Exploring Student Failure to Use Smartphones for Language Learning

Olivia Kennedy

Nagahama Institute of Bioscience and Technology

Sandra Healy

Kyoto Institute of Technology

Two second language acquisition researchers were invited by a teacher of English as a Foreign Language (EFL) to investigate why a technological intervention intended to raise the low student motivation levels in her high school classroom was not successful. This article explores that failure and the reasons for it. Students were taught how to install and use the language learning application, Duolingo, and instructed to use it for ten minutes each day in class. Unfortunately, few students engaged with the app and no improvement was seen in their attitudes towards learning English. The researchers analyzed the way that the technology had been implemented and examined the students' experience of it. The teacher was interviewed, questionnaires were distributed, focus groups were held, and the data were coded and analyzed. The results show that the poorly managed implementation and the participants' not viewing their devices as potential learning tools directly impacted their willingness to use their smartphones for learning purposes. This article adds to the growing body of knowledge that technology must be strategically implemented if it is to meaningfully impact learning.

第二言語習得（SLA）の研究者である筆者は、ある教師が実施した高校生の英語学習のモチベーションの低さを改善することを目的とした技術的介入が不成功に終わった理由について調査を実施した。教師は言語学習アプリ「Duolingo」のインストール方法と使用方法を生徒に教え、毎日10分間、授業中に使用するように指示した。しかし、アプリを使いこなす生徒はほとんどおらず、英語学習に対する姿勢にも改善が見られなかった。教師へのインタビュー、アンケートの配布、フォーカスグループの開催、そしてデータのコード化と分析を通して、技術の導入方法を分

析・調査した。その結果、技術導入時の管理が不十分であったこと、参加者が自分のデバイスを潜在的な学習ツールと見なしていなかったことが、学習意欲に直接影響を与えたことが判明した。本論文は、技術が学習に意味のある影響を与えるためには、戦略的に導入されなければならないという知見を提供するものである。

This article describes a research project undertaken to explore the reasons why the implementation of Mobile Assisted Language Learning (MALL) into a Japanese high school English as a Foreign Language (EFL) classroom was not successful. Two second language acquisition researchers were asked to investigate the unsuccessful introduction of the language learning app Duolingo (Von Ahn & Hacker, 2011). This article first presents a brief literature review covering MALL and Information Communication Technology (ICT) usage in Japanese schools and Duolingo, then describes the mixed methods study that was undertaken to explore the reasons for the unsuccessful integration of Duolingo into this setting.

For some 20 years, due to the international increase in the use of mobile devices such as smartphones and tablets, MALL has been predicted to change the way that languages are learnt. The term MALL describes language learning that can be achieved wherever the learner is and takes place on handheld devices such as smartphones or tablets. Seen as a subset of Computer Assisted Language Learning (CALL), MALL has the following key characteristics: the use of mobile devices, their portability, and the afforded access to information. Kukulska-Hulme and Shields (2008) state that "MALL differs from CALL in its use of personal, portable devices that enable new ways of learning, emphasizing continuity or spontaneity of access across contexts of use" (p. 273). Teachers and administrators around the world now see MALL as an important part of language courses in many different learning contexts, and it has been found to encourage collaboration (Chang & Hsu, 2011), communication and interaction between learners (Troussas et al., 2014; Ahmed, 2015), and development of socio-cultural knowledge (Pachler et al., 2009). Positive effects on learner autonomy levels have also been reported throughout the world, with various types of MALL giving learners more control over the learning process, thereby allowing them to choose what to focus on (Alzubi & Singh, 2017) and

encouraging them to think independently (Ahmed, 2015). Additionally, MALL has been found to empower students (Ahmed, 2015; Alzubi & Singh, 2017; Samsiah & Azidah, 2013; Ma, 2017). As a result, MALL is seen a potential solution to many problems that occur in language learning including negative attitudes to learning and a lack of exposure to the language being studied (McCarty et al., 2017).

In Japan, however, despite high levels of technology usage, the uptake of technology in education has been limited. For example, Shiobara (2018) found that Japanese classrooms mainly use blackboards, video and DVD players to present information, and Moritz (2017) commented that many high school classrooms still have tape recorders. Tasaki (2017) also noted the infrequent use of ICT in Japanese schools and added that many tests are administered on paper rather than via computers. Takashiro (2018) reported that it is uncommon for schools in Japan to use technology outside of information technology (IT) classes. These findings are reinforced by the 2018 results of the Programme for International Student Assessment (PISA) (Schleicher, 2019), a worldwide study by the Organisation for Economic Co-operation and Development (OECD) in which 80% of Japanese high school students responded that they spent no time using computers for school lessons, the highest in OECD countries. Only 3% reported doing their homework on a computer and 6% browsing the internet for schoolwork.

