Mobile phone placement during lectures and dependency on LINE and text messaging: Survey of students at a women's university in Japan

Keywords:
LINE messaging, text messaging, mobile phone dependency, classroom behavior, higher education

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Abstract

This study measured the dependency on text messaging of students in lectures at a women's university in Japan, comparing students who placed their mobile phone on their desk during lectures with those who did not do so. Dependency was measured by using a text-message dependency scale. Dependency on LINE messaging was measured by the same scale with "text" replaced by "LINE" in each question. The results of the questionnaire survey showed a significant difference in "emotional reaction," one of the three subscales of the scale used in the study, between students who placed their mobile phone on their desk and those who did not: the LINE messaging dependency score was higher among those who did. Also, in each subscale score and in the total of those scores, dependency on LINE messaging was significantly higher than dependency on text messaging for both students who placed their mobile phones on their desks during lectures and those who did not do so.

1. Introduction

Previous studies discussed the use of personal laptop computers during university lecture. Although these studies pointed out the negative effect of student laptop use during lectures, finding that it was a distraction from the lectures (Fang 2009; Fried 2008; Hembrooke and Gay 2003), different studies showed increased learning effectiveness through the appropriate use of laptops during lectures (Barak et al. 2006; Demb et al. 2004; Gay et al. 2001). In modern university lecture halls, the use of not only laptop computers but also of mobile phones (including smart phones) by students in lectures has also been frequently observed (Amali et al. 2012; Campbell 2006; Hammer et al. 2010; McCoy 2013; Wei and Wang 2010; Wei et al. 2012).

In the past, we saw almost no use of laptop computers by students in lectures at Japanese universities, as is seen in other countries, but the personal use of mobile phones by students during lectures was a common sight (Tachino et al. 2012). In the past, use of mobile phones by students during lectures was conducted "under the desk," that is, out of sight of the instructor (Matsushita 2007). However, we observed that the personal use of mobile phones by students during lectures has changed owing to the widespread use of smart phones, which was sparked in Japan by the introduction of the iPhone in 2008. In other words, the shift in the personal use of mobile phones to easy "on the desk" use was made possible by the fact that the backs of smart phones are flat and that the phones are usually operated by touchscreen. It cannot be said that the shape and design of smart phones is the sole cause for the change from hiding one's phone under the desk to using it on top, but it can be said that, at least as a background to this study, it is not difficult to find students using mobile phones on desks during lectures at Japanese universities in the present day.

Accordingly, we undertook an investigation of the use of mobile phones during lectures. In a preliminary investigation in which 21 Japanese university students participated, 52.4% of students responded that they "use mobile phones during lectures," and 42.9% of students said that they "don't feel embarrassed about operating mobile phones during lectures (Tachino et al. 2012)." In a study by Tachino et al. (2013a), a questionnaire was distributed to 20 students who placed their mobile phones on their desks during an exercise class in a computer lab room. The students were asked to answer two questions: a free response regarding the "reason for placing the mobile phone on the desk," and a yes or no question as to the "sense of guilt about placing a mobile phone on the desk." The results showed that the most common reason for placing a mobile phone on the desk, given by 7 students, was "for the purpose of receiving contact," and 9 of the students responded that they felt no sense of guilt about placing their phone on their desk (Tachino et al. 2013a). Also, in Tachino et al. (2013b) and Tachino et al. (2014), a yes/no questionnaire was given to 237 students, asking about their "experience of placing a mobile phone on the desk during lectures." Among respondents, 67.9% said that they placed their phone on their desk during regular lectures, and 30.8% said that they did so even in lectures where mobile phone use was prohibited (Tachino et al. 2013b; Tachino et al. 2014). The common finding of these preliminary investigations is that most university students who use mobile phones during lectures place their phones on their desks for the purpose

of using their phone as a communication tool.

