


## Article

# Exploring Undergraduate Students' Digital Multitasking in Class: An Empirical Study in China

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**Abstract:** UN's 2030 Agenda for Sustainable Development highlights the crucial role of education in securing a promising future for humanity, especially in today's digital era. However, the prevalence of smartphones has fostered an increase in students' usage and subsequent digital multitasking tendencies, posing a significant threat to education process, especially in higher education. To gain further insights into this phenomenon, this exploratory descriptive study surveyed 519 students from China university to investigate the magnitude of students' digital multitasking, motivation behind digital multitasking, and beliefs about reducing phone use. The study found that, (1) despite many respondents reporting the existence of phone limits, no possible reduction in phone use frequency was observed; (2) digital multitasking was positively correlated with mobile phone dependence and non-study motivation; (3) while a majority (86.71%) students expressed their intent to reduce digital multitasking, they were mostly hesitant to follow the moderate or strict rules on phone use; (4) no clear consensus was established (49.90% vs. 50.10%) regarding whether schools should pose more restrictions to encourage such reduction. Our research provides further insights into students' digital multitasking to improve learning quality and sustainable education.

**Keywords:** digital multitasking; smartphone use; motivation



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## 1. Introduction

Currently, the younger generation has grown up in an environment emerged in electronics and technologies, with much more exposure to these digital devices than any other generations. In modern China, the penetration rate of the internet and smartphones has reached a new high level, and almost all the Chinese university students are equipped with smartphones [1]. Zooming out, the current landscape in universities around the world shows the same increasing trend in smartphones [2]. Mobile phones in the classroom allow students to record audio or video, take pictures of lecturers' instructions on the board or screen, share study-related documents among their peers, and enhance communications with teachers beyond the class. Mobile phones have provided essential assistance to college students in class [3–5], in finishing coursework [6], and in exam preparation [7]. As digital natives, students believe that smartphones have become an integral part of their lives [8].

On the other hand, the accessibility to smartphones in class has posed challenges to sustainable education, owing to the tendency of students to undertake non-study-related activities [9,10]. Universities in different countries, such as France, America, and Australia, have tried to ban smartphones in class [11]. In such circumstances, increasing attention has been paid to the investigation of students' digital multitasking in class—a behavior that involves using a digital device while simultaneously engaging in a different activity [12–15]. Despite the fact that, in certain cases, digital multitasking would not impact students' learning process [16], a number of the downsides of digital multitasking were reported in higher education. For example, researchers have found that digital multitasking could facilitate

the development of a “checking habit”, which could impact students’ concentration [17], generating distractions and course work conflicts [18], and even influencing overall college GPA [6,19–21]. Meanwhile, many researchers tried to examine the nature and the major mediator behind such behavior [22]. For instance, researchers believed that more exposure to digital devices would cause physical stimulation to students and then increase the tendency of digital multitasking in class, called “technology addiction” [11]. Rozgonjuk et al. found that fear of missing out (FOMO) was a key mediator in influencing students’ learning process [23].

Although studies have been conducted to analyze digital multitasking, it is worth noting that only showing the downsides of digital multitasking is insufficient for improving students’ overall academic performance. Some studies tried to employ interventions to reduce students’ digital multitasking but failed to achieve that goal [24,25]. Furthermore, some studies [8,23] only took social media as a lens to investigate the impact and the nature of digital multitasking, which means that more factors should be included to better understand such behavior.

To address these research gaps, this study draws upon Brown’s behavior addiction components, which encompass symptoms such as cognitive salience, withdrawal, and loss of control [26,27]. This framework was adapted to measure engagement with technology integration [28]. On the basis of this theory, Walsh et al. developed the Mobile Phone Involvement Questionnaire for assessing respondents’ dependence on their phones [28]. By applying the behavior addiction theory and utilizing the model developed by Walsh et al., this study examined students’ mobile phone dependence and its relationships among other factors.