The high level of ownership of smartphones in Japan (Ministry of Internal Affairs and Communications, 2018) and their familiarity make them a logical choice when introducing MALL activities into the classroom. Caldwell (2018), examining Japanese university students' ICT competencies and the potential of MALL found that students felt more familiar using smartphones than other devices. However, Fathali et al. (2020) found that while Japanese university students regularly use ICT on a daily basis in Japanese, they rarely do so in English. They suggested this may be due to lack of knowledge about technology and the fact that the dominant method of language teaching in Japan, *yakudoku,* or translation-reading, connects students to traditional technologies like dictionaries. The translation-reading method often results in "transmissionist"

or teacher-centred learning (Saito, 2019), and is common in countries with Confucian backgrounds. Transmissionist learning places "the teacher as the source of knowledge and the students as passive recipients of knowledge" (Teo et al., 2008, p. 165). In cultures which value the teacher as the master of knowledge, when technology is entrusted with the task of instruction, the role of the teacher becomes unclear (Aoki, 2010), and learners may also be unsure of how to behave. Teachers may also worry that a new, more facilitative role (in contrast to the traditional instructive lecturing style) may lead to a concurrent loss of control (Reinders & White, 2016).

Duolingo is a free language-learning app which, according to the company's website, Duolingo.com, has some 500 million users, of whom 40 million use the app monthly as of December 2020. Learners of the 39 languages offered initially take a placement test, and then the app uses adaptive learning technology to introduce vocabulary and activities according to the ability that learners display. The app is popular for its accessibility via smartphone, gamification, and variety of activities (Munday, 2016).

In 2011 and again in 2020, the Duolingo company itself commissioned studies of the effectiveness of their app and claimed based on the results that the app is more effective than a university language course (Vesselinov & Grego, 2012; Jiang, et al., 2020). However, Krashen (2014) criticized Vesselinov and Grego's research methods and also Duolingo's reliance on conscious learning, rather than acquired knowledge, and instead maintained the importance of learners being exposed to language that they can understand in order to truly make progress (Krashen, 1985). Similarly, Reinders and Pegrum (2015) found that Duolingo's behaviorist approach, which conditions learners with stimulus followed by either reward or punishment, limits its effectiveness. Crowther et al. (2017) found that Duolingo lacks productive and interactive tasks and also criticized its lack of meaning-focused input, which gives learners opportunities to learn incidentally as they focus on meaning while either listening or reading (Nation & Yamamoto, 2012).

Little research is available on Japanese high school students and their use of technology in language learning due to restrictions on the usage of mobile

devices in the classroom/at school. However, as usage of these tools will increase from now and rests on their successful implementation, it is important to understand how problems arise and how they can be prevented. This study describes an investigation that resulted from the failure of the introduction of Duolingo by the classroom teacher to improve low motivation levels and English ability, and examines the questions:

1. What were the contributing factors for the student participants' failure to engage with Duolingo?
2. What role did the teacher play in that failure?

Method

Setting and Participants

The 20 female and 16 male Japanese participants ($n = 36$) attend a large co-educational public high school in a small city in western Japan. They are aged 16 ($n = 31$), 17 ($n = 4$) and 18 ($n = 1$) years old; all are in first year of high school, which is the standard fourth year of compulsory EFL instruction in Japan. The participants form an intact class of 36 students who spend 30 hours each week in the classroom together. They must achieve a passing grade in EFL to graduate. Seventy percent will enter employment directly from school, and the remaining 30% are expected to attend tertiary education, which is lower than the national average of 54% (Entrich, 2017). All participants in this study have their own smartphone compatible with Duolingo.

The teacher of the class is a participant in this research project rather than part of the research team. A Japanese national and veteran teacher of EFL with more than 30 years of classroom experience, she had seen significant improvements in her own conversational Italian by using Duolingo and subsequently hoped to bring this experience of language-learning success to her students. While she was not involved in data collection or analysis, she agreed to be interviewed, facilitated the researchers' efforts to collect data, and organized her lessons so that group interviews could be held during class time.

