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Does authenticity really matter? Exploring the middle-aged and elderly users' motivations to share information on social media

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ABSTRACT

With information and communication technologies' rapid development, gradually increased have been both the number of social media users and people receiving information via various social media platforms. There was plenty of misinformation that runs alongside may have harmful effects on individuals' well-being. More importantly, the middle-aged and elderly people might serve as unintentional accomplices in spreading misinformation. To deal with these issues, more understandings should be garnered about the nature of both middle-aged and elderly users' information sharing behavior via social media. This study examined users' motivations through a survey questionnaire, and a total of 268 valid responses were obtained. The findings showed that the users' motivations were various and rooted from three major factors: 1) Social Interaction; 2) Knowledge Sharing; 3) Information Exchange. Although users have certain abilities to judge the authenticity of online information, users with lower educational levels were more likely to share information due to the need for social interaction and the authenticity might not be the main concern for them. This study suggests that to curb the spread of misinformation around the social communities of aged people, verification channels from authorities are vital but rather insufficient at times. Thus, the information literacy education should be strengthened proactively and at least include three learning indicators: 1) the basic skills of social media tools; 2) the strategies of credibility assessment; 3) the netiquette of social communities.

Keywords: Misinformation; Motivations of information sharing; Middle-aged and elderly user; Social media

Introduction

Over the past decade, with the rapid development of information and communication technologies (ICTs), both mobile Internet and smartphone use have become everyday norms. In this same time, gradually increased has been the number of social media users. As of 2018, approximately 2.65 billion people around the world have used social media (Statista, 2019). Therefore, social media has provided new ways for governments, service providers, and industry to communicate and engage with populations, as well as for individuals to engage with each other (Penno & Gauld, 2017). According to a survey by Pew Research Center, nearly 63% of Facebook and Twitter users across the United States are used to receiving news information through these social media platforms (Shearer, 2015). In the past, we could only receive news from newspapers or TV passively, but today people can easily obtain information through various news sites or social media anywhere, anytime. However, there are hundreds of social media channels that convey different perspectives every day, and users have to distinguish the true from the false on themselves (Warner-Søderholm et al., 2018). Guess, Nagler, and Tucker (2019) examined the individual-level characteristics associated with sharing misinformation on Facebook, and they found that only 5.3% of the total users have at least sharing one false article before. Although it seems to be a relatively rare activity on Facebook, it is worth noting that they also found a strong age effect. On average, users over 65 shared nearly seven times as many articles from fake news domains as the youngest age group (18-29). It can be seen that these middle-aged and elderly people who are not considered "digital natives" might not have had ample information literacy education opportunities back then, and maybe not so familiar with ICTs and social media as well. With all these in mind, these middle-aged and elderly social media users may become accomplices in misinformation spreading.

With an aging worldwide populace, an increasingly large proportion of social media users are middle-aged and elderly people. A survey found that the proportion of people using social media over 65 years old was 11% in 2010 and increased significantly to 30% by 2016 in the United Kingdom (OfCom, 2016). Likewise, only 13% of the population over the age of 65 were social media users in 2009 (Zickuhr & Madden, 2012), but this proportion has increased to Over 40% by 2018 in the United States (Smith & Anderson, 2018). From these data, it can be found that middle-aged and elderly users on social media have indeed increased a lot in recent years, and how to assist these users in making good use of social media tools has become a topic of concern. Although lifelong learning has been promoted all over the world in years,

information literacy education has also been regarded as an important part of it in an attempt to fulfill the digital gap. Even so, most studies in this field have only focused on the usage and skills of ICTs, and not treated other aspects in much detail (Gallistl & Nimrod, 2019). Thus, teaching middle-aged and elderly people how to use social media may be insufficient, and the main point is how to use it well. In order to achieve this goal effectively, we must have a deeper understanding of the social media use behavior of middle-aged and elderly users, so that we can provide truly constructive suggestions.

The main purpose of this study is to gain more understanding about the nature of the behavior of information sharing on social media by middle-aged and elderly users. Hence, the following research questions are:

RQ1.   *About middle-aged and elderly users, what are their motivations to share information on social media?*

RQ2.   *About such motivations, are there differences by 1) gender, 2) age, 3) educational level, or 4) employment status?*

RQ3.   *About the willingness to share information on social media, is it related to the information's cognitive authenticity?*

This study aimed to provide implications for the design of information literacy education for middle-aged and elderly people through the findings. In the hope that with this kind of proactive intervention, the spread of misinformation can be suppressed.