Building on the preliminary investigations mentioned above, our current investigative study (Kato and Kato 2016) surveyed university about the use of mobile phones in lecture. The questionnaire began with a question regarding whether the student had their mobile phone placed on their desk "now" (from the time of distribution of the questionnaire to about 30 minutes after the beginning of the class). The analysis proceeded by grouping students according to the answer on that question and comparing the other responses between groups. The results of this study are given below. It was seen that the ratio of students who placed their mobile phone on their desk was 64.5% and that there was a higher probability among those who did so to use their phones during lessons to check phone, text, and LINE message content and to respond (by replying, etc.) to those messages; further, those who placed their phone on their desk felt more unease when rules restricting the use of mobile phones during classes were in place (Kato and Kato 2016). An additional pattern was seen: in mobile phone communication by students during classes, text-based communication was an easy choice. In particular, the LINE application, which is a (primarily smart phone-based) communication tool for free chat and voice over IP telephone calls, was used more often than standard mobile text messaging (Hereafter, "LINE messaging" will refer to LINE's chat function, called "Talk" in-app) (Kato and Kato 2016).

Although personal communication using mobile phones during classes differs from standard class behavior (Ling 2004), one reason this behavior occurs is because students desire the rapid exchange of mobile text messages (Kato et al 2012, 2013; Kato et al. 2013). Typically, a speedy response is desired in mobile text message communications. Students are aware that this expectation should be modified during classes. However, when there is pressure to not wait, or to keep others from waiting, until class has finished, and in situations where there are rules restricting the use of mobile phones, a sense of unease among students demonstrates a clear dependency on mobile text message communication. Yoshida et al. (2005) writes, (translated from Japanese) : "In recent years, the use of mobile phones without respect of time or place, and the prioritization of mobile text messaging over communication with others right in front of them, is becoming a significant dependency issue with mobile text messaging among young people."

Long hours of use was named as the primary cause of "Internet dependency" according to a 2013 Ministry of Internal Affairs and Communications survey targeting participants between upper primary school age and age 25 (Ministry of Internal Affairs and Communications, Japan 2014). According to the survey, 68.8% of high school students and 65.6% of university students responded that they had taken away from time dedicated for other activities in order to make more time for Internet use, mainly from sleeping (48.1% of high school students and 47.5% of university students) and study (46.6% of high school students and 34.6% of university students) (Ministry of Internal Affairs and Communications, Japan 2014). Many related studies point out that the existence of adverse effects on normal life activities is one possible indicator of dependency (Okada 2014). It has been noted that women are far more likely to use their mobile phones more than a PC, and that more women use mobile text

messaging and LINE (Ministry of Internal Affairs and Communications, Japan 2014). LINE, in particular, has been reported to be the most-used mobile communication tool (LINE Corporation 2013), particularly its chat, which is faster and easier to use for long periods of time than mobile text messaging (Kato 2015). Also, because LINE displays read receipts (a function that lets the sender know when his/her message has been read by the recipient), many young people continually check their phone to see if their messages have been read by the other party, in addition to normal use to send and receive messages. A previous study (Kato and Kato 2016) showed that LINE messaging is used more than text messaging in class, and as a result it is thought that dependency on LINE messaging is greater among students than dependency on other forms of text messaging. Because of the above, it is necessary to examine the degree of student Internet dependency as a factor in considering the personal use of mobile phones during lectures. Furthermore, consideration should be given to the main communication tools used in mobile text-based communication (mobile text messaging and LINE) within the overall scope of Internet dependency.

This study takes the student factor (dependency) into consideration in the personal use of mobile phones in lectures, but there are a variety of influences on student behavior. Many factors other than the student factor can be considered, such as lecture content, form of the lecture, the lecturer, and the classroom. However, moving students to an experimental setting wherein all of these factors are controlled for could cause students to alter their normal behavior. Therefore, the present study was conducted during a lecture at an actual university. Although in a real-life setting, students will be influenced by these various factors, intra-class comparison of students should allow for discernment of individual differences.

