Mobile-CALT: A Practical Guide for Using Cell Phones for CALT

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This paper describes Mobile-CALT, a cell phone-based Computer Assisted Language Testing (CALT) method that was used at Hokkaido University of Education's Asahikawa campus during the 2014 academic year. The paper begins, first, with the motivations for developing an off-the-shelf implementation of phone-based CALT. Second, it describes the history of Mobile Assisted Language Learning (MALL) in Japan and then explains how to implement Mobile-CALT using Google Forms, bit.ly, and Quick-Response (QR) codes. Finally, the paper discusses the effectiveness of utilizing Google Forms for Mobile-CALT and indicates optimal contexts for this implementation.

本研究が北海道教育大学旭川校で平成26年度の前期に、携帯電話を基盤としたCALT、Mobile−CALTと呼ぶ、の実施を述べる。まず、施す動機の背景を説明する。それでこれは今までのMALL文献及び日本内実践の中に置く。また、 Google Formsおよび bit.ly およびQRコードが使う手続きを述べる。最後に、Mobile−CALTの実践的効果と実行するのが良い状況を述べる。

CALL (Computer-Assisted Language Learning) often evokes images of expensive computer classrooms, but not every university provides such resources. Most students, however, bring cell phones to school every day, and these can be used for MALL (Mobile-Assisted Language Learning) without a CALL classroom. In what follows, I present "mobile-CALT" (Computer-Assisted Language Testing [CALT] on cell phones), a method for doing homework and quizzes on mobile phones.

In the spring semester of the 2014, I began teaching classes for primarily first- and second-year students at the Asahikawa campus of Hokkaido University of Education. Having previously taught smaller university courses in the U.S. in my

discipline (philosophy), the number of classes and students seemed daunting to manage using conventional means (seven courses with 215 students). The students I taught were taking courses offered by the English faculty to fulfill either general education requirements for all majors or requirements for an English teaching license.

I wanted to survey my students to better understand them and develop relevant content, but a paper survey would have been time-consuming in terms of data entry. To remedy these issues and to have digital data, I wanted to use an online system, but I faced two problems. First, my classrooms did not have computers. Moreover, several students I spoke with indicated they did not own computers and that they did not have laptops or tablets that they could bring to class. Computer ownership and literacy among Japanese college students appears to vary widely. Thornton and Houser (2005) claim only 17% of students at Kinjo Gakuin University have computers, while Gromik (2009) claims 97% of students at Tohoku University do own computers. As such, I could not depend on computers for data collection. To solve the problem of computer access, I decided to have them take the survey on their cell phones. As Lockley (2011) and Murray and Blythe (2011) point out, Japanese students tend to have higher rates of ownership, usage, and literacy with cell phones than computers. Based on this, informal surveying, and prior experience in Web application development, I concluded that using cell phones would be a plausible digital data entry method.

The Case for Mobile-CALT

Improvements in cell phone and tablet computer technology have led to a rapid increase in the use of MALL over the past 20 years. MALL utilizes a mobile device such as a cell phone or tablet computer (Kukulska-Hulme & Shield, 2008) to provide a "highly portable...individual... unobtrusive...available...adaptable... [and] intuitive" platform (Sharples, 2000, pp. 178-179). In the process, MALL acts as a force for change in equalizing access for all students (Valk, Rashid, & Elder, 2010). Many recent implementations of MALL have been Web-based. Web-based testing provides (a) asynchronous testability, (b) grassroots availability, and (c) affordability (Roever, 2001). Continuing advances in mobile

HTML and cellphones have helped make MALL even easier to implement (Godwin-Jones, 2011).

Japanese universities have also seen MALL implementations, mainly for vocabulary learning (Thornton & Houser, 2005; Stockwell, 2007; Rivers, 2009). While cell phones and more recently smartphones are nearly ubiquitous in Japan (Kondo et al., 2012; Wang & Smith, 2013), educational use has lagged general adoption (Kukulska-Hulme & Shield, 2008). Thornton and Houser (2005) tested a cellphone-based delivery method for short vocabulary lessons, building on the higher penetration of cellphones to personal computers in Japan at the time. Stockwell (2007) implemented a more advanced vocabulary-learning system where a user's profile and the performance on prior vocabulary activities influence future activities. Quick Response (QR) codes have also been used in MALL in Japan to store messages for use in class (Rivers, 2009).

MALL implementations have had two types of challenges. First, there are human problems. Of note are lower completion rate for remote classes (Bouhnik & Marcus, 2006), lower performance versus face-to-face interactive tasks (Chinnery, 2006), problems of motivation (Bouhnik & Marcus, 2006), and students resisting the use of their cell phones for school purposes that they perceive to be invasive (Kondo et al., 2012; Stockwell & Hubbard, 2013). I did not encounter these sorts of issues in any notable way.