Literature review

Information sharing on social media

Web 2.0 is a term that was first used in 2004 to describe a new way of utilizing the World Wide Web. The content and applications online are no longer created and published by individuals, but instead are continuously modified by all users in a collaborative fashion. Social Media is a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0 (Kaplan & Haenlein, 2010). As a new form of media, it provides users with a channel to communicate, share information, collaborate, and most important of all, interact with others in a virtual community.

Today, social media is no longer an alternative media form that just a few audiences care about it, and there has been an increasing interest in the effect of social media on either propaganda, marketing, or impression management. The researchers from Facebook conducted an experiment on users during the US elections in 2010 to

exam the media effect on the voting rate. Through a plug-in application called "I voted!", users in the experimental group shared messages that they had voted publicly. It turns out that this intervention indeed facilitates voting (Bond et al., 2012). In addition, many vendors have seen this popularity of online communities of business opportunities, and then started their own fan pages or promoted their products through celebrities on social media (Fraade-Blanar & Glazer, 2017). Besides product marketing, there is a growing number of users promoting themselves on social media, and these users regard the platforms as useful tools for their impression management (Kyncl & Peyvan, 2017).

From the above, it seems that social media has become a major hotspot for publicity and marketing, and a dynamic ecosystem has gradually been formed (Nekaj, 2017). On the other hand, if social media is used as a tool for disseminating misinformation, the information may spread quickly and broadly. In time, social media platforms will become the hotbeds of rumors or fake news that are likely to do far more harm than good. For example, in the 2016 US presidential election, spread like wildfire were rumors that then-President Barack Obama was a Muslim. Although rumors like this might seem absurd to most voters, such rumors might at times impact election results if the information was effectively transmitted to a target audience who might actually believe in it. (O'Neil, 2018). Besides, Allcott, Gentzkow, and Yu (2019) found that during the same election year, there was almost as much fake news on Facebook as real ones. Even post-election, there were nearly 70 million fake news per month appeared on the platform, and the possible harm caused by it cannot be ignored.

Misinformation is defined as information that has been shown to be inaccurate (Karlova & Fisher, 2013). The massive spread of such information on social media can cause suspicion and fear among the public and creates harmful effects on individuals' well-being (Ferrara, 2015). Since misinformation has been proven to be inaccurate, it should be actively verified by relevant organizations or stakeholders. To curb such spread, relevant legislation and public education initiatives should be considered. (Chen, Sin, Theng, & Lee, 2015; Dickey, 2019).

Today, millions of people around the world acquire information through social media, whereas little has been known about the human behavior related to social media and especially the reasons for sharing information on these social media platforms. People tend to consider information that "a friend told them" to be reliable enough to share on social media (Mintz, 2012), and many regular users unwittingly propel the spread of misinformation when they forward misinformation to their own social networks without noticing (Ratkiewicz et al., 2011). However, not all users shared misinformation unintentionally, some users did that on purpose while already

knew the information might be false. For example, Chen et al. (2015) explored the reason behind the misinformation sharing of undergraduate and graduate students in Singapore. They found that the top reasons were related to the information's perceived characteristics, as well as self-expression and socializing. Among them, both accuracy and authoritativeness did not rank highly. In order to gain more understanding of the user behavior, Warner-Søderholm et al. (2018) applied items from different validated scales to measure trust to investigate to what degree a users' perception of trust varies depending on their gender, age, or amount of time spent using social media. They found at least five constructs within users' perceptions of trust that were benevolence, integrity, competence, identification, and concern. In other words, the trust of information on social media was not built on one pillar but in a complicated context. So, It can be seen that if information literacy education for social media use focuses only on the ability to discern authenticity but ignores other possible related factors, it may reduce its effectiveness in preventing the spread of misinformation (Chen, et al., 2015). Drawing upon previous researches, this study attempts to explore the various causes within the motivations behind the information-sharing behavior on social media through multiple perspectives.

Middle-aged and elderly populaces' motivations for social media use

Previously, the vast majority of the users on social media were younger people, but the proportion of middle-aged and elderly people using social media has been increasing in recent years. Although aged users might still not be as many as younger ones, they are probably the main force for sharing misinformation. More specifically, a research shows that users over 65 years old share the most misinformation on social media (Guess, Nagler, & Tucker, 2019). Under these circumstances, when the authorities try to curb the spread of misinformation via information literacy education, middle-aged and elderly users are definitely important targets that cannot be ignored.