In certain types of classes, such as sports classes, multiple seminars, or classes where the lecturer strictly prohibits or punishes cell phone use in-class, external influences are too strong to confirm student factor. A survey by Terao and Ito (2014) reported that 40% to 60% of students used their mobile phones in lectures for personal reasons when no particular rules about mobile phone use in class were made. Because this is about the same as our abovementioned preliminary research, even though the classroom conditions may be different, the observation that about 50% of students are using their mobile phones during lectures (especially those in which no rules regarding phone use have been set) suggests that the relationships between the in-class factors and the students' behavior can be elucidated. Against this background, the present study was done in a class at a women's university confirmed to meet the above preliminary study requirements (Kato and Kato 2016). An all-female class was chosen to exclude the effects of gender.

Given the above, the present study examined the following two hypotheses.

Hypothesis 1: Due to the high probability of use of mobile phones during class by students who place their phone on their desk as compared with those who do not do so, there is a high degree of dependency on mobile text message communication among students who place their mobile phone on their desk during classes.

Hypothesis 2: Due to the trend for LINE text messaging to be used during classes, the degree of dependency on LINE text messaging among present-day female university students is greater

than that on mobile phone text messaging, another text communication tool.

2. Purpose

This study examined the relationship between the behavior of placing mobile phones on desks during university lectures and the dependency of university students on mobile text messaging and LINE. The dependency of students who placed their mobile phones on their desks during lectures was compared to students who did not. The aforementioned Hypothesis 1 and Hypothesis 2 were also examined.

3. Method

(1) Participants and Class Surveyed

This study was performed at a women's university in a liberal arts class on understanding media. This is an elective course, taken by first- to fourth-year students from various schools within the university. As a result, although small groups of three to five friends were seen, there was little overall social cohesion as is frequently seen in courses intended for specific majors. Enrolled students perform investigations on self-selected topics related to media and compile their findings into a PowerPoint presentation. In addition to general lectures, in each class approximately 10 of these presentations are randomly selected for the respective students to give 5-min presentations, which are then critiqued by the instructor and the rest of the class. This class was the same class surveyed in Kato and Kato (2016).

There were 101 students enrolled in the course, and the 80 participants (all Japanese women 18-21 years old, mean age 18.98 years ± SD 0.63 years) were the enrolled students in attendance on the day of the questionnaire.

The survey was performed in December 2013 during the eleventh class meeting, approximately 30 minutes after the class began. Students required approximately 15 minutes to complete the questionnaire. At the time of the questionnaire, no class rules were in place regarding the use of mobile phones.

(2) Questionnaire

The questionnaire distributed to student survey participants first required a "Yes or No" response to the question, "Is your mobile phone on your desk at the present moment?"

For the rest of the questionnaire, questions were used to measure dependency on mobile text messaging and LINE messaging. The text-message dependency scale of Yoshida et al. (2005) and Igarashi et al. (2008) was used to measure dependency on mobile phone text messaging. This scale incorporated an element of dependency on communication, taken from previous studies on Internet, computer, and mobile phone addiction (e.g., Armstrong et al. 2000; Block 2008; Caplan 2005; Griffiths 2000; Kandell 1998; Morahan-Martin and Schumacher 2000; Park 2005; Young 1998), and created from a comprehensive viewpoint of dependency on communication media (Igarashi et al. 2008; Yoshida et al. 2005). The full scale contains 56 items, but there is also a 15-item short-version scale (Igarashi et al. 2008, p.2318), and it was this short-version scale that was used in this study.

This scale is composed of 3 subscales. There are 5 questions in the "emotional reaction" subscale, such as "I feel disappointed if I don't receive any text messages," and "I often check my mailbox to see if I have a new text message."