Second, there are technological issues. While difficulties with data entry on flip phone cell phones and bandwidth associated-problems (Wang & Higgins, 2006; Kukulska-Hulme & Shield, 2008; Burston, 2011; Godwin-Jones, 2011) have diminished, Roever (2001) presciently identified three potential issues that still have currency: (1) "Cheating and Item Exposure" insofar as Web-implemented tests are hard to keep confidential, (2) the problem of managing user-entered data, and (3) browser incompatibility in managing the different browsers and the different versions of a given browser students may use (pp. 88-89; see also Wang & Higgins, 2006, p. 9). Mobile-CALT benefits directly from the ubiquity of cell phones, advances in mobile Web technology, and prior MALL research, but these technical and human problems remain.

Method

In utilizing mobile-CALT with my students, a challenge existed in how to provide each student in all my classes with access to the survey on the first day without requiring them to type a lengthy URL. To solve this problem, I decided to use three off-the-shelf and easily accessed Web site-based technologies: Google Forms, Bitly (bitly.com), and QR Codes. Google Forms supplies a very simple system for creating quizzes that can include multiple-choice, multiple-answer, short answer, and other question formats, and this is compatible with nearly all cell phones. This application handles the data entry and submission. The URLs that it generates, however, are long and thus unwieldy to enter.

I addressed making the URLs easier for cell phones to handle through a combination of a URL shortening service (Bitly) and QR codes (black-and-white square block patterns common in advertising). Denso Wave, the owner of QR codes, has promised not to enforce its patents, in order to make the technology free and widely available. Consequently, with a simple search, I found a QR code generator online. The use of both QR codes and Bitly URLs is redundant, but using both enables both those with and those without QR readers to take quizzes since students without QR code readers installed can also type the URL quickly.

I used this method for the initial survey, providing paper versions to students who did not take the survey on phones. Based on the success of this initial trial survey and its convenience and ease of use, I expanded and refined the method throughout the semester across several classes for submitting homework and managing quizzes. Still, I worried, as have many of my peers (McCoy, 2013; Valois, 2012; Weimer, 2014; Young, 2006) that cell phones would prove to be classroom distractions. Both in America and Japan, I have seen students distracted by texting and other applications. Teachers more accustomed to MALL may feel differently.

As indicated before, cell phones have the advantage of students already being familiar with how to use their own phones, and my experience matched this. Out of 195 students who used the system, only three did not have smartphones. While mobile phones are not the best tool for every teaching purpose, they offer

a very effective and under-utilized tool for mobile-CALT. Setting up mobile-CALT with Google Forms and QR codes took some trial and error, and the following represents the best practices version.

Mobile-CALT Setup

Setting up mobile-CALT with Google Forms is relatively simple. First, log in to a Google account. Then, access Google Forms by opening a browser window to http://forms.google.com. The initial screen appeared as in Figure 1.

To make a form, rename the "Untitled Form" to a descriptive title by clicking on the text "Untitled Form" and changing it there. Add questions by clicking on "Untitled Question" and changing the text and type to be appropriate (for example, a survey question, or a quiz question). To add further questions, click "Add Item" and repeat as necessary to complete the form (Figure 2). Since the primary use of mobile-CALT is for quizzes and homework assignments, check the "Required Question" option to insure students must write or select an answer before they can submit their form. For mobile-CALT quizzes, unclick the checkbox that reads "Show link to submit another response" to reduce the chances of confusion and multiple entries. The design is complete when "Done" is clicked.

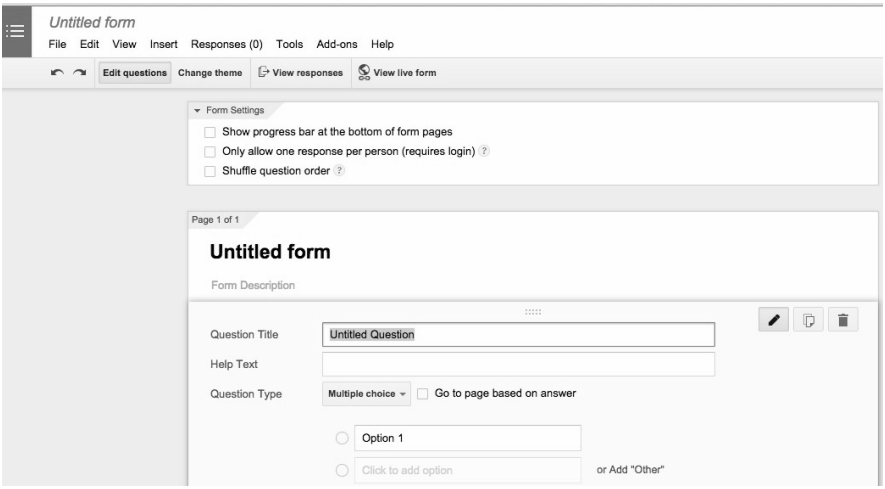


Figure 1. Initial screen when accessing Google Forms.