A mixed methods approach as outlined by Creswell (2009) was used, and both qualitative and quantitative data were collected. The teacher was

interviewed both at the start of the project, and after the focus groups were held (see below); the sessions were recorded and transcribed. At the end of the semester, students were first asked to fill in a simple paper-based survey about their smartphone ownership and usage (Appendix), and then they took part in a 30-minute focus group to discuss their smartphone usage. Focus groups have been found to be particularly suitable for teenagers (Ho, 2006). The students were randomly assigned to six groups and were provided with general prompts to start and facilitate the discussions. All of the data was gathered in Japanese including the focus group discussions, which were audio-recorded, transcribed, and translated by the authors of this paper. Later, the transcripts were coded manually and analyzed using Steps for Coding and Theorization (SCAT) method (Otani, 2007). Once this data had been initially analyzed, participants were asked to answer a further short questionnaire consisting of eight open-ended questions to further explicate some of the issues that arose (Appendix).

Student participants were informed about the purpose and scope of the research project and were asked to sign a consent form in Japanese. They understood that participation or lack thereof would not affect their course grade and that they could withdraw at any point. The teacher of the class also gave her written consent.

Results

Teacher interview

The teacher described how she first introduced Duolingo to her students, saying she tried to create a connection with them and develop a positive attitude towards language learning by sharing her own experiences as a language learner and user of Duolingo to study Italian. The students responded enthusiastically, and so she showed them how to download and use the app. The students all downloaded it, and after an initial exploratory session and discussion they decided to use it for targeted individual language practice in class for the next 10 weeks. She allowed them 10 minutes in each class but did not monitor their usage.

Although she was familiar with Duolingo for personal use, she stated she was unaware of functions that make it possible for teachers to use it with groups of

learners. Because she asked her students to register individually rather than as a group, it was not possible for her to monitor their usage online and track their progress. She was also not able to look at their devices in class because privacy laws in Japan do not allow teachers to access students' mobile phones (Mitomo, 2020).

Questionnaire results

All student participants have their own smartphone of which 88% are iPhones. Length of ownership ranges from one to more than seven years, with a mean of three years and 10 months. Participants reported an average daily usage of 171 minutes, which is much higher that the Japanese average weekly smartphone usage for teenagers (aged 13-19), which was 143 minutes in 2016 (Ministry of Internal Affairs and Communications, 2017). The average number of nights participants reported using their smartphones between the hours of midnight and 5:30am was 3.96. When asked why they used their phones at night, 10 participants reported that they are checking notifications, 10 said they cannot sleep, and five are worried that they may miss something.

Focus Groups Results

Three dominant themes emerged through the analysis of the focus groups: convenience, connections with others, and overuse. All of these themes concern the relationship between the participants themselves and their smartphones.

Convenience. The most dominant theme that emerged concerned how convenient life with a smartphone has become. Approximately a third of the total discussion time was dedicated to the convenience that instant access provides to information necessary for daily life.

While most of the participants' discussions related to checking information about lifestyle or entertainment, one participant, S15, raised the idea of the smartphone as an educational tool. He talked about doing homework assignments using his phone but was teased by classmates for this idea. Most of the participants seemed to see no connection between themselves, their mobile phones, and their schooling. None of the other participants mentioned education during the focus groups, and the theme was conspicuous in its

absence. Despite the apparent convenience of using their phones for so many other aspects of their lives, they did not consider their potential use for study. This will be further addressed in the discussion section.

Connections with others. Another theme that was mentioned by all groups was the ability that their smartphone has given them to connect with others. Fourteen speakers raised this theme and eight others added to it. As their conversations deepened and became gradually more personally revealing, many speakers described how much social support their smartphones provide them. Participants talked about how having a smartphone made social interaction easier. They described checking television programs or song lyrics, the opening/closing times of stores, or the status of public transport. This online access gave them the ability to share accurate information and increased confidence when joining conversations with their peers.

Participants also mentioned being able to readily and comfortably contact parents, siblings, friends, coaches, teammates, and employers. One participant (S27) mentioned how he could comfortably send text messages to his father, saying that he finds it easier to talk to him by text message rather than face-to-face. His comments were acknowledged and agreed with by the group. Another participant (S4) added that it is always good to prepare her mother for difficult topics by sending a text before she wants to talk to her face-to-face.

