Exploring the effect of WeChat on adjustment of international students in China
Zameer Hassan1*, Chu Jianxun1, Sara Qaisar1, Zakir Shah1 and Mitha Ram2

Abstract: WeChat is a popular social network application in China, which has fundamentally impacted users social interaction, communication, and personal relationships. In this study, we propose a conceptual model to measure how WeChat use intensity is associated with sojourners’ social and psychological adjustment in China. An online survey was conducted among 327 international students in Hefei City. The data were analysed through the statistical tools of IBM-SPSS & AMOS (22) by implementing correlation and Structural Equation Modeling (SEM). The finding indicated that social adjustment, emotional adjustment, and social support have a significant association with WeChat usage intensity. Moreover, acquired social adjustment and social support have a significant positive association with sojourners’ psychological adjustment. The study highlights the importance of WeChat use in the social and psychological adjustment of sojourners in China.

Keywords: Wechat use intensity; adjustment; social adjustment; emotional adjustment; psychological adjustment; sojourners; China

1. Introduction
International students are the most intensely studied group in the intercultural communication process because of their unique and diverse status across the world. Since the Chinese government scholarship program has launched, there has been a significant influx of international students in Chinese universities. About 489,200 international students from 204 countries and territories furthered their studies in 935 Chinese higher education institutions. The top 10 source countries are South Korea, Thailand, Pakistan, the United States, India, Russia, Japan, Indonesia, Kazakhstan, and Laos. Remarkably “Belt and Road” countries accounted for 64.85% of all international students in China (MOE.CN, 2019). China is on the third index for welcoming a large number of international students

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PUBLIC INTEREST STATEMENT
International students are the most intensely studied group in the intercultural communication process because of their unique and diverse status across the world. International students have to deal with transitional issues like academic challenges, social issues, language barriers, teaching style, perceived discrimination, social isolation, social & cultural adjustment, anxiety, insecurity, homesickness, insomnia, loneliness, and a general sense of unhappiness. This paper analysed how new media changes the individual’s social interaction and networking behaviour with its distinctive and unique nature across diverse cultures.
flocking to yield an opportunity to study in a well matured highly ranked education system (ChinaPower, 2018). Although the international students are pursuing higher degrees in more specialised fields, they have to deal with transitional issues like academic challenges, social issues, language barriers, teaching style, perceived discrimination, social isolation, and social and cultural adjustment. The same cause within China, sojourners experiences culture shock (Oberg, 1960) while experiencing the diverse culture with different behavioural standards and language. The international students also suffer from psychological issues like anxiety, insecurity, homesickness, insomnia, loneliness, and a general sense of unhappiness (Neri & Ville, 2006; Rohrlich & Martin, 1991).

The new media drastically changed the individual’s social interaction and networking behaviour with its distinctive and unique nature across diverse cultures in the past few decades. It has also made society interconnected and interdependent by managing individual social relationships (Chen, 2012; Nseke, 2018; Pang, 2018b; Vromen et al., 2015). A substantial body of research indicated that how the young generation adopted and utilised social networking websites in civic and social engagement, social capital, social adjustment, and other psychological consequences (Gil De Zúñiga et al., 2012; Steinfield et al., 2008). The intensity of Social Network Sites (SNSS) usage is positively associated with international students’ psychological well-being and similarly contributes to students’ psychological development (Burke & Kraut, 2016). A considerable literature has focused on the relations ship between Facebook use intensity with the psychological well-being, social adjustment of the individuals in the Western World (Hendrickson et al., 2011; Lin et al., 2012; Sandel, 2014).

In China, social media platforms like Facebook, WhatsApp, Google, Twitter are banned by the Chinese Government. Meanwhile, “China Made” social networking sites like WeChat, Weibo QQ are being used in the Chinese market. Tencent WeChat is a popular social networking site among individuals in China. It is named as China app for everything (Chao, 2017) with many functions like instant messaging, multimedia messages, scanning QR code to make new friends and finding new friends nearby (Chen, 2015). WeChat has 930 million subscribers around the world (CIW, 2017) with 1.2 billion monthly active users (Statista, 2021). WeChat has become the vital communication tool in the campuses and the fastest-growing social media application in China (Mao, 2014).