There are 5 questions in the "perception of excessive use" subscale, such as "I sometimes send text messages while engaging in a conversation with another person," and "I sometimes spend many hours on text messages." There are also 5 questions in the "relationship maintenance" subscale, such as "I cannot maintain new friendships without text messages," and "I can't form any new relationships without using text messages." The questions require responses on a 5-point scale: not at all applicable, not very applicable, can't say either way, somewhat applicable, and very applicable.

To measure dependency on LINE text messaging, the phrase "text messages" was replaced by the phrase "LINE messages" in each of the 15 questions in the text-message dependency scale. For example, the phrase "I feel disappointed if I don't receive any text messages" for text-message dependency was changed to "I feel disappointed if I don't receive any LINE messages" for LINE text messaging.

Permission was obtained from the creators of the text-message dependency scale for the replacement of "text messages" with "LINE messages" in the text of each question.

4. Results

Responses to the question, "Is your mobile phone on your desk at the present moment?" showed that 67.5% (54 students) had their mobile phone placed on their desk (Figure 1). This group of 54 students is referred to as the "on-desk group" hereinafter, and the group of 26 students who answered negatively is called the "not-on-desk group."

Next, to compare the score for dependency on text messaging and LINE messaging between

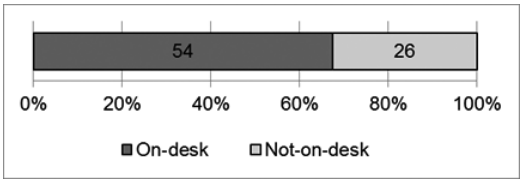

Figure 1 Number of students who placed their mobile phones on the desk during class

the two groups, an analysis of variance was performed with 2 factors, membership in the on-desk group (an intersubject or "group" factor) and dependency on mobile text messaging / LINE messaging (an intrasubject or "tool" factor).

Responses to the two dependency scale questions were on a 5-point scale and were analyzed as Likert items, with "Not at all applicable" given a value of 1 and "Very applicable" a value of 5. Additionally, there was 1 student in each group who reported that they do not use LINE messaging, and data for these 2 students were omitted from the analysis.

In the results of the analysis of variance using the total score of all 15 questions, the tool factor had a significant main effect (F (1, 76) = 45.50, p < .001), the group factor did not (F (1, 76) = 2.05), and the interaction was not significant (F (1, 76) = 0.95). Figure 2 shows that in both groups the dependency on LINE messaging was greater than the dependency on mobile text messaging.

An analysis of variance was also performed for the 3 subscale scores. Additionally, Cronbach's alpha was calculated for each subscale with the following results for text messaging and LINE messaging, respectively: 0.84 and 0.90 for emotional reaction, 0.73 and 0.83 for excessive use, and 0.91 and 0.85 for relationship maintenance.

In the results for the emotional reaction subscale, there were marked differences between

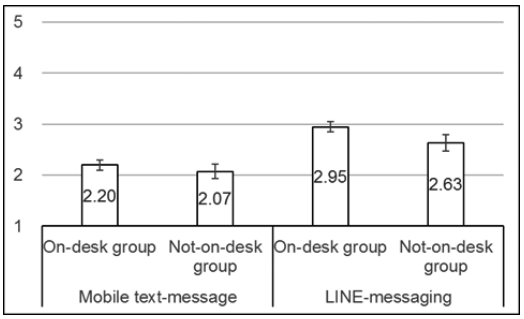

Figure 2 Comparison of average dependency scores between on-desk and not-on-desk groups

significances of the tool factor main effect (F (1, 76) = 30.58, p < .001), the group factor main effect (F (1, 76) = 3.30, p < .10), and the interaction effect (F (1, 76) = 3.03, p<.10). Figure 3 shows that in both groups, LINE-messaging dependency was higher than mobile text-message dependency, but that LINE-messaging dependency was even higher in the on-desk group.