From a more macro view, before implementing any information literacy education initiatives, it is vital to first understand the motivations for social media use. With regard to this, Newman, Stoner, and Spector (2019) tried to find the main motivations of middle-aged and elderly social media users, and the results show that a primary motivation for using social media amongst older adults is to maintain close ties with family and friends. As for non-users, the finding suggests that personal privacy issues and the perception of meaningless are the main factors that keep them from using social media. In addition, some middle-aged and elderly users believe that using social media helps them remain cognitively active (Quinn, Smith-Ray, & Boulter, 2016), and some users keep using social media because the interesting things

shared by others or just curious about others' life (Hope, Schwaba, & Piper, 2014; Jung, Walden, Johnson, & Sundar, 2017).

From the above, it can be found that middle-aged and elderly people have multiple motivations for using social media with the social factor having an important role. The users on social media deal with information in a sense of two-way interactions. Comparatively, traditional media (i.e. newspapers, radio, and television) had users receiving information only passively. Hence, interpersonal communication should be more weighed upon in the study of the motivations behind social media use. Papacharissi and Rubin (2010) developed a scale to measure Internet use's motivations based on the theory of Uses and Gratification (U&G) that includes five constructs: entertainment, pass time, interpersonal utility, information seeking, and convenience. It covers both users' internal and external aspects of motivations. Compared to those of general Internet use, the motivations behind social media use might be more complicated. Therefore, when discussing this issue from a broader perspective, multiple aspects should be considered instead of focusing only on tool-oriented factors.

Factors affecting social media use of middle-aged and elderly populaces

Along with the multiple motivations behind social media use, there might be individual-level characteristics that middle-aged and elderly users have associated with such behavior. A study of the internet and human behavior shows a significant connection between social media use and user personality (Hughes, Rowe, Batey, & Lee, 2012). Newman, Stoner, and Spector (2019) found that aged social media users were more receptive to new technologies, used the Internet more frequently, and generally had a positive attitude towards social media than non-users. Richter, Bannier, Glott, Marquard and Schwarze (2013) also found that aged social media users were more socially engaged than non-SNS users. Thus, social media might have a role in strengthening social connectedness for those aged social media users (Campos et al., 2016). However, a lack of familiarity with social media tools was the main factor that deterred aged people's social media use and usually related to the educational level of users (Jung et al., 2017).

Furthermore, studies have shown that between users and non-users, there were differences in demographic characteristics. For example, middle-aged and elderly social media users were more commonly female (Bell et al., 2013; Yu, Ellison, McCammon, & Langa, 2016), and younger (Bell et al., 2013; Hutto et al., 2015; Yu et al., 2016). Also, people with different demographic characteristics may hold different values or expectations toward social media. Significant differences in levels of

trusting behavior were found across gender, age, social media newsfeed preferences and extent of social media use (Warner-Søderholm et al., 2018).

Although extensive research has been carried out on the individual-level characteristics in association with social media use, little is known about the relationship between the motivations and the demographic characteristics of middle-aged and elderly social media users. Since the factors that drive social media use are both complex and diverse, sharing information online might not be a simple behavior to understand. The motivations behind social media use not only are various but also related to the demographic characteristics of the users. Besides, the characteristics of the information itself might also be a factor in affecting the users' decisions. Therefore, the authenticity of the information that has been generally valued in information literacy education does not seem to be the only key element in discussing the information sharing motivations on social media (Chen et al., 2015). To take positive actions in curbing the spread of misinformation, it is important to discuss this issue from multiple perspectives. As long as the motivations behind the information sharing behavior are better understood, the information literacy education might be improved and become more effective.

Data and method

Survey instruments and participants

The study was conducted in the form of an online survey. The questionnaire is composed of three parts:

Part 1: Cognitive authenticity and willingness to share information on social media

In order to understand the relationship between the willingness to share and the cognitive authenticity of information on social media. There were six information examples (three of them were "real", others were "misinformation") applied by the researcher. On a 7-point Likert-type scale, respondents were asked to rate the authenticity and the willingness to share of each information example.

