Original Article

Expanding Self-assessment through Technology

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Part of a larger academic-year long project at a private Japanese sciences and engineering university, this study demonstrates the increased effectiveness of self-assessment surveys in second language learning when administered electronically. The participants (n=94) were from the lowest tier first year classes in their respective departments based on their Visualizing English Language Competency (VELC) placement test scores. Two Likert-scaled surveys, one pre-treatment and one post-treatment, bookended daily self-assessment surveys. Form one determined participants' initial second language learning motivation and understanding of the mobile technology to be used in the project. Form two was to determine any significant changes in motivation to improve language skills and overall awareness of the learning process as well as understanding of the mobile technology by the end of the course through the use of a paired sample T-test. The electronically administered daily self-assessment surveys tracked progress and attitude of participants in the daily lessons. Students' marks were consolidated into automated reports, which included individual feedback. Initial results indicated that self-assessment surveys, when administered electronically, correspond to a positive effect on the participants' motivation to improve their language skills and overall awareness of their language education. The results also validate the usefulness of electronic self-assessment surveys. It was not conclusively shown that self-assessment surveys administered electronically are the sole reason for improvements in motivation to improve language skills and overall awareness of the learning process, but their impact on the learning process regarding efficiency and personalized feedback should not be overlooked.

Keywords: Motivation, MALL, Learner autonomy, Feedback

Introduction

In this study it has been observed that Japanese classrooms have been heavily teacher centered learning environments. Therefore students rarely participate in an active manner, offering their opinions, volunteering information, or taking initiative or responsibility regarding their studies. At university level with higher expectations, students need to be active learners with the ability to study and learn autonomously. The researchers observed, in this envi-

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ronment students seemingly lacked the aforementioned skills. In order to guide a greater number of students to become more effective learners the researchers introduced electronic self-assessment surveys, with the notion they would help students to identify any strengths and weaknesses they possess in their English language studies, but also to motivate them to willingly take a bigger role in developing into autonomous learners, as in Chen's study (2008, pp. 237-238). Through the use of electronically administered self-assessment surveys, the researchers hope to alleviate some of the pressures of self-produced communication in the L2 without any loss of information. Moreover, students would have an opportunity to engage through the use of Quick Response (QR) code technology with their personal mobile devices eliminating any "cognitive burden" (Fageeh, 2011, p. 23), where students are unfamiliar with using the technology. It is also a convenient way to administer the survey to a large number of participants quickly. Therefore by answering the questions "How do students benefit from self-assessment surveys administered electronically?" and "Can self-assessment surveys usefulness increase if done electronically?", the researchers will show here how self-assessment surveys can be more useful if administered electronically, helping students to engage with the learning process, increase their motivation to improve their language skills and improve their overall awareness of the learning process.

Literature Review

Studies have shown the importance of self-assessment in the EFL classroom as a tool for learner awareness, motivation and autonomy (Ross, 2006; Chen, 2008; Dam, 2009; Hirschel, Yamamoto & Lee, 2012). Specifically for lower-proficiency EFL learners, self-assessment can be overwhelming, but is necessary for them to become more consciously involved in the learning process (Dam, 2009).

One notion to increase involvement from students and improve effectiveness of self-assessments was to incorporating QR Codes and Mobile Assisted Language Learning (MALL) in the process. QR Codes created by a two-person team, headed by Masahiro Hara in 1994 (Denso Wave, n.d.), although not originally developed for educational purposes, allow teachers to link surveys to a code that can be quickly accessed by students using personal mobile devices. In Attewell's (2005, p. 2) Evaluator's Report of the m-learning project, she noted that MALL:

> can be used to enliven, or add variety to, conventional lessons or courses; can be used to remove some of the formality which non-traditional learners may find unattractive or frightening and can make learning fun; can help to combat resistance to the use of Information Communication Technology (ICT) by providing a bridge between mobile phone literacy and PC literacy; and has been observed to help young disconnected learners to remain more focused for longer periods of time.

MALL gives students a unique way to enhance language studies by increasing motivation to improve language skills, overall awareness of the learning process and autonomous learning (Kukulska-Hulme, 2016; Hazaea, A. & Alzubi, A, 2018). Fujimura & Doi (2006) mention that paper-based questionnaires can be a burdensome way to collect and analyze students' feedback. They also point out that even in classrooms equipped with computers, students are not willing to access the Internet if they are required to input an entire webpage address.