In the current digital age, exploring the nature of students’ digital multitasking is essential for achieving sustainable development in higher education. Therefore, this study adopted quantitative approach to gain insights into undergraduate students’ digital multitasking in class. Specifically, the goals of the present study were to investigate (1) the magnitude of students’ digital multitasking, (2) motivation behind digital multitasking, and (3) beliefs about reducing phone use.

## 2. Materials and Methods

### 2.1. Research Design

This study employed a quantitative approach to investigate digital multitasking among Chinese undergraduate students during class, with the aim of promoting sustainable higher education. The primary focus of the present study was to explore the magnitude of students’ digital multitasking, motivations behind students’ digital multitasking, and beliefs about reducing phone use. Additionally, the study examined the relationships among these variables. To obtain data, students were invited to complete an anonymous online-based questionnaire specifically designed to assess their digital multitasking practices. The quantitative data collected were subsequently analyzed using statistic software, and the findings were reported accordingly.

### 2.2. Participants

In this study, the population of interest was undergraduate students in China. We adopted convenience sampling and online-based snowball sampling to gain insights into students’ digital multitasking in class. A total of 634 online-based questionnaires were collected. A total of 72 questionnaires were excluded because of attention check failure; 38 questionnaires were excluded because the respondents claimed that they were not undergraduate students; five questionnaires were excluded because the same responses were presented among all the items in all the sectors. In total, 519 questionnaires were established for further analysis. The demographic profile of the respondents is presented in Table 1. Among all the respondents, 85 students were identified as being from “985 Project” universities, which are classed as the top universities in China (Tier A); 74 students were identified as being from “211 Project” universities, which ranks lower than the “985

Project” regarding their comprehensive abilities (Tier B); 159 students were identified as being from “double first-class” universities, the emerging institutions in recent years (Tier C); 147 students were identified as being from mainstream public universities (Tier D); 54 students remained confidential.

**Table 1.** Sample demographics.

|                     | <i>n</i> | %    |
|---------------------|----------|------|
| Gender              |          |      |
| Male                | 206      | 39.7 |
| Female              | 313      | 60.3 |
| Age                 |          |      |
| 19 and below        | 216      | 41.6 |
| 20                  | 71       | 13.7 |
| 21                  | 77       | 14.8 |
| 22                  | 85       | 16.4 |
| 23 and above        | 70       | 13.5 |
| Year of study       |          |      |
| 1st                 | 198      | 38.2 |
| 2nd                 | 87       | 16.8 |
| 3rd                 | 93       | 17.9 |
| 4th                 | 141      | 27.2 |
| University level    |          |      |
| Tier A              | 85       | 16.4 |
| Tier B              | 74       | 14.3 |
| Tier C              | 159      | 30.6 |
| Tier D              | 147      | 28.3 |
| Confidential        | 54       | 10.4 |
| Field of study      |          |      |
| Arts and humanities | 144      | 27.7 |
| Social sciences     | 89       | 17.1 |
| Natural sciences    | 114      | 22.0 |
| Engineering         | 122      | 23.5 |
| Others              | 50       | 9.6  |

Specifically, the largest majority of respondents were female students (60.3%), in their first year (38.2%), and majoring in arts and humanities (27.7%). As shown in the age breakdown, most participants were 19 or below (41.6%).

### 2.3. Data Collection

In this study, students were asked to complete an anonymous online-based questionnaire. The first page of the questionnaire served as a consent form, informing the students of the purpose of this study and ensuring that all the responses would remain anonymous. Students were also informed that this study was completely voluntary, and that they could quit from the study at any time. The data collection lasted from 11 November 2022 to 22 November 2022. At the time of the study, all of the participants had experienced face-to-face class and were able to describe their smartphone use in class.

### 2.4. Instruments

In the present study, the measure consisted of three sections: (1) the magnitude of students’ digital multitasking, (2) motivation behind digital multitasking, and (3) beliefs about reducing phone use. All the instruments were originally presented in Chinese and then translated into English for further investigation. All the translated scripts were quality-checked and double-checked by all the authors. Furthermore, to reduce any order effect bias in the questionnaire, all three sections were presented randomly.

