Variations in the Adoption and Use of Mobile Social Apps in Everyday Lives in Urban and Rural China

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Abstract

China has in recent years seen the rapid adoption of multi-functional social networking applications such as WeChat. This paper aims to explore if China's social stratification has influenced the adoption and use of mobile social apps and if social apps such as WeChat can help to bridge the digital divide by providing urban and rural users equal access to diverse information and communication resources. The study is based on four months of fieldwork in the Henan province of central China and combines quantitative data from surveys and qualitative data from semi-structured interviews and focus groups. We find that there still exists a digital gap in the adoption and use of mobile social apps such as WeChat between rural and urban China, but such differences are also associated with demographic variables such as age, gender, and education level. Meanwhile, we found that WeChat has become more than a communication tool; it has also played an essential role in everyday problem-solving and information seeking for both rural and urban users. Our qualitative interviews and focus group studies reveal how WeChat influences various aspects of daily life in developing areas in China. We argue that although some divides in information seeking are being overcome, other new divides are emerging.

Keywords: mobile social apps, Chinese Internet, rural-urban divides, everyday information seeking practices, WeChat

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Introduction and Background

Mobile Internet has recently seen rapid adoption in China, a country where the Internet now reaches more than half of the total population. Most of the new users, however, are coming to the Internet via mobile devices. And most mobile users, in turn, are mainly using WeChat, an app which combines many functions and on which users rely on for many of their everyday needs. In view of this reliance, we ask whether there are gaps or divides in how different groups use mobile apps. In previous research about China, there have been extensive discussions of digital divides, and in particular about urban-rural divides in Internet or mobile uses. We will review these studies below, but the debate about the role of the Internet and mobile phones in development has in recent years moved beyond the question of whether people have access or not (Donner 2015). Our aim similarly is to go beyond adoption versus non-adoption and also beyond the dichotomy between the highly developed urban East and the far less developed rural West of China. By focusing on peoples' everyday information and communication needs, we will show instead that some divides in the uses of digital devices are being overcome while new divides are emerging.

Our research addresses the gap in literature on the adoption, use and domestication of mobile apps, in this case WeChat. We examine these uses among the urban and rural populations in Central China, an understudied region that lends itself particularly to this investigation because this area is neither part of coastal highly urbanized and higher-income part of China nearer the coast in the East of the country – nor is it part of the underdeveloped and large mainly Western interior region of China. We adopt a comparative perspective within Central China to see if the urban/rural dichotomy influences the uses of WeChat in a part of the country that is neither high-income nor underdeveloped, but which still evinces urban/rural contrasts. More specifically, we are interested to know how mobile apps like WeChat play a role not just in communication but also in human information seeking practices in everyday life.

By way of background to these issues, in 2013, 84% of rural Internet users reported using mobile Internet as opposed to 79% among urban users, making mobile phones the sole technological device that is more commonly used among rural as opposed to urban users (CNNIC, 2014, 2015). Further, in 2016, Chinese mobile Internet users accounted for more than 95.1% of Internet population, with 80.7% of new Internet users first gaining access to the Internet through mobile devices (CNNIC 2017). Still, there are gaps in the ways in which rural and urban users adopt the Internet and mobile applications. For example, according to CNNIC (2018), while WeChat has become widespread in China, the adoption of instant messaging apps by rural Internet users is still 10 per cent less than that of urban Internet users.

The urban-rural dichotomy, and more recently the mobile divide has, been a perennial theme in the academic literature on China. Furthermore, the Chinese government's economic and social policies have recently tried to address the shortcomings of earlier policies that favored urban industries over rural agriculture. There were also problems created by China's strict household registration policy (the *hukou* system) that tried to discourage rural-to-urban migration. According to National Bureau of Statistics of China, average income per capita in urban China was 3.21 times higher than rural China in 2012,

higher than the urban-to-rural income ratio in 1979. Chinese rural economic, social, and cultural development has thus lagged far behind urban development, including a far poorer provision of pensions, healthcare, and education. In recent years, the Chinese government has therefore promoted a national informatisation plan which uses the development of ICT infrastructure (village-to-village electricity, gas, and telecommunication network) as a stimulus to the rural economy. And government-led construction of 4G and soon 5G networks has also promoted the adoption of mobile Internet.

We focus on WeChat as by the far the most commonly used app in China. WeChat was tailored by its developers to be suitable for mobile phone screens and to include many functions. It was initially launched in 2011 as an instant messaging app to send and receive text or image messages. Within the first few years of its launch, WeChat developers designed new communication functions such as voice and video calls, discovering nearby friends, and moments (sharing and viewing of everyday updates on the timeline). However, it is when WeChat started to add functions beyond communication that WeChat became a Swiss-Army-Knife app for everyday life. For example, the development of financial functions such as WeChat Pay allows users to pay or receive money by scanning QR codes. Informational functions such as Public Accounts enable users to subscribe to traditional media accounts or independent blogs and personalize their information flow. By the end of 2017, WeChat had become the most popular social media platform, adopted by more than 87.3% of Chinese Internet users and it had more than 938 million monthly active users[1](CNNIC, 2018). It is thus an example of a versatile and multi-functional app that combines inter-personal communication, mass media broadcasting, and information seeking and sharing functions (Chen, Miao and Qiu 2018). WeChat has become more than a text messaging app and embedded in many everyday life routines, including but not limited to shopping, news reading, paying bills, and personal finance management.

