of

e-ISSN 2821-3394

electronic devices and the economic costs of internet usage served as major reasons for many elderly individuals to resist digital access [15]. The "access divide" thus became the "first level of the digital divide" for elderly individuals in the digital era [16].

With the continuous iteration of internet technology and the accelerated construction of infrastructure, the reduction in technology costs was gradually bridging the "access divide". However, the emergence of the second level of the digital divide, also known as the "usage divide", became apparent [17]. This level of the digital divide typically emphasized digital contact and usage capabilities, highlighting how media contact and usage abilities influenced people's behavior in meaningful ways [18].

Research indicated that young individuals tended to demonstrate more appropriate social media behavior and were more accepting of social applications compared to the elderly [19]. Studies showed that young adults used social media more frequently for various purposes, including exploring healthy lifestyle behaviors [20]. Conversely, the elderly used social media more influenced by the perceived usefulness of the network and its contents rather than the perceived ease of use [21]. Meanwhile, within the elderly population, individual diversity influenced the media usage skills of the elderly, resulting in different media contacts and usage patterns [22]. The use of digital technology among the elderly was affected by physical skills; for example, some older adults experienced physical and mobility barriers, making it difficult to read small text fonts or control small screen buttons. Even if older adults were willing to try new technologies, factors such as health status and educational level prevented them from learning to use new media in their work and daily lives, unlike younger individuals [23]. Furthermore, older adults often lacked confidence in using technology psychologically, leading to technology anxiety or even fear, which affected their actual usage [24]. Elderly individuals lacked confidence when using digital media and technology. Some elderly participants lacked confidence, considering themselves as novices and lacking patience with technology. Additionally, some elderly individuals worried that making certain unchangeable "mistakes" could damage their devices or lead to concerns about privacy breaches. Digital media usage attitude was crucial in determining the elderly engagement with social media and online services [21]. The potential, frequency, and breadth of digital media usage among the elderly population consistently remained lower than that of the general population, indicating a significant digital divide between the elderly and younger demographics [25].

"The knowledge gap" represented the third level of the digital divide for elderly individuals in the digital age. In comparison to younger demographics, the disadvantages in digital access, usage methods, and skills among the elderly population led to inadequate acquisition of digital knowledge [26]. Some elderly individuals were unable to access relevant digital information or might have misconstrued digitally provided public service information. Moreover, the information cocoon effect brought about by algorithmic recommendations inadvertently fostered an information bubble among the elderly, leading to phenomena such as speechlessness or voicelessness when expressing social service needs and evaluating social service performance [27]. The decentralized nature of new media provided the younger generation with the possibility to challenge parental authority, resulting in the monopolization of discourse on the internet by younger individuals, thus marginalizing the elderly and rendering them the "others" in online communication [28].

The digital divide across age groups was extensively studied, revealing disparities that affected individuals of different ages, including older adults [29]. In addition to this, many researchers identified various factors influencing internet access among different age groups, leading to the recognition of a "grey digital divide" [30]. The concept of the grey digital divide specifically addressed the digital exclusion of the elderly [31]. The gray digital divide was recognized as a hindrance preventing older adults from reaping the benefits

e-ISSN 2821-3394

of digital technology research and design, especially concerning social isolation and dementia [32]. Studies indicated that the gray digital divide was not solely a result of physiological aging but was also influenced by societal categories and positions [33]. The reduced utilization of digital technologies by older individuals was identified as a crucial aspect of the gray digital divide [34]. Additionally, evidence supported the presence of a gray digital divide arising from both lack of access and lack of use among older adults [35]. Concerns were raised regarding the limited levels of technological service utilization among older adults, highlighting the existence of a gray digital divide [36]. The impact of the COVID-19 pandemic further underscored the necessity of addressing the digital divide among the elderly to ensure fair access to technology [37].

Based on the empirical findings cited above, it was easy to find the digital divide not only between the cohorts of the young and older adults but also within older adults. Therefore, this study looked at the level of digital media usage behavior among older adults, and the differences in digital media usage behavior among older adults individuals based on various personal characteristics, as well as the fundamental reasons leading to these differences.

3.0 Research Questions

As we all knew, digital adoption was growing faster among individuals aged over 60 [38]. Such growth had closed the first digital divide among older adults. Research had shown that even after achieving universal physical access to the internet, divides in digital media skills and usage patterns continued to expand [39]. Hence, the first research question looks at the level of digital media usage behavior within groupings of persons 60 years and older.

RQ1: What is the level of digital media usage behavior among older adults?

The second research question addresses the differences of digital media usage behavior among older adults. The literature suggested testing for socio-demographic variables such as sex, age, education, income, occupational exposure to PCs [40]. Therefore, the second research question concerns the differences in digital media usage behavior among older adults based on various demographic characteristics.

RQ2: What differences exist in the digital media usage behavior among older adults?