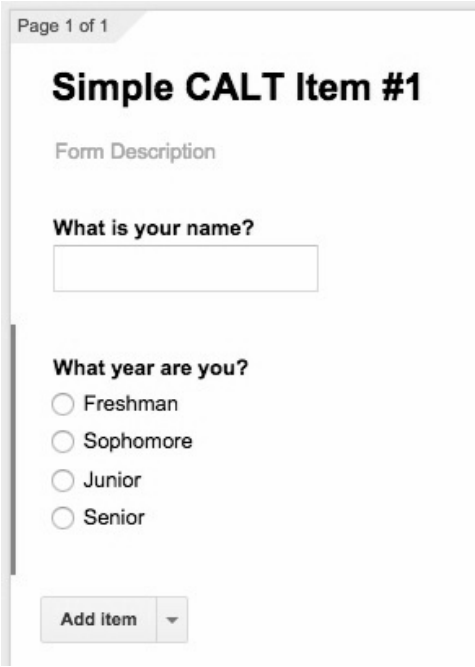


Figure 2. Example of a question item on Google Forms.

Clicking on "Send Form" in the completed Google Form provides the URL to give to students in the box entitled "Link to Share." This URL provides anyone in the world who has the code to take the mobile-CALT item (survey, quiz, etc.) prepared. While not necessary for QR codes, I then passed this URL through the URL shortener Bitly by pasting the URL into the box that reads, "Paste a link to shorten it" and clicking "Shorten". This shortened URL can be supplied to students so that those without QR code reader applications can also use Mobile-CALT with an Internet-connected phone or other device such as a computer.

Making a QR code involves entering the URL into a QR code generator. Copy either the original URL or one returned by the shortener into a text document. Enter this URL into the generator (https://www.the-qrcode-generator.com/) and enter the URL in the box (Figure 3). Confirm the functionality of the QR code by testing with a phone. This measure is merely a precaution to avoid human error.

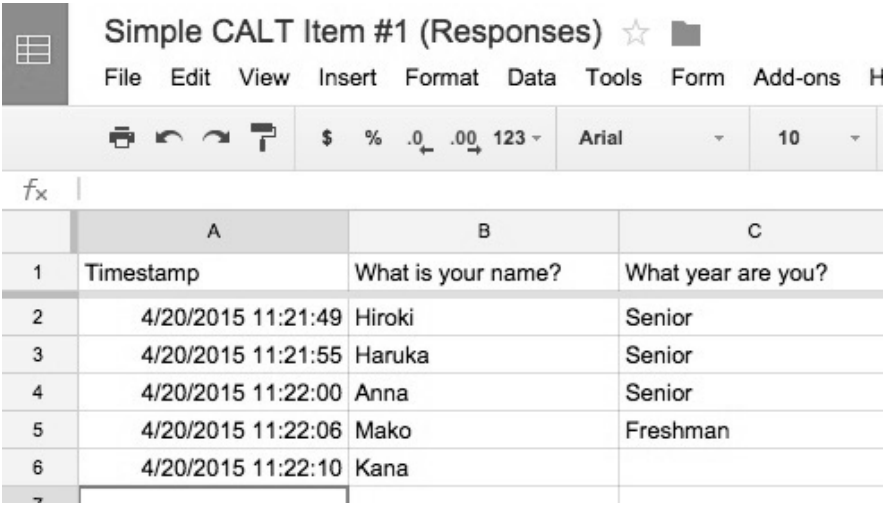
Figure 3. Example of a QR Code created by a QR code generator.

After the code's functionality is confirmed, save the image by clicking "Save" to store it as a file. For distribution, the image and URL can be either projected on a screen, handed out, or both with the optimal method varying depending on the class size. The author found that multiple QR codes yielded a more timely start to quizzes.

The results of submitted homework and quizzes appear on Google Drive. To view the results, go to drive.google.com and click on the created Form. On that page, "View Responses," an option near the top of the screen, is clicked. This shows a Google Sheet that contains the answers to the quiz or homework in question. An example of the output is shown in Figure 4.

