

BUILDING BITE-SIZED MOBILE LEARNING CONTENT

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Abstract

By their nature, mobile devices such as smartphones and tablets are ready for access almost all the time. Mobile learning therefore allows for greater flexibility when it comes to delivering learning content to the learners. However, designing learning content for the mobile platform is much more challenging than building conventional e-learning materials. With small screen size, restricted input capability and smaller network bandwidth, mobile devices simply cannot handle the sophisticated contents usually found on the computer platform. Indeed, there are language teachers who think that the difficulties in developing content for mobile devices outweigh the potential benefits. At Nanyang Polytechnic, teachers of French, German, Japanese and Korean have developed an authoring framework to facilitate the creation, management and delivery of mobile learning content. In this paper, we will highlight some of the constraints and technical difficulties that we have encountered, and discuss the various ways of tackling these issues.

1 Introduction

The use of mobile devices is getting more and more widespread. People are spending more time accessing different types of content on their mobile phones every day. Compared to personal computers, mobile devices provide users with more flexibility in terms of time and place when it comes to accessing online information and communicating with others. Language teachers who have been involved in e-learning can quickly see the benefit that comes with this flexibility. We have been talking about e-learning with the idea of “anytime, anywhere” for years. With the new mobile devices, in particular smartphones, it has finally become a workable idea.

2 E-learning on mobile devices: Strengths and constraints

Being small in size and light in weight, modern mobile devices can be used almost anytime anywhere. With WiFi or 3G/4G connection, users of such devices can stay connected all day long, that is, when the infrastructure is adequate and affordable (which is the case in Singapore). Mobile devices can therefore provide a more flexible platform which not only enables e-learning materials to be delivered to the learners anytime anywhere, but also allows the instructors to interact with the learners. For example, using smartphones, “instructors can

send regular SMS messages to interact with learners in various ways...: push regular reminders, requests, quizzes, and questions... (Elias, 2011)".

However, because of their small size and lightweight, mobile devices, in particular mobile phones have smaller screen and limited data manipulation rate as compared to conventional PCs. Text input is another weak point of mobile devices. Even for devices with a physical keypad, typing text is rather tedious (and that is why the widespread use of short forms in SMS communication).

To further complicate the situation, mobile devices vary from each other in terms of screen size, input method (keypad or touch screen) and operating system. This diversity poses a serious challenge to content developers who will have to take into consideration all these factors before deciding on the design layout, functionality and delivery mode of the learning content. As Stead (2010) pointed out: "There is no single solution to push richly interactive mobile content onto every possible phone. Rather, there is a spectrum of possible solutions: On one side, going for the richest possible interactivities...and on the other side going for the widest possible phone coverage".

3 Towards the widest possible coverage

Our target users are students attending foreign language classes at Nanyang Polytechnic. Our lecturers have observed that most, if not all students use mobile phones and some of them even tablets. If we are to develop mobile learning content, these devices will be used to run it. As Stockwell (2010) put it: "The goal for teachers, then, is to be aware of what tools learners possess, and to choose and/or adapt resources to these tools."

To help us determine our development direction, we conducted a survey with 623 students in July 2014 (see Appendix A) to find out the hardware/software profile of their mobile devices. The survey results can be summarized as follows:

- Most students (85%) use either an Android phone (48.9%) or an iPhone (36.1%).
- A vast majority of students (92%) use a mobile phone that is less than 3 years old.
- Most students (74.5%) stay connected to the internet 2/3 of the time when they use their mobile phones.
- More than half (58.59%) do not use a tablet.

Based on the survey results, we outlined the profile of our mobile learning platform as follows:

Table 1

Operating system:	Android / iOS
Screen size:	4 – 5 inches
Input method:	Touch screen with simulated keypad
Internet connection:	WiFi and 3G/4G

If we design our mobile learning content in accordance with this platform profile (which is basically that of the mainstream smartphones less than 3 years old), we can attain at least 85% of device coverage.

4 Native app or web app?

Smartphone user experience depends in large part on the software applications designed for mobile devices. These software applications, or mobile apps as they are usually called, can be downloaded and installed on the phone, or run directly from web servers over the internet. The formers are called “native apps” and the latter “web apps”.

Native apps can take full advantage of the hardware and OS capabilities of the device, and as such they are specific to the hardware and the OS: Android apps run only on Android phones and iOS apps on iPhones. Therefore, for the same native app to run on both devices, the developer has to produce two sets of codes using two different programming frameworks. Web apps, on the other hand, actually run in the web browser that is installed on the user’s device. They are compatible with both Android phones and iPhones as the web browsers on these phones are based on the same Webkit standard.

Godwin-Jones (2011) rightly pointed out: “What does one sacrifice creating a web app rather than ‘going native’? Execution speed is likely to be slower and the user interface not as slick. There will also be more limited access to the device hardware, including its camera, audio player or GPS. These considerations may or may not be of consequence, depending on the nature of the application. They may be outweighed by the advantage of creating one app which can be universally deployed”. In our case, a web app does make more sense as our mobile learning content is not demanding in terms of hardware and OS capabilities.