Part 2: Causes of information sharing on social media

This part's questions were borrowed from Chen et al. (2015) to understand the reasons for sharing information on social media. There were 29 closed-ended questions mainly based on the theory of U&G answered via a 7 point Likert-type scale.

Part 3: Personal information

Although all responses were anonymous, to collect the individual-level characteristics, added were 4 demographic questions: 1) gender; 2) age; 3) educational level; 4) employment status.

The questionnaires were disseminated to target users via the instant messaging application of social media platforms through a convenience sampling approach. A total of 268 valid responses were obtained. The reliability or internal consistency of measures was tested using Cronbach's alpha test. The Cronbach's alpha value of "Part 1" scale was .841 and .963 for the "Part 2" that altogether show that these scales could be considered as reliable data collection tools within the context of this study. Since the data used in this study was collected only in Taiwan and the target users were chosen with a convenience sampling method, the general applicability of the findings is rather limited.

Data analysis method

In this study, both descriptive statistics and inferential testing were conducted with SPSS 25.0, and the descriptive statistics were used for all this study's three research questions. For RQ1, the explanatory factor analysis was performed to extract the principal components of information sharing motivations on social media in 29 items. For RQ2, independent sample t-tests and one-way ANOVA were used for inferential testing of gender, age, educational level, and employment status. For RQ3, Pearson correlations on the authenticity of information and willingness to share information were calculated.

Findings

Respondent Characteristics

Of all respondents, 54.3% were female (n = 145), slightly more than men (45.7%, n = 122). A majority of the respondents were between 51 and 60 years of age (about 61.4%, n = 164), followed by 61-70 (about 34.5%, n = 92), and 71-80 (about 4.1%, n = 11).In terms of educational level, the share of respondents with a college degree (about 60.3%, n = 161) was the largest, followed by master's degree (about 18.0%, n = 48) and high school diploma (about 14.6%, n = 39). Also, there were 18 respondents (about 6.7%) with a doctoral degree and only 1 (about 0.4%) whose highest education

level attained was the middle school level. In terms of employment status, more than half of the respondents currently have full-time jobs (about 54.3%, n = 145), 36.7% were retired (n = 98), and 9% were others.

The motivations of middle-aged and elderly people to share information on social media

The explanatory factor analysis (see Table 1) was performed to extract the principal components of information sharing motivations on social media in the aforesaid 29 items. Pre-analysis testing suggested that the data were indeed suitable for the extraction of factors (KMO = .951, Bartlett's test of sphericity = Sig. < .000). The result suggested that three factors were extracted with Eigenvalues higher than one and factor loadings above 0.5 (23 items left). The factors were subsequently interpreted and provided with labels according to what was perceived as their principal characteristics given the loading variables. As the first factor, "Social Interaction" appears as primarily oriented towards interpersonal utility such as interacting with family or friends but also towards the good feelings from interactions such as relaxation, not bored, etc. As the second factor, "Knowledge Sharing" represents the aggregate of items related to altruistic sharing and mainly focuses on the characteristics of the information shared. As the third factor, "Information Exchange" extracted arguably mirrors the information sharing acts that are egoistic. In other words, users share information to benefit oneself, not others.

Table 1. Exploratory factor analysis identifying online information sharing motivations for different causes.

No.	Causes	Social Interaction	Knowledge Sharing	Information Exchange
M20	Sharing information is a good way of killing time.	**0.842**	0.061	0.241
M15	Sharing information makes me not feel bored.	**0.814**	0.180	0.234
M28	I want to be the first to share the information among friends.	**0.791**	0.134	0.290
M19	Sharing information is a culture that everyone does.	**0.784**	0.187	0.317
M25	Sharing information makes me feel influential.	**0.779**	0.207	0.303
M17	Sharing information makes me feel relaxed.	**0.774**	0.317	0.178