The digital media usage behavior of older adults was influenced by a complex interplay of various individual factors. It was influenced not only by their demographic characteristics but also by individuals' media usage attitude [21] and their personal media usage abilities [23]. Although, some individual factors cannot be directly influenced to digital media usage behavior, the complex interactions among these factors are crucial for influencing the digital media usage behavior of the older adults. Therefore, the third research question focuses on reasons for different digital media usage behavior among older adults.

RQ3: Which reasons lead to varying digital media usage behavior among older adults?

4. 0 Method

This study used a quantitative, non-experimental, correlational design. According to Creswell, J. W. and Creswell, J. D, leveraging quantitative methods allows the researcher to apply statistical data to test hypotheses and examine the relationships between variables [41]. This is done by drawing on numerical data. This study analyses the variability of digital media use behaviors within the older age group through quantitative research methods and explores the underlying causes of the intra-generational digital divide.

4.1 Sample

This study primarily explores the differences in digital media usage behaviors among older adults, with

e-ISSN 2821-3394

the research subjects required to possess certain digital skills. According to the 55th "Statistical Report on Internet Development in China," by December 2024, there were 156 million internet users aged 60 and above in China, accounting for 50.32% of the total elderly population. The internet is further penetrating the elderly population. As one of the economically developed regions in China, Guangdong Province has a relatively high internet penetration rate. The digital media usage behavior of the elderly can well reflect the internet usage characteristics of the elderly population. Therefore, this study conducts a survey based on the elderly population in Guangdong Province as the research sample.

Due to the highly homogeneous nature of the elderly population and the influence of media-reported crime incidents and fraud news, elderly individuals generally exhibited a high level of vigilance in unfamiliar environments [42]. In order to reduce concerns about risk among surveyed elderly individuals and enhance the efficiency of the investigation, this study collaborated with community residents' committees in Guangdong Province of China. Community residents' committee staffs used purposive sampling to conduct online surveys.

Krejcie & Morgan provided a widely used guideline for determining sample sizes in research activities, recommending a sample size of 384 for populations above a million [43]. This guideline has been adopted in various fields such as health studies, social sciences, and environmental research. According to the latest statistics from the Guangdong Provincial Bureau of Statistics, as of the end of 2023, the resident population of elderly individuals aged 60 and above in Guangdong Province was 17.16 million [44]. Therefore, this study ultimately determined 394 valid samples through purposive sampling.

4.2 Measures

Digital media usage encompasses attitudes, abilities, and behavioral manifestations regarding digital media usage. Measurement of attitudes and abilities regarding digital media usage referenced the scale developed by Chen & Lou for measuring older adults' technology acceptance. This scale was primarily used to assess the acceptance and usage of new technology among the elderly, including attitudinal beliefs and control beliefs. Cronbach’s alpha and composite reliability for all subscales were above 0.80 in brief version, indicating that the internal consistency was excellent [45].

Digital media usage behavior referred to the audience's utilization and acceptance of digital media, encompassing all activities in which the audience engaged to determine information needs, gather information, use information, and transmit information [46]. The Media Technology Use Attitude Scale (MTUAS) was widely used in research on individuals' frequency and manner of media technology usage. This scale covered various aspects of media technology, such as email, social media, online news, etc [47]. At the same time, some studies found the MTUAS to be a valid and reliable measure for social media usage across these culturally diverse samples [48]. The MTUAS showed acceptable reliability, with Cronbach's alpha values ranging from 0.60 to 0.90 for teen reports and 0.67 to 0.98 for caregiver reports [49]. Therefore, this study referenced the scale developed by Chen & Lou for measuring older adults' technology acceptance and the Media Technology Use Attitude Scale (MTUAS) to measure digital media usage behavior. Taking into account the functional characteristics of digital media in China, the study measured digital media usage behavior in factors of attitude, ability, information reception behavior, and information dissemination behavior. In addition to demographic items, all items corresponding to these themes were constructed with a six-point Likert scale questionnaire, ranging from 1 (strongly disagree), 2 (disagree), 3 (slightly disagree), 4 (slightly agree), 5 (agree) to 6 (strongly agree).

e-ISSN 2821-3394

5. 0 Results

5.1 Sample Profile

In the 394 valid samples, males accounted for 40.10%, while females accounted for 59.90%. As older adults individuals age, they tend to participate in fewer social activities. In the sample data of this study, individuals aged 60-69 predominated, with those aged 70 and above comprising only 24.12%. Moreover, due to slow economic and social development in China during the 1960s, educational attainment was generally low. Consequently, the respondents in this study were mainly concentrated at the primary and junior high school levels, with only 6.85% having received college education, as shown in Table 1.

