the jaltcalljournal

ISSN 1832-4215
Vol. 14, No.3 Pages 211–223

Exploring Japanese students' e-learning habits

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Since 2010, both universities in which the authors teach have integrated PC-based e-learning or mobile learning programs into several English courses. Students' online performances are evaluated and used in determining the grades for each course. The data accumulated over the years indicates both changing and unchanged e-learning habits among Japanese university students. By analyzing the accumulated data, coupled with information obtained from questionnaires, we conclude that while some e-learning habits remain unchanged, several new learning habits have emerged. The unchanged e-learning habits include: predominant use of the iPhone, which remains the most popular mobile learning tool; a deadline rush for completing e-learning tasks; a preference for engaging in e-learning in the evening and at night; e-learning diligence, i.e., frequency of participation and duration of participation, show no change. In recent years some new trends have appeared in students' e-learning: more students entering university have previous experience with e-learning, and they are less concerned about the cost of mobile phone Internet connection.

Keywords: e-learning, Japanese students, e-learning habits, tendencies, changes and unchanged habits

1. Introduction

E-learning has witnessed explosive development in the last two decades. Cassette players, black and white TVs, and overhead projectors (OHP), which were common in foreign language classes in 1980s and 1990s, have almost disappeared. Correspondence-style courses relying on textbooks and radio

Regular Paper

or TV broadcasts have largely been replaced by digital materials. Multi-media learning materials such as audio, images, videos, and texts can now be easily transmitted via the Internet. Along with advances in hardware and networks, new e-learning software and systems have been developed.

Since the emergence of the iPhone in 2007, smartphones now have become the norm, with almost every learner possessing one. Accordingly, mobile learning has become an extremely important branch of e-learning. As Gros & Garcia-Peñalvo (2016) point out, "future e-learning should encompass the use of Internet technologies for both formal and informal learning by leveraging different services and applications."

Japan is a land of sophisticated information technology with one of the world's fastest mobile networks. E-learning is being carried out in all levels of schooling, especially in higher education. Many Japanese universities have integrated e-learning into their curricula. PowerPoint is no longer the only most common tool for "e-learning" as teachers move on to other forms of e-learning to assist their teaching, to assign and collect homework, and to contact students. Moodle, Quizlet, and podcasts are among the applications that are commonly used these days by language teachers. In addition, the Japanese government has set a goal of "one student, one tablet" for all schools by 2020 (Ministry of Education, Culture, Sports, Science and Technology – Japan (MEXT), 2015), thereby enhancing the e-learning hardware environment. Furthermore, active learning, an educational mode that involves students in the learning process more directly, is strongly supported by MEXT. According to Chen, et al. (2010), students with e-learning experiences have been shown to perform better in active and collaborative learning than students with only traditional class-learning. E-learning students are also more likely to use deep approaches of learning such as higher-order thinking and reflective learning

General "learning habits" refer to modes used by learners to process, organize and interact with learning materials (Kolb, 1984; Sadler-Simit, 1996). Gregorc (1985) asserted that almost 95% of individual learners have specific learning habits. In terms of e-learning, habits are the students' common styles of online behaviours. There are numerous e-learning research articles and reports available online or offprint, but most of the research focuses on specific e-learning systems and individual implementation of e-learning projects. Very few have discussed autonomous learners' learning styles, their habits and the evolution of these styles and habits over time.

Saeed et al. (2009) did discuss students' learning habits and their technology preferences, but their research was a case study focused on students' learning habits with blogs, podcasts and social bookmarks, not with an entire e-learning course. Kim, et al (2011) compared SNS habits of Korean students and American students from a viewpoint of cultural differences. However, the SNS in this research was not for learning purposes. Chang, et al. (2009) developed a mechanism which can -identify students e-learning habits. However, the system was only tried out with elementary school students. Successful system application to university students has yet to be reported.

Among very few research papers discussing Japanese university students' e-learning and habits, Goda et al. (2013) categorized 7 types of e-learning behaviours after analysing data from a 15-week English course. As some "types" of e-learning behaviour were defined based on data from a very small number of students, they cannot be generalized for Japanese university students' e-learning habits.