Discussion

This mobile-CALT implementation (and its variations) was used in the Spring 2014 semester for 1,503 student responses to intake surveys, an exit survey, homework, tests, and quizzes instances (see Table 1). This produced 13,999 student answers to questions. Further, 184 out of 195 students agreed to allow use of their data for future research and to evaluate question difficulties. While the precise time savings for grading cannot be calculated, clear benefits were achieved in rapidly assessing the surveys to tailor classes and in quickly being able to grade items.


Simple CALT Item #1 (Responses)

File Edit View Insert Format Data Tools Form Add-ons H

$ % .0 .00 123 Arial 10

fx

	A	B	C
1	Timestamp	What is your name?	What year are you?
2	4/20/2015 11:21:49	Hiroki	Senior
3	4/20/2015 11:21:55	Haruka	Senior
4	4/20/2015 11:22:00	Anna	Senior
5	4/20/2015 11:22:06	Mako	Freshman
6	4/20/2015 11:22:10	Kana	

Figure 4. A Google Sheet that contains the homework answers submitted by Google Forms.

Though this procedure both easy and useful, I encountered five challenges one should be aware of if using this system for giving quizzes or homework. First, not every student either owns a cell phone or is willing to use a cell phone to take a quiz, so I still needed to provide some printed copies of the quiz or homework. I chose to input those students' answers into the Google Sheet myself which, depending on the class size, took a good deal of time, but it helped keep the data in one place.

Second, not every phone works well with Google Forms. Almost all phones were capable of handling text questions, but some stumbled with drop-down options, multiple-choice, and multiple checkbox questions. Older flip-style cell phones had the worst compatibility problems, but some older Android phones issued by Docomo from 2012 also saw some difficulties, particularly with drop-down questions. Due to the in situ nature of Mobile-CALT, I did not have the opportunity to collect more precise information about which phones faced difficulty. Fortunately, all iPhones and all modern (2013 or later) Android phones were fully compatible with the quizzes through Google Forms. This problem should become less prominent in the future as students tend to get new or newer cell phone models.

Table 1
Utilization of Google Forms and QR Codes in Spring 2014 Semester

	Item Name	Entries	Fields
1	Intake Survey	195	32
2	English Comm. Quiz 1	51	9
3	English Comm. Quiz 2	51	9
4	Eng. Comm. Midterm	54	29
5	English 1 Quiz 1	40	11
6	English 1 Quiz 2	41	8
7	English 1 Quiz 3	30	22*
8	English 1 Quiz 4	38	4
9	English 1 Quiz 5	39	12
10	English 1 HW Week 10	35	10
11	English 1 HW Week 11	30	12
12	English 1 Final	42	28*
13	Eng. 2 Chapter 10 HW	26	18
14	Eng. 2 Chapter 12 HW	33	18
15	Eng. 2 Chapter 13 HW	25	19
16	Eng. 2 Chapter 15 HW	15	22
17	Eng. 2 Chapter 16 HW	29	20
18	Eng. 2 Chapter 7 HW	36	9
19	Eng. 2 Quiz 1	39	11
20	Eng. 2 Quiz 2	39	7
21	Eng. 2 Quiz 3	41	6
22	End-Class Survey	124	22

Note. When fields is marked by a *, this means that not every item required an answer. The number of end-class surveys is less than initial survey due to students taking multiple classes taking the exit survey only once.

Third, several students accidentally navigated away from the Web page and lost their data. Google Forms only takes data once a student clicks "submit." Consequently, if a student navigates away (either by accidentally hitting the back button, moving his finger on the screen such that it makes a refresh, back, or navigate away gesture, or by mistakenly presuming they had submitted and closing the browser), then the student's quiz data was lost. Though this did occur, it happened in just a handful of cases. In the worst case, one student had it occur twice in one day. For subsequent items, these students always requested a paper version.

Fourth, a few students inadvertently submitted the same quiz twice. This produced two rows in the Google Sheet (the duplicated rows can simply be deleted from the Google Sheet afterward). This tended to happen sparingly on each assignment and usually to the same students. One reason might be that the cell phone's browser window tries to refresh the next time it opens and consequently resubmits the same data. A second reason might be that students did not understand they had successfully submitted the quiz and resubmitted to be sure.

Fifth, Google Sheets proved difficult for grading and returning feedback. The Google Sheets produced by Google Forms do not leave extra spots for grading. Moreover, converting them into something that can be returned to the students would require either major reformatting or the cutting of each row into a separate strip of paper. The author solved this by importing all of the Google Sheets into a MySQL database using Google's API and giving each student a custom QR code with access to their graded information.