TABLE 1

Demographics of Respondents (n=394)

Demographics	Frequency	Percentage(%)
Sex		
Male	158	40. 10
Female	236	59. 90
Age		
60-69	299	75. 89
70-79	75	19. 04
80 and above	20	5. 08
Education Level		
No Formal Education	34	8. 63
Elementary School	135	34. 26
Junior High School	122	30. 96
High School	76	19. 29
College	27	6. 85

5.2 Level of Digital Media Usage Behavior among Older adults

To determine the level of digital media usage behavior among older adults, this study use class intervals for this abstract concept. The class interval, also known as the class width, was a concept used in statistics and data analysis to group a set of data values into intervals or ranges. It was an important aspect of creating frequency distributions. The class interval determined the width of each interval or range and plays a crucial role in organizing and presenting data in a meaningful and interpretable manner [50].

To identification of class interval, the initial step involved calculating the range, followed by dividing the range by three to correspond to the three levels of digital media usage attitude, ultimately resulting in the determination of the Class Interval (CI) value. Digital media usage included 15 items, which were measured with Likert Scales 6 points – scale 1 (Strongly Disagree) to scale 6 (Strongly Agree). The highest value of digital media usage behavior was 48, the lowest value was 8 among respondents. The calculation yielded the following results.

Range = Highest Value – Lowest Value

e-ISSN 2821-3394

= 48 – 8 = 40

CI = Range / N

= 49 / 3 =16.3 ≈ 16

The class interval was determined as 16. To get the value for every level, minimum score for every level have to add with CI value.

Low = 8 + 16 =24

Moderate = 25 +16 =41

High = 42 +16 = 58

The classification of the class intervals for digital media usage behavior level among older adults was as show in Table 2

TABLE 2

Classification of the Class Intervals for Digital Media Usage Behavior Level

Class Interval	Level of Digital Media Usage Behavior
42 - 58	High
25 - 41	Moderate
8 - 24	Low

Through frequency analysis in the SPSS statistical software, the results of digital media usage behavior level among older adults were shown in Table 3.

TABLE 3

Level of Digital Media Usage Behavior

Digital Media Usage Behavior	Frequency	Percentage (%)
High	48	12.18
Moderate	242	61.42
Low	104	26.40
Total	394	100

In Table 3, it was observed that the majority (61.42%) of older adults had moderate level of digital media usage behavior, while 26.40% had low level of digital media usage behavior. However, only (12.18%) had high level of digital media usage behavior. Older adults who had moderate level of digital media usage behavior often click “Like” to a posting, photo, etc. This situation happened because social media platforms such as WeChat and TikTok have indeed gained immense popularity and were widely used for online communication and interaction in China. Clicking “Like” was one of the primary ways people engage in communication through social media.

5.3 Individual Differences in Digital Media Usage among Older adults

To further validate the specific manifestations of individual differences in digital media usage behavior among older adults, detailed analyses were conducted using independent sample t-tests, one-way analysis of variance (ANOVA), and LSD post-hoc multiple comparisons, focusing on differences in digital media usage behavior among older adults individuals of different genders, educational levels, and financial statuses.

The analysis of differences in digital media usage behavior by gender using independent sample t-tests was presented in Table 4.

e-ISSN 2821-3394

TABLE 4

Independent Sample T-test Between Gender and Digital Media Usage Behavior

	Gender	N	Mean	Std. Deviation	T	P
Digital Media Usage Behavior	Male	158	3.782	1.291	-0.254	0.604
	Female	236	3.815	1.242		

From Table 4, it was observed that there was no significant difference in digital media usage behavior of different genders among older adults. The p-value for digital media usage behavior was 0.604, which was greater than 0.05, indicating consistency and lack of difference.

The analysis results of differences in digital media usage behavior among older adults by educational level using one-way analysis of variance (ANOVA) were presented in Table 5.

TABLE 5

ANOVA between Education and Digital Media Usage Behavior

Variable	Mean Square	df	F	P
Digital Media Usage Behavior	11.510	4	7.740	0.000

From Table 5, it was observed that there was significant difference of digital media usage behavior and education among older adults ($F = 7.740$, $P < 0.05$).

To further analyze the specific manifestations of differences in digital media usage behavior with varying levels of educational among older adults. Building upon one-way analysis of variance (ANOVA), this study utilized LSD post hoc multiple comparisons to meticulously analyze the specific differences, with varying levels of educational attainment—ranging from those with None Formal Education (NFE), Elementary School (ES), Junior High School (JHS), High School (HS), and College (COL). The result was shown in Table 6.

TABLE 6

Multiple Comparisons between Education and Digital Media Usage Behavior

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Digital Media Usage Behavior	NFE	ES	-.898*	.234	.000	-1.358	-.438
		JHS	-1.184*	.236	.000	-1.649	-.719
		HS	-1.175*	.252	.000	-1.670	-.680
		COL	-1.394*	.314	.000	-2.012	-.776
	ES	NFE	.898*	.234	.000	.438	1.358
		JHS	-.286	.152	.061	-.585	.014
		HS	-.277	.175	.113	-.621	.066
		COL	-.496	.257	.054	-1.002	.009
	JHS	NFE	1.184*	.236	.000	.719	1.649
		ES	.286	.152	.061	-.014	.585
		HS	.008	.178	.962	-.342	.359
		COL	-.210	.259	.418	-.720	.300
	HS	NFE	1.175*	.252	.000	.680	1.670
		ES	.277	.175	.113	-.066	.621
		JHS	-.008	.178	.962	-.359	.342

e-ISSN 2821-3394

	COL	-.219	.273	.424	-.756	.318
COL	NFE	1.394*	.314	.000	.776	2.012
	ES	.496	.257	.054	-.009	1.002
	JHS	.210	.259	.418	-.300	.720
	HS	.219	.273	.424	-.318	.756

*. The mean difference is significant at the 0.05 level.