M27	Sharing information improves my personal image.	**0.737**	0.298	0.215
M21	Sharing helps me enhance interpersonal relations.	**0.689**	0.328	0.324
M29	The information looks frightening.	**0.669**	0.239	0.122
M16	I feel enjoyment while sharing information.	**0.647**	0.471	0.226
M23	The information comes from my friends/family.	**0.646**	0.353	0.178
M24	The information seems accurate.	0.216	**0.855**	0.108
M13	The information seems useful.	0.174	**0.851**	0.216
M26	The information comes from authoritative sources.	0.193	**0.806**	0.020
M11	The information provides understandings of a particular event for everyone.	0.174	**0.796**	0.293
M18	The information seems important.	0.311	**0.770**	0.173
M22	The information is consistent with my belief/assumption.	0.214	**0.767**	0.290
M12	The information is current.	0.331	**0.664**	0.348
M01	The information can be a good topic for conversation.	0.420	0.104	**0.744**
M05	I can express my opinion by sharing that information.	0.389	0.285	**0.713**
M03	The information is eye-catching.	0.262	0.486	**0.615**
M06	Sharing helps me interact with people.	0.443	0.371	**0.611**
M10	Sharing helps me get other related information.	0.395	0.456	**0.563**

The relationship between different motivation factors and background variables of middle-aged and elderly users

To understand if there are differences in motivations among middle-aged and elder users with different backgrounds in using social media to share information, this study accounts four background variables: 1) gender; 2) age; 3) educational level; 4) employment status.

The inferential testing was conducted to explore the relationship between users' background variables and the three motivation factors extracted from the explanatory factor analysis. First, the analyses of variance show that age differences were not statistically significant in the aforesaid three motivation variables. Second, employment status differences were not statistically significant in the three variables.

Third, the independent sample t-tests show that gender differences were not statistically significant for two of the three motivation variables. As for the education level, the one-way ANOVA test showed a significant difference in the Social Interaction motivation between different educational level clusters. The users with a high school diploma scored significantly higher in the Social Interaction motivation than both the users with a college degree and users with a master's degree (Table 2). In addition, the users with a doctoral degree scored significantly higher in the Knowledge Sharing motivation than the users with a high school diploma (Table 3). These findings suggested that users with different educational levels might lead to differences in the motivations of information sharing among middle-aged and elderly social media users.

Table 2. Results of variance analysis on background differences in the Social interaction motivation.

Background variables	N	Mean	SD.	F value	Post hoc test
Age:					
51-60	164	-0.031	0.998	0.203	
61-70	92	0.047	0.991		
71-80	11	0.065	1.181		
Edu. Level:					
High school	39	0.504	1.047	4.941**	Scheffé Test:
Bachelor's degree	161	-0.021	1.005		(1) > (2)
Master's degree	48	-0.254	0.764		(1) > (3)
Doctoral degree	18	-0.255	1.107		
Employment Status:					
Full-time job	145	-0.045	0.995	0.771	
Part-time job	10	-0.265	1.123		
Between jobs	3	0.062	1.342		
Retired	98	0.091	0.986		
Others	11	0.011	1.108		
Gender:				*T* 值	
Male	122	0.039	0.985	0.577	
Female	145	-0.032	1.015		

*p < .05, ** p < .001

Table 3. Results of variance analysis on background differences in the knowledge Sharing motivation.

Background variables	N	Mean	SD.	*F value*	Post hoc test
Age:					
51-60	164	-0.049	0.989	0.506	
61-70	92	0.077	1.019		
71-80	11	0.087	1.059		
Edu. Level:					
High school	39	-0.215	1.011	0.015*	Games-Howell
Bachelor's degree	161	0.034	1.013		Test:
Master's degree	48	-0.067	1.062		(4) > (1)
Doctoral degree	18	0.392	0.507		
Employment Status:					
Full-time job	145	0.027	0.990	0.484	
Part-time job	10	0.220	1.104		
Between jobs	3	0.440	1.360		
Retired	98	-0.051	1.009		
Others	11	-0.220	0.975		
Gender:					*T* 值
Male	122	0.033	0.974		0.501
Female	145	-0.028	1.024		

*$p < .05$, ** $p < .001$

Table 4. Results of variance analysis on background differences in the Information Exchange motivation.

Background variables	N	Mean	SD.	*F value*	Post hoc test
Age:					
51-60	164	-0.082	0.988	1.429	
61-70	92	0.125	1.000		
71-80	11	0.172	1.150		
Edu. Level:					
High school	39	0.041	0.752	0.704	
Bachelor's degree	161	-0.056	1.039		
Master's degree	48	0.040	1.024		
Doctoral degree	18	0.286	1.091		
Employment Status:					
Full-time job	145	0.010	1.015	0.683	
Part-time job	10	0.308	1.125		
Between jobs	3	-0.367	1.517		
Retired	98	-0.068	0.943		
Others	11	0.290	1.122		
Gender:					*T* 值
Male	122	0.147	1.037		2.219
Female	145	-0.124	0.954		