#### 2.4.1. The Magnitude of Students' Digital Multitasking

*Restrictions on phone use.* This measure intended to investigate students' perception on school restrictions of phone use. Moreover, it was assumed that school restrictions in class may impact students' behavior regarding digital multitasking. To assess such possible influences and perception, the respondents were asked: "In your school, are there any restrictions during class?" (yes or no). If yes, we then asked, "Do you follow school rules that restrict in-class smartphone use?", with students responding on a scale from 1 (never) to 5 (very often).

*Frequency of phone use.* This measure consisted of two items: (1) "How often do you use your mobile phone during class in a school day?" (2) "How often do you use your mobile phone during class for *non-course-related activities* in a school day?" The respondents were asked to describe their frequency of phone use on a scale from 1 (never) to 5 (very often). This means that students with higher scores in total used their phone more in general or for non-study purposes in a school day.

#### 2.4.2. Motivation behind Digital Multitasking

*Mobile phone dependence.* The Mobile Phone Involvement Questionnaire (MPIQ) is aimed at assessing respondents' phone dependence using an eight-item measurement [28]. Students were asked to rate each item on a scale from 1 (strongly disagree) to 6 (strongly agree).

*Motivation behind phone use.* Olufadi revealed six types of motivations for smartphone use in class [29]. In the present study, we presented five possible motivations, four of which were inspired by Olufadi's work, and then asked the students to rate how frequently each reason was the motivation for their phone use on a scale from 1 (never) to 5 (very often). The five items in English were as follows: I use my phone . . . (1) " . . . to chat with others" (social connection), (2) " . . . just to kill time" (boredom), (3) " . . . to entertain myself but I believe it will not affect my concentration" (perceived behavioral control), (4) " . . . to take notes or search for course-related information" (class-related use), and (5) " . . . to learn other courses". According to the different contents of each motivation, we marked motivations (1), (2), and (3) as "non-study motivations", while (4) and (5) were considered "study-related motivations".

#### 2.4.3. Beliefs about Reducing Phone Use

*Intention to minimize phone use.* Two items were included in this measure: (1) "I should reduce the frequency of phone use in class or try to never use it"; (2) "I think the school should introduce more methods to help me reduce my phone use". The respondents were asked to rate these two items on a scale from 1 (strongly disagree) to 6 (strongly agree).

*Receptivity to strategies for reducing digital multitasking.* Students were presented with four strategies to possibly reduce their digital multitasking during class, and then asked whether they would be willing to adopt these strategies. Specifically, the respondents were told, "The following strategies might help you concentrate more and reduce your phone use in class. Which one would you like to follow?": (1) put your phone into silent or flight mode; (2) put your phone somewhere unseen but within your reach (i.e., schoolbag, handbag, or drawer); (3) take no phone with you or put your phone someplace beyond your reach (i.e., designated storeroom or lockers outside of the classroom); (4) turn off your cellphone. According to the accessibility to their cellphones (whether students could use their phone immediately), we marked methods (1) and (2) as "moderate strategies", and methods (3) and (4) as "strict strategies".

#### 2.5. Data Analysis

For the analysis of the collected data, this study employed a quantitative analysis approach using the Statistical Package for the Social Science (SPSS) software version 26 and Microsoft Excel 2019. A total of 519 questionnaires were identified for further analysis.

Initially, the internal reliability of the instruments was assessed using Cronbach's alpha coefficient. The calculated value of Cronbach's alpha was found to be 0.827, indicating a high level of internal reliability of the questionnaire instruments.

Descriptive statistics, including means (M), standard deviations (SD), frequencies, and percentages, were calculated to provide a comprehensive landscape of Chinese undergraduate students' digital multitasking magnitude, motivation, and beliefs about reducing phone use. These statistics summarized and presented the detailed responses from the participants, allowing for a clearer understanding of the data.