The acquisition of their phone was an important development in the relationship between the participants and their parent(s). Several described having difficulty persuading their parents to buy them a smartphone. However, most viewed having a smartphone as having a positive impact on their family lives. One student (S10) mentioned his family viewed him as more considerate and increased his freedom due to his use of his phone to keep in touch. Like other members in his group, the communication that his smartphone allowed had made a positive difference in his family dynamic.

Overuse. The final theme that emerged in the focus groups concerned the overuse of smartphones. The situation that one participant (S31) described seemed to resonate with his group. Each night in bed he listens to music, watches videos, plays games, texts friends, and reads blogs until he drifts into sleep, often

with his phone still in his hand. When it buzzes with a new notification, he wakes up to read it. That then leads into another cycle of phone use until he falls asleep again. As he described his experiences, the five others nodded and made sounds of agreement.

Nine of the 36 participants (25%) talked about not being able to control their smartphone use, for example: "I use it more than I need to, and I don't really like that" (S6). Another participant said, "Once I touch it, I can't stop, and that's a problem for me" (S14). Another said, "I have to study, but I use my phone. At that time, having a phone is a problem for me" (S11). In addition, in three separate groups a participant used the word "addicted", and other members of those groups nodded. One described his feelings, "It's highly addictive and I can't resist" (S23). Another said, "I'm so addicted that it's like one of my organs" (S3).

Written Data Post-Focus-Group Discussions

After the focus groups, the students were asked to complete a short questionnaire (Appendix) designed to gather more information about issues that had arisen in the focus groups. Ten of the participants (28%) agreed that they feel addicted to their smartphone, while seven (11%) did not respond to this question. Twenty-four of the participants (67%) agreed that apps are useful for learning, and twenty-two (61%) reported that they would like to use apps in class for learning.

When participants were asked how much they had used Duolingo, 18 (50%) said that they used it whenever the teacher told them to. The remaining 50% said that they did not use it. Nine participants (25%) explained their lack of use as, "I did other things on my phone." Three participants (8%) explained that they did not use Duolingo because they "learn better using a pen and paper," and two said that they "need to hear the teacher talking, rather than a CD, etc." Two students (5%) answered that they were worried about using the data on their phones, and a further two stated that they simply did not want to use the app. Sixteen of the students removed Duolingo from their phones after every class session, and a further two removed it periodically. One female student (S8) justified this with "it was taking up space that was needed for something more important."

Discussion

The relationship that the participants felt with their smartphones emerged as a key factor in their usage of Duolingo. Participants referred to their phones as if they were people, and we can see this anthropomorphism in their comments. For example, one participant stated that his phone is his "ideal partner," and another that he "want[s] to marry it". They continued to say that they love their phones and never wanted to be separated from them.

The participants also viewed their phones as helpmates or personal assistants because of the convenience, access to information, and ability to contact friends, family, and community that these devices bring to their lives. Before Duolingo was introduced, the participants had no experience using their smartphones for formal learning at high school. Their teacher also reported that when she asked them as a class whether they had used their smartphones as part of formal learning during junior high school, one student described instead the experience of having to hand their devices in to their homeroom teacher at the start of the school day and not receiving them back until it was time to go home. A show of hands confirmed to her that this was almost universal. Their lack of experience in using their devices in a formal learning environment may in part explain their failure to make full use of Duolingo.

Duolingo usage data is not presented as part of this research article because unfortunately that data was not collected. Walking around the classroom looking over students' shoulders, the classroom teacher stated she could see the Duolingo symbols and color theme on their screens and was satisfied that her class was working productively. Many teachers are not confident using MALL in their teaching, as they do not have the requisite skills and are often too busy to learn how to do it effectively (Farley et al., 2015). Additionally, as a teacher in her late 50s, she overestimated the students' ability to use technological tools and disregarded her knowledge of them as learners. While they may have known how to use the technology, they were unable to use it to study independently. Better scaffolding was required. In much the same way as the New Zealand university learners that Reinders (2014) described, "[w]ithout proper guidance and ongoing support, many do not have the skills and experience to be successful

in learning independently" (p. 14). Reinders advocates for the establishment of a personal learning environment, set up by each individual with tools and resources to develop their language learning. This was not done in this context. While the students here knew how to download and install the app, they did not have the experience of self-directed learning necessary to work independently, even during class time. They had not previously taken control of their own learning, and therefore found even the ten minutes allocated each lesson to Duolingo difficult to make effective use of.