Previous research on WeChat has explored its multi-functional features and highlighted its use as an interpersonal and small-group communication tool (L. Chen, Goh, Sun, & Rasli, 2017; Gan, 2018; Harwit, 2017). Compared to Weibo (or Twitter in the Western context), one feature that sets WeChat apart from these services is that users' 'Moments' on WeChat is visible only to mutually added friends. Thus, it is less public. However, WeChat users who have larger social networks tend to have more diverse access to network resources compared to those with smaller networks (Shen & Gong, 2018). The information seeking and -sharing functions such as 'public accounts' and article search also play major roles in delivering diverse information to users during crises and for other everyday purposes and matters of public concern (Y. Chen, Liang, & Cai, 2018; Gan, 2017; Guo, 2017). In recent years, there have been an increasing number of heated debates on WeChat after the viral spread of articles about issues such as the eviction of migrant workers[2], investigations into abuses in a Beijing kindergarten[3], and the

[1] https://www.tencent.com/zh-cn/system.html

[2] https://www.theguardian.com/world/2017/nov/27/china-ruthless-campaign-evict-beijings-migrant-workers-condemned

[3] https://www.nytimes.com/2017/11/24/world/asia/beijing-kindergarten-abuse.html

outrage over the vaccine scandal[4]. There have been only a few empirical studies of the use of apps by rural and urban Internet users. As one study with elderly users notes, while the information 'have-less' have benefited from the diversity of information sources and views on WeChat, at the same time these benefits are severely constrained because of the lack of digital skills and limited functionalities on mobile devices (Guo, 2017).

As literature review articles on ICT and China have pointed out, empirical studies in the field predominantly focus on macro-level national policy and political implications of ICTs in China, with far fewer studies about how ordinary Chinese Internet users embed digital technologies in everyday life (Qiu & Bu, 2013; Herold & de Seta, 2014). Qiu (2009), in his review of the field, highlighted the important implications of mobile telephony implications across the micro- (personal life), meso- (communities and organization), and macro- (regional and national) levels. Research on mobile phones has also broadened from the investigation of technology adoption to extend to the implications for various facets of everyday life (Yue, Wei & Nekmat, 2016). But while mobile phones used to be seen primarily as communication devices for people to stay connected with each other, in recent years, smartphones have also become an indispensable tool that facilitates information seeking and sharing.

Information Practices in Everyday Life

As already mentioned, recent research has moved beyond adoption and towards what people actually do with smartphones in their everyday lives (sometimes also known as the domestication approach, see Silverstone and Hirsch 1992; Haddon 2011). A major gap in this literature, however, has been that scant attention has been paid to how people seek and share information for everyday practical purposes (Savolainen 2012); that is, apart from how they use mobile phones for interpersonal communication, or for news or political information which have been extensively studied in China (see Qiu and Bu 2013). As Schroeder (2018) stated, "searching for and accessing information online has become one of two main everyday online activities – sociability or communicating is the other" (p.103). Of course, it is often difficult to separate information from communication as, for example, when links are shared between people. However, it has recently come to the attention of ICT scholarship that the role of say, using searching engines to look for information, which has become pervasive in everyday life, has been largely overlooked in the social sciences (Haider and Sundin 2019).

One discipline that has nevertheless examined information behaviors is library and information sciences. Scholars in this field have developed theories and models to study how information interact with information systems, including digital platforms (Wilson 1999). Several models focus on how users' information needs are situated in their psychological social, economic, political and technological environment (Wilson 1997) and how information sources are utilised to bridge knowledge gaps when users encounter problem-solving situations (Dervin 1998). Compared to communication studies, information seeking research has more emphasis on the individual or on environmental

[4] https://edition.cnn.com/2018/07/31/asia/vaccine-protest-scandal-china-intl/index.html

factors associated with information-seekers (message receiver or audience in communication studies) and also highlights the contexts of information and communication practices. Savolainen (1995) first introduced a theoretical framework of everyday life information seeking in the study of human information seeking behaviours in non-work-related contexts, for example, healthcare or hobbies. Drawing from Bourdieu's theory of *habitus*, he argues that individuals' information seeking is influenced by both their social status and cultural capital and their ways of life, which are often shaped by personal attitudes and beliefs. While the notion of habitus would draw us too far afield from the concerns in this paper, we share with Savolainen the focus on everyday routines and how information practices are important peoples' lives outside of the work context.

Another gap is that outside of China, people use a variety of tools such as Google (Waller 2011) to access and share information. In China, people typically use one or two social media platforms which combine multiple functions within a single service. And while the dominance of certain social media has sometimes been seen as being shaped by the government seeking to control the Internet, Pan (2016) has shown that in fact, the dominance of a few major services in China is based largely on market competition that has fostered simple and user-friendly functionalities. Tencent's WeChat has recently become the leading mobile app and become dominant in China. In this study, we therefore focus on the role of WeChat in rural and urban users' daily life.

Everyday Information Practices and the Digital Divide

At the same time, it should not be assumed that where people need practical information and have access to it, they will use it. Many researchers have warned that, as mobile phones become the sole mode of Internet access in developing areas, mobile users might experience the lack of functionalities or have limited mobile data packages compared to multi-devices users (Donner, 2015; Napoli & Obar, 2014). Oreglia (2013), for example, found little use of computers or mobile phones by rural users for gathering practical information about farming techniques, prices, weather and the like. For these purposes, farmers already had sufficient information through existing channels. She correctly points to the need to study information practices in context, rather than as if new information technologies will bring about changed practices on their own. Wei (Wei, 2013) studied the role of mobile technologies on civic engagement and found that mobile phones facilitated conversations in public spheres by disseminating news and information. Huang and Zhang (2017) more recently examined the adoption of WeChat among middle-aged urban Chinese and found that they use WeChat for between sixty and ninety minutes per day, often during several long sessions. Approximately half used one more platform such as QQ in addition to WeChat, while approximately a quarter used only WeChat and the rest more than two platforms.