2. Research purposes

In order to provide a general picture of Japanese students' e-learning habits, the authors started to collect relevant e-learning data eight years ago when they started integrating e-learning into the English syllabus. PC-based e-learning and mobile phone-based mobile learning were introduced to both regular courses and special English projects. Up to March 2018, 7535 students at the main campus of Shimane University had used an English e-learning program called Gyuto-e and about 850 students had used another e-learning program called ALC NetAcademy2. The MLP (Mobile Learning Project), a MEXT grant-supported mobile English learning project, was carried out at both Shimane University and Nagoya Women's University with an approximate total of 700 students registering from 2013 through May 2018. Students' learning data in these three projects has been carefully collected and stored on server.

As the administrators of three different e-learning programs (see Figure 1), the authors are authorised to access all logs and other learning records on the server systems where the above three projects reside. Besides, the authors conduct surveys every year to ask students to self-report their e-learning activities and perceptions.

Figure 1. Three e-learning programs: ALC NetAcademy 2 (left), Gyuto-e (middle), Mobile Learning Project (right)

By analysing the objective server data and subjective self-report data that the authors accumulated from e-learning projects over the past years (2010–2018), this research aims to clarify the following behaviours and look into trends and changes.

1. What digital devices do students use to complete e-learning tasks? Computers or smartphones?
2. When students have a deadline, when do they actually complete an e-learning task?
3. Do students these days have more pre-university e-learning experiences than students in the past?

3. Method

Shimane University is a national university in western Japan. Every year about 1000 new students are enrolled to six different faculties of this university. As a part of general education, all of the first-year students are required to take an e-learning blended TOEIC-oriented course, with the exception of medical students. It is mandatory for students to complete online assignments every week on an LMS (Learning Management System). Students' learning achievements are measured using eight online quizzes and two summary tests. The data we focus on include students' login and logout time, time length of online participation, answer accuracy, and the system functions which are frequently used.

Gyuto-e is an online English learning program developed by an IT company in Hiroshima, Japan. The program itself is a user-friendly LMS with a database of 40 reading passages, 800 listening questions and 740 grammar questions. All of the questions are multiple choice. After the answer is submitted, students can choose to view audio scripts, re-listen to the audio, and read the detailed explanations if it is a grammar question. On the administration side, the teacher can view a variety of students' learning data and manage the learning process.

Gyuto-e has been integrated into a mandatory course for first-year students from five different faculties at Shimane University since 2010. Eight years of student learning data, including online test results, are stored on the server.

Gyuto-e is basically a PC-based English learning program, although it is compatible with most smartphones.

ALC Net Academy 2, developed by Hitachi Solutions Ltd., is another English e-learning program used at Shimane University. Students at this university use various courses such as life sciences, medicine, and TOEIC preparation provided by the program. Students' learning outcomes are checked with multiple choice and fill-in-the-blank questions. As with Gyuto-e, students' learning performances are recorded in the system, and teachers can view overall class data or look into an individual student's learning history.

The Mobile English Learning Project (MLP) is a mobile language learning project jointly implemented by Shimane University and Nagoya Women's University. The project began in 2011 and sends various types of English learning materials to students' mobile phones twice a week. These materials mainly consist of short news and cultural reports, personal anecdotes, TOEIC study materials, and general knowledge quizzes. After students read the materials, they can choose to respond by taking short comprehension quizzes or giving feedback on what they read.

In terms of the first two English language e-learning systems, we look at concentrated login time, total online learning time and accuracy of the answers.

The MLP server also records students' access time and answer accuracy. When the students are asked to register with this project, they report their expectations about, perceptions of and preferences concerning mobile language learning. In order to collect reliable data in different years, the survey questions have remained almost identical. In the registration form, we include the following questions.

1. Does your mobile phone contract have an unlimited data plan?
2. What kind of device will you use to receive mobile English learning content?
3. Have you ever used a mobile phone for learning before?
4. At what time of day do you prefer to receive English learning materials on your mobile phone?