Furthermore, Spearman's rho coefficients ( $r_s$ ) were computed to explore the relationships among different variables. This statistical enabled the exploration of correlations among the variables of interest.

### 3. Findings

This section provides an overview of the three measurements applied in the present study. Frequency and percentage for all specific responses are reported, while correlations among different variables were analyzed utilizing Spearman's rho coefficients.

#### 3.1. The Magnitude of Students' Digital Multitasking

*Restrictions on phone use.* Of all the respondents, 54.72% (284) claimed that there was no rule restricting phone use in class. Out of the remaining 45.28% (235), 48.51% (114) reported that they would always adhere to the restrictions in class, while 29.36% (69) indicated they would often follow the rules. In sum, 64.74% (336) respondents had no rules or barely followed the rules in class.

*Frequency of phone use.* Table 2 presents the frequency of phone use among those who did not face restrictions or barely followed them in class, with a sample size of 336. According to the table presented, a significant number of respondents (82.74%, 278) reported using their phones often or very often in class, while only a small percentage (3.87%, 13) claimed that they never or rarely used smartphones in class. Furthermore, among all the participants involved, 58.93% (198) used smartphones often or very often for non-study purposes during class.

**Table 2.** Frequency of phone use.

|                    | Never <sup>(a)</sup> | Rarely <sup>(b)</sup> | Sometimes <sup>(c)</sup> | Often <sup>(d)</sup> | Very Often <sup>(e)</sup> |
|--------------------|----------------------|-----------------------|--------------------------|----------------------|---------------------------|
| Frequency of ...   |                      |                       |                          |                      |                           |
| Phone use          | 4 (1.19%)            | 9 (2.68%)             | 45 (13.39%)              | 107 (31.85%)         | 171 (50.89%)              |
| Non-study purposes | 5 (1.49%)            | 40 (11.90%)           | 93 (27.68%)              | 109 (32.44%)         | 89 (26.49%)               |

Note: <sup>a</sup> Students never used mobile phone in class. <sup>b</sup> Students used their mobile phone 1–3 times a day. <sup>c</sup> Students used their mobile phone 4–10 times a day. <sup>d</sup> Students used their mobile phone 11–30 times a day. <sup>e</sup> Students used their mobile phone over 30 times a day.

The findings revealed that school restrictions in class may not have a significant impact on reducing students' phone use. Although it was assumed that such restrictions could possibly achieve that goal, the qualitative analysis did not suggest any possible correlation between the frequency of phone usage and the implementation of phone restrictions.

#### 3.2. Motivation behind Digital Multitasking

*Students' mobile phone dependence.* Table 3 presents Walsh's MPIQ [28] results of students' mobile phone dependence. Data in the present study were in line with the trend in Walsh's work, with "withdrawal" being the most commonly endorsed ( $M = 4.12$ ,  $SD = 1.52$ ) and "interpersonal conflict" being mostly opposed ( $M = 2.72$ ,  $SD = 1.50$ ).

*Motivation behind digital multitasking.* Table 4 presents the data on motivation behind students' digital multitasking in class. Among the five motivations listed, the most commonly cited motivation was to take notes or search for course-related information ( $M = 3.40$ ,  $SD = 1.06$ ), with 49.7% of students reported being "often" or "very often". Additionally, students also reported other motivations for using mobile phone during class. These

motivations included to chat with others ( $M = 3.12$ ,  $SD = 1.15$ ), just to kill time ( $M = 3.12$ ,  $SD = 1.20$ ), to entertain myself but I believe it will not affect my concentration ( $M = 2.65$ ,  $SD = 1.13$ ), and to learn other courses ( $M = 2.78$ ,  $SD = 1.22$ ).