Previous research has also investigated the social consequences of different levels of access and adoption of ICTs, which is often conceptualized as the "digital divide". Demographic and socioeconomic variables such as age, education, and gender are often associated with differences in adoption and usage differences (Scheerder, van Deursen, & van Dijk 2017). In cases where digital technologies become accessible to most of the population, Internet experience is also a sociotechnical factor accounting for digital ine-

qualities (van Deursen & van Dijk 2014). The Internet is increasingly embedded in everyday life to identify, search, collect, and share various types of information. In Sweden, for example, Sundin et al. (2017) examined young peoples' information behaviours. The authors found that young people take searching for information completely for granted as a part of everyday life (see also Ling 2012). They rely on Google, and googling something on their smartphone is so mundane that they no longer regard it as a distinguishable activity. Researchers have also shifted their focus to the usage of different Internet devices (Wyatt *et al.* 2005; Tsetsi & Rains 2017) where there is a divide among users of Internet platforms (Blank 2017) or different levels of participation in online platforms (Shaw & Hargittai 2018). Shifts from the divide in access and adoption to the divide in usage and information divide is thus leading to a rethinking of the concept of the digital divide.

What then about those that Qiu (2012) some time ago called the 'information-have-less' in China, what kinds of information practices do they engage in? There are even fewer studies that focus on how Chinese Internet users seek, collect and share information. Yu (2010) has shown in a longitudinal study of information practices that it is not just socio-economic disadvantages that lead people to be information poor, but also that information poverty is a condition that perpetuates itself: for example, Yu and Zhou (2015) found that information poverty also applied to managers and professionals, in addition to groups like rural migrants that have moved to in urban areas. The implication is that if there is little use of resources such as computers or mobile phones or newspapers among these groups, the resulting restricted horizon also leads to limited use of online information resources. It needs to be added that this is not primarily an issue of access to technology but rather of peoples' socially shaped habits and needs. Thus, people do not use mobile phones for purposes for which they might be needed; rather, they stick to what they know. Yu (2010) also suggests that this lack of information is not necessarily perceived as a problem by the people she investigated, while it is clear for the researcher that this lack has practical and disadvantageous consequences. Clearly, however, in-depth and comparative research is needed to examine if the rural, information have-less users are employing digital technologies differently from the urban, information have-more users, and this is the question to which we can now turn.

Research Questions

Previous literature has shown that rural users in China are often late adopters of ICTs (Oreglia, 2014). We ask if there are rural/urban disparities between rural and urban residents in their adoption and use of mobile media. Does the digital divide between rural and urban China also exist in the adoption and use of mobile apps such as WeChat? (**RQ_1**) Based on statistical reports and previous empirical research on mobile apps, we expect to see the same technological gap appear in WeChat. Hence our first hypothesis: Urban mobile users are more likely than rural users to adopt WeChat **(H_1)**. Many empirical studies have found Chinese social media users seeking out social connections ('guanxi') through interactions on the platforms (Chen et al., 2017; Yan & Yasseri, 2017) but many of these connections on mobiles are based on sharing the same hometown (Wang, 2016) and among close relationships (Cui, 2015). We hypothesize that rural users have smaller social networks on WeChat because of geographical constraints and lack of

social connections (**H2**). Further, previous qualitative research has indicated that age and gender is associated with ICT adoptions and use (McDonald, 2016; Wallis, 2015), so we expect to see the influence of socioeconomic factors associated with the adoption of mobile apps (**H3**) and with the size of social networks on WeChat (**H4**).

We also investigate if mobile apps such as WeChat are becoming more than a social-networking tool. If so, are other function of WeChat used similarly or differently by rural and urban users? (**RQ2**) Research on ICT for development has often expected mobile phones and mobile applications to bridge the pre-existing social and digital divides by empowering people living in developing areas with new access to everyday information. For example, research in India saw the potential of 'hybrid forms' of mobile SMS-based social media as an influential source of information in economic development (Donner, 2015). The use of WeChat for information was found to be associated with higher likelihood of reposting articles from WeChat public accounts (Wei, Huang, & Zheng, 2018). However, we also anticipate that due to lack of Internet experience and digital competencies, rural users are less likely than urban users to use WeChat as a tool for purposes beyond social networking (**H5**) and that rural users might also have different information needs comparing to their urban counterparts (**H6**). Finally, and more generally, we want to understand how users domesticate mobile social apps such as WeChat as a multi-functional tool in everyday communication, problem-solving, and information seeking processes (**RQ3**). Especially for this final research question, we will see that combining our quantitative analysis with qualitative insights will prove to be essential.

Methods

Data Collection

Unlike Weibo, which is often considered a public-sphere online platform in China, WeChat is used as a more personal and everyday tool (Gan, 2018). The private nature of mobile phones and of WeChat poses challenges for understanding the embeddedness of mobile apps in everyday life. Furthermore, literature reviews of research on China have suggested that there is a lack of empirical research that combines different methods (Liu, Liang & Zheng, 2016). Hence, we use a mixed methods approach, triangulating data from surveys, semi-structured interviews and focus groups to provide a comprehensive understanding of the social implications of mobile apps. Data for this study was collected during a four-month period of fieldwork from February to May 2017, during which period one of the authors spent time in three communities in a county in Henan Province - two rural villages and one urban residential community. Henan is in the Central region of China both geographically and in terms of social and economic development: as mentioned earlier, it is not situated in the highly developed coastal region, nor in the underdeveloped and mostly agrarian West of the country.