5 Bite-sized mobile learning content

As much as we see the benefit in using the mobile platform, we are not going to replace our existing e-learning content with a new set of mobile learning materials. In a study on mobile learning, Stockwell (2008) showed that “even when materials were adapted to their mobile phones, when given a choice of whether to use their mobile phone or a PC for completing vocabulary-learning activities, the overwhelming majority of learners chose the PC”. We are of the opinion that conventional e-learning on the PC platform will still have an important role to play. In our development strategy, conventional e-learning materials are designed for helping the students to learn certain new topics on their own, while the mobile learning materials can help them reinforce what they have already learnt. Bite-sized materials such as vocabulary flashcards, typical sentence patterns, phonics exercises and grammar drills can be used to serve this purpose. For example, after a lesson on “Japanese pronunciation”, the instructor can select some drills on hiragana and katakana characters (see Appendix B) and “push” them to the students through SMS.

6 Building the mobile learning content

Web apps are HTML5-compliant, which means that our mobile learning content has to be delivered to the user’s device in the form of HTML5 pages. To facilitate the creation and management of the content data, developers usually build the app logics separately from the content. Our content data are stored in the form of XML files which are delivered by the web server to the user’s device. The web browser in the user’s device will then format the data into HTML5 pages.

To create and manage the mobile learning content, our lecturers use a simple wiki markup editor (see Appendix C) to type in the data and assemble the materials into lessons which will be stored in XML files. The wiki markup editor, which was developed by our e-learning team, is easy enough to use: it takes one to two hours of hands-on training for a lecturer to master its functionality.

7 Conclusion

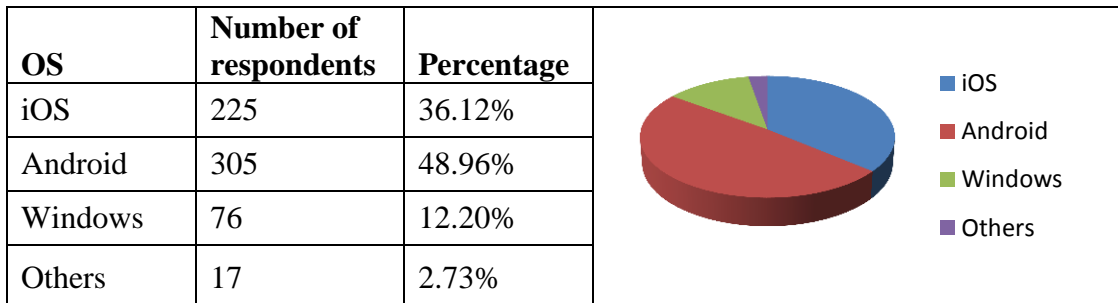
The mobile learning platform is flexible and versatile. There are many ways to take advantage of this platform. Which way to choose will depend on the e-learning strategy adopted, and also on the device configuration of the target users. In this paper, we have shown how we created bite-sized mobile learning materials to help students reinforce their learning by using a web app on their smartphones. Further research will be needed to gauge the effectiveness of this approach.

References

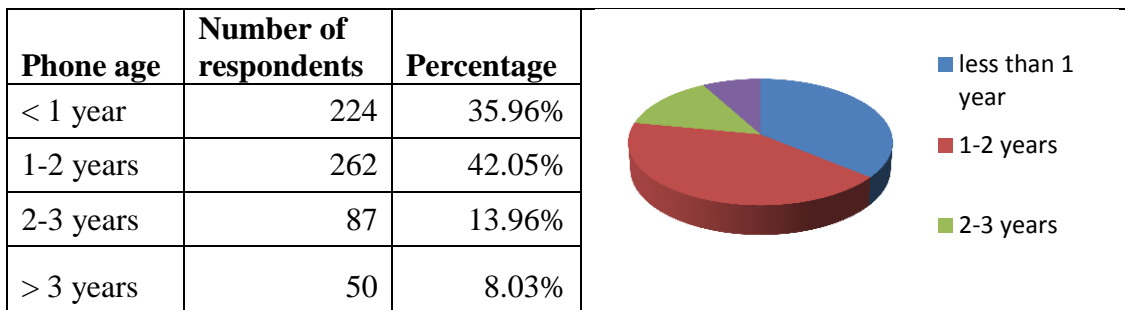
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Appendix A: Survey on mobile devices with NYP students taking foreign language modules

