A Discussion on Effective Implementation and Prototyping of Voice User Interfaces for Learning Activities on Moodle

Toshihiro Kita[1], Chikako Nagaoka[1], Naoshi Hiraoka[1], Katsuaki Suzuki[1], Martin Dougiamas[2]
[1] Research Center for Instructional Systems, Kumamoto University, Kumamoto, Japan
[2] Moodle HQ, Perth, Australia

Voice User Interfaces (VUI) are effective and intuitive for many people. The VUI is rapidly becoming suitable for various practical purposes using voice-operated smartphones, or smart speakers. If VUIs, which may require less cognitive load to use, are available on learning management systems (LMS) like Moodle, they could enhance LMSs' functionality. Examples of existing educational applications for VUIs, and design suggestions of VUIs for several Moodle activities are described. A prototype VUI for Moodle quizzes has been developed with Dialogflow platform.

What is a VUI?

A **Voice User Interface** (VUI) is a human-computer interface that allows people to use voice input to control computers and devices. It has a long history going back to the 1950s (Pearl,2016) During the last decade VUIs have quickly grown smarter thanks to evolving **Natural Language Understanding (NLU) techniques**, and have become well known through the spread of **smart speakers**, such as **Amazon Echo** and **Google Home**.

Existing Application Examples of VUIs to Education

Alexa Skills (apps for Amazon Echo)

- **"Canvas"** : provide information like user's grades, missing assignments, due dates, etc. by connecting to user's Canvas LMS.
- **"My Blackboard for Blackboard Learn"** : connect to a user's school Blackboard account and report the user's grades and course announcements.
- **"News for the Moodle.org Community"** : provide Moodle.org announcements, forum posts, etc. (general information about Moodle, not learner's individual information)

… There are no VUI apps that enable users to do learning activities on LMS yet.

Moodle Activities Expected to be More Effective with VUIs

Quiz quickly grasp what will be learned in a course

dialog example:

```
U: Open Moodle Quiz.     (U: user)
  S: Do you want to attempt a quiz?     (S: smart speaker)
U: Yes.
  S: Which quiz do you want to attempt?
U: First quiz.
  S: OK. Please answer questions by saying '1','2','3'.
  Question 1. When an eigenvalue of a matrix is greater than 1.0,
  the characteristic of the matrix is: 1.rotating, 2.stretching, 3.static.
U: 2.
  S: Your answer is 2.  Question 2. …(snip)
U: 3.
  S: Your answer is 3. This is the end of the quiz.
  The first question score is 1.0 out of 1 points. (snip)
  You can review your attempt on the Moodle course page.
```

Lesson (not yet implemented)

roleplay simulations or decision-making exercises with conversation and sound effects
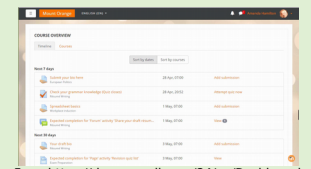
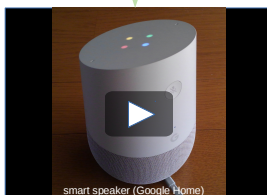(e.g., what to do when an earthquake occurs)

Dashboard (not yet implemented)

by voice messages, easily and quickly get information (due dates, etc.) that learners cannot miss to keep learning,

From https://docs.moodle.org/34/en/Dashboard

Prototype of a VUI for Attempting Quizzes on a Moodle Site

smart speaker (Google Home)

Demo video
http://tkita.net/ai/vui.html

- Dialogflow (https://dialogflow.com/) was used for prototyping.
- Communication between Moodle and a smart speaker is done through Moodle web service API.
- Supports only multiple-choice questions.
- Currently works only with Google Home (for limited users).
- Learners are able to review their attempts on the Moodle site.

Findings through the prototyping

- VUIs should always speak in short phrases. (Long phrases may annoy users.)
- LMS content needs redesigning to make the most of learning through a VUI.
- For more effective learning, apps with VUIs should be more interactive.
- Interactions with voice (conversation) are expected to positively affect learners' motivation.

References

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