Survey. Previous research on the Chinese Internet primarily used online surveys to recruit respondents, which have provided interesting findings about savvy Chinese Internet users who live in urban areas. However, due to lower education levels and lack of Internet experience, online surveys might be inaccessible or difficult to interpret for rural Internet users. To address the issue, we conducted a survey of two hundred participants

through face-to-face administrations of the survey, each of which lasted 15 to 20 minutes. The survey instructions were read and detailed explanations given about survey questions using the same transcripts to ensure that all measurements are consistent and reliable. We used a purposive sampling technique (Battagila, 2008) to ensure that diverse groups of gender, age, education, income level, and internet experience were included in our survey. After eliminating incomplete surveys, the complete survey sample consisted of 152 survey respondents in three field sites, with a response rate of 76%. The survey consists of questions about demographic variables such as residence, age, gender, marital status, occupation, monthly income, education level and mobile social app adoption and use variables. Questions about the adoption and use of mobile media consist of whether or not the respondent uses WeChat, size of the mobile social network (measured by number of WeChat friends and number of WeChat groups), user's perception of the role of WeChat in different aspects of everyday life[5], and use of various WeChat information categories.[6]

Interviews and focus groups. After preliminary analysis of the survey data, we identified 13 individuals from the survey respondents who have diverse socioeconomic backgrounds and experience with technology to conduct semi-structured interviews. Two categories of information on WeChat, educational and entertainment, are frequently mentioned by the interviewees. Hence, we recruited another 10 participants from the survey respondents to join three focus groups to further explore these two topics. Participants in each focus group share similar backgrounds in terms of age or profession. Complementary qualitative data brings additional insights about the motivations for using or not using WeChat as well as understanding of 'outliers' such as tech-savvy or non-users in the surveyed population.

[5] Measured by a five-point Likert scale ranging from 1= 'strongly disagree', 2 = 'somewhat disagree', 3 = 'neutral', 4 = 'somewhat agree', 5 = 'strongly agree'. Perceptions include WeChat's perceived influence on social, entertainment, health, information seeking, education, and business in everyday life.

[6] Measured by a five-point Likert scale with 1= 'very negative', 2 = 'somewhat negative', 3 = 'neutral', 4 = 'somewhat positive', 5 = 'very positive'). Information categories include local news, national news, employment, self-learning, culture and entertainment, relationship, commercial, and health.

Descriptive statistics of survey data

Table 1 shows the descriptive statistics of the survey. The percentage of male and female respondents is almost equal. Most respondents are young or middle-aged, but there were also adolescents (7.2%) and elderly (10.5%) represented in the sample. More than half of the survey respondents had education levels equal to or below high school, and the majority (74.3%) of respondents had an income below 3000 RMB. The rate of mobile phone adoption in Central China is high, with 95.4% of respondents owning at least one mobile phone. Among mobile users, 90.3% use mobile Internet. After excluding non-users of mobile phone and non-users of mobile Internet, 41.2 % of Internet users use only their mobile phone exclusively to access the Internet. 42.8% Internet users spend more than 3 hours online, and the majority of surveyed users have over 3 years of Internet experience. However, 74.4% of mobile Internet users have less than 1 GB mobile data per month.

Table **1.** Descriptive statistics for demographic, mobile Internet adoption and use variables

Demographics	Frequency	Percent	Mobile Internet adoption and use	Frequency	Percent
Gender (N = 152)			Mobile phone (N = 152)		
Female (0)	78	51.3	Non-users	7	4.6
Male (1)	74	48.7	Users	145	95.4
Age (N = 152)			Mobile Internet (N = 145)		
<18	11	7.2	Non-users	14	9.7
18~25	25	16.4	Users	131	90.3
26~30	31	20.4	Mobile-only (N = 131)		
31~40	31	20.4	No	77	58.8
41~50	26	17.1	Yes	54	41.2
51~60	12	7.9	Time-spent online (N = 131)		
>60	16	10.5	<1 hour	27	20.6
Education level (N = 152)			1~3 hour	48	36.6
Middle school or under	47	30.9	3~5 hour	29	22.1
High school	31	20.4	5~7 hour	11	8.4
Occupational school	26	17.1	>7 hour	16	12.2
Undergraduate	36	23.7	Internet experience (N = 131)		
Postgraduate	12	7.9	<1 year	14	10.7
Monthly income (N = 152)			1~3 years	33	25.2
<2000 RMB	64	42.1	3~5 years	30	22.9
2001~3000 RMB	49	32.2	>5 years	54	41.2
3001~5000 RMB	29	19.1	Mobile data per month (N = 121)		
5001~8000 RMB	5	3.3	<150 MB	25	20.7
8001~12000 RMB	2	1.3	150~500 MB	29	24.0
12001~20000 RMB	2	1.3	500 mb~1GB	36	29.8
>20000 RMB	1	.7	1GB~3GB	27	22.3
Residence area			>3GB	4	3.3
Rural (0)	51	33.6			
Urban (1)	101	66.4			

Quantitative Analysis

The urban-rural gap in adoption and use of mobile Internet and mobile apps

We ran two binomial logistic regressions to see how rural-urban residence (H_1) and other demographic variables such as gender, age, monthly income, and education level (H_3) associated with the likelihood of the adoption of mobile media. The logistic regression model (See Table 2) on the adoption of mobile media was statistically significant, $\chi 2(5) = 38.236$, $p < .0005$ which explains 46.3% of the variance in mobile media adoption according to Nagelkerke R2. We found that age ($p = .006$) and education level ($p = .025$) added significantly to the prediction of adoption of the mobile app, but rural-urban residence ($p = .700$), gender ($p = .523$), and monthly income ($p = .104$) did not add significantly to the prediction.

We then ran multiple linear regressions to see if rural-urban residence (H_2) and other demographic variables (H_4) are associated with the size of one's social network on mobile social app. The regression model (See Table 3) on the size of the WeChat social network was statistically significant, $F(5, 123) = 3.442$, $p = .006$, which explains 8.7% of the variance in the size of social networks on WeChat. Again, rural-urban residence ($p = .106$) was not a statistically significant factor for the social network size. In the model of the size of mobile social network, gender ($p = .030$) was in fact the only statistically significant demographic variable, with male users more likely than female users to have larger social networks on WeChat.