In this study, the foremost objective of this investigation was to understand how the usage intensity of WeChat influences the social and psychological adjustment of sojourners in China. As international students counter several socio-cultural adjustment issues to emotional adjustment with the host environment, sojourners need to overcome the intercultural interaction issue and adjustment issues. Intercultural scholars stress that new studies need to analyse and examine the sociological and social-cultural aspects of students’ cultural adoption and social adjustment (Jiang et al., 2020; Ye, 2006b; Ying & Liese, 1991). Considerable researches have been conducted on how people adjust to dramatic cultural changes (Kim, 2001). Meanwhile, many studies have analysed that how individuals use social network sites to regulate their relationships and adjust to the host environment both socially and psychologically (Lin et al., 2012; Ye, 2005). A growing body of literature has also shown that social network sites’ usage directly impacts network building, social interaction, social integration, and social capital among students (Li & Chen, 2014; Lin et al., 2012; Steinfield et al., 2008). International students use social networking sites like Facebook, Myspace, WeChat, Snapshot to maintain social relationships. Still, very few studies are conducted on the social and psychological adjustment of sojourners with relationship to social media use (Lin et al., 2012). Few studies have been conducted on the WeChat use intensity and social well being (Pang, 2018a; Wen et al., 2016). Hou et al. (2017) also claim that online social interaction skills and external locus of control are associated with the excessive use of WeChat among students. However, several studies have focused on the increased inflow of international students to China.
(e.g., Zheng & Kapoor, 2020). Less scholarly attention has been given to international student’s experiences of socio-cultural adjustment and life satisfaction.

Grounded in the discussion, the foremost goal of this investigation is to fill the research gap and offer a possible way to understand that how usage intensity of WeChat is associated with the social and psychological adjustment of sojourners in China. This study explored the relationship between WeChat usage and sojourners’ social, emotional, and psychological adjustment in China. How WeChat facilitates international students in adjustment with a different culture and social structure. How usage of WeChat contributes to social, emotional, and psychological adjustment of sojourners in China.

2. Social networking sites and adjustment

The adjustment is defined as “the degree of psychological comfort with the socio-cultural patterns in the host society’s sociological and psychological aspects” (Black et al., 1991; E. R. Pedersen et al., 2011). The Sojourner Adjustment concept appeared from the ideas of “culture shock” (Oberg, 1960). When sojourner encounters life transitions (starting student life in a different country and culture), they experience common issues, i.e., academic pressures, loneliness, problematic verbal & nonverbal communication, and stress. Even adjusting to the host environment is difficult because their home cultures are often vastly different from the host environment. Besides, they have less access to family & friends social support (friends living in their hometown) to cope with problems (Hechanova et al., 2002; P. B. Pedersen, 1991). Adler (1975) describes the different stages of the cross-cultural adjustment of individuals. In the “initial contact” phase, the individual become excited, and when the cultural dissimilarities become noticeable, it causes tension and frustration. This stage is called disintegration. The next step is known as reintegration; in this, emphatic rejection of the other culture occurs. In the next stage, “autonomy,” personal flexibility and the diverse ways to cope with difficulties bring the host culture understanding. In the last level; individual comfort increases, and in this the transition phase, individuals accepts the cultural differences and similarities. The individuals who separate themselves from the host environment are at the most risk of acculturative stress, socio-cultural, and psychological adjustment in the host country as compare to individuals with integration and assimilation attitudes. Adopting the host country environment is conceptualised as “acculturation” (Berry, 2003; Jiang et al., 2020; E. R. Pedersen et al., 2011). So, establishing new social networks in the host environment is a critical factor for social adjustment.

Recent scholarships showed that web 2.0 has positive impacts on social adjustment and the psychological well-being of sojourners. Lin et al. (2012) found that social networking website usage and personal characteristics are positively related to international students’ social adjustment. Ye (2006a) agreed that the sojourners who received more social support from online social media groups have lower societal problems adjusting to the host culture. Nevertheless, Sojourners use social networking websites to acquire social support and manages their social relationships.