From Table 6, it was observed that there were significant differences in digital media usage behavior between the NFE group and any other educational level group. The p-value for the comparison of digital media usage behavior between the NFE and ES groups was 0.000 ($p < 0.05$), with a mean difference of -0.898. The p-value for the comparison of digital media usage behavior between the NFE and JHS groups was 0.000 ($p < 0.05$), with a mean difference of -1.184. The p-value for the comparison of digital media usage behavior between the NFE and HS groups was 0.000 ($p < 0.05$), with a mean difference of -1.175. The p-value for the comparison of digital media usage behavior between the NFE and COL groups was 0.000 ($p < 0.05$), with a mean difference of -1.394. Furthermore, there was no significant difference in digital media usage behavior between the ES group and any educational level group above it. Therefore, it was concluded that the elementary school educational level served as the boundary for differences in digital media usage behavior among the older adults. For elderly individuals who have received formal education, differences in education level do not lead to differences in digital media usage behaviors.

To further verify the differences in digital media usage behavior with different financial statuses among older adults, this study conducted independent sample t-tests, and the results were presented in Table 7.

TABLE 7

Independent Sample T-test Between Financial Status and Digital Media Usage Behavior

	Financial	**N**	**Mean**	**Std. Deviation**	**T**	**P**
Digital Media Usage Behavior	Restricted	133	3.013	1.141	9.839	0.000
	Unrestricted	261	4.203	1.123		

From Table 7, it was observed that there were significant differences in digital media usage behavior with different financial statuses among older adults. The p-value for digital media usage behavior was 0.000 ($p < 0.05$). The mean for digital media usage behavior among elderly individuals not constrained by financial situations was 4.203, while the mean for those constrained by financial situations was 3.013, indicating elderly individuals with unrestricted financial statuses exhibited better digital media usage behaviors.

5.4 Individual Factors Influencing Digital Media Usage among Older adults

To investigate the influencing factors of digital media usage behavior among elderly individuals, this study used gender, level of education, and financial status as control variables, digital media usage attitude and digital media usage capability as independent variables, and conducted a multilevel hierarchical regression analysis with digital media usage behavior as the dependent variable. The results of the analysis were presented in Table 8.

e-ISSN 2821-3394

TABLE 8

Multilevel Hierarchical Regression Analysis on Digital Media Usage Behavior

Variables Predicting Digital Media Usage Behavior	*B*	Std. Error	β	t	Sig.	R Square	Adjusted R Square	*F*
Model 1						**.369**	**.364**	**76.093 (*P*=0.000)**
Gender	.027	.104	.011	.262	.794			
Education Level	.101	.050	.085	2.029	.043			
Financial Status	.554	.039	.582	14.040	.000			
Model 2						**.588**	**.583**	**103.264 (*P*=0.000)**
Gender	.001	.085	.001	.016	.987			
Education Level	.008	.041	.006	.189	.850			
Financial Status	.035	.048	.036	.718	.473			
Usage Attitude	-.035	.053	-.029	-.660	.509			
Usage Capability	.848	.067	.757	12.757	.000			

In Table 8, Model 1 includes gender, level of education, and financial status as control variables, the coefficient of determination (R^2) for this model was 0.369, indicating that these control variables together accounted for 36.9% of the variance in the dependent variable. The F-value was 76.093, with a corresponding p-value of 0.000 ($p < 0.05$), indicating overall significance of the model according to the F-test, suggesting that the control variables collectively had a significant impact on the dependent variable.

Specifically, concerning gender, the p-value was 0.794, significantly greater than the significance level of 0.05, suggesting that gender had no significant influence on the digital media usage behavior of older adults individuals. Regarding the level of education, the coefficient (*B*) was 0.101, with a p-value of 0.043 ($p < 0.05$), indicating a significant positive impact of education level on digital media usage behavior, suggesting that the more educated the elderly, the higher their level of digital media usage. Regarding financial status, the coefficient (*B*) was 0.554, with a p-value of 0.000 ($p < 0.05$), indicating a significant positive impact of financial status on digital media usage behavior, suggesting that older adults individuals with better financial status exhibited higher levels of digital media usage behavior.