4. Data results

The Mobile Learning Project (MLP) was set up as a collaborative mobile learning project between Shimane University and Nagoya Women's University. Every year, we ask students to voluntarily register with the project so that they can receive English learning materials on their mobile phones. The registration page is in fact a questionnaire to determine their e-learning habits.

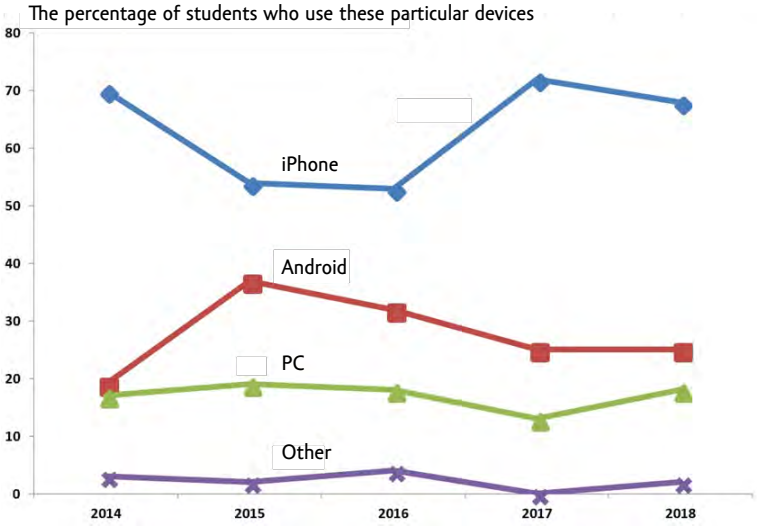

Figure 2. Most-frequently used device for receiving mobile learning materials
Note: The question "On which device are you going to receive mobile learning materials" was added to the registration in 2014.

This graph (see Figure 2) shows that in the two universities, the iPhone is the still most common device for mobile learning, with 53–72% of the total survey participants relying on it. 19–35% of students use Android smartphones. Just under 20% of students prefer not to use mobile devices and opt for the PC to receive small chunks of learning materials.

The following Figure 3 clearly shows that unlike 5 years ago, Japanese students now tend to use a limited data plan for their smartphones. Unlimited plan usage was 88% in 2013 but has declined to 39% in 2018.