Numerous studies find out that international students use SNS to communicate with the community to seek social support from online support groups (Gray et al., 2013; Karpinski & Duberstein, 2009). However, other literature also suggests that web 2.0 can help sojourners in receiving social support, and it could be an integral factor for international students for better adjustment socially, emotionally, and academically (Friedlander et al., 2007; Seo et al., 2016). Previous literature also found a positive relationship between social support and social relationship variables like self-efficacy, leisure, social skills, self-stem, social belonging, and social networking. However, social support also reduces loneliness, inferiority, and discrimination (acculturative stresses) (Poyrazli & Grahame, 2007; Sylvia-Bobiak & Caldwell, 2006). International students are likely to experience lack of social support because it is tough for them to seek social support from their family and long-term friends. They take social support from people around them, and they also face difficulties to make friendships with domestic students, most of them get connected with co-national students over there (Lee et al., 2018;
Ye, 2006a; Yoon & Jepsen, 2008). International students go to different countries to pursue their higher education and face mental anguish because of the new environment and cultural differences. These differences can have a powerful emotional impact on sojourners.

Along with unknown cultural variances, academic, social, and sometimes financial problems cause diverse issues like loneliness, confusion, frustration, anger, and depression. Some students adopt it gradually, and some sojourners reject cultural differences; the adoption process varies from personality to personality (Ammigan, 2019; Jerry G. Gebhard, 2012; Jerry Greer Gebhard, 2010). The host country’s limited language proficiency is also a fence in making new friends and establishing a social network in the host country (Constantine et al., 2005). Previous studies have also confirmed that language, educational experience, social integration, finical insecurity, and stress are common influential factors (Jiang et al., 2020). However, Ammigan (2019) argued that social networking, work opportunities, and compatibility with the host culture could predict student adjustments. More recent literature also claims that some other sophisticated variables can impact international student adjustments like prior sojourn experiences, sojourn coping competence, cultural distance/proximity, campus support services, etc. (Alemu & Cordier, 2017; Hennings & Tanabe, 2018; Kosheleva et al., 2015). An increasing body of literature examines the connection between social support and the psychological adaptation of international students. The meta-analysis on social support and sojourners psychological transition indicates a positive correlation between social support and international students’ psychological adjustment (Bender et al., 2019). Psychological well-being is also closely associated with international students’ emotional and social adjustment with the host environment (Mesidor & Sly, 2016).

3. Hypotheses
This research aims to examine how WeChat use intensity is associated with social and psychological adjustment of sojourners in China. We consequently pose the following hypothesis (Figure 1):

- WeChat usage intensity would be positively associated with perceived social adjustment (H1a), emotional adjustment (H1b) and social support (H1c) of sojourners.
- The acquired social adjustment would be positively associated with a person self-esteem (H2a) and personal satisfaction with life (H2b).

![Figure 1. The conceptual research model.](https://doi.org/10.1080/23311908.2021.1908705)
The acquired emotional adjustment would be positively associated with a person self-esteem (H3a) and personal satisfaction with life (H3b).

The acquired social support would be positively associated with a person self-esteem (H4a) and personal satisfaction with life (H4b).

4. Methodology

4.1. Research model
The abstracted model of the present study is illustrated in Figure 1. In this conceptual model, the WeChat use intensity is expected to be positively related to the sojourners, social, emotional adjustment, and social support, respectively.

4.2. Sample and procedure
A total of 389 undergraduate and postgraduate international students participated in this study who use WeChat in China. The research respondents were drawn from three famous universities of Hefei, China. The electronic version of the survey questionnaire was developed through an online data collection platform, namely, WJX.com, and distributed in the international students’ groups via the electronic link. The electronic questionnaire link was also circulated to WeChat contacts.

Participants were informed that their participation was both voluntary and anonymous. The international students come from different countries like Pakistan 44%, ASEAN countries 14.1%, African countries 13.8%, Indian 11%, and forth on. Among the participants, 72 (14.6%) were undergraduate, 113 (23%) were postgraduate, and 142 (28.9%) were Ph.D. scholars. The average length of living in China was almost two years (SD: 1.232).

Meanwhile, 62 questionnaire responses were discarded from the data set due to missing responses. Thus, 327 valid responses were used in this empirical research. The demographics are shown in Table 1.