**Table 3.** Students' mobile phone dependence.

| Categories                     | M    | SD   |
|--------------------------------|------|------|
| Cognitive salience             | 3.82 | 1.38 |
| Behavioral salience            | 4.08 | 1.38 |
| Interpersonal conflict         | 2.72 | 1.50 |
| Conflict with other activities | 3.20 | 1.35 |
| Euphoria                       | 3.75 | 1.38 |
| Loss of control                | 4.02 | 1.48 |
| Withdrawal                     | 4.12 | 1.52 |
| Relapse and reinstatement      | 3.84 | 1.40 |

**Table 4.** Motivation behind students' digital multitasking.

| Motivation (I Use My Phone . . . )                                 | Never      | Rarely      | Sometimes   | Often       | Very Often |
|--|------------|-------------|-------------|-------------|------------|
| To chat with others  | 53 (10.2%) | 98 (18.9%)  | 156 (30.1%) | 157 (30.3%) | 55 (10.6%) |
| Just to kill time  | 63 (12.1%) | 96 (18.5%)  | 136 (26.2%) | 163 (31.4%) | 61 (11.8%) |
| Entertain myself but I believe it will not affect my concentration | 97 (18.7%) | 137 (26.4%) | 161 (31.0%) | 100 (19.3%) | 24 (4.6%)  |
| To take notes or search for course-related information             | 34 (6.6%)  | 56 (10.8%)  | 171 (32.9%) | 186 (35.8%) | 72 (13.9%) |
| To learn other courses   | 96 (18.5%) | 119 (22.9%) | 152 (29.3%) | 106 (20.4%) | 46 (8.9%)  |

Unsurprisingly, the motivations for non-study reasons were positively correlated with mobile phone dependence ( $r_s = 0.37$ ,  $p < 0.01$ ). In terms of study-related reasons, learning other courses was positively correlated with mobile phone dependence ( $r_s = 0.171$ ,  $p < 0.01$ ), while no significant correlation was observed between course-related activities and mobile phone dependence. Furthermore, students who were more prone to digital multitasking for non-study reasons were less receptive to any restrictions on phone use ( $r_s = -0.217$ ,  $p < 0.01$ ), indicating that they would be less likely to comply with such restrictions. In particular, habitual phone use was the most important factor in digital multitasking. Students with a higher level of phone-use habit were more likely to engage in digital multitasking for non-study reasons during class ( $r_s = 0.302$ ,  $p < 0.01$ ), and they were less willing to follow restrictions on phone use ( $r_s = -0.112$ ,  $p < 0.01$ ).

These findings suggested that (1) students with higher tendency to digital multitasking for non-study reasons and learning other courses would have a higher level of mobile phone dependence; (2) students preferring non-study digital multitasking would be less likely to accept any restrictions on phone use.

### 3.3. Beliefs about Reducing Phone Use

*Intention to minimize phone use.* Table 5 presents students' willingness to minimize their phone use during class. For the first item, "I should reduce the frequency . . ." ( $M = 4.28$ ,  $SD = 1.27$ ), 450 respondents (86.71%) acknowledged that they should reduce their phone use in class as much as possible. In terms of the item, "I think the school should introduce more . . ." ( $M = 3.91$ ,  $SD = 1.30$ ), 259 (49.90%) believed that they needed schools' further help to reduce their phone use, while 260 (50.10%) held the opposite view.