While these students fall within Prensky's (2001) definition of digital natives, their comments in the final survey show that they prefer traditional methods of learning.

Japanese students are not used to using ICT for learning outside the ICT classroom and instead largely rely on paper and pencil to produce work (Takashiro, 2018). Classes in Japan are also generally teacher-centered (McCarty et al., 2017), and students are often passive, with Higuchi (2013) noting there is a lack of independent-minded learning among students here. For these students, who have never experienced student-centered learning, the unstructured class time to explore the Duolingo app independently may have seemed unfamiliar and threatening.

Smartphones have been shown to be strongly connected to digital identity and also to individuals' sense of self (Traxler, 2011). Before the introduction of Duolingo, the participants in this study had not previously been asked to use their phones as part of a formal learning process or allowed to use them during lessons. The lack of a school Wi-Fi network which necessitated students using their own cellular data plans further caused the participants to view their devices as strictly for personal use. Attempts by the teacher to bring the students' private smartphones into their academic sphere were rejected. As Stockwell and Hubbard (2013) found, some students may prefer to reserve their phone use for private purposes.

Levels of acceptable phone usage may vary according to social and cultural contexts. In their review, Sohn et al. (2019) found between 10% and 30% of smartphone addiction in young people, with higher levels in Asia than in other

parts of the world. While Tangmunkongvorakul et al. (2020) found lower levels of smartphone addiction among Japanese high school students (12%) compared to Thai high school students (35.9%), this was not borne out in the present study. Here, 25% of the participants self-reported they feel addicted to their phones and showed awareness of the extent of their smartphone usage.

Several studies have found significant correlations between self-identified smartphone addiction and smartphone usage that negatively impacts study participants' lives (Duke & Montag, 2017; Kim et al., 2015). Research in various learning contexts has found correlations with four types of impact. First, impacts on physical health are often seen in a reduction of sleep hours and daily exercise (Ezoe et al., 2016, with university student participants). Second, impacts on mental health are seen in the form of depression (Bickham et al., 2015, with young adolescents), stress (Thomée et al., 2011, with young adults), anxiety (Elhai et al., 2017), and low self-esteem (Yang et al., 2010, with adolescents). Third, impacts on school grades or work performance (Gallimberti et al., 2016) and finally impacts on relationships and the ability to concentrate on tasks, which is termed "technoference" (McDaniel & Coyne, 2016), are observed. All of these impacts can be described as decreased well-being caused by problematic smartphone use.

Seventy percent of the participants do not plan to continue on to post-secondary education and feel that they have little need or desire to master the English language. Their teacher, talking about her relationship with them, said:

> They don't hate me. We get along quite nicely, and around school and in the break before the bell they chat to me about all sorts of things in their lives. When I start into the lesson, they switch off. It's English that they hate.

Falout and Maruyama (2004) mention that the attribute of English language learning that most commonly demotivated students was the need to memorize vocabulary. Because of the dense focus on vocabulary study in the lower levels of the Duolingo app, this may have played a part in these students' failure to engage with it.

Conclusion

The teacher in this study attempted to intervene and improve the language-learning environment for her students by introducing a technological solution; however, the learners' prior beliefs and experiences negatively influenced the outcome of the intervention. The students' perceived their smartphones as being for personal and social rather than educational usage, which made it difficult for them to see their phones as tools for learning. The teacher lacked experience using technology in the classroom and took a risk trying to introduce something new, exemplifying the problem that teachers face trying to incorporate new practices without training while maintaining educational standards. The study was limited by the small number of participants from a specific environment which affects the generalizability of the findings, and further research is needed to explore this hypothesis and extend the research to other groups.

Acknowledgements

References

Ahmed, M. D. (2015). Can smartphones pave the path towards EFL competence for Saudi college students? *Education and Linguistics Research*, *1*(2), 120–144. https://doi.org/10.5296/elr.v1i2.8467

Alzubi, A., & Singh, M. (2017). The use of language learning strategies through smartphones in improving learner autonomy in EFL reading among undergraduates in Saudi Arabia. *International Journal of English Linguistics*, *7*(6), 59–72. https://doi.org/10.5539/ijel.v7n6p59

Aoki, K. (2010). The use of ICT and e-learning in higher education in Japan. *World Academy of Science, Engineering and Technology*, *42*, 854–858.