4.3. Measures
WeChat usage intensity (M: 4.0, S.D: 1.03, CA .993) measure was taken from Ellison et al. (2007) with slight alterations. The same scale was used by Valenzuela et al. (2009); Wen et al. (2016). To measure the time: on average, about how many minutes per day have you spent on WeChat? Participants picked answer from the following: 1) 1–10 Min, 2) 10–30 1–10 Min, 3) 31–60 Min, 4) 1 – 2 hours, 5) 2 – 3 hours and (more than 3 hours). Then we ask participants to report how many WeChat friends do you have at University and elsewhere in China? Participants answered from these items: 0(less...
Table 1. Descriptive statistics for the participants (N = 327)

| Variables               | Category   | Distribution/Percentage |
|-------------------------|------------|-------------------------|
| Age                     | 18–22 year | 31 (9.5%)               |
|                         | 23–27 year | 102 (31.2%)             |
|                         | 28–32      | 138 (42.2%)             |
|                         | More than 33 | 56 (17.1%)              |
| Educational achievement | Graduate students | 72 (14.6%)          |
|                         | Postgraduate students | 113 (23%)            |
|                         | Doctoral students | 142 (28.9%)           |
| Residence length in China | Less than 1 year | 34 (6.9%)            |
|                         | 1–2 years   | 92 (18.7%)              |
|                         | 2–3 years   | 79 (16.1%)              |
|                         | More than 3 years | 114 (23.2%)           |
| Nationality             | Pakistan   | 144 (44%)               |
|                         | ASEAN countries | 46 (14.1%)           |
|                         | African continent | 45 (13.8%)       |
|                         | India       | 36 (11%)                |
|                         | Bangladesh  | 14 (4.3%)               |
|                         | Other countries | 28 (12.8%)           |

than 10), 2 (11–50 friends), 3 (51–100), 4 (more than 150). In order to calculate the intensity of WeChat, we asked participants to report the following questions using 5 point scale 1 Strongly Disagree, 2 Disagree, 3 Neutral, 4 Strongly Agree: I am proud to tell people that I'm on WeChat and it has become part of my daily routine?, I feel out of touch when I haven't logged onto WeChat for a while, I feel I am part of the WeChat community, I would be sorry if WeChat shut down. (Cronbach alpha 0.993).

Social adjustment scale (M:3.55, S.D:0.69, CA:0.833) was taken from Baker and Siryk (1986). This measure analyses the sojourner's involvement in social activities, interpersonal activities, and satisfaction with the new environment. Example items for the social adjustment scale include I feel I am very involved in social activities. I have several close social ties; I am satisfied with social participation. (Cronbach alpha 0.833).

Personal-Emotional Adjustment (M:2.53, S.D:0.949 CA:0.908) measure was used to analyse sojourners' psychological health, their responses to stress, and physical manifestations of social pressures (Hurtado et al., 1996). This scale contains different items like Some time I feel tense or nervous. Most of the time I am seeking psychological help. (Cronbach alpha 0.908).

Perceived Social support (M:2.06, S.D:0.47, CA:0.794) measure was used to analysed to perceived social support taken from the host country friends. This measure is taken from “measuring social integration and social support (Bille-Brahe, 1996). For example, I get social support from WeChat friends when I need it. I feel that you get the desired support you needed. I believe that you need social support from your social friends on WeChat. (Cronbach alpha 0.794).

The psychosocial adjustment will be assessed as a latent construct composed of our related adjustment outcomes: (a) self-esteem (M:3.85, S.D:0.64, CA:0.918) measured by the Rosenberg Self Esteem Scale (RSE) (Rosenberg, 2015) (Cronbach alpha is 0.918). (b) life satisfaction (M:3.08, S.D:0.721, CA:0.716) measured by the Satisfaction with Life Scale (Diener et al., 1985). (Cronbach alpha 0.866)
5. Results

5.1. Validity, reliability, and discriminant validity
To test the validity and factor loading of each domain of the proposed model, we performed principal component factor analysis with varimax rotation with threshold value “less than 0.50”. Specifically, the loadings of each item observed above the lower cut-off value of 0.4, which were also observed to hold no cross-loading effect, recommended for additional analysis (Black & Babin, 2010). The factor loading of each domain should be higher than 0.6. In contrast, all the factors loading is in the range of .724 to 0.946. The threshold values of the composite reliability (CR), Cronbach’s alpha (CA) of constructs should be substantial and exceed 0.7, and average variance extracted AVE should be substantial and exceed 0.5 (Bagozzi et al., 1991). Table 3 shows that all CA and CR values exceed 0.7, and average variance extracted (AVE) values are higher than the minimum recommended threshold. The finding also indicates that Decrement validity (square root of the AVE) is higher than correlations value, which affirms discriminant validity (see Table 2).