For the perception of excessive use subscale, the tool factor main effect was significant (F (1, 76) = 58.63, p < .001), but the group factor main effect was not (F (1, 76) = 0.49) and there was no significant interaction (F (1, 76) = 0.00). Figure 4 shows that in both groups LINE-messaging dependency was higher than mobile text-message dependency.

For the relationship maintenance subscale, the tool factor main effect was significant (F (1, 76) = 13. 30, p < .001), but the group factor main effect was not (F (1, 76) = 0.63) and there was no significant interaction (F (1, 76) = 0.75). Figure 5 shows that in both groups LINE-messaging dependency was higher than mobile-text message dependency.

Finally, an analysis of variance was performed using the scores of each of the 5 questions for emotional reaction, where a difference in the group factor was observed. Significance was observed for each of the following 3 items. For "I

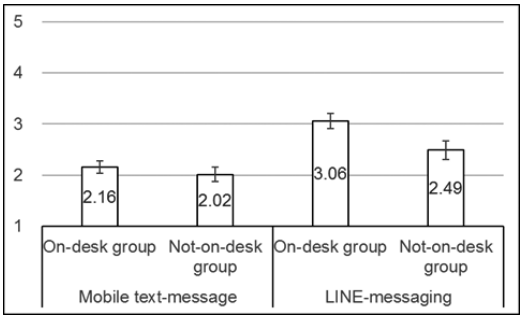

Figure 3 Comparison of average emotional reaction subscale scores between on-desk and not-on-desk groups

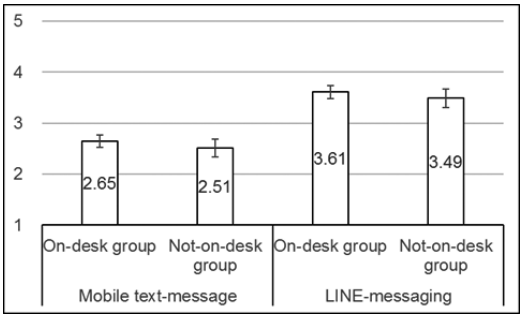

Figure 4 Comparison of average excessive use subscale scores between on-desk and not-on-desk groups

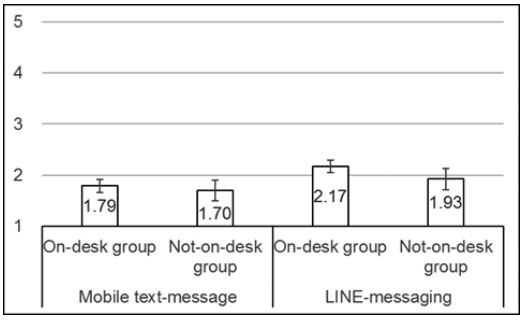

Figure 5 Comparison of average relationship maintenance subscale scores between on-desk and not-on-desk groups

feel disappointed if I don't receive any text messages / LINE messages", the interaction was significant (F (1, 76) = 4.90, p < .05) as were the tool factor main effect (F (1, 76) = 24.57, p < .001) and the group factor main effect (F (1, 76) = 3.48, p < .10). Figure 6 shows that for both groups LINE-messaging dependency was higher than mobile text-message dependency, but that LINE-messaging dependency was even higher in the on-desk group. For "I feel disappointed if I don't get a reply to my text message / LINE message immediately," the tool factor main effect was significant (F (1, 76) = 17.96, p < .001) as was the group factor main effect (F (1, 76) = 5.63, p < .05), but there was no significant interaction (F (1, 76) = 1.69). The item "I feel anxious when people don't immediately reply to my text message / LINE message" had the same pattern: a significant tool factor main effect (F (1, 76) = 14.22, p < .001) and group factor main effect (F (1, 76) = 5.38, p < .05), but an insignificant interaction (F (1, 76) = 0.85). The LINE-messaging dependency score was higher than the mobile text messaging dependency score, and both scores for the on-desk group were higher than those for the not-on-desk group (Figures 7 and 8).