Table 2. Logistic regression predicting likelihood of mobile media adoption based on urban-rural residence, age, gender, monthly income, and education level

	B	S.E.	Wald	*df*	*Sig.*	Exp(B)	95% CI for EXP(B)	
							Lower	Upper
Urban-rural Residence	.262	.681	.148	1	.700	1.300	.342	4.938
Age	-.617	.226	7.468	1	.006**	.540	.347	.840
Gender	-.450	.704	.408	1	.523	.638	.160	2.536
Monthly Income	.681	.419	2.640	1	.104	1.976	.869	4.491
Education Level	1.162	.519	5.023	1	.025*	3.198	1.157	8.837
(Constant)	1.653	1.527	1.172	1	.279	5.221		

Note: Gender is for males compared to females; Urban-rural residence is for urban compared to rural
^ *p < .01*
* *p < .05*
***p< .01*
****p< .001*

Table 3. Multiple linear regression predicting the size of mobile social network based on urban-rural residence, age, gender, monthly income, and education level

	B	S.E.	*Beta*	*t*	Sig.	95% CI for B	
						Lower	Upper
Urban-rural Residence	.234	.144	.144	1.629	.106	-.050	.519
Age	-.043	.050	-.083	-.851	.396	-.142	.057
Gender	.280	.128	.191	2.189	.030*	.027	.533
Monthly Income	.032	.065	.049	.485	.628	-.098	.161
Education Level	.097	.054	.171	1.816	.072^	-.009	.203
(Constant)	1.346	.254		5.300	.000	.843	1.848

^ *p < .1*
* *p < .05*
***p< .01*
****p< .001*

Urban-rural gap, WeChat, and information needs in everyday lives

Next we explored if there is an urban-rural gap in the use of WeChat for various purposes including but not limited to social networking (H_5). We ran several linear regressions with various perceived functions of WeChat as dependent variables, and demographic variables as independent variables. Table 4 shows the results of multiple linear regressions. We found that rural and urban WeChat users do not differ significantly in their use of WeChat as tools of social, entertainment, health, and information seeking. However, there are significant differences between rural and urban WeChat users in perceiving mobile social apps as tools for education ($p = .004$) and business ($p = .009$). Urban users are more likely than rural users to utilise WeChat for learning and managing or maintaining businesses. The finding supports our hypothesis that there is an urban-rural gap in the use of WeChat for purposes beyond social networking. Rural users are less likely than their urban counterparts to see WeChat as a tool of self-learning and business. We will provide qualitative analysis later to examine the obstacles for rural residents to benefitting from using WeChat in these two everyday contexts.

To see if there are differences among the information needs in everyday life between rural and urban mobile social app users (H_6), we ran linear regressions with different types of information needs as dependent variables and demographic variables as independent variables. As shown in Table 5, we found that when predicting information needs in everyday life using demographic variables, urban-rural residence is not a statistically significant factor. Instead, age and education levels are associated with WeChat users' needs for employment, self-learning, relationships, and commercial information. Younger generation users are more likely than older generations to seek for information about jobs ($p = .0004$), self-development ($p = .001$), and commerce ($p = .012$). WeChat users with higher education levels are more likely than those with lower educational backgrounds to seek information on employment ($p = .029$) and relationships ($p = .019$).

Table 4. Multiple linear regression predicting the perceptions of the role of WeChat in everyday life based on urban-rural residence, age, gender, monthly income, and education level

	Social					Entertainment					Health					Information seeking				
	B	S.E.	*Beta*	*t*	Sig.	*B*	S.E.	*Beta*	*T*	Sig.	*B*	S.E.	*Beta*	*t*	Sig.	*B*	S.E.	*Beta*	*t*	Sig.
Urban-rural Residence	.226	.139	.150	1.622	.107	.171	.149	.107	1.152	.252	.056	.161	.032	.346	.730	.097	.130	.070	.748	.456
Age	-.067	.049	-.140	-1.385	.168	-.018	.052	-.035	-.348	.728	.083	.056	.150	1.469	.144	.006	.045	.014	.133	.895
Gender	.003	.124	.002	.022	.982	.063	.132	.044	.478	.633	-.084	.144	-.054	-.585	.560	-.004	.115	-.003	-.034	.973
Monthly Income	.097	.063	.162	1.533	.128	-.068	.068	-.107	-1.008	.315	-.056	.074	-.081	-.758	.450	-.053	.059	-.096	-.900	.370
Education Level	-.066	.052	-.124	-1.266	.208	-.066	.055	-.117	-1.188	.237	-.034	.060	-.056	-.564	.574	.039	.048	.080	.804	.423
(Constant)	2.978	.246		12.127	.000	3.021	.263		11.500	.000	2.496	.285		8.751	.000	3.020	.229		13.196	.000
R^2	.049					.038					.030					.017				
Adjusted R^2	.010					-.001					-.010					-.023				
Sig.	.282					.442					.582					.824				

	Self-learning					Business				
	B	S.E.	*Beta*	*t*	Sig.	*B*	S.E.	*Beta*	*t*	Sig.
Urban-rural Residence	.415	.142	.262	2.916	.004**	.448	.170	.236	2.640	.009**
Age	-.003	.050	-.006	-.063	.950	-.107	.059	-.176	-1.801	.074^
Gender	.146	.127	.102	1.149	.253	.207	.151	.120	1.369	.174
Monthly Income	-.055	.065	-.087	-.845	.400	.003	.077	.004	.041	.967
Education Level	.045	.053	.081	.847	.399	-.006	.063	-.009	-.091	.927
(Constant)	2.459	.252		9.775	.000	2.701	.300		9.007	.000
R^2	.095					.109				
Adjusted R^2	.058					.072				
Sig.	.029*					.014*				

a. Dependent variables: WeChat is my social/entertainment/health/information seeking/self-learning/business tool.