In the correlation analysis the inter-correlations among the key variables indicates that WeChat intensity is positively correlated to social adjustment (r = 0.464, p < 0.01), emotional adjustment (r = 0.235, p < 0.01), perceived social support (r = 0.248, p < 0.01) and life satisfaction (r = 0.268, p < 0.01), while there was no such correlation found between WeChat use intensity and self-esteem (r = 0.68, p < 0.01). Multiple regression analysis was conducted to analyse four constructed hypotheses. This study explored that the WeChat use intensity interacted with the social adjustment (b = .476, p < 0.001), emotional adjustment (b = .289, p < 0.001) and social support (b = .173, p < 0.001) scales found positively significant.

The Structural Equation Modeling (SEM) was conducted by using (Amos 22) to evaluate the structural stability and assessing the linear relationship between the latent variables simultaneously (Cheng, 2001). The SEM analysis suggested that the research hypothesized model demonstrated on acceptable model fit to the data: χ²/df ratio = 1.520, RMSEA = 0.040, CFI = 0.956, IFI = 0.957, and TLI = 0.947. The results indicate that the WeChat use intensity has a significant association with social adjustment (b = .476, p < 0.001), emotional adjustment (b = .289, p < 0.001) and social support (b = .173, p < 0.001). Moreover, acquired social adjustment has a significant positive association with psychological adjustment variables (self-esteem (b = .290 p < 0.001) and life satisfaction (b = .310 p < 0.001)). Results also indicate that the acquired emotional adjustment has no significant association relationship between self-esteem (b = -.178) while life satisfaction (b = .81) has partially significant relationship between obtained emotional adjustment. Social support also has a positive relationship between self-esteem (b = .385 p < 0.001) and life satisfaction (b = .461 p < 0.001) (see Figure 2).

| Table 2. Inter-correlations of variables |
|-----------------------------------------|
| Variable                  | 1      | 2      | 3      | 4      | 5      | 6      |
| WeChat intensity          | (.939) |        |        |        |        |        |
| Social adjustment         |        | .464** | (.834) |        |        |        |
| Emotional Adjustment      |        |        | .213** | (.809) |        |        |
| Social support            |        |        |        | .230** | (.793) |        |
| Self-esteem               |        |        |        |        | .370** | (.797) |
| Life satisfaction         |        |        |        |        |        | .810)  |

*Note*:
- ** indicates p-value < 0.001.
- * indicates p-value < 0.01.
5.2. Discussion and conclusion

This study was designed to focus on the role of WeChat usage in Student adjustments when making life transactions. International students encounter different transitional issues like academic challenges, social issues, loneliness, problematic communication, perceived discrimination, social isolation, social and cultural adjustment, etc. We investigated how WeChat usage affects the international student’s emotional and social adjustment, social support, and psychological adjustment in the host environment.

China is on the third index for welcoming many international students flocking to yield an opportunity to study in a well matured highly ranked education system. At the same time, little is known about this diverse and ever-expanding population in China. Our foremost research objective was to explore WeChat usage is associated with the social and psychological adjustment of sojourners in China. Like how WeChat facilitates international students in adjustment with

### Table 3. Reliability and validity

| Construct           | Items   | Loading | Cronbach’s alpha | AVE  | CR  |
|---------------------|---------|---------|------------------|------|-----|
| WeChat use intensity| WUI1    | .934    |                  |      |     |
|                     | WUI2    | .946    |                  |      |     |
|                     | WUI3    | .945    | .993             | .88  | .97 |
|                     | WUI4    | .930    |                  |      |     |
|                     | WUI5    | .940    |                  |      |     |
|                     | SS1     | .836    |                  |      |     |
|                     | SS2     | .756    |                  |      |     |
| Social adjustment   | SS3     | .893    | .833             | .69  | .91 |
|                     | SS4     | .874    |                  |      |     |
|                     | SS5     | .806    |                  |      |     |
|                     | EA1     | .724    |                  |      |     |
| Emotional adjustment| EA2     | .84     | .908             | .65  | .809|
|                     | EA3     | .857    |                  |      |     |
|                     | SS1     | .764    |                  |      |     |
| Social support      | SS2     | .771    | .794             | .62  | .87 |
|                     | SS3     | .823    |                  |      |     |
|                     | SS4     | .815    |                  |      |     |
|                     | SE1     | .756    |                  |      |     |
|                     | SE2     | .857    |                  |      |     |
| Self esteem         | SE3     | .839    | .918             | .636 | .897|
|                     | SE4     | .767    |                  |      |     |
|                     | SE5     | .764    |                  |      |     |
| Life satisfaction   | LS1     | .842    |                  |      |     |
|                     | LS2     | .746    |                  |      |     |
|                     | LS3     | .855    | .886             | .657 | .90 |
|                     | LS4     | .857    |                  |      |     |
|                     | LS5     | .745    |                  |      |     |