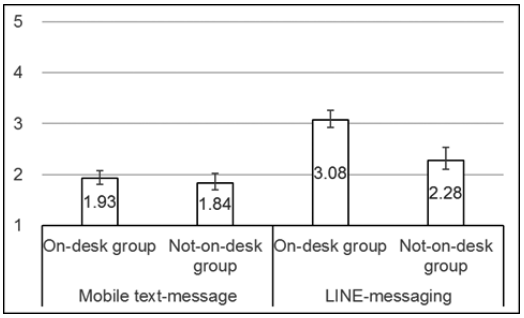

Figure 6 Comparison of average scores between on-desk and not-on-desk groups for the statement "I feel disappointed if I don't receive any text messages / LINE messages."

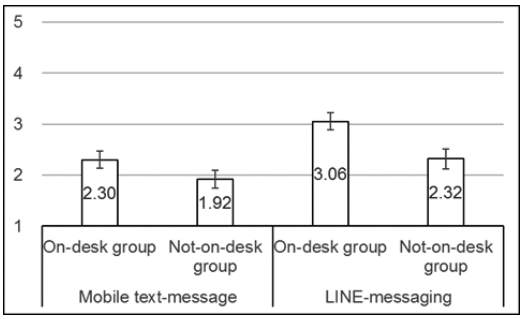

Figure 7 Comparison of average scores between on-desk and not-on-desk groups for the statement "I feel disappointed if I don't get a reply to my text message / LINE message immediately."

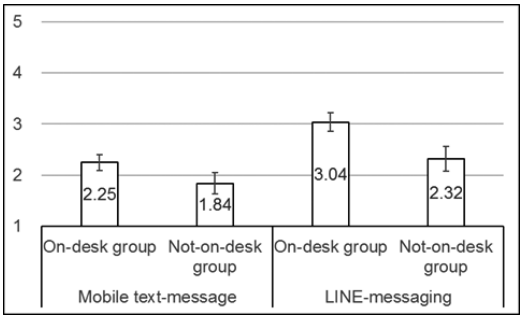

Figure 8 Comparison of average scores between on-desk and not-on-desk groups for the statement "I feel anxious when people don't immediately reply to my text message / LINE message."

5. Discussion

Using a questionnaire delivered to students of a women's university in Japan, dependency on LINE and text messaging was measured for students who placed their mobile phones on their

desk during class and those who did not do so, and two hypotheses were examined.

The first hypothesis, that there is a high degree of dependency on mobile text message communication among students who place their mobile phone on their desk during classes, is partly supported. A difference in score was observed between the on-desk and not-on-desk groups in only the emotional reaction subscale of dependency on LINE messaging, with the on-desk group having a higher score. Among the 3 subscales, the score for perception of excessive use was highest in both groups for both mobile phone text messaging and LINE messaging. Excessive use indicates extended periods of continuous mobile text messaging and LINE messaging, and the use of mobile text messaging and LINE messaging in communicating back and forth with people as well. In contrast, the relationship maintenance subscale, which asked about the necessity of mobile text messages and LINE messages to create and maintaining personal relationships, was lowest among the subscales for both groups. Taken together, these imply that university students use mobile text messaging frequently but do not think that personal relationships are impossible to create and maintain without mobile text and LINE messaging. It was also observed that students who place their phone on their desk during class have a marked tendency to feel lonely or uneasy when they do not receive a quick reply from the other party during their communication, but this emotional reaction was more apparent for LINE messaging than in mobile text messaging.