In Model 2, with the addition of digital media usage attitude and digital media usage capability to Model 1, the R^2 value increased from the original 0.369 to 0.588, indicating that these independent variables together account for 58.8% of the variance in the dependent variable. The F-value was 103.264, with a corresponding p-value of 0.000 ($p < 0.05$), suggesting overall significance of the model according to the F-test, indicating that the newly added independent variables significantly influence the dependent variable, implying that digital media usage attitude and capability significantly impacted the digital media usage behavior of older adults individuals.

Specifically, concerning digital media usage attitude, the p-value was 0.509, which was greater than the significance level of 0.05, suggesting that the digital media usage attitude did not significantly affect media usage behavior among older adults. Regarding digital media usage capability, the coefficient (*B*) was 0.848, with a p-value of 0.000 ($p < 0.05$), indicating a significant positive impact of digital media usage capability on usage behavior. This suggested that the stronger the digital media usage capability of older adults individuals, the higher their level of media usage behavior.

e-ISSN 2821-3394

6. 0 Discussion and Conclusion

This study primarily focused on the digital divide among elderly digital media users, examining individual intrinsic factors influencing their digital media usage behavior through quantitative analysis methods. The findings from this study indicated that more than half of the older adults perceive themselves as having a moderate level of digital media usage behavior. Specifically, 61.42% of older adults had moderate level of digital media usage behavior, while 26.40% of older adults had low level of digital media usage behavior, only 12.18% of older adults had high level of digital media usage behavior. It aligned closely with the survey results from the China Internet Network Information Center (CNNIC). The 52nd China Internet Development Status Statistical Report released that 54.6% of internet users aged 60 and above, who were considered elderly netizens, possess at least one basic digital skill [51]. The majority of elderly netizens in China were capable of tasks such as searching for, copying, and pasting information on computers or smartphones. These skills essentially enable older adults to engage in daily information reception, transmission, and sharing activities using digital media. Although the increased usage, many elderly individuals still face challenges in adapting to new technologies due to limited digital skills and anxiety associated with technology use [52].

There were significant differences in the digital media usage behaviors of elderly individuals with different levels of education. The elementary school educational level served as the boundary for differences in digital media usage behavior among the older adults. This indicates that the development of digital technology has gradually lowered the threshold for use, with interfaces and operational processes becoming simpler and more intuitive [4]. Users only need to have a elementary school education level to access and use digital media, and there are no significant differences in digital media usage behaviors between elderly individuals with a primary school education level and those with a college education level. Meanwhile, there were significant differences in the digital media usage behaviors of elderly individuals with different financial status, elderly individuals with unrestricted financial statuses exhibited better digital media usage behaviors. Older adults with unrestricted financial conditions may have more resources to access and engage with digital media platforms, leading to higher levels of usage [53]. There were no significant differences in digital media usage behaviors between elderly individuals of different genders.

Further research revealed that level of education, financial status, and media usage capability were the primary intrinsic factors influencing the digital media usage behavior of older adults. This conclusion aligned closely with previous research findings. Some studies noted that the digital media usage behavior was influenced by people's level of education and income [40]. Older adults with higher educational attainment tended to engage more actively with digital media, they were more inclined to utilize platforms such as social media [54]. And elderly individuals with better financial conditions were more likely to own advanced digital devices and had stable internet connections, which were fundamental prerequisites for digital media usage. Those with higher income levels could afford the costs of purchasing and maintaining these devices, enabling them to access and use the internet more frequently. Moreover, higher income also means they can pay for additional digital services, such as online courses or smart device usage fees, thereby enhancing their digital media usage capabilities [55].

The media capability of older adults had a significant positive impact on their digital media usage behavior, the higher the media capability, the higher their level of digital media usage behavior. This was mainly because older adults with higher digital media capability may develop a strong interest in digital media, which motivates them to continuously learn and experiment with new digital media skills, thus enhancing their level of digital media usage. Some researches supported this notion, indicating that older adults who perceived

e-ISSN 2821-3394

digital media as useful and easy to use were more likely to engage with digital technologies and develop their digital skills over time. There was positive impact of digital literacy on older adults' digital media usage, suggesting that older adults with higher digital capabilities were more inclined to explore and utilize digital media platforms for various purposes [56]. Additionally, older adults with higher digital media capability may acquire more information through digital media compared to their peers, which could make them more confident and willing to try more features and applications. Smith revealed that individuals with advanced video editing skills were more inclined to create and share video content on social media platforms, highlighting the influence of skill level on media choice [57]. This suggested that proficiency in specific media formats could shape media preferences and choices. At the same time, media proficiency enhanced an individual's ability to control the media messages they received, facilitating their utilization of media to acquire necessary information for daily life and achieve personal goals [58]. This created a virtuous cycle where the higher the digital media capability of older adults individuals, the higher their level of digital media usage behavior.

However, gender did not influence the digital media usage behavior of older adults individuals. There was no significant difference in digital media usage behavior between male and female. This result was consistent with previous research conclusions. Existing studies suggested that the gender gaps in access to digital media in later life have considerably narrowed and in some respects even disappeared [59]. This was mainly attributed to the fact that in modern society, men and women enjoy equal rights and opportunities in various fields such as socioeconomics and culture. They have equal access to and utilization of digital technology and resources, which results in no significant differences in digital media usage levels with different genders among older adults.