Bickham, D. S., Hswen, Y., & Rich, M. (2015). Media use and depression: Exposure, household rules, and symptoms among young adolescents in the USA. *International Journal of Public Health*, *60*, 147–155. https://doi.org/10.1007/s00038-014-0647-6

Caldwell, M. (2018). Japanese university students' perceptions on the use of ICT and mobile-learning in an EFL setting. *Computer Assisted Language Learning-Electronic Journal*, *19*(2), 187–212.

Chang, C. K., & Hsu, C. K. (2011). A mobile-assisted synchronously collaborative translation-annotation system for English as a foreign language (EFL) reading comprehension. *Computer Assisted Language Learning*, *24*(2), 155–180. https://doi.org/10.1080/09588221.2010.536952

Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage.

Crowther, D., Kim, K. M., & Loewen, S. (2017). The implementation of ISLA in MALL technology: An investigation into the potential effectiveness of Duolingo. *MSU Working Papers in Second Language Studies.* Michigan State University.

Duke, Ã., & Montag, C. (2017). Smartphone addiction, daily interruptions and self-reported productivity. *Addictive Behaviors Reports*, *6*: 90–95. https://doi.org/10.1016/j.abrep.2017.07.002

Elhai, J. D., Dvorak, R. D., Levine, J. C., & Hall, B. J. (2017). Problematic smartphone use: A conceptual overview and systematic review of relations with anxiety and depression psychopathology. *Journal of Affective Disorders*, *207*, 251–259.https://doi.org/10.1016/j.jad.2016.08.030

Entrich, S. R. (2017). *Shadow education and social inequalities in Japan: Evolving patterns and conceptual implications*. Springer. https://doi.org/10.1007/978-3-319-69119-0

Ezoe, S., Iida, T., Inoue, K., & Toda, M. (2016). Development of a Japanese version of smartphone dependence scale. *Open Journal of Preventative Medicine*, *6*, 179–185. https://doi.org/10.4236/ojpm.2016.67017

Falout, J., & Maruyama, M. (2004). A comparative study of proficiency and learner demotivation. *The Language Teacher*, *28*(8), 3–10.

Farley, H., Murphy, A., Johnson, C., Carter, B., Lane, M., Midgley, W., Hafeez-Baiz, A., Dekeysey, S., & Koronios, A. (2015). How do students use their mobile devices to support learning? A case study from an Australian

regional university. *Journal of Interactive Media in Education*. https://doi.org/10.5334/jime.ar

Fathali, S., Marandi, S. S., & Okada, T. (2020). Beyond the language classroom: A case of Japanese EFL students' engagement with ICT. *CALL-EJ*, *21*(2), 150–175.

Gallimberti, L., Buja, A., Chindamo, S., Terraneo, A., Marini, E., Rabensteiner, A., Vinelli, A., Gomez Perez, L. J., & Baldo, V. (2016). Problematic cell phone use for text messaging and substance abuse in early adolescence (11- to 13-year-olds). *European Journal of Pediatrics*, *175*, 355–364. https://doi.org/10.1007/s00431-015-2645-y

Higuchi, T. (2013). How should college students' independence be nurtured? Benesse Educational Research & Development Institute. http://www.childresearch.net/data/school/2013_01.html.

Ho, D. G. (2006). The focus group interview: Rising to the challenge in qualitative research methodology. *Australian Review of Applied Linguistics*, *29*(1), 1–19. https://doi.org/10.2104/aral0605

Jiang, X., Rollinson, J., Plonsky, L., & Pajak, B. (2020) Duolingo efficacy study: Beginning-level courses equivalent to four university semesters. Duolingo Research Report DRR-20-04 August 14, 2020. https://www.duolingo.com/efficacy

Kennedy, O. (2018). Examining student perceptions about smartphones to understand lack of acceptance of mobile-assisted language learning. In P. Taalas, J. Jalkanen, L. Bradley, & S. ThouÄ«sny (Eds). (2018). *Future-proof CALL: Language learning as exploration and encounters – Short papers from EUROCALL 2018*. Research-publishing.net. https://doi.org/10.14705/rpnet.2018.26.9782490057221

Kim, S. E., Kim, J. W. & Jee, Y. S. (2015) Relationship between smartphone addiction and physical activity in Chinese international students in Korea. *Journal of Behavioral Addictions*, *4*(3), 200–205. https://doi.org/10.1556/2006.4.2015.02

Krashen, S. D. (1985). *The input hypothesis: Issues and implications*. Addison-Wesley Longman.