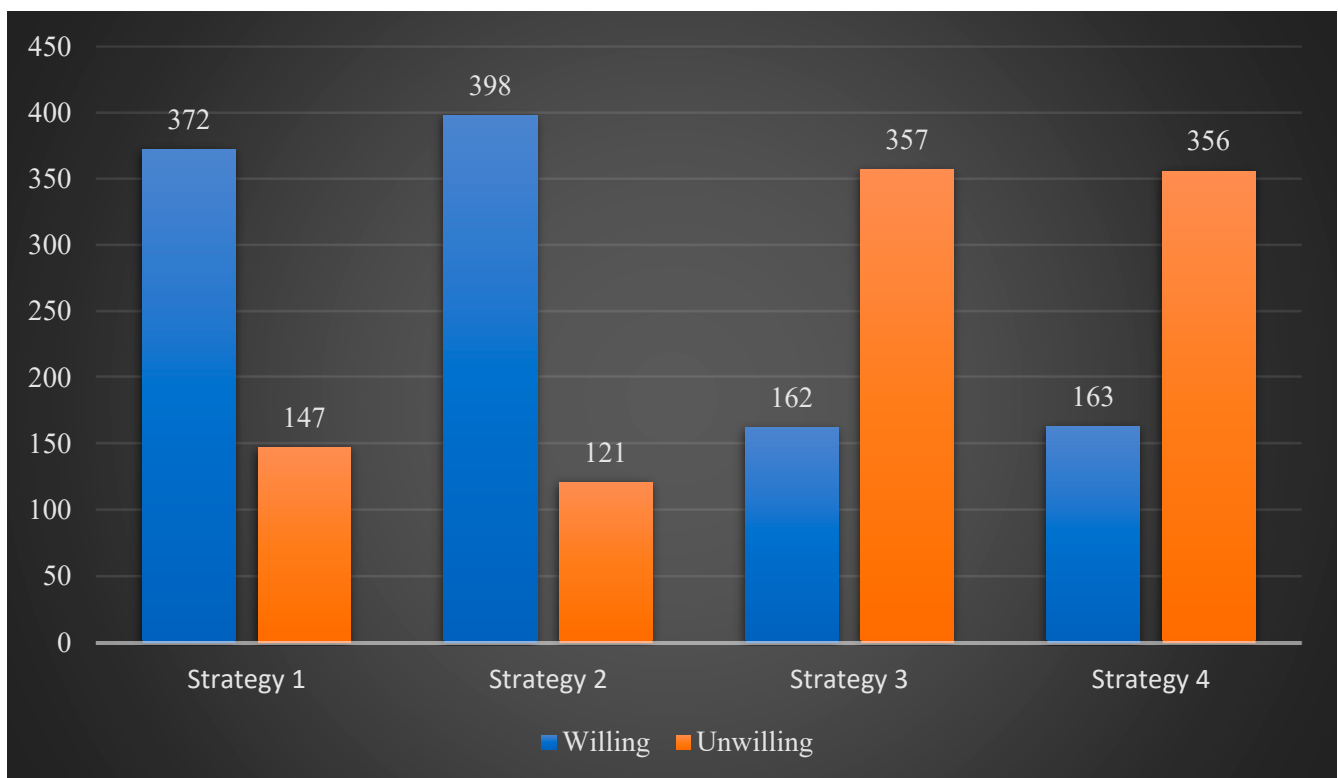
The result showed that the majority of the respondents would choose to reduce their digital multitasking intentionally. However, as for the other item, the results indicated a lack of consensus among the respondents, with almost half (49.90%) expressing agreement and the other half (50.10%) expressing disagreement. This even split distribution suggested that there was no clear dominant view of whether schools should introduce more restriction on phone use in class.

*Receptivity to strategies for reducing digital multitasking.* Figure 1 illustrates students' willingness to adopt specific strategies against their digital multitasking. For the moderate methods, 71.68% of respondents (372) reported being open to turning their phones into

silent or flight mode ( $M = 0.72$ ,  $SD = 0.451$ ), while 76.69% (398) were willing to put the phone somewhere unseen but within their reach ( $M = 0.77$ ,  $SD = 0.423$ ).