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totally different cultures and social structure. How the use of WeChat contributes to social, emotional, and psychological adjustment of sojourners.

The findings documented that WeChat usage exerts a positive association with social and emotional adjustment. The result indicated that WeChat usage played an essential role in a student’s social and emotional adjustment. It also implies that the WeChat use intensity could help and improve social relations for better adjustments. The estimated results may also expose that it works as a communication tool for international students to expand and sustain their friendship networks in the new environment. The results are in line with previous studies (Lin et al., 2012; Ye, 2006b). Results also showed that WeChat usage has a direct positive association with social support. It implies that WeChat usage intensity could be an excellent technique to gain social support; it may help international students to break the ice and encourage them to have active social interaction and pursue the social support they needed. It also suggests that WeChat usage can help overseas students get better adjustment socially, emotionally, academically and receive social support. This finding supports previous research’s proposition (Friedlander et al., 2007; Gray et al., 2013; E. R. Pedersen et al., 2011).

Regarding WeChat usage and international students’ adjustments, other results reveal that the acquired social adjustment has a positive association with self-esteem and life satisfaction (psychological adjustment). WeChat usage intensity with relation to life satisfaction finding correlates with the previous studies (Wen et al., 2016) and inconsistent with (Valenzuela et al., 2009). However, contrary to our expectations, the emotional adjustment association with self-esteem was found non-significant but emotional adjustment having a positive association with life satisfaction.

The social support also has a positive association with psychological adjustment. This result is inline with the previous researches (Bender et al., 2019). This study also shows that self-esteem is associated with the degree of the social, emotional, and perceived social support level. We find that the higher the self-esteem higher the social adjustment level. Self-Esteem refers to the value and emotional significance attached to the specific group and how the individual identifies himself in a social group (Barker, 2009). This study also does not correlate with the (Wheatley & Buglass, 2019) finding that the extensive use of SNS has considerable adverse well-being effects.

In short, the individuals who separate themselves from the host environment are at the most risk of acculturative stress, socio-cultural, and psychological adjustment in the host country as compare to individuals with integration and assimilation attitudes. Establishing new social networks in the host environment is a vital factor for social adjustment. WeChat has positive impacts on social adjustment and psychological well-being of sojourners and different social media tools and personal characteristics, which could help in the social adjustment of international students. The international students who received social support from online social media groups have lower social problems adjusting to the host culture. Social media applications could be an integral factor for international students to adjust socially, emotionally and academically.

5.3. Practical implications
New media technologies are a vital part of international students’ lives; they can connect to their families, friends, relatives and build new relations in the host country. It is vital to know the association between social media use and social, emotional, and psychological adjustment of international students whose numbers have significantly increased over the years. This study provides a clearer picture of understanding the relationship between social media use (WeChat). Social, emotional adjustment, and social support concerning psychological adjustment. This study is also an important step to understanding international students’ social and emotional ties towards the host country. It is also an essential step towards a new student adjustment model.
This research will also help international students' offices devise ways to better support international students and develop programs that facilitate students.

5.4. Limitation and future work

The research sample was small as compared to students studying. The results cannot be generalised to whole international students in China; this study is based on the sample, studying in the same city. Therefore, future research is needed to extend this research area with large number of samples from a large population. It will help to compare students’ related issues. In future research, the different variables like sojourners’ language proficiency, familiarity comfort with the host culture, existing social connections could be helpful. The measures are adopted and modified slightly by adding content related to measuring from the other studies, which were not explicitly designed for WeChat use. This survey was conducted online, it has some advantages and disadvantages too, like cost of online survey is meager, quick response time with flexibility and control over the format is present, but some limitation are also there like rating the issue, representation of samples and other technical issues that could potentially affect the reliability of data (Lefever et al., 2007).

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