Krashen, S. (2014). Does Duolingo "trump" university-level language learning. *International Journal of Foreign Language Teaching*, *9*(1), 13–15.

Kukulska-Hulme, A., & Shield, L. (2008). An overview of mobile assisted language learning: From content delivery to supported collaboration and interaction. *ReCALL*, *20*(3), 271–289. https://doi.org/10.1017/S0958344008000335

Ma, Q. (2017). A multi-case study of university students' language-learning experience mediated by mobile technologies: a socio-cultural perspective. *Computer Assisted Language Learning*, *30*(3-4), 183–203. https://doi.org/10.1080/09588221.2017.1301957

McCarty, S., Obari, H., & Sato, T. (2017). *Implementing mobile language learning technologies in Japan*. Springer. https://doi.org/10.1007/978-981-10-2451-1

McDaniel, B. T., & Coyne, S. M. (2016). "Technoference": The interference of technology in couple relationships and implications for women's personal and relational well-being. *Psychology of Popular Media Culture*, *5*(1), 85. https://doi.org/10.1037/ppm0000065

Ministry of Internal Affairs and Communications. (2017). White paper on information and communications 2017. http://www.soumu.go.jp/johotsusintokei/whitepaper/eng/WP2017/2017-index.html

Ministry of Internal Affairs and Communications. (2018). White paper on information and communications 2018. http://www.soumu.go.jp/johotsusintokei/whitepaper/eng/WP2018/2018-index.html.

Mitomo, H. (2020). Utilization of ICT in elementary and secondary education in Japan: Its policies and effects. In H. Mitomo (Ed.), *Telecommunications policies of Japan* (pp. 239–266). Springer. https://doi.org/10.1007/978-981-15-1033-5_13

Moritz, C. (2017, July 7). Technology in the English Classroom. *Jobs in Japan*. https://jobsinjapan.com/living-in-japan-guide/technology-english-classroom/

Munday, P. (2016). The case for using Duolingo as part of the classroom experience. *Revista Iberoamericana de EducaciÃ³n a Distancia*, *19*(1):

83–101. https://doi.org/10.5944/ried.19.1.14581

Nation, P., & Yamamoto, A. (2012). Applying the four strands to language learning. *International Journal of Innovation in English Language Teaching*, *1*(2): 167–181. https://doi.org/10.2167/illt039.0

Otani, T. (2007). SCAT. A qualitative data analysis method by four-step coding: Easy startable and small scale data-applicable process of theorization. *Bulletin of the Nagoya University Graduate School of Education and Human Development*, *54*, 27–44.

Pachler, N., Cook, J., & Bradley, C. (2009). "I don't really see it": Whither case-based approaches to understanding off-site and on-campus mobile learning? In G. Vavoula, N. Pachler, & A. Kukulska-Hulme (Eds.), *Researching mobile learning: Frameworks, tools and research designs* (pp. 77–95). Peter Lang Publishing.

Prensky, M. (2001). Digital natives, digital immigrants Part 1. *On the Horizon*, *9*(5). https://doi.org/10.1108/10748120110424816

Reinders, H. (2014). Personal learning environments for supporting out-of-class language learning. *English Teaching Forum*, *4*, 14–27.

Reinders, H., & Pegrum, M. (2015). Supporting language learning on the move. An evaluative framework for mobile language learning resources. In B. Tomlinson (Ed.), *Second language acquisition research and materials development for language learning* (pp. 116–141). Taylor & Francis.

Reinders, H., & White, C. (2016). 20 years of autonomy and technology: How far have we come and where to next. *Language Learning and Technology*, *20*(2), 143–154.

Saito, Y. (2019). Pedagogical stylistics as a discipline for bridging the gap between literary studies and English language teaching in Japan. *Kantō eibun-gaku kenkyū [Kanto Review of English Literature]*, *12*, 129–138.

Samsiah, B., & Azidah, A. (2013). Adoption and application of mobile learning in the education industry. *Procedia Social and Behavioral Sciences*, *90*, 720–729. https://doi.org/10.1016/j.sbspro.2013.07.145

Schleicher, A. (2019). *PISA 2018: Insights and interpretations*. OECD Publishing.

Shiobara, F. J. (2018). Paradoxes of technology and human behaviour in Japanese higher education. The University of Liverpool (United Kingdom).