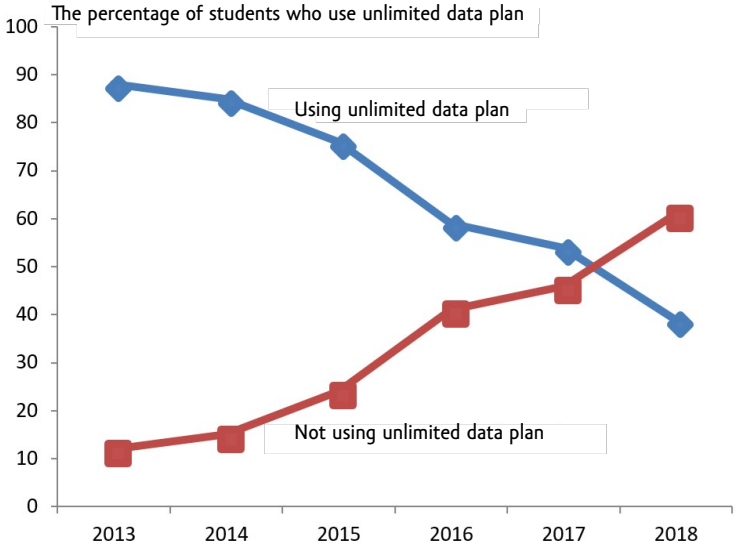

Figure 3. Use of mobile phone unlimited data plan

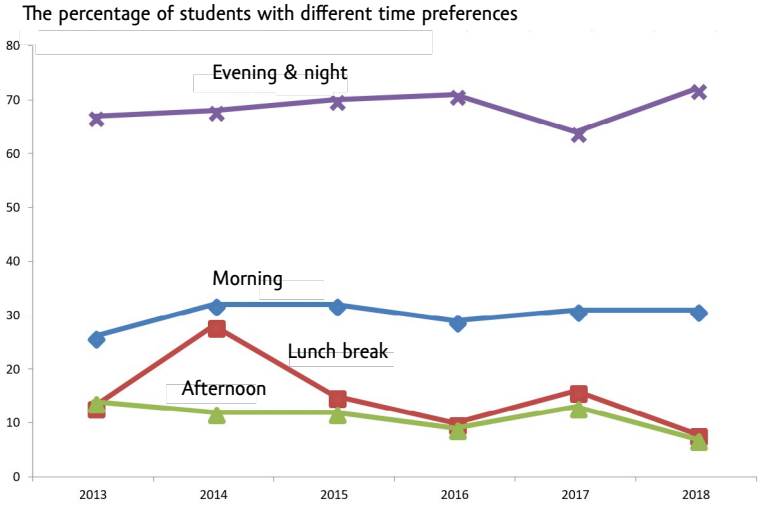

Figure 4. Most-favoured time to receive learning materials

"When is your preferred time to receive learning materials on your mobile devices/PCs?" We have asked the same question to the Mobile Learning Project registrants every year since 2013. The students who answered this question changed every year, but the preferred time for receiving e-learning materials has shown little change (see Figure 4): evening and night remain the most favored times, while morning is ranked second. The afternoon is ranked as the least desirable time to receive learning materials on their mobile phone, which is

consistent with the university students' schedule. They are unlikely to have time for learning online in the afternoon due to their university courses.

The data in Figure 5 only goes back to 2015, which was the first year students were asked if they had any experience using a mobile phone for learning prior to entering university. The number of students who have used a mobile phone for learning is gradually increasing. In 2018, 87% of first-year registrants reported that they had used mobile phones for learning before entering university.

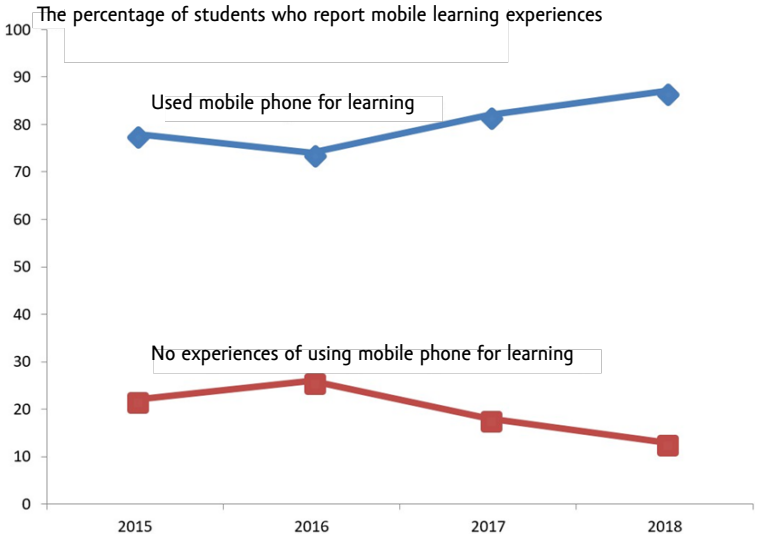

Figure 5. Pre-university experience using a mobile phone for learning

To conclude our findings from six years of data from registrations for a mobile learning project, the following two learning habits have remained unchanged. Evening and night are still the preferred mobile learning times, and the iPhone remains the most commonly used tool for mobile learning.

However, we have also noticed some changes in students' mobile learning styles: The number of students who use an unlimited data plan is decreasing, and more students enter university with prior mobile-learning experiences.