The second hypothesis, that the degree of dependency on LINE text messaging among university students is greater than that on mobile phone text messaging, is supported. LINE text communication is a form of chatting. That is, because LINE messages are regarded as more casual, daily conversation (with messages exchanged simultaneously and continuously), the perception of excessive use score was higher for LINE messaging than for mobile text communication. As regular conversation creates and maintain personal relationships, it was expected that the relationship maintenance score would be slightly higher for LINE messaging, which enables conversation-style exchanges more readily than mobile text messaging does. Additionally, LINE messaging notifies the sender when a message has been read. This means that, in addition to waiting for a reply that is not arriving quickly, which occurs with mobile text messaging, LINE messaging also causes users to wait for a reply that is not arriving quickly even though the sender that knows the recipient has read the message. Thus the emotional reactions of loneliness and unease arise more easily with LINE messaging.

According to LINE Corporation (2013), most LINE users are in their teens and twenties, with the amount dropping for those 30 and older. While most university students use LINE to communicate with students of the same generation, most members of the older generation use standard mobile text messaging, mainly because they are not as accustomed to the newer communication tool as younger students (Kato 2015). Thus, the parties involved when communicating by LINE are different from those in mobile text messaging. Because for most university students, familiar people such as friends, significant others, and so on are generally in the same generation, it is assumed that they use LINE to communicate with these parties and mobile text messaging to communicate with out-

of-generation individuals such as superiors at work or parents. If parties are different, the message content will also differ: in LINE, the content is mainly conversation that includes a variety of emotional expressions, while in mobile text messaging the content is more likely to be mainly business-like exchange. Compared with mobile text messaging, the use ratio of LINE is therefore increasing, with LINE taking on an important role in the deepening of relationships such as friendships. Because of this, it is thought that there are many more messages received in LINE and that the attention paid to replies and whether messages have been read or replied to has contributed to increased dependency on LINE.

This study was conducted in a classroom where no rules had been set regarding mobile phones. However, this didn't completely remove differences in influence between students. For example, we assume that differences in student's seating were influential. Generally speaking, if the seat in front of you is occupied, it's easier to take out your mobile phone without being seen by the lecturer. This can be described as an external influence on the placing of a phone on the desk. However, several student factors other than dependency can also be considered, such as difference in student age. First-year students may still experience residual influences from mobile phone rules in high school, which are generally very strict. Also, individual differences between students may also become factors, such as student relationships and events taking place that day (such as an emergency call, or having just received a romantic confession). This study, however, demonstrated and clarified that there are a number of correlations between the behavior of setting phones on desks in lectures and dependency scale score, although it goes without saying that future studies should investigate the various external and internal influences on phone behavior.

6. Conclusions

This study examined the relation between dependency on mobile text messaging and LINE messaging and the act of placing a mobile phone on the desk during classes, focusing on students at a Japanese women's university.

1) Students who place their mobile phone on their desk have a particularly high dependency score for LINE messaging for emotional reactions, including feelings of uncertainty and loneliness in waiting for a slow reply.

2) There is a higher dependency score for LINE messaging than for mobile text messaging.

This study focused on the act of university students placing their phone on their desk during classes. Our previous study showed that the act of placing a mobile phone on one's desk is a sign that shows the potential for mobile phone use during classes (Kato and Kato 2015). According to this study, this action also suggests a high degree of dependency on mobile phone use by the student.

7. Limitations and future research

The number of samples in this study was 78, so consideration remained focused on classification of whether students did or did not place their mobile phones on their desk. In the future, it will be necessary to conduct this same survey under the same conditions, but with an increase sample size, to improve the quantity of data. By doing so, it will become possible to classify phone use

according to common student attributes (e.g. academic year, major, seat that day, frequency of mobile text messaging / LINE use, purpose of use) and consider the influence of these attributes in more detail. Furthermore, adding data on various lecture factors will enable multivariate analysis to include external attributes, improving our understanding of the relative strengths and weaknesses of a variety of influences.

Modern university students are often called "digital natives," indicating a generation that has been born and educated in an environment where they are surrounded by computers and mobile phones, and it is said that they are skilled at multitasking (Prensky 2001a, 2001b). A detailed examination of the effects of mobile phone use during classroom lectures should be conducted to test this assertion (Baron 2008).

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