Methodology

The following will introduce the parameters for this study beginning with the participants, including all pertinent information regarding their educational setting and background. In the research design, we will explain what devices were used for the study, their implementation, the functionality of the devices within the study and why these specific devices were chosen.

Participants

In this study the participants (N＝94) were first-year undergraduate students from a private Japanese university of sciences and engineering. All participants attended two compulsory, 90-minute English Communication classes per week for one academic year, equating to thirty weeks. The participants (six female, 88 male) were classified at the lowest tier of English language learners in their respective faculties: Aerospace Systems Engineering, Architecture, Computer Information Sciences, Life Sciences and

Mechanical Engineering. Students were divided into tiers determined by initial Visualizing English Language Competency (VELC) Placement Test scores during the university orientation week. All participants in the study scored in the 300 to 400 point band, or 205 to 330 point TOEIC range except one, who scored 298 points. All scores equate to an A1 to lower A2 band on the Common European Framework of Reference (CEFR). Before this research project began, all participants completed voluntary online agreements allowing the researchers to use any and all information from the course to conduct their research with the understanding that all participants would remain anonymous.

Research Design

This project was part of a larger academic year-long study of electronically administered self-assessment surveys from April 2017 to January 2018. The project was bookended with the administration of a six-point Likert scale (1 = Strongly disagree, 2 = Disagree, 3 = Somewhat disagree, 4 = Somewhat agree, 5 = Agree, 6 = Strongly agree) pre- and post-treatment questionnaires administered through Survey Monkey and Google Forms.

This portion of the research project was to examine the usefulness of electronically administered self-assessment surveys created in Google Forms, and their role in students' motivation to actively be involved in their own language learning. The pre-treatment questionnaire was to determine the students' understanding of the technology to be used in the study and their perceptions on their language learning motivation. The post-treatment questionnaire was developed to determine any changes that the use of the electronically administered self-assessment surveys might have had on their perceptions of their language learning.

Electronically administered self-assessment surveys would be completed at the end of each content-based lesson. Students would access them through QR codes, using mobile devices. Students would later receive a Self-Assessment Survey Report, (SASR) developed from a formatted Excel spreadsheet, of their marks at the end of each unit to use as a study tool for their upcoming unit assessment.

MALL as opposed to CALL

Through pre-trials conducted in the previous aca-demic year regarding the use of Computer Assisted Language Learning (CALL) technology versus using MALL technology, the researchers concluded that accessing online surveys through links on a website had the following problems. Firstly, it was too time-consuming for researchers to create and upload a link to the course Moodle Learning Management System (LMS) (Moodle, n.d.) for each department. Secondly, it was too confusing for students to find and/or select the correct survey. Finally, at times, students experienced problems connecting to the university's wireless network. Conversely, MALL technology simplified administration of surveys by eliminating links to an LMS for various departments. There was no confusion as to the correct survey to complete. Moreover, with students' personal mobile devices, wireless connectivity concerns were eliminated, due to the option for mobile data usage.

The researchers were also interested in incorporating personal devices into the classroom as:

> students show an extremely strong tendency to 'play' with their smartphones throughout classes with little regard for their peers or the teacher. With the opportunity to use their personal devices (mobile/smartphones, phablets or tablets) in class to complete activities, students seemingly show less interest in non-classroom types of usage (Yamamoto, 2016, pp. 75-76).

Using QR Codes was seen as a refreshingly unique way to administer self-assessment surveys quickly to a large number of students simultaneously, using familiar technology they had never used in an educational setting. QR codes were also determined to be the most efficient and effective way to distribute self-assessment surveys using smartphone technology. Through this method, the administration time was significantly reduced, as taking out, setting up and putting away classroom tablets, which took between ten and 15 minutes with classes of over 20 students, was no longer necessary. Anyone possessing any type of mobile device including a traditional "flip-phone" would have quick access to a QR code reader and could access a survey in roughly one minute.

Conditions

The researchers first created each Self-Assessment Survey as a separate Google Form. Once creat-

ed, each form was attached to a specifically generated QR Code using the website QR Stuff, as it seemed to be the most straightforward approach. Each QR Code was then downloaded and added to the last page of each lesson in the adapted workbook, viewable in (Appendix A).

For the study, all surveys were tailored to a particular lesson and consisted of five questions focused on:

1) vocabulary,
2) use of English (grammar),
3) interaction,
4) troublesome areas, and
5) completed homework assignments,

as shown in Appendix B. Each was formatted to get the most accurate responses in the shortest time from students at an A1 to lower A2 level of English. Thus there were no open-ended items and all items were translated into Japanese, following Meilleur, Yamamoto & Franz (2014), who noted that students below a certain proficiency level were unable to express reflective responses coherently in the L2.