The media attitude of older adults did not influence their media usage behavior. This finding contradicted some previous research conclusions. Parida et al indicated that technology attitude was a crucial factor in mitigating the impact of age on social media use among elders [60]. The reason was that the relationship between attitude and behavior was complex and multifaceted. Ajzen and Fishbein had highlighted that while there was a link between attitudes and behavior, it was not always straightforward or direct [61]. Factors such as cognitive-affective inconsistency, ambivalence, and the context in which attitudes were formed could all play a role in determining whether attitudes translated into actual behavior. Therefore, there was no significant relationship between the media attitude of older adults and their digital media usage behavior.

6.0 References

[1] P. Wang, X. P. Xiao, C. P. Su, and K. R. Cao, "Analysis of the Current Situation and Influencing Factors of Digital Life of older people in Cities," Library Journal, vol. 41, no. 6, pp. 108, 2022.

[2] S. J. Czaja, W. R. Boot, N. Charness, W. A. Rogers, and J. Sharit, "Improving social support for older adults through technology: Findings from the PRISM randomized controlled trial," The Gerontologist, vol. 58, no. 3, pp. 467-477, 2018.

[3] A. González, M. P. Ramírez, and V. Viadel, "Attitudes of the elderly toward information and communications technologies," Educational Gerontology, vol. 38, no. 9, pp. 585-594, 2012.

[4] China Internet Network Information Center (CNNIC), "55nd Statistical Report on Internet Development in China," Internet Development Research. [Online]. Available: http://www.cnnic.net.cn

[5] P. Ractham , A. Techatassanasoontorn, and L. Kaewkitipong, “Old but not out: Social media use and older adults' life satisfaction”, Australasian Journal of Information Systems, 26. 2022.

e-ISSN 2821-3394

[6] H. Seo, M. Blomberg, D. Altschwager, and H. T. Vu, “Vulnerable populations and misinformation: A mixed-methods approach to underserved older adults’ online information assessment,” New Media & Society, vol. 23, no. 7, pp. 2012-2033, 2021.

[7] A. Quan-Haase, C. Williams, M. Kicevski, I. Elueze, and B. Wellman, “Dividing the grey divide: Deconstructing myths about older adults’ online activities, skills, and attitudes,” American Behavioral Scientist, vol. 62, no. 9, pp. 1207-1228, 2018.

[8] T. Wilson, "Exploring models of information behaviour: the ‘uncertainty’ project," Information Processing & Management, vol. 35, no. 6, pp. 839-849, 1999.

[9] J. H. Kietzmann, K. Hermkens, I. P. McCarthy, and B. S. Silvestre, "Social media? Get serious! Understanding the functional building blocks of social media," Business Horizons, vol. 54, no. 3, pp. 241-251, 2011.

[10] S. S. Sundar, "The MAIN model: A heuristic approach to understanding technology effects on credibility," Cambridge, MA: MacArthur Foundation Digital Media and Learning Initiative, pp. 73-100, 2008.

[11] L. Zhang, "Information dissemination behavior based on social media: Theoretical and practical changes," Science and Society, vol. 4, no. 1, pp. 80-96, 2014.

[12] H. O. Liu, J. J. Sun, Y. M. Zhang, and P. Zhao, "User portraits and information dissemination behavior in online social activities," Information Science, vol. 36, no. 12, pp. 17-21, 2018.

[13] G. Nimrod, "Older audiences in the digital media environment," Information, Communication & Society, vol. 20, no. 2, pp. 233-249, 2017.

[14] P. DiMaggio and E. Hargittai, "From the ‘digital divide’ to ‘digital inequality’: Studying Internet use as penetration increases," Princeton: Center for Arts and Cultural Policy Studies, Woodrow Wilson School, Princeton University, vol. 4, no. 1, pp. 4-2, 2001.

[15] Y. L. Wang and Y. N. Jiang, "The pain of the digital divide for the elderly and ways to bridge it," News Enthusiasts, no. 07, pp. 31-34, 2021.

[16] P. Attewell, "Comment: The first and second digital divides," Sociology of Education, vol. 74, no. 3, pp. 252-259, 2001.

[17] E. Hargittai and G. Walejko, "The participation divide: Content creation and sharing in the digital age," Information, Community and Society, vol. 11, no. 2, pp. 239-256, 2008.

[18] E. Hargittai and A. Hinnant, "Digital inequality: Differences in young adults' use of the Internet," Communication Research, vol. 35, no. 5, pp. 602-621, 2008.

[19] S. Vasudeva, "Age in the acceptance of mobile social media: A comparison of generation Y and baby boomers using UTAUT2 model," International Journal of E-Adoption (IJEA), vol. 15, no. 1, pp. 1-24, 2023.