Conclusion

While I did encounter some minor issues, I still highly recommend the Google Forms and QR Codes for mobile-CALT. While other systems such as GLEXA and Moodle can do more, these resources require time to master and institutional support, plus they are often not available to part-time instructors. Google Forms is quick to set up, has the support of a global corporation, and organizes the data into a spreadsheet on its own. I maintain that Mobile-CALT is thus well-

suited for surveying students and giving them quizzes and tests. Consequently, I enthusiastically suggest this mobile-CALT implementation to instructors who lack these resources (or just lack the time to master larger packages) as a no-cost, relatively hassle-free way of creating quizzes and homework, which they can implement without the assistance of their employers. For those accustomed to the lengthy, time-consuming process of grading by hand on paper and or data entry, this method will be a welcome educational tool for significant time reduction.

References

Bouhnik, D., & Marcus, T. (2006). Interaction in distance-learning courses. *Journal of the American Society for Information Science and Technology*, *57,* 299-305.

Burston, J. (2011). Realizing the potential of mobile phone technology for language learning. *The IALLT Journal*, *41* (2), 56-71.

Chinnery, G. (2006). Going to the MALL: Mobile assisted language learning. *Language Learning & Technology*, *10*(1), 9-16.

Denso Wave Incorporated. (n.d.). "History of QR code." [sic] Retrieved from http://www.qrcode.com/en/history/

Godwin-Jones, R. (2011). Mobile apps for language learning. *Language Learning & Technology*, *15*(2), 2-11.

Gromik, N. (2009). Do you know who we are? Undergraduate students' access to technology: A survey report. *The JALT CALL Journal*, *5*, 57-66.

Kondo, M., Ishikawa, Y., Smith, C., Sakamoto, K., Shimomura, H., & Wada, N. (2012). Mobile assisted language learning in university EFL courses in Japan: Attitudes and skills for self-regulated learning. *ReCALL*, *24*, 169-187.

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

Lockley, T. (2011). Japanese students' experience of ICT and other technology prior to university: A survey. *The JALT CALL Journal*, *7*, 93-102.

McCoy, B. (2013). Digital distractions in the classroom: Student classroom use

of digital devices for non-class related purposes. *Journal of Media Education*, *4*(4), 5-15.

Murray, A., & Blyth, A. (2011). A survey of Japanese university students' computer literacy levels. *The JALT CALL Journal*, *7*, 307-318.

Rivers, D. (2009). Utilizing the quick response (QR) code within a Japanese EFL environment. *The JALT CALL Journal*, *5*, 15-28.

Roever, C. (2001). Web-based language testing. *Language Learning & Technology*, *5*(2), 84-94.

Sharples, M. (2000). The design of personal mobile technologies for lifelong learning. *Computers & Education*, *34*, 177-193.

Stockwell, G. (2007). Vocabulary on the move: Investigating an intelligent mobile phone-based vocabulary tutor. *Computer Assisted Language Learning*, *20*, 365-383.

Stockwell, G., & Hubbard, P. (2013). *Some emerging principles for mobile-assisted language learning.* Monterey, CA: The International Research Foundation for English Language Education. Retrieved from http://www.tirfonline.org/english-in-the-workforce/mobile-assisted-language-learning

Thornton, P., & Houser C. (2005). Using mobile phones in English education in Japan. *Journal of Computer Assisted Learning*, *21*, 217-228.

Valk, J., Rashid, A., & Elder, L. (2010). Using mobile phones to improve educational outcomes: An analysis of evidence from Asia. *The International Review of Research in Open and Distributed Learning*, *11*(1), 117-140.

Valois, M. (2012, April 20). The professor's inner bitch. *Chronicle of Higher Education.* Retrieved from http://chronicle.com/article/The-Professors-Inner-Bitch/131478/

Wang, S., & Higgins, M. (2006). Limitations of mobile phone learning. *The JALT CALL Journal*, *2*, 3-14.

Wang, S., & Smith, S. (2013). Reading and grammar skills through mobile phones. *Language Learning and Technology*, *17*(3), 117-134.

Weimer, M. (2014, January 8). The age of distraction: Getting students to put away their phones and focus on learning. *Faculty Focus*. Retrieved from http://www.facultyfocus.com/articles/teaching-professor-blog/the-age-

of-distraction-getting-students-to-put-away-their-phones-and-focus-on-learning/

Young, J. (2006, June 2). The fight for classroom attention: Professor vs. laptop. *Chronicle of Higher Education*. Retrieved from http://chronicle.com/article/The-Fight-for-Classroom/19431

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