The above is the self-report data from students who participated in MLP projects in different years from 2013 to 2018. The following is the object server data from two syllabus integrated e-learning programs at Shimane University from 2010–2017: Gyuto-e and ALC NetAcademy 2

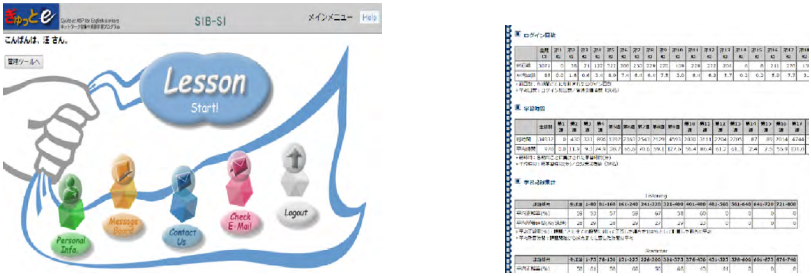

Figure 6. Syllabus integrated e-learning program – Gyuto-e

Figure 6 are screenshots of Gyuto-e. This e-learning program has been integrated into regular mandatory English courses in Shimane University since 2010. Although we encourage students to complete their online task using PCs, the system is also accessible via smartphones. Students are required to complete online assignments in this program, and teachers are provided with very detailed student learning data such as logins, learning hours, and answer accuracy by the system.

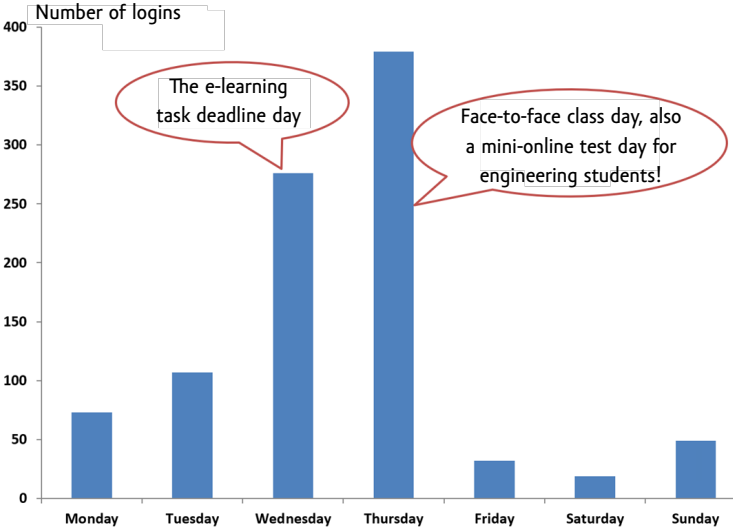

Figure 7. When students go online for their e-learning tasks (n = 36, 2017/10/4 – 2018/2/10, 15 weeks)

Note: Every Thursday was the e-learning class day when the teacher would talk about students' "online completion".

Figure 7 shows Gyuto-e login data of one 2017 class taught by the first author. There were 36 students in this class. They needed to complete 40 listening questions and about 30–40 grammar questions every week by 5 p.m. the day before their face-to-face class.

By analyzing the class login data stored on the server, we can see that most students only

study intensively online the day before class day, which is the deadline for the online assignment. It is natural that that the largest number of accesses is on Thursday when students are required to take an online test in the Thursday face-to-face class. The second highest number of accesses is on Wednesday, the deadline for the assignment It is clear that when given an e-learning task and a deadline, students tend to go online right before the deadline.

Students rush before the deadline, and they relax after the deadline passes. The two days after the class are when we record the fewest accesses. Interestingly, we found that on Sundays more students go online than Saturdays. This may be because the weekend is coming to an end, and students are starting to think about the coming week.

メール		学籍番号	氏名	クラス	前回学習日	学習回数	学習終了ユニット数	進捗率(%)	サブコース合計学習時間
	個人	1		L1B-A2	2018/01/23	66	22	55	29:38:33
	個人	1		L1B-A2	2018/01/24	76	22	55	12:01:45
	個人	1		L1B-A2	2017/12/21	25	16	40	7:55:31
	個人	1		L1B-A2	2018/01/23	43	22	55	21:07:33
	個人	1		L1B-A2	2018/01/24	43	22	55	15:30:59
	個人	1		L1B-A2	2018/01/18	70	20	50	12:27:23
	個人	1		L1B-A2	2018/01/18	54	22	55	18:24:23
	個人	1		L1B-A2	2018/02/01	67	22	55	21:01:06
	個人	1		L1B-A2	2018/01/24	60	22	55	9:35:56
	個人	1		L1B-A2	2018/01/23	74	22	55	23:14:02
	個人	1		L1B-A2	2018/01/18	28	16	40	5:25:54
	個人	1		L1B-A2	2018/01/23	43	22	55	18:09:14
	個人	11		L1B-A2	2018/02/01	77	22	55	15:00:51
	個人	11		L1B-A2	2018/01/18	40	20	50	17:38:53
	個人	11		L1B-A2	2018/01/24	46	22	55	18:07:14
	個人	11		L1B-A2	2018/01/24	102	22	55	31:55:50