Self-Assessment Survey Report

Participant responses were collected in Google Spreadsheets and downloaded into a preformatted Excel document. The Excel file was used to sort participants and their answers to produce individualized SASRs to receive more personalized subsequent feedback from teachers based on their individual responses. At the end of each unit, students received Excel formatted individualized SASRs (Appendix C), identifying what they should attend to so as to perform adequately on their upcoming unit quiz. Using this electronically administered system, we could present each student with a report of their individual responses including feedback simultaneously.

Survey Instruments

Initially students answered the five items in Appendix D, three items based on the mobile technology they use on a daily basis and two 6-point Likert scale items, one regarding their impression of using MALL technology in the classroom and another regarding their progress with general pre-assigned homework. The post-treatment survey (Appendix E) consisted of three six-point Likert scale items. Item 1 directly related to using their device to access the Self-Assessment Survey, while the second item centered on overall MALL usage. Item 3 pertained to motivation relating to Self-Assessment Surveys and homework progression.

Results and Discussion

Initial Results

Viewable in Table 1, results of the pre-treatment survey showed that all students possessed personal mobile devices, with all but one participant owning a smartphone in item 1. This allowed the project to incorporate personal mobile devices saving significant time to access surveys while eliminating the possibility of wireless connectivity issues arising. Secondly, it confirmed Yamamoto's (2016, pp. 75-76) observation that students' interest in non-classroom activity decreases, as similar observations were made throughout this project. Item 2 indicated that 96.8% ($x = 91$) of students' devices possessed QR code reading capabilities, while 1% ($x = 1$) did not have the capability and 2.1% ($x = 2$) did not answer. Despite the results, through verification, all participants' mobile devices possessed the capability to scan and read a QR code. Therefore, the researchers felt confident that using QR code technology would be effective as instruction meant telling students what application to use, such as the camera on their mobile device, a QR code reader, or LINE (LINE, n.d.) In item 3, the participants stated they use QR codes in their daily lives, but not often. Regardless, of the average daily usage,

Table 1   Pre-treatment survey results

1. Mobile device used	Standard phone 1.1%	Smartphone 98.9%	No mobile device 0.0%
2. My mobile device can scan QR Codes and access the internet	Yes 96.8%	No 1.0%	N/A 2.1%
3. I often use QR Codes in my daily life	Mean (μ) 2.99	SD 1.44	Variance 2.10

we were confident that due to the overall popularity of QR codes in Japan students were still comfortable with the technology. Other than giving information about application use there were no situations when a student needed assistance with what to do with a QR code.

Descriptive Statistical Comparison

When analyzing the statistical comparisons between the pre-treatment and post-treatment surveys, shown in Table 2, it is clear that students were positive in their responses regarding the use of QR codes and their convenience. In comparison to item 3 in Table 1, although students stated that they did not use QR codes much in their daily lives, they were quite comfortable in using them in the class. The survey does not directly investigate this notion, but students' familiarity with the technology and the differences between attempting to use classroom tablets versus personal mobile devices likely was influential in the positive response. In addition, item 2, in Table 2, shows that, initially, participants were somewhat positive about using smartphones in the class increasing interest. Surprisingly, by the end of the project, they were even more positive and to a statistically significant value (p=0.003). An assumption for their positive response could be the novelty of using their personal mobile devices in classroom situations, as it has been forbidden throughout their educational careers. Though not gamifying the lessons, adding this type of technology to improve learning showed a visual increase in students' interest, in turn motivate them to take a larger role in their second language learning. Similar to item 2, the third item also showed signif-

icant gains (p=0.02) and is a direct response to the second research question regarding self-assessment surveys usefulness when distributed electronically. Thus demonstrating that through the use of electronically administered self-assessment surveys students' were more interested in their achievements and took a more active role in the learning process, by actively using the surveys results and feedback to track their progress throughout the course.

In response to the first research question regarding how students can benefit from using self-assessment surveys administered electronically, students responded with what they found to be useful. Comments such as "All my problem areas were organized together and feedback on what I should do was written" and "It made reviewing easier" were common across all departments, as were positive comments such as, "I think this is necessary for class" and "[it is] very useful [to continue using Electronic Self-Assessment Surveys]." Students' comments suggest the surveys improved their organizational skills, which in turn made studying easier showing their usefulness. The positive responses further validate the effectiveness on students' motivation to improve their language skills and overall awareness of the learning process, when self-assessments surveys are administered electronically making them more useful tools compared to in analog form, where individual feedback for such a large number of students would not be possible for each lesson.