[20] F. Khaliq, S. Tariq, and D. S. Batool, "Health-related behaviors and social media usage in young adults: mediating role of coping strategies during covid-19 smart lockdown," Journal of Professional & Applied Psychology, vol. 2, no. 2, pp. 59-73, 2021.

[21] C. Ugalde, M. Acosta, and J. Carvallo, "Social media usage by elderly: application of technology acceptance model," Brazilian Journal of Development, vol. 9, no. 1, pp. 5902-5918, 2023.

[22] E. Hargittai, A. M. Piper, and M. R. Morris, "From internet access to internet skills: digital inequality among older adults," Universal Access in the Information Society, vol. 18, pp. 881-890, 2019.

[23] B. Yang and D. C. Jin, "The manifestation, motivation, and bridging path of the elderly's digital divide," Journal of Zhongzhou, vol. 43, no. 12, pp. 74-80, 2021.

e-ISSN 2821-3394

[24] Q. Q. Liu, M. Y. Zuo, and M. C. Liu, "Empirical Analysis of Continuous Use of Internet Applications by the Elderly Based on Expectation-Confirmation Theory," Management Review, vol. 24, no. 5, pp. 89-101, 2012.

[25] R. König, A. Seifert, and M. Doh, "Internet use among older Europeans: an analysis based on SHARE data," Universal Access in the Information Society, vol. 17, no. 3, pp. 621-633, 2018.

[26] L. We, and M. X. Zhang, "The third digital divide: Knowledge gap on the internet," Journalism & Communication Research, vol. 13, no. 4, pp. 43-53, 2006.

[27] H. M. Liu, and X. Q. Ma, "Fracture and Healing: 'Digital Divide for the Silver-haired' and the Construction of Humanistic Ethics," News Enthusiast, no. 3, pp. 18-22, 2021.

[28] X. H. Zhou, "The era of self-media: From communication to interactivity," Journalism, no. 4, pp. 20-22, 2011.

[29] T. Friemel, "The digital divide has grown old: determinants of a digital divide among older adults," New Media & Society, vol. 18, no. 2, pp. 313-331, 2014.

[30] O. Huxhold, E. Hees, and N. J. Webster, "Towards bridging the grey digital divide: changes in internet access and its predictors from 2002 to 2014 in Germany," Eur J Ageing, vol. 17, pp. 271-280, 2020.

[31] F. Mubarak, and R. Suomi, "Elderly forgotten? digital exclusion in the information age and the rising grey digital divide," INQUIRY: The Journal of Health Care Organization, Provision, and Financing, vol. 59, 2022.

[32] J. Faieta, L. Faieta, J. Leblond, F. Routhier, and K. L. Best, "Can technology abate the experience of social isolation for those affected by dementia?" Frontiers in Aging Neuroscience, vol. 13, 2022.

[33] S. Taipale, T. Oinas, L. Ivan, and D. Rosenberg, "Mobile phone use before and during the covid-19 pandemic – a panel study of older adults in seven countries," Mobile Media & Communication, vol. 12, no. 1, pp. 23-44, 2023.

[34] M. Leontowitsch, F. Wolf, and F. Oswald, "Digital (in)equalities and user emancipation: examining the potential of adorno's maxim of mündigkeit for critical intergenerational learning," Frontiers in Sociology, vol. 7, 2022.

[35] H. Enwald, N. Hirvonen, M. Kangas, et al., "Relationship between everyday health information literacy and attitudes towards mobile technology among older people," in *Information Literacy in the Workplace: 5th European Conference, ECIL 2017*, Saint Malo, France, Sept. 18-21, 2017, Revised Selected Papers 5. Springer International Publishing, 2018, pp. 450-459.

[36] S. J. Chang, S. J. Jang, H. Lee, and H. Kim, "Building on evidence to improve ehealth literacy in older adults," CIN: Computers, Informatics, Nursing, vol. 39, no. 5, pp. 241-247, 2020.

[37] G. M. V. Jaarsveld, "The effects of covid-19 among the elderly population: a case for closing the digital divide," Frontiers in Psychiatry, vol. 11, 2020.

[38] J. Choudrie, S. Pheeraphuttranghkoon, and S. Davari, "The digital divide and older adult population adoption, use and diffusion of mobile phones: A quantitative study," Information Systems Frontiers, vol. 22, pp. 673-695, 2020.

[39] A. Kumi‐Yeboah, Y. Kim, and Y. E. Armah, "Strategies for overcoming the digital divide during the covid‐19 pandemic in higher education institutions in Ghana," British Journal of Educational Technology, vol. 54, no. 6, pp. 1441-1462, 2023.

[40] M. A. Ishak, N. A. Khalid, K. R. Jenal, M. R. A. Rashid, and M. Yahaya, "Analyzing countries that have made significant progress in bridging the digital divide through e-government programs: Lessons learned

e-ISSN 2821-3394

from Estonia, Rwanda, South Korea, Singapore, Taiwan, and the United States," Journal of Media and Information Warfare, vol. 17, no. 2, pp. 143-163, 2024.