^ *p* < *.1*
* *p* < *.05*
** *p*< *.01*
*** *p*< *.001*

Table 5. Multiple linear regression predicting information needs in everyday life based on urban-rural residence, age, gender, monthly income, and education level

	Local News					State Affairs					Employment					Self-learning				
	B	S.E.	*Beta*	*t*	Sig.	*B*	S.E.	*Beta*	*T*	Sig.	*B*	S.E.	*Beta*	*t*	Sig.	*B*	S.E.	*Beta*	*t*	Sig.
Urban-rural Residence	-.254	.127	-.173	-1.993	.048	.181	.151	.103	1.197	.233	-.080	.136	-.047	-.585	.559	-.258	.148	-.146	-1.744	.083^
Age	.025	.036	.062	.685	.494	.111	.043	.229	2.575	.011	-.142	.039	-.306	-3.642	.000***	-.142	.042	-.291	-3.343	.001**
Gender	-.034	.116	-.025	-.292	.770	.132	.138	.079	.956	.340	.139	.124	.087	1.113	.267	-.085	.135	-.051	-.625	.533
Monthly Income	-.020	.059	-.032	-.344	.731	-.039	.070	-.052	-.557	.579	.024	.063	.033	.379	.705	.081	.068	.108	1.184	.238
Education Level	.074	.049	.144	1.503	.135	.069	.059	.111	1.175	.242	.117	.053	.198	2.211	.029*	.046	.057	.074	.801	.425
(Constant)	2.956	.216		13.691	.000	2.017	.256		7.870	.000	2.947	.231		12.769	.000	3.402	.251		13.542	.000
R^2	.036					.061					.163					.101				
Adjusted R^2	.003					.028					.135					.071				
Sig.	.364					.100					.000***					.008**				

	Culture and Entertainment					Relationship					Commercial					Health				
	B	S.E.	*Beta*	*t*	Sig.	*B*	S.E.	*Beta*	*T*	Sig.	*B*	S.E.	*Beta*	*t*	Sig.	*B*	S.E.	*Beta*	*t*	Sig.
Urban-rural Residence	.105	.140	.064	.749	.455	.140	.151	.079	.923	.357	.181	.140	.107	1.291	.199	-.109	.151	-.062	-.721	.472
Age	-.053	.040	-.116	-1.310	.192	-.002	.043	-.005	-.054	.957	-.102	.040	-.218	-2.549	.012*	.089	.043	.184	2.055	.042
Gender	-.217	.128	-.140	-1.691	.093^	-.018	.139	-.011	-.133	.894	-.072	.128	-.045	-.560	.576	-.157	.138	-.095	-1.138	.257
Monthly Income	.006	.065	.008	.088	.930	.023	.070	.030	.327	.744	-.003	.065	-.004	-.047	.963	-.052	.070	-.070	-.743	.459
Education Level	.060	.054	.104	1.103	.272	.139	.059	.223	2.366	.019*	.098	.054	.165	1.804	.073^	.050	.059	.082	.853	.395
(Constant)	2.713	.238		11.398	.000	1.963	.257		7.642	.000	2.527	.238		10.627	.000	2.645	.256		10.329	.000
R^2	.062					.074					.128					.044				
Adjusted R^2	.030					.042					.098					.011				
Sig.	.092^					.046*					.001**					.251				

a. Dependent variables: Everyday information need for local news/state affairs/employment/self-learning/culture and entertainment/relationship/commercial/health on social media

^ *p < .1*

* *p < .05*

***p< .01*

****p< .001*

Interviews and Focus Groups

WeChat for education and self-learning

We have identified some factors responsible for key differences in WeChat uses based on the quantitative analysis. However, as mentioned, this tells us little about how people perceive their different information needs and the reasons why people use – or don't use - certain WeChat functions more than others and how these uses fit into their everyday lives. Hence, we turn to qualitative analysis.

A key role of WeChat, combining parenting and education, is to allow families to maintain contact with their children remotely when they are being schooled away from home and facilitate rural education at home or at school. Migrant workers from rural China have contributed enormously to Chinese economy. However, due to policy restrictions on urban household registration (or *Hukou* in Chinese), as well as the high living expenses in the cities, many migrant workers leave their children back in their hometowns. There are currently over six million of left-behind children in China, educated in rural areas while their parents work in urban areas (Xinhua News Agency, 2018). Before the smartphone became widespread in rural China, phone calls were the only meaningful means of communication between parents who had migrated and left-behind children (Murphy, 2014). Yet the adoption of WeChat by migrant workers now provide new channels of communication such as video calls and voice chats between left-behind children and their parents and facilitate the emotional bonding process within the migrant families.

Ms Du is the executive principal of the Qiaoguaiwa Kindergarten at B Village, The Valley County. For her, WeChat is a professional tool that helps the teachers to maintain daily communications with parents. In B Village, most of the parents are busy working in the fields or in other cities and so they would otherwise not be able to get to the kindergarten in times of emergency. WeChat is also a platform on which school teachers share knowledge about early childhood education. On Ms Du's WeChat Moments, she sometimes forwards articles about pre-school education to the parents' WeChat groups and in this way enhances their understanding of early childhood development at home and also about their roles in supporting children's education. The strong parent-teacher links also emerged from focus groups and 'perpetual contact' (Katz and Aakhus 2012) was frequently mentioned by high school and middle school teachers.

Our survey results suggest that rural users have a higher need for information about self-learning; nevertheless, social media platforms like WeChat are used more frequently as a tool for lifelong learning by urban than rural users. In the urban field site, WeChat groups enables teachers to exchange information about teaching materials and pedagogical methods. Miss Ruili Du, an English teacher in the local middle school in the county, for example, often collects articles from Official Accounts on WeChat, including China Education (Jiaoyu Bao), Teacher's Digest (Jiaoshi Bolan), and English Prose (Yingyu Gongdu), and either shares the English articles in her classes or teaches exam techniques to her students. For Zhai, who teaches mathematics in a rural middle school,

WeChat official accounts (See Figure 1 for Zhai's WeChat Official Accounts) and articles shared by colleagues are her most important information sources for developing teaching skills:

> The most informative account [on education] is managed by the education department of Henan Province, which publishes information about government guidelines on high school entrance exams or provincial workshops for rural middle school teachers. For me, an inexperienced teacher, the most difficult thing is how to build trust but maintain boundaries with students, which I learned mostly through reading posts shared by other teachers on WeChat Moments.