Limitations

Although the researchers viewed this as minor in

Table 2   Descriptive statistical comparison

1. Using QR codes was a convenient way to access the self-assessment survey (post)	Mean (x) 4.67			SD 1.30	Variance 1.69
Item	Mean (μ)	SD	T	Degree of Freedom	Significance (2-tailed)
2. Using a smartphone in class would make it more interesting. (Pre Item 4) Using a smartphone for classroom activities made the lessons more interesting. (Post)	4.15 4.69	1.38 1.30	3.06	93	0.003
3. I do general homework assignments regularly. (Pre Item 5) The self-assessment survey was a useful way to track and motivate me to do ongoing homework assignments. (Post)	3.76 4.12	1.32 1.08	2.45	93	0.02

Difference in means statistically significant at p<0.05

light of the positive effect, it was somewhat time-consuming for the researchers to download responses into an Excel spreadsheet and then print individualized copies for 94 participants after each unit. Also, in some instances, participants did not properly send their surveys from their mobile devices and with no system to immediately monitor surveys sent, students could not be informed.

Future Research

Due to the above limitations and the proven effectiveness of electronically administered self-assessment surveys, future research would involve developing a system database that could be used to create self-assessment surveys and reports. The database research would investigate the possibilities and usefulness across other boundaries such as part of professional development or in training situations. With the opportunity to immediately view the feedback from individual surveys without having to wait for someone to print copies, it could be seen as completely autonomous. The administration of the reports would also be done electronically and instantaneous for each participant, greatly reducing the time to complete a self-assessment survey.

Conclusion

Self-Assessment is a valuable tool for independent learning, but can be difficult should the self-assessment be done in the L2, particularly in lower level classes as this study showed. Through the use of QR Code technology, Google Forms and Excel, the researchers were able to simplify the process of assessment reducing L2 interference. This ability, along with the participants' interest in the learning process increasing significantly and their positive comments to continue the project, reinforces the importance of self-assessment. Electronically administered self-assessment surveys are far less time-consuming to administer, collect and collate into a concise report with feedback for students to use effectively compared to paper versions. Moreover, if done electronically, teachers and researchers can reach out to every student, motivating them to take responsibility of their learning and the learning process, making them more proficient independent learners.

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Appendix A
QR coding on the handout

A. Write "Yes/No" questions using "Do".

Subject	Question	Answer
(例) sports	*Do you like baseball?*	*Yes, I do.*
1. sports		
2. movies		
3. books		

B. Write questions using "What".

Subject	Question	Answer
(例) TV programs	*What TV program do you like?*	*I like SMAP x SMAP.*
1. TV programs		
2. video games		
3. kind of music		

C. Write the questions.

1. soccer / do / play / on the weekend / you   _____

2. family / like / does / what sport / your   _____

3. best friend / your / in the evening / does / exercise   _____

4. surf the internet / friends / do / your / on the weekend   _____

D. Answer the questions. Please ask a partner.

Your answer	Partner 1:	Partner 2:
1.	1.	1.
2.	2.	2.
3.	3.	3.
4.	4.	4.

Task 3: Speaking – Hobbies/Interests Interview

Go to "Likes & Dislikes – Hobbies" on Moodle. Interview a partner.

Self-Assessment

Complete the Self-assessment.

Appendix B
The self-assessment survey

Q1. Check what you DON'T KNOW. *
分からない単語のみチェックして下さい

☐ food 食べ物

☐ drink 飲み物

☐ Vietnamese ベトナムの

☐ Indian インドの

☐ Korean 韓国の

☐ Italian イタリアの

☐ French フランスの

☐ sour 酸っぱい

☐ bitter 苦い

☐ salty 塩辛い

☐ sweet 甘い

☐ spicy / hot 辛い

☐ bland / plain 味気ない

☐ mild (丁度良い)

☐ favorite 好きな

☐ kind/type of ~ ~の種類

☐ I KNOW EVERYTHING! (全部理解できる！)

I need more practice with...
私は・・・に関して、まだ練習が必要です

☐ Q1   （単語）

☐ Q2   （好物について説明すること）

☐ Q3   （好物について話すこと）

☐ Reading

☐ Speaking

☐ Listening

☐ Writng

I did this activity last week. *
先週は…を行いました

☐ Listening Tasks (on Moodle)