[41] J. W. Creswell, and J. D. Creswell, Research Design: Qualitative, Quantitative, and Mixed Method Approaches, Sage Publications, 2017.

[42] Y. Wu, F. Li, R. Triplett, and I. Sun, "Media consumption and fear of crime in a large Chinese city," Social Science Quarterly, vol. 100, no. 6, pp. 2337-2350, 2019.

[43] R. Krejcie, and D. Morgan, "Determining sample size for research activities," Educational and Psychological Measurement, vol. 30, no. 3, pp. 607-610, 1970.

[44] Guangdong's Aging Services and Elderly Care: Wholeheartedly Supporting the "Sunset Years" Department of Civil Affairs of Guangdong Province. [Online]. Available: https://smzt.gd.gov.cn/

[45] K. Chen, and V. W. Q. Lou, "Measuring older adults technology acceptance: Development of a brief, 14-item scale," Innovation in Aging, vol. 4, no. 3, pp. 1–12, 2020.

[46] B. G. Cui, "Information Behavior Theory - A New Thinking of Audience Research," Contemporary Communication, no. 1, pp. 34-37, 2000.

[47] L. D. Rosen, K. Whaling, L. M. Carrier, N. A. Cheever, and J. Rokkum, "The media and technology usage and attitudes scale: An empirical investigation," Computers in Human Behavior, vol. 29, no. 6, pp. 2501-2511, 2013.

[48] L. Sigerson, and C. Cheng, "Scales for measuring user engagement with social network sites: A systematic review of psychometric properties," Computers in Human Behavior, vol. 83, pp. 87-105, 2018.

[49] C. Stiles-Shields, K. M. Reyes, J. Archer, N. Lennan, J. Zhang, W. A. Julion, and N. S. Karnik, "mHealth uses and opportunities for teens from communities with high health disparities: A mixed-methods study," Journal of Technology in Behavioral Science, vol. 8, no. 3, pp. 282-294, 2023.

[50] C. Heumann, and M. S. Shalabh, *Introduction to Statistics and Data Analysis*, Springer International Publishing, Switzerland, 2016.

[51] China Internet Network Information Center (CNNIC), "52nd Statistical Report on Internet Development in China," Internet Development Research. [Online]. Available: http://www.cnnic.net.cn

[52] P. Ren, and S. H. Klausen, "Smartphone use, intergenerational support and older adults' wellbeing". Current Psychology, vol. 43, no. 1, pp. 407-424, 2024.

[53] Kraiwanit, Tanpat, Kris Jangjarat, and Areeya Srijam. "Factors Determining Online Activities and Technology Use Among Older Adults in Thailand." Pertanika Journal of Social Science and Humanities 31.2, 2023.

[54] Y. Shen, W. Hu, and C. J. Hueng, "The effects of financial literacy, digital financial product usage and internet usage on financial inclusion in China," MATEC Web of Conferences, vol. 228, 05012, 2018.

[55] S. J. Chen, SH. L. Zhou, and T. H. Jiang, "A Study on the Factors Influencing Internet Use Among the Elderly in the Digital Age," Lanzhou Academic Journal, vol. 05, pp. 141-149, 2022.

[56] B. Xie, I. Watkins, J. Golbeck, and M. Huang, "Understanding and changing older adults' perceptions and learning of social media," Educational Gerontology, vol. 38, no. 4, pp. 282–296, 2012.

[57] A. Smith, and M. Anderson, "Social Media Use in 2018," Pew Research Center: Internet, Science & Tech, United States of America, 2018. [Online]. Available: https://policycommons.net/artifacts/617452/social-media-use-in-2018/1598263/. [Accessed: May 30, 2024].

[58] H. S. Shokri, M. S. Hassan, and S. N. S. Allam, "New Media Literacy and its Impact on Moral Behaviour among Generation Z in Klang Valley," Journal of Media and Information Warfare, vol. 17, no. 1, pp. 70-

e-ISSN 2821-3394

82, 2024.
[59] E. Hargittai, and K. Dobransky, "Old dogs, new clicks: Digital inequality in internet skills and uses among older adults," Canadian Journal of Communication, vol. 42, no. 2, pp. 195-212, 2017.
[60] V. Parida, R. Mostaghel, and P. Oghazi, "Factors for elderly use of social media for health-related activities," Psychology & Marketing, vol. 33, no. 12, pp. 1134-1141, 2016.
[61] I. Ajzen and M. Fishbein, "Attitude-behavior relations: A theoretical analysis and review of empirical research," Psychological Bulletin, vol. 84, no. 5, pp. 888-918, 1977.

7.0 Acknowledgement

The authors thank the Philosophy and Social Sciences Work Office of the Guangxi Zhuang Autonomous Region, China, for providing financial support for this research (21FXW013).

e-ISSN 2821-3394