Figure 8. Learning record of syllabus-integrated e-learning program – ALC Academy 2

Figure 8 is an online TOEIC course in the alc Academy 2 program. We looked at average total online learning time and total logins per student in this e-learning integrated course. Students were required to complete 22 units in a TOEIC course in 15 weeks. We collected data from classes in the same course taught by the same teacher with the same syllabus to same level of students between 2014–2017. Here are the results (see Figure 9).

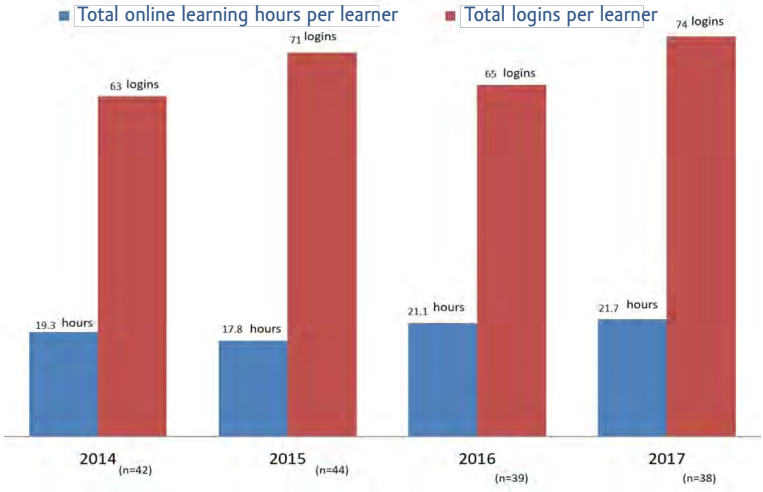

Figure 9. Total logins and total learning time for an online TOEIC course over four years

We did not find any major changes in terms of total learning time and total logins in the past four years. This indicates that students' e-learning efforts for same e-learning tasks have remained unchanged over the past few years.

5. Discussion

In this section, the authors will discuss the possible reasons for the observed e-learning habits and changes, and how online learning can be made more effective by taking these habits and changes into account.

The iPhone is used more widely in Japan than in any other country in the world. Compared to a 20.32% overall share in the world market, the iPhone has a 66.5% share in Japan, while the Android only has a 32.57% share (AERAdot, 2017). Our surveys to the students in two universities confirmed this: 72% of MLP project registrants in 2017 and 68% in 2018 reported that they have iPhones.

This difference should remind e-learning teachers in Japan that when designing mobile language learning apps, the apps must be usable on iPhones. If the budget is too small to support the development of two different kinds of OS, one for the iPhone and one for Android phones, then iPhone app development should be given priority.

At first mobile data was expensive and Wi-Fi was not widely available, so students were concerned about the cost of their mobile data. They tried to avoid receiving any large audio or video files on their mobile phones. By 2013, 88% had decided to contract for an unlimited data plan which enabled them use as much data as they wanted. However, the portion of students who had unlimited data plans kept decreasing every year. In 2018, only 39% students signed such a plan with a mobile network provider. This may be due to the fact that Wi-Fi now covers most areas of the Shimane University campus and students' apartments, so students no longer need unlimited mobile data from providers, or they just need a limited amount of mobile data when they are away from Wi-Fi. What is more,

Wi-Fi is usually much faster and much more stable than mobile data. With these results in mind, e-learning system designers no longer need to be cautious about using videos and pictures. They can now develop materials without concerns about the students' ability to access these materials.