However, Miss Zhai Di also observes the lack of information skills and information sources among her collogues in rural middle school. One of the main obstacles in information seeking skills is to tell the difference between high-quality teaching materials and online advertisements. According to Zhai, sponsored advertisements on social media are difficult to tell apart, especially for older teachers. Zhai is often an information proxy for her colleagues in "filtering" free and open-source materials from sponsored articles about educational products.

Figure 1 Zhai's screen shot of subscribed public accounts on her WeChat. The second account is managed by education department of Henan Province

Information seeking on WeChat for employment and business opportunities

We found in the quantitative analysis that urban users are more likely to perceive WeChat as a tool for business and that younger generation users, regardless of their residence, are in greater need for information about employment. In the in-depth interviews, we also identified the younger generation in rural China as a social group that has particularly benefited from using WeChat for employment and business. As early adopters of WeChat

in rural China, younger generations in the village are more familiar with advanced information functions on WeChat and they have also accumulated more social connections than other rural residents.

For the younger generation living in rural China, WeChat is a tool to explore the outside world. Xiaopan, aged 18, is preparing for the first major challenge in her life, Gaokao, the Chinese college entrance exam. Her favourite WeChat function is Moments, which allows her to observe the life of others in her situation. She found many of her WeChat friends from 'Shake', who come from all over the country: 'The world of strangers that I see from WeChat Moments is different from mine', she said in the interview. Another interviewee, Huihui, is a 20 year old college student whose familiarity with technologies has enabled her to become the centre of her social circle by helping friends to solve technical or informational problems. The dream job for Huihui is to be a personal assistant in an entertainment agency in Beijing. We watched her as she skillfully switched between multiple mobile applications, including Sina Weibo, WeChat and 58 Tongcheng[7], to find information about jobs. She first found a CV template from Weibo, and then searched for positions available on 58 Tongcheng, and finally used WeChat to obtain information about her dream job and about the city where she has long wanted to live. For Xiaopan and Huihui, the Internet and social media exemplified by WeChat connect their villages with the rest of the world. Both are the youngest daughters in their families and their parents, perhaps because they are protective of their daughters or because they are retired and want to their daughters to remain close, have tried to stop them from leaving Henan province. However, their daughters have secretly gathered information that could enable them to envision a future life in the cities and help them to escape their villages. They cherished the opportunity to explore the outside world online and resist their families, their social circumstances, and perhaps also to overcome their own fears and misgivings.[8]

Apart from WeChat offering new windows on new job opportunities to young generations living in rural China, working-class users in urban China also find business ideas and build business networks on social media. Gui, who lives in the town centre, is a full-time employee in a pharmaceutical company. For him, WeChat is where he learned how to start a business on e-commerce platforms and social media platforms. Having accumulated experiences and social connections on WeChat, Gui now runs a WeChat-business that sells fruit in addition to his full-time job, earning more than three times the monthly salary of his co-workers. However, those who can take advantage of these opportunities still mostly live in urban areas:

[7] 58.com is a website that aims at facilitating trading and exchange of information in the same city. It covers every province in China and can be used for job-seeking.

[8] While this example shows how information can be individually empowering, as Wallis (2018) shows in her study of domestic workers, this does not necessarily lead to wider changes in women's unequal or marginalized positions. Indeed, as Wallis shows in other research, mobiles can tether migrant women workers to their employers and subject them to informal surveillance (2013: esp.162-69).

In 2014, I joined a WeChat group for car owners in the local area. It was an online group for business "elites" back then since car ownership was not quite common in the county. One of the group members shared his experience of running online business on WeChat with other members. I paid attention to all the process involved in e-commerce, from designing product logo to planning online promotion, and most importantly, I learned from his experience that WeChat Moments could be used to sell local agricultural products such as kiwi fruit (See Figure 2).

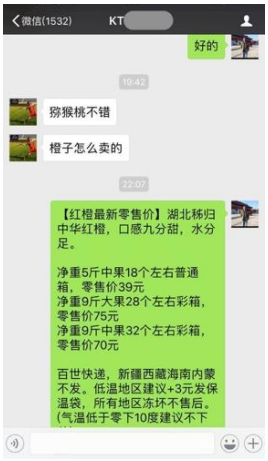

Figure 2 Gui's screen shot of his WeChat conversation with a customer. There are 1532 unread messages shown on the upper left corner. Gui manages all of his business online through WeChat chats and WeChat mobile transactions.

Virtual community and WeChat as information ground

Our interviews also included village community leaders who found WeChat Groups useful for their work. How rural governance is organized has been a theme in some research on China (for example, Tsai, 2007). Mobile social media apps are increasingly used by both local officials and rural residence to create online public spaces for information seeking and sharing (see also McDonald 2016: 60, 156-61). Here we can take as an example Chaofeng, who is a group leader in B Village. He has two work-related WeChat Groups: one is for all the officials in B Village, another is for all the group members who he represents. His daily work routine starts with virtual meetings in the officials' Group, and he then forwards documents or messages to the group members' Group. The use of WeChat allows information exchange and means that he no longer has to travel across the whole village to attend meetings and meet villagers. For villagers, WeChat Groups intended for local governance has become a space for shared information, or what has been called a virtual information ground (Fisher, Landry, & Naumer, 2006). Another example is Mr. Yang, a teacher at B Village. He says WeChat groups for team members is a platform where fellow villagers convey breaking news:

> There was a severe car accident that happened in the neighboring Province. More than 100 cars collided. I heard about this news from the WeChat Group. We all commented on local news there.