**Table 5.** Intention to minimize phone use.

|  | SD             | D              | PD              | PA              | A               | SA              |
|--|----------------|----------------|-----------------|-----------------|-----------------|-----------------|
| I should reduce the frequency ...            | 16<br>(3.08%)  | 16<br>(3.08%)  | 37<br>(7.13%)   | 140<br>(26.97%) | 204<br>(39.31%) | 106<br>(20.42%) |
| I think the school should introduce more ... | 62<br>(11.95%) | 84<br>(16.18%) | 114<br>(21.97%) | 145<br>(27.94%) | 68<br>(13.1%)   | 46<br>(8.86%)   |



**Figure 1.** Receptivity to strategies for reducing digital multitasking.

Furthermore, students were generally reluctant toward restricted methods: only 31.21% (162) were willing to take no phone to class or put their phones someplace beyond the reach ( $M = 0.31$ ,  $SD = 0.464$ ), and 31.41% (163) were open to turning off their phones ( $M = 0.31$ ,  $SD = 0.465$ ). No significant correlation was found between such reluctance and other factors, such as age, gender, university rank, school's restrictions, and students' acceptance to their schools' restrictions. On the basis of some respondents' feedback, accessibility to their phones and immediate use during class were vital factors in determining their willingness to comply with restrictions.

Positive correlations were found among students' mobile phone dependence, frequency of phone use, frequency for other than course-related activities, and receptivity to strategies for reducing digital multitasking (see Table 6). Students with higher mobile phone dependence tended to engage in more digital multitasking during class, and they were less likely to accept restrictions on phone use, both moderate and restricted. Students who spent more time using their mobile phones were also less accepting of restrictions on phone use. Students with higher receptivity to moderate restrictions on phone use were more open to adopting restricted methods.

**Table 6.** Spearman’s correlation matrix.

|                                 | 1         | 2         | 3         | 4        | 5 |
|---------------------------------|-----------|-----------|-----------|----------|---|
| 1. Mobile phone dependence      | -         |           |           |          |   |
| 2. Frequency                    | 0.330 **  | -         |           |          |   |
| 3. Frequency for other purposes | 0.383 **  | 0.638 **  | -         |          |   |
| 4. Moderate method              | −0.150 ** | −0.138 ** | −0.208 ** | -        |   |
| 5. Restricted method            | −0.120 ** | −0.219 ** | −0.225 ** | 0.341 ** | - |

Note: \*\*  $p < 0.01$ .

#### 4. Discussion

This exploratory descriptive study examined Chinese university students’ magnitude of digital multitasking, motivation behind digital multitasking, and beliefs about reducing phone use. In this section, all the quantitative results of three measurements are analyzed and discussed separately.

##### 4.1. The Magnitude of Students’ Digital Multitasking

Currently, an increasing number of universities have recognized the negative impact of smartphone phone use in class, leading educators and policymakers to implement various methods to tackle this issue. In our study, we found that nearly half of the respondents (45.28%, 235) reported that their schools had implemented relevant regulations on phone use. However, during the analysis phase, we found no positive correlation between the implementation of school restrictions and the reduction in phone use frequency. Even in a phone-banned class, students continued to use their mobile phones, despite knowing it could be detrimental to their concentration to some degree, which is consistent with previous studies [29–31]. These findings highlight the need for more effective and sophisticated methods to reduce phone use and enhance students’ learning outcomes from a Chinese perspective.

Regarding students’ frequency of phone use, a significant number of respondents (82.74%, 278) reported using their phones often or very often (11–30 or over 30 times) in a typical school day. In contrast, only a small percentage (3.87%, 13) claimed that they never or rarely (1–3 times) used smartphones in a typical school day. This indicates that students used their smartphones much more frequently than in the previous study [2]. One possible explanation for this increase is that students starting college in the 2020s have had more exposure to digital devices.

##### 4.2. Students’ Motivation behind Digital Multitasking

In the present study, we found that, in testing students’ mobile phone dependence, withdrawal was the most commonly endorsed, and interpersonal conflict was mostly opposed, presenting a similar trend to that in Walsh’s work [28]. We also discovered that students’ mobile phone dependence plays a crucial role in mediating different variables; those with higher levels of mobile phone dependence were more likely to use their phones in class, less likely to follow schools’ rules on phone use, and more likely to engage in digital multitasking for non-study purpose. These results presented a similar trend with the previous studies [31,32] and provided further insights into the crucial role of students’ mobile phone dependence in digital multitasking.