*p < .05, ** p < .001

The relationship between cognitive authenticity and willingness to share of the information

To further understand the relationship between the willingness to share and the cognitive authenticity of information on social media, six information examples were made. Among them, three were real information adapted from reliable sources. Whereas, the other three were misinformation fabricated by the researcher. Respondents were asked to rate the authenticity and the willingness to share of each information example on a 7-point Likert-type scale in which 1 refers to the lowest

degree of authenticity/willingness and 7 the highest. Pearson correlations on the authenticity and willingness to share were calculated. Results revealed a positive correlation between the degree of authenticity and the willingness to share in all six examples (Table 5). Thus, the higher the authenticity of information the user thinks it is, the higher the willingness of the user to share it, and vice versa.

Taking a close look at the results, the average cognitive authenticity of the three real information cases was above 4.12. In contrast, the average cognitive authenticity of the two misinformation cases was below 2.99. Hence, the middle-aged and elderly users altogether have certain abilities to distinguish the true from the false. However, only one misinformation, which was health-related, was rated 4.46 on average. In other words, most respondents may have misjudged it as real information. From the perspective of information subjects, the health-related misinformation was the only one that was misjudged as real on average. Yet, whether this finding represents that middle-aged and elderly users have weak judgments on this subject is beyond the scope of this study with further research needed then.

Table 5. Correlations among the cognitive authenticity and willingness to share of the information.

Cases	True/False	Cognitive authenticity (x) (Mean/SD.)	Willingness to share (y) (Mean/SD.)	Correlation coefficient between x & y (r)
FN01 (Politics)	False	2.65 / 1.947	2.25 / 1.873	0.558**
TN04 (Politics)	True	4.88 / 2.036	3.86 / 2.294	0.578**
FN05 (Daily life)	False	2.99 / 1.638	2.56 / 1.829	0.612**
TN02 (Daily life)	True	4.83 / 2.212	3.92 / 2.430	0.626**
FN06 (Health)	False	4.46 / 1.918	3.66 / 2.196	0.692**
TN03 (Health)	True	4.12 / 1.819	3.20 / 2.072	0.637**

** $p < .001$

Discussion

In response to RQ1, this study found that the main motivations of middle-aged and elderly users while using social media to share information can be divided into three major factors: 1) Social Interaction; 2) Knowledge Sharing; 3) Information Exchange. Among them, the users with the Knowledge Sharing motivation might focus on the information content being shared, along with the importance, novelty, or authenticity of the information. Likewise, they seem to share information on social media with the intention of benefiting others, so it is more like an altruistic behavior. On the other hand, the content of the information might be also important to the users with the Information Exchange motivation, but the focus of the information seem to be quite different. It is not how it will help others like users with the Knowledge Sharing motivation intended to do, but how it can benefit oneself by sharing, such as getting other related information, expressing opinions, breaking the ice, etc. Compared with knowledge sharing, it is more like an egoistic behavior. As for the users with the Social Interaction motivation, the content of the information is usually not the point while sharing. The users might simply regard the information shared as a means of interacting with others, managing personal image, accumulating social capital, or just feeling good about oneself. Under these circumstances, the authenticity of the information or even the content itself might have been not important. As prior studies have suggested that, the primary motivation for using social media among older adults is to maintain close ties with family and friends (Newman, Stoner, & Spector, 2019). Overall, the motivations of middle-aged and elderly users to share information on social media are not always directly related to the information's content. More specifically, the authenticity of the information is just one of the considerations, and there might be more factors that drive the sharing behaviors. These factors may also cause middle-aged and elderly users to share misinformation unintentionally. In that case, to curb the spread of misinformation, these various motivation factors and complex contexts should be considered while designing information literacy education curriculums for middle-aged and elderly people.

In response to RQ2, we further explored the relationship between different motivation factors and background variables of middle-aged and elderly users. As a result, no significant difference was found between middle-aged and elderly users of

different ages, genders, or employment status in their motivations of information sharing on social media. In terms of age, it can be found from the results of descriptive statistics that younger middle-aged and elderly users do use social media to share information more that is close to the previous researches suggested (e.g. Bell et al., 2013; Hutto et al., 2015; Yu et al., 2016). Still, there were no significant differences in motivations between age groups. In terms of gender, female respondents have slightly more than males, and there were no significant differences in motivations. As for the employment status, more than half of the middle-aged and elderly people have full-time jobs, and the remaining respondents were retired, part-time, or unemployed, whereas no significant differences were found in the motivations.