As to the appropriate time to be sent e-learning materials, the majority of students responded that evening and night are the preferred times. From this, it can be inferred that this is the preferred time for students to study. A plausible explanation for this preference may be that, in most cases, Japanese universities students have no classes at night. They have more time at their disposal and can learn online at their own pace. On the other hand, the afternoon is ranked as the least desirable time to receive e-learning materials, and hence the time of day when students are least likely to do e-learning. This is likely due to their schedule: they are occupied with classes or part-time work in the afternoon.

The increase in the number of students who had pre-university e-learning experiences is no doubt the result of guidelines set out by MEXT. MEXT has very detailed guidelines for information education in elementary and high schools (MEXT, 2008). Students are supposed to have basic IT skills before they are enrolled in a university. In addition, 86.1% of senior high school students are reported to have smartphones, and more than 83% access the Internet through smartphones rather than by PC. (Benesse Educational Research and Development Institute, 2014). Since the number of educational smartphone apps is increasing, it is quite understandable that more and more students have mobile learning experiences before they enter university.

Study habits with an integrated e-learning syllabus show certain clear tendencies. Students recognize that, as a part of the course, their online learning performance will be evaluated. They view every e-learning task as a type of homework and go online on the day of the deadline to get the tasks done. This is in spite of the fact that in the first author's blended learning class, students were repeatedly told to avoid procrastination and last-minute e-learning. Procrastination and deadline rush have existed every year in every blended class. This phenomenon has been noted in the research of Xu (2015) and Goda et al (2013). Actually, students may benefit from such procrastination in the post mini-test as they study right before the test day. However, in the long run, deadline rush negatively affects the learning outcomes (Milgram & Tenne, 2000). Indeed, in the authors' classes, students who always complete e-learning tasks well before the deadline had better scores on both mini-tests and final exams.

Once students complete their online homework and take the online post-test, they seem reluctant to study online again until they feel the new deadline approaching. This explains why in both e-learning programs being used at the first author's university, the number of accesses is lowest on the day after the face-to-face class and then gradually rises as the deadline approaches. Teachers should be aware of such e-learning habits. In spite of the deadline rush tendency of most university students, we still need to set a deadline for every e-learning task. Otherwise students may not learn at all. Grit and self-discipline together with admonitions by their teachers may only work for a small group of very high motivated students (Wang & Smith, 2013).

It has been reported that that the time spent on task and frequency of participation are key factors for successful e-learning (Morris, Finnegan & Wu, 2005). However, over the past 4 years, no changes were observed in students' online participation. In a designated e-learning course, the average students' total online learning time and total login frequencies remained essentially the same from 2014 to 2017. There has not be a change in the

behavior of students enrolled in recent years; they do not demonstrate any more diligence than their seniors in terms of e-learning, so teachers have no reason to increase the quantity and difficulty of assigned e-learning tasks.

6. Conclusion

By analyzing the long-term and follow-up data collected from two PC-based e-learning projects and one mobile phone-based e-learning project, the authors have found that in Japanese universities, there are twice as many iPhones users as Android users. Evening and night are perceived to be the optimal time for mobile learning, and perhaps for PC-based e-learning as well. When given a mandatory learning task, students tend to study most intensively right before the deadline. The cost of mobile data is no longer a big concern for mobile learning users due to the expanding availability of Wi-Fi and lower mobile data prices. More students had learning experiences with mobile phones before entering university. For a syllabus integrated e-learning program, no changes were witnessed in terms of students' e-learning diligence

The findings obtained from the two Japanese universities may be applicable to other universities in Japan. Some of e-learning habits of Japanese students may also exist in students of other countries. It is clear that when e-learning is employed, learners' learning devices, learners' learning styles, their preferred learning time and other learning habits should be taken into consideration. Fully understanding students' e-learning habits should help e-learning teachers design an appropriate and effective e-learning program. These findings, although drawn from language e-learning courses, may provide clues for e-learning in other educational areas as well.

The above findings describing common e-learning styles and habits of Japanese university students will be also useful in developing personalized e-learning systems using design system algorithms (Klašnja-Milićević et,al. 2011; Wang & Wu, 2011). This is another contribution that this research can make to the e-learning field.