Sohn, S. Y., Rees, P., Wildridge, B., Kalk, N. J., & Carter, B. (2019). Prevalence of problematic smartphone usage and associated mental health outcomes amongst children and young people: A systematic review, meta-analysis and GRADE of the evidence. *BMC Psychiatry*, *19*(1), 356. https://doi.org/10.1186/s12888-019-2350-x

Stockwell, G., & Hubbard, P. (2013). Some emerging principles for mobile assisted language learning. *The International Research Foundation for English Language Education, 2013,* 1–15. https://www.tirfonline.org/wp-content/uploads/2013/11/TIRF_MALL_Papers_StockwellHubbard.pdf

Takashiro, N. (2018). Technology use and middle school students' participation in shadow education in Japan. *International Psychology Bulletin*, *22*(4), 14–21.

Tangmunkongvorakul, A., Musumari, P. M., Tsubohara, Y., Ayood, P., Srithanaviboonchai, K., Techasrivichien, T., Suguimoto, S. P., Ono-Kihara, M., & Kihara, M. (2020). Factors associated with smartphone addiction: A comparative study between Japanese and Thai high school students. *Plos One*, *15*(9), e0238459. https://doi.org/10.1371/journal.pone.0238459

Tasaki, N. (2017). The impact of OECD-PISA results on Japanese educational policy. *European Journal of Education*, *52*(2), 145–153. https://doi.org/10.1111/ejed.12217

Teo, T., Chai, C. S., Hung, D., & Lee, C. B. (2008). Beliefs about teaching and uses of technology among pre-service teachers. *Asia-Pacific Journal of Teacher Education*, *36*, 163–174. https://doi.org/10.1080/13598660801971641

Thomée, S., Härenstam, A., & Hagberg, M. (2011). Mobile phone use and stress, sleep disturbances, and symptoms of depression among young adults - A prospective cohort study. *BMC Public Health*, *11*, 66. https://doi.org/10.1186/1471-2458-11-66

Traxler, J. (2011). Ethics in mobile learning - Moral movements? In I. A. SÃ¡nchez & P. IsaÃas (Eds.) *Mobile learning 2011* (pp. 95–101). IADIS

Press.

Troussas, C., Virvou, M., & Alepis, E. (2014). Collaborative learning: Group interaction in an intelligent mobile-assisted multiple language learning system. *Informatics in Education, 13*(2), 279–292. https://doi.org/10.15388/infedu.2014.17

UNICUITC (United Nations International Telecommunication Union Information and Communication Technologies). (2017). *Measuring the information society report 2017.* https://www.itu.int/pub/D-IND-ICTOI-2017

Vesselinov, R., & Grego, J. (2012). Duolingo effectiveness study. *City University of New York, USA, 28,* 1–25. https://static.duolingo.com/s3/DuolingoReport_Final.pdf

Von Ahn, L., & Hacker, S. (2011). *Duolingo* [Computer software and mobile app]. https://www.duolingo.com/

Yang, Y., Yen, J., Ko, C., Cheng, C., & Yen, C. (2010). The association between problematic cellular phone use and risky behaviors and low self-esteem among Taiwanese adolescents. *BMC Public Health*, *10*(1), 1–8. https://doi.org/10.1186/1471-2458-10-217

Author bios

Olivia Kennedy *is a lecturer at Nagahama Institute of Bioscience and Technology in Shiga, Japan. She is passionate about improving student experiences of learning. Her research interests include the uptake, usage and acceptance of technology for language learning. o_kennedy@nagahama-i-bio.ac.jp*

Sandra Healy *is an Associate Professor at Kyoto Institute of Technology in Japan. Her research interests include using technology in English language education, and gender, language and identity issues in language learning. healy@kit.ac.jp*

Appendix

English translation of the first survey instrument

1. How old are you?
2. Are you male/female/prefer not to say?
3. Do you have a smartphone? If "yes", what make/model is it?
4. How long have you had your smartphone? (years months)
5. How long do you spend each day using your smartphone?
6. How many times each week do you use your phone between 12am and 5:30am?
7. Why do you use your smartphone during the night?

English translation of the second survey instrument

1. How do you feel about your smartphone?
2. Do you feel addicted to your smartphone?
3. Are you happy that you have a smartphone? Please explain your answer.
4. Since you got your smartphone, how has your life changed?
5. Do you think that apps are useful for learning? If "yes," please explain.
6. Would you like to use apps in class for learning again?
7. How much did you use Duolingo? Please explain.
8. If you didn't use Duolingo, please explain why not.