Among all the background variables, the educational level was the one and only factor that related to the differences of motivations. According to the results of variance analyses, middle-aged and elderly users with a high school diploma were more likely to share information on social media due to the need for social interaction than the users with a college degree or a master's degree. On the other hand, users with a doctoral degree were more likely to share information for knowledge sharing than users with a high school diploma. From these results, it can be found that middle-aged and elderly users with higher educational levels possibly pay more attention to the value of the information in which authenticity might be one of the key concepts when sharing information on social media. Whereas, users with lower education levels were more concerned about the interaction with others, not the information's content. Thus, users with different education levels might have different motivations for sharing information on social media. In regards to intervening in misinformation spreading, this study suggests that while the causes of information sharing are various by educational level, the interventional strategies should not be limited to one criterion. It would better suit our measures to differing conditions in terms of educational level and need.

In response to RQ3, this study has found that middle-aged and elderly users have certain abilities to judge the authenticity of online information, and the lower authenticity they thought it was, the lesser willingness to share. However, it is worth noting that there is only one health-related misinformation that was misjudged as real on average. A possible explanation for this outcome was that the health-related information may be most relevant to their self-interest. Therefore, the middle-aged and elderly people may possibly pay close attention to it. As the saying goes, "the spectators see the chess game better than the players." Moreover, people tend to consider information that "a friend told them" to be reliable enough to share on social

media (Mintz, 2012). Thus, if the most relevant information for the user was inaccurate, the user may not only misjudges it but spreads it widely via social media, the possible harm cannot be underestimated. Although the results were based on a survey with a convenience sampling method in which the general applicability of the findings is limited, it may be regarded as a clue and will be explored in future research. Anyway, we cannot expect all the middle-aged and elderly people to have the abilities to distinguish the true from the false in all kinds of information. Hence, to curb the spread of misinformation, it is important to strengthen advocacy in information literacy education with more understanding of the middle-aged and elderly people's actual needs and provide verification channels from authorities.

Conclusion

The study found that the motivations of middle-aged and elderly users to share information on social media can be divided into three major factors: 1) Social Interaction, 2) Knowledge Sharing, and 3) Information Exchange. Furthermore, users with different educational levels might have different motivations for sharing information on social media. Lastly, users have a certain abilities to judge the authenticity of online information, and the lower authenticity they thought it was, the lesser willingness to share.

From above results, it can be found that the motivations of middle-aged and elderly people to share information on social media are various. Except simply informing others something important, novelty, or just interesting, notable numbers of causes that have nothing to do with the content drive the sharing behaviors too. Among them, social interaction was one of the main factors, especially for middle-aged and elderly users with lower educational levels. For these users, the authenticity of the information or even the content itself might not be the main concern when they share information on social media. Coincidentally, these users might also be the target audiences of the information literacy education. Thus, if the information literacy education was only focused on teaching the skills of ICTs, it will be limited help to prevent aged users from being the accomplices in the spread of misinformation.

So far, many countries have increased their awareness of the harm caused by misinformation on the Internet and adopted all kinds of containment measures. For example, in Taiwan, government institutions have increased their efforts to assist in the fact-checking of public information and news stories. Also, Taiwan's executive and legislative branches have introduced amendments to existing laws to curb the

spread of misinformation. Besides, private-sector tech companies have built apps that allow users to check on possible misinformation such as "Aunt Meiyu" (Dickey, 2019).

However, misinformation can spread rapidly online mainly through the transmission of users. Unless users have a proactive attitude to check the information before they share it, it will be difficult to curb the spread. If we only adopt these passive strategies in the fight against misinformation, the effectiveness may be limited. As this study suggests, active intervention measures should also be addressed such as strengthening the information literacy education of middle-aged and elderly people. More importantly, the information literacy education should not be limited to the skills of how to use social media but to use it well. For this purpose, both rational and emotional needs should be taken into consideration. That is, the information literacy education should include at least three major learning indicators: 1) the basic skills of social media tools; 2) the strategies of credibility assessment; 3) the netiquette of social communities. In that case, the middle-aged and elderly people should not be the accomplices in misinformation spreading but properly socially engaged.

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