☐ Praxis Ed

☐ SALC Activity

☐ Quizlet (Vocabulary)

☐ Nothing (してません)

Q2. I can describe foods and drinks in easy English. *
自分の好きな食べ物、飲み物について簡単な英語で説明できます

	1	2	3	4	5	
Need to work on (まだまだ)	○	○	○	○	○	Very Well (よく出来る)

Q3. I can talk about my favorite food and drink in easy English. *
自分の好きな食べ物、飲み物について簡単な英語で話せます

	1	2	3	4	5	
Need to work on (まだまだ)	○	○	○	○	○	Very Well (よく出来る。)

Appendix C
The self-assessment survey report

Student Number: ▉▉▉▉▉▉		Student Name: ▉▉▉▉▉▉▉▉▉		

01 Getting Around & Time

Q1. Check what you DON'T know.	Q2. I can tell time in English.	Q3. I can ask and answer questions about time.	I need more practice with	I did this activity since last class.
half （30分＜半時間＞）, hour(s) （～時間）, midnight （午前12時）, minute(s) （～分）, noon （正午）, ~past/after~ (time) （（～時の）～後）, quarter （15分）, ~to~ (time) （（～時まで）～時間・分・秒）	Review Task 3A: Telling Time on your handout with a partner.	Please speak to your teacher for help with Task 4: What time...?	Speaking	Praxis Ed

01 Routines – Daily & Weekend Routines

Q1. Check what you DON'T know.	Q2. I can understand frequency adverbs in easy English.	Q3. I can use frequency adverbs to talk about my daily routines.	I need more practice with	I did this activity since last class.
cook dinner 夕食を作る, How often...? どのくらいの頻度で...?, never 絶対~ない, read the news ニュースを読む, sometimes 時々, study 勉強する, usually 普段は・大抵, watch TV テレビを見る	Please speak to a learning advisor for help with Task 1: Frequency Adverbs.	Please speak to your teacher for help with Task 1C: Frequency Adverbs.	Speaking	Praxis Ed

02 Routines – Yesterday & Last Weekend

Q1. Check what you DON'T know.	Q2. I can conjugate verbs in the past tense.	Q3. I can talk about my past hobbies and interests.	I need more practice with	I did this activity since last class.
did laundry 洗濯した, played 遊んだ, relaxed (stayed) at home 家でくつろいだ, sang karaoke カラオケで歌った, studied 勉強した, took a nap 昼寝した, washed my pet ペットを洗った, washed the dishes 皿を洗った, went for a walk 散歩した, went to a movie 映画に行った, (daily) routine 日課	Well done! Keep doing a good job.	Well done! Keep doing a good job.	Writing	Praxis Ed

Appendix D
Pre-treatment survey

1. Mobile device used   使用している携帯電話の機種

○ Standard mobile phone 普通の携帯電話（ガラケー）

○ Smartphone スマートフォン

○ I don't have a mobile device.   使用していません

2. My mobile device can scan QR Codes and access the internet.
私の携帯電話からQRコードでのインターネットアクセスは可能である

○ Yes

○ No

○ N/A

3. I often use QR Codes in my daily life.
日常的によくQRコードを使用する

Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree
○	○	○	○	○	○

4. Using a smartphone in class would make it more interesting.
授業中にスマートフォンを使用することで授業により興味が沸く

Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree
○	○	○	○	○	○

5. I do general homework assignments (Praxis Ed, Listening Tasks, SALC Activities, etc.) regularly.
Praxis Ed, Listening Tasks, SALC Activities等の課題は定期的に行っている

Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree
○	○	○	○	○	○

Appendix E
Post-treatment survey

1. Using QR codes was a convenient way to access the self-assessment survey.

QRコードを使うことで自己評価調査にアクセスするのは簡単だった。

	1	2	3	4	5	6	
Strongly Disagree	○	○	○	○	○	○	Strongly Agree

2. Using my smartphone for classroom activities made the lessons more interesting.

授業中にスマートフォンを使用することで授業がより面白くなる。

	1	2	3	4	5	6	
Strongly Disagree	○	○	○	○	○	○	Strongly Agree

3. The self-assessment survey was a useful way to track and motivate me to do ongoing homework assignments.

自己評価調査は、課題・宿題の進行状況の確認と、課題に対するやる気を出させるのに良い方法だと思う。

	1	2	3	4	5	6	
Strongly Disagree	○	○	○	○	○	○	Strongly Agree