References

AERAdot (2017). Why iPhone share in Japan is higher than it is in US. Retrieved from https://diamond.jp/articles/-/144140 on July 22, 2018.

Benesse Educational Research and Development Institute (2014). Survey of ICT Use in Japanese High Schools. Retrieved from https://berd.benesse.jp/up_images/research/ict_2014-all.pdf on July 25, 2018.

Chang, Y., Kao, W., Chu, C., Chiu, C. (2009). A learning style classification mechanism for e-learning. *Computers & Education, 53*(2), 273–285.

Chen, D., Lambert, A. & Guidry. K. (2010). Engaging online learners: The impact of Web-based learning technology on college student engagement. *Computers & Education, 54*(4), 1222–1232.

Dyer, J. & Osborne, E. (1996). Effects of teaching approach on achievement, retention, and problem-solving ability of Illinois agricultural education students with varying learning styles. *Journal of Agricultural Education, 37* (3), 43–51.

Goda, Y., Yamada, M., Matsuda, T., Kato, H. Saito, H. & Miyagawa, H. (2013). Categorization of Learning Behaviour in e-Learning. *Proceedings of 29th Annual Conference of Japan Society of Educational Technology.* 867–868.

Gros, B. & García-Peñalvo, F. J. (2016) Future Trends in the Design Strategies and Technological Affordances of E-Learning. In Spector M., Lockee B., Childress M. (Eds) *Learning, Design, and Technology.* Springer, Cham, Switzerland.

Gregorc, A. F. (1985). Inside styles: Beyond the basics. Columbia, CT: Gregorc Associates.

Kim, Y., Sohn, D., Choia. S. (2011). Cultural difference in motivations for using social network sites: A comparative study of American and Korean college students. *Computers in Human Behaviour, 27* (1), 365–372.

Klašnja-Milićević, A., Vesin, B., Ivanovic, M. & Budiamac, Z. (2011). E-Learning personalization based on hybrid recommendation strategy and learning style identification. *Computers & Education, 56* (3), 885–899.

Kolb D. (1984). Experiential Learning: Experience as the Source of Learning and Development. Englewood Cliffs, NJ: Prentice Hall

Milgram, N. & Tenne, R. (2000). Personality correlates of decisional and task avoidant procrastination. *Personality, 14*(2). 141–156.

Ministry of Education, Culture, Sports, Science and Technology – Japan (MEXT) (2015). MEXT White Book 2015. p 384. Retrieved from http://www.mext.go.jp/b_menu/hakusho/html/hpab201601/1375335_017.pdf on July 25,2018.

Ministry of Education, Culture, Sports, Science and Technology – Japan (MEXT) (2008). Digitization of Education Guide Book., Chapter 4. Retrieved from http://www.mext.go.jp/b_menu/shingi/chousa/shotou/056/gijigaiyou/attach/1259389.htm on July 22, 2018

Morris, L., Finnegan, C. & Wu. S. (2005). Tracking student behaviour, persistence, and achievement in online courses. *The Internet and Higher Education, 8*(3), 221–231.

Saeed, N., Yang, Y., & Sinnappan, S.(2009). Emerging Web Technologies in Higher Education: A Case of Incorporating Blogs, Podcasts and Social Bookmarks in a Web Programming Course based on Students' Learning Styles and Technology Preferences. *Educational Technology & Society, 12*(4), 98–109.

Salter, D. W., Evans, N. J. & Fomey, D. S. (2006). A longitudinal study of learning style preferences on the Myers-Briggs Type Indicator and Learning Style Inventory. *Journal of College Student Development, 47*(2), 173–184.

Wang, S & Smith, S. (2013). Reading and Grammar Learning Through Mobile Phones. *Language Learning and Technology, 17*(3). 117–134.

Wang, S. & Wu, C. (2011). Application of context-aware and personalized recommendation to implement an adaptive ubiquitous learning system. *Expert Systems with Applications, 38* (9). 10831–10838.

Xu, Z. (2015). Just Do It! Reducing Academic Procrastination of Secondary Students. *Journal of Intervention in School and Clinic.* https://doi.org/10.1177/1053451215589178