Interviewees from both rural and urban field sites mentioned WeChat as an information source for locally relevant news and everyday information. Some local users, having added thousands of users within the region through this function, called 'Finding Nearby Friends', transformed personal accounts into local news forums and some even charged for publishing local information. Jing, a young resident living in the rural area, benefits from using such services on WeChat:

> I added a "platform" on WeChat, which was actually a personal WeChat account owned by a Mr. Du. He posts advertisements such as business promotions, looking for cars or houses to rent, or recruiting part-time workers on his WeChat Moments. He must have more than 10,000 WeChat friends on all of the accounts that he owns. I contacted him last year to find a house to buy in the town centre and was offered free advertisements on his accounts twice a day, and only 4 to 5 Yuan if I want my post to appear more than two times daily. I trusted his platform and really believed that it works more efficiently and reaches a wider audience than posting advertisements in a local newspaper.

Conclusion and Discussion

In this paper we have brought survey data as well as insights from focus groups and interviews to bear on the question of how WeChat is becoming adopted and used in urban and rural environments in central region in China. Instead of finding a simple gap between the two, we uncovered a more complex picture. For example, although both rural and urban Chinese use WeChat for a variety of purposes, one of the main differences between them is that urban dwellers use WeChat more for self-development and business-related purposes. Apart from these differences, the urban-rural digital gap in the adoption and use of the mobile app is accounted for by demographic variables, such as gender, age, and education level. This finding echo previous quantitative research on major predictors for different access and usage of the Internet, indicating that digital divide exists in the adoption and use of WeChat (van Deursen & van Dijk 2014). For example, the younger generations are more likely to adopt mobile apps than other age groups, and female app users tend to have fewer WeChat friends than male users. Or again, users with higher education levels are more likely to adopt mobile apps. But we also found intriguing reasons behind these gender, age and education differences, which are linked to parenting, schooling, job-seeking and work-related needs.

We found that both groups rely intensively on both the social and information functions of the WeChat app. Both urban and rural people are equally likely to consider WeChat an important information resource, though as we just mentioned, they have somewhat different information needs. It is therefore necessary to complement these quantitative findings with the results of focus groups and fieldwork observations and interviews. WeChat connects migrant parents and their left-behind children, opens a world

of urban lifestyles to the younger generation, and supports some governance tasks of middle-aged village leaders. What we see here is that WeChat fits the functionalities of this service, such as connecting families but also local governance, into peoples' everyday lives as needed; in short, they domesticate the technology. What they do not do, and do not see a need for, are uses of WeChat that go beyond these functionalities which fit into their lives.

These many uses highlight how the absence of connectedness entails that a certain part of the population, and rural and older non-users in particular, are missing a useful tool that could benefit their lives (but we have seen that for others, it provides precisely this connectedness that was needed and missing, as with parents and teachers and children). At the same time, they did not recognize this lack, as previous studies have also found (see above, Yu 2012; Yu and Zhou 2015). Instead, they regard their information needs as being met, despite evidence to the contrary. Second, this absence also points to how WeChat or other similar platforms still have some way to go to make social media into a tool that could overcome the hurdles to make it appeal to these non-users, including those that do not intend to adopt mobile Internet. Furthermore, for rural mobile Internet users in particular, the range of uses is still restricted, which points to a potential lack of rich or variegated uses (see also Donner 2015). And peoples' circumstances change of course, so pupils or young people, for example, may have different needs as they move into the next stage of their lives or as circumstances change in their social surroundings (say, in teaching materials or resources for finding work), at which stage their existing habits may no longer match their awareness or familiarity with certain WeChat functionalities.

Mobile technologies have become the sole source of Internet access for almost half of rural population. This paper has moved beyond the existing research agenda on access to digital technologies which are driving the policies of the government and technology developers and pointed to new research directions that provide a fuller understanding of information uses that combines quantitative and qualitative analysis. Researchers have assumed, based on a review of studies that were mainly social-psychological and experimental (in other words, not studies of uses in context) that mobile-only users are inferior to multi-device users due to their lack of functionalities on smartphones (Napoli and Obar, 2016). Yet what we find is that mobile-only users rely on PC users to accomplish more complex tasks, while most of their information needs are satisfied by using smartphones. The mobile Internet plays a large role in the Chinese government's plans for the future. But we find some information-related functions of mobile media more important than others, which points to new research directions and implications for future development of the technology. As WeChat becomes a tool for information seeking, there is a need to explore how mobile media play a role apart from communication and sociability; the information practices of both urban and rural WeChat users are diverse. They have so far been analysed at a rather general level. Analysing them in context reveals a multiplicity of practices that tie to different ways of life and social roles, rather than general abstract categories: some are problematic, as when mobile phones are used to access materials for students to cheat; others are liberating, as when young women use mobile phones to access information about places that are otherwise 'off limits' to them.

These and other uses may not be those envisaged for social development by the government or by the developers of mobile media platforms, but they are no less important for that.

As our examples have shown, the digital divide is no longer simply about access to ICTs for economic and social development, but rather about such mundane practices as providing emotional support at a distance for children at school, helping to coordinate local administrative meetings, or exploring the possibilities of life in the big city. Moreover, these practices cut across the demographic divides of age and gender that have previously been identified, such as elderly and women being disadvantaged by lack of access. Such divides still exist, as our surveys show, but they are more about the informational needs of different social groups. These groups, or social roles, change over time, and people belong to multiple groups and have multiple roles, so they may also miss out on or take advantage of different WeChat functions, depending, as we have illustrated, on the reach of their social networks or how the information spreads within groups; the teacher who circulates pedagogical tips being just one example. Our findings therefore points to future directions in research with a more complex conceptualization and contextualization of digital divides.

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