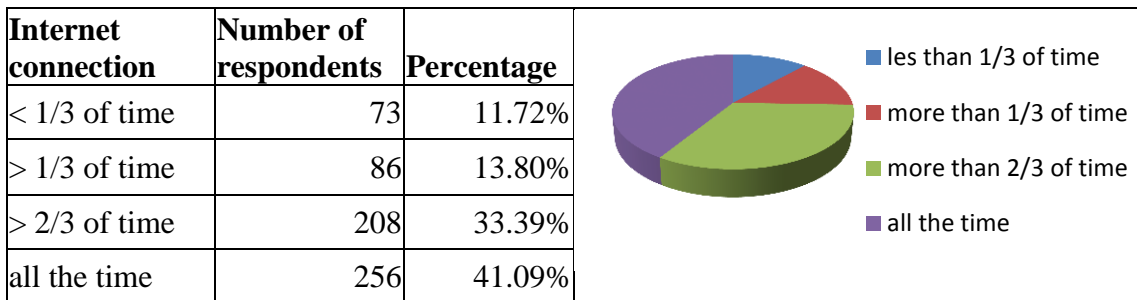
1. “The operating system of my mobile phone is...”



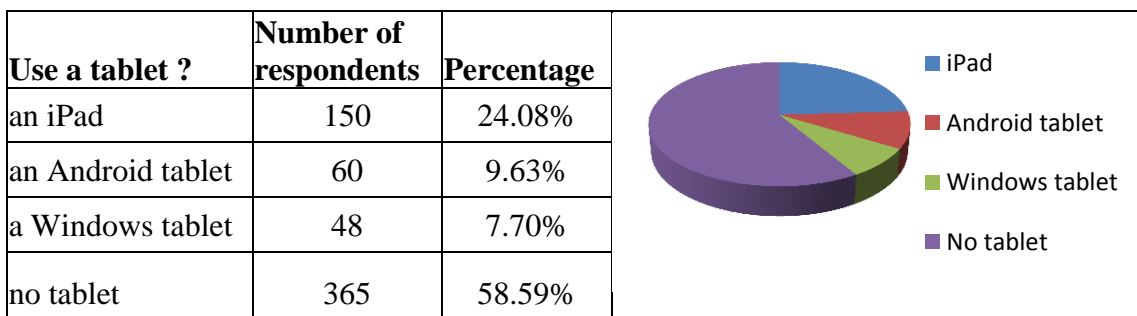
2. “The age of my mobile phone is...”



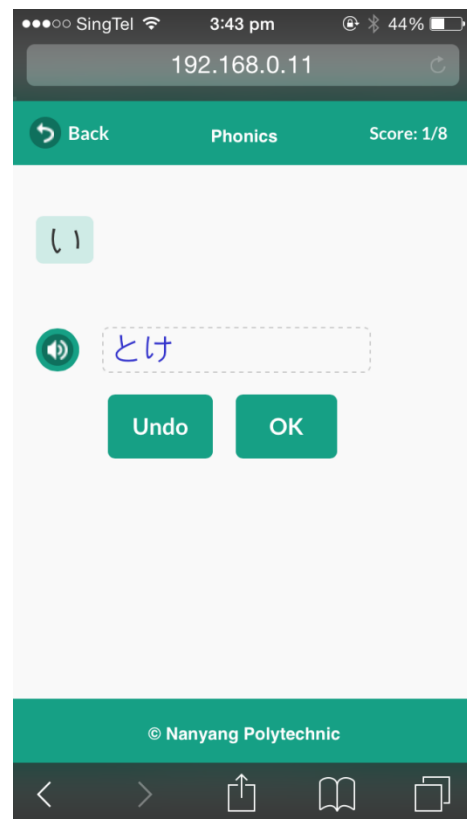
3. “When I use my mobile phone, it is connected to the internet...”



4. “Besides my mobile phone, I use ...”



Appendix B: Web app featuring the interactive drills on Hiragana and Katakana characters



Appendix C: Wiki Markup Editor for creating mobile learning content

The screenshot shows a web-based editor titled "Mobile lesson editor" with a "Save data" button in the top right. Below the title bar, there are tabs for "Lesson content" and "Activities", and a "Lesson title" field containing "Greeting people" and a "Level" dropdown menu set to "1".

The main content area is divided into three sections, each with a "Topic title" field and a "Preview" button:

- 1. Topic title:** "Hello/How are you?". The content area contains the following Wiki Markup:

```
{img=m_greeting_how_are_you.png}

{audio=greeting_hi.mp3}안녕하세요{/audio} is the most common greeting expression. It can be used to either greet someone you meet for the first time or someone you see every day.
```
- 2. Topic title:** "Goodbye". The content area contains the following Wiki Markup:

```
{img=m_greeting_bye.png}

{list}
*:{audio=greeting_bye1.mp3}안녕히 가세요{/audio} - 'Goodbye' to a person who is leaving.
*:{audio=greeting_bye2.mp3}안녕히 계세요{/audio} - 'Goodbye' to a person who is staying behind.
{/list}
```
- 3. Topic title:** "Thank you". The content area is currently empty.

At the bottom left, there is an "Add topic" button.