Meanwhile, we presented five possible motivations behind students’ digital multitasking, with three being non-study- and two being study-related. We also illustrated frequencies of each motivation. Among all the factors, students’ habitual phone use was the most influential in digital multitasking. Students with higher levels of phone use habit were more likely to engage in non-study-related digital multitasking in class. Although this study only presented a limited number of motivations, it can still shed light on the nature or correlation between students’ motivations and their digital multitasking. Despite class-related purpose being reported as the most cited motivation, other purposes behind students’ digital motivation could influence students’ concentration and undermine their



learning efficiency. We found that students with higher levels of mobile phone dependence were more susceptible to non-study-related digital multitasking and were less likely to abide by school's rules on phone use. To improve learning efficiency, we believe that further investigation should be conducted on students' phone dependence and other factors that may prompt digital multitasking.

#### 4.3. Students' Beliefs about Reducing Phone Use

In this study, we found that, while the majority (86.71%) respondents expressed an intention to reduce digital multitasking, they were mostly hesitant to follow the moderate or strict rules on phone use. Furthermore, no clear consensus was established (49.90% vs. 50.10%) regarding whether schools should impose more restrictions to promote phone use reduction. This gap may be explained by students increasing dependence on technological devices during their daily lives and academic pursuits as digital natives. These findings demonstrate that banning smartphone use in class may not be sufficient for addressing students' digital multitasking. Instead, appropriate regulations on phone use are urgently needed to strike a balance between the potential benefits and accompanying distractions of digital devices. These findings also highlight the importance for teachers and policymakers to consider more sustainable approaches to tackling this crucial challenge.

### 5. Conclusions

Currently, the prevalence of smartphones in higher education has resulted in heightened use among university students, leading to a concerning upsurge in students' digital multitasking. To minimize the impact of such behavior and, thus, promote sustainable higher education, further research into this field is warranted. This study employed a quantitative approach to examine Chinese university students' magnitude of digital multitasking, motivation behind digital multitasking, and beliefs about reducing phone use. The study found that (1) students' digital multitasking behavior was positively correlated with mobile phone dependence and their non-study motivation; (2) despite a number of participants acknowledging the phone restrictions in their schools, no discernible decrease in smartphone use was evident; (3) while the majority (86.71%) students expressed their intention to reduce digital multitasking, strict limitations on phone use were generally met with resistance by the students; (4) no clear consensus was established (49.90% vs. 50.10%) in regarding of whether schools should apply more restrictions to prompt a reduction in digital multitasking.

While the present study offers valuable insights into students' digital multitasking, it is important to acknowledge several limitations. (1) Due to the restrictions of students' confidentiality and online-based sampling method, more in-depth information about the participants, such as their academic performance, was not included as the variable in qualitative analysis. (2) Only a limited number of potential motivations were examined during the data collection phase of this study. (3) This study only employed a qualitative analysis approach to assess the nature of university students' digital multitasking behavior, which could probably limit the generalizability of the findings. (4) The sampling methods employed in this study may have introduced limitations to the findings. For example, convenience sampling may have caused a selection bias, as the students were recruited on the basis of accessibility rather than representing the entire group. Additionally, online-based snowball sampling may have resulted in a biased outcome, as students with specific interests were more likely to be selected in the study.

Therefore, to acquire a more holistic understanding of students' digital multitasking behavior, future research should consider (1) expanding the scope of variables examined in qualitative analysis, such as academic performance, precise durations of digital multitasking, and students' preference of task-switching, (2) incorporating more potential motivations in data collection procedure, (3) utilizing a mixed-method design that integrates both quantitative and qualitative approaches to obtain a more comprehensive understanding of this behavior among university students, and (4) employing more rigor-

ous sampling methods, such as random sampling and stratified sampling, to enhance the representativeness of the findings.

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