

The impact of using AI and VR with blended learning on English as a foreign language teaching

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Abstract. This study focuses on the use of emerging technologies such as Artificial Intelligence (AI) smart speakers and smartphone applications for improving the English language skills of L1 Japanese undergraduates. An empirical investigation was carried out with 82 Japanese students. Participants were required to study a variety of online English programmes using AI speakers over an eight-month period. The results showed that students using AI speakers outperformed on the Test of English for International Communication (TOEIC) a group of non-AI users, who instead exclusively used online materials. This research suggests integrating blended learning, including AI and Virtual Reality (VR), may be an effective way to improve the English proficiency of native Japanese.

Keywords: AI, VR, smart speaker, flipped learning.

1. Introduction

The present study focuses on the use of emerging technologies such as smart speakers and smartphone applications for the purpose of improving the English language skills of undergraduates whose L1 is Japanese. Two case studies were carried out with the goal of exploring the implementation of a blended learning English language programme incorporating the AI speakers Google Home Mini and Amazon Alexa to improve the English proficiency of undergraduate Japanese students. The programme also aimed at fostering the development of intercultural awareness and at ascertaining how students felt about using AI and VR to study English.

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2. Method

2.1. Participants

The two case studies were conducted over two semesters (April 2019 to January 2020). A total of 82 undergraduates (L1 Japanese) participated. Case Study 1 participants were divided into two groups: Group 1 (n=30) used an AI speaker during the blended learning training programme (April 2019 to January 2020), and Group 2 (n=29) did not use an AI speaker during the same training period. Case Study 2 included a total of 23 students. The participants were divided into six subgroups.

2.2. Training procedure

The following technologies were utilised: Amazon Alexa⁴ and Google Home Mini⁵ (see [Figure 1](#)), as well as ATR CALL Brix⁶, and the social networking service (Facebook, Twitter, and Line), and other programmes. In Case Study 1, TOEIC was used to determine if participants' English skills improved and ascertain the effectiveness of the AI/blended learning programme. TOEIC was administered to Groups 1 and 2 as a pretest in April 2019 and posttest in January 2020.

Figure 1. Amazon Alexa and Google Home Mini



4. <https://www.amazon.com/Amazon-Echo-And-Alexa-Devices/b?ie=UTF8&node=9818047011>

5. <https://rithvikvibhu.github.io/GHLocalApi/#top>

6. ATR CALL Grix is a sort of e-learning materials in which students could study TOEIC, vocabulary, listening, and reading: <https://school.uchida.co.jp/index.cfm/23,5784,74,292.html>

During training, Alexa was utilised by Group 1 participants who filmed and wrote in journals about their experiences. The AI speaker was integrated into their daily lives (e.g. for assistance in cooking, weather reports, movie recommendations, and so on) over the ten-month period. They each set a timer while interacting with the AI speaker to practise English listening, speaking, and vocabulary skills (could you explain how?).

Group 2 participants used only ATR CALL Brix online materials at home, which focused on TOEIC and vocabulary learning. Thus, the main difference in training between groups was whether either the AI speaker or ATR CALL Brix was used, although the utilisation of other online activities (e.g. studying about World Heritage sites) were identical for both groups.

Case Study 2 participants were administered both TOEIC and the Oral Proficiency Interview by Computer (OPIC) test in April 2019 and again in January 2020. The AI speakers were integrated into their daily lives over the ten-month period. A timer was set at home while interacting with the AI speaker to practise English listening, speaking, and vocabulary skills along with other various software programs. Half of the participants used Google Home Mini to improve English listening and speaking skills using the applications *Best Teacher*, *Travel English*, *Let's play around with English*, and *BBC/CNN news*. The other half also used Home Mini to improve their listening and vocabulary skills, along with the programmes *Kikutan*, *English Quiz* by Arc, *Liberty English*, and *Kindle*.

All participants of Case Study 2 also used VR goggles to interact within a variety of authentic environments. While studying with the AI speakers, participants recorded short movie clips of their experiences which were uploaded to a Facebook group page so the videos could be easily viewed by all participants. The participants also kept written journals with observations about the contents and duration of their studies, periodically recording their thoughts using a smartphone. At the end of training, participants of all six subgroups delivered presentations of their impressions of the AI/blended learning lesson training with smart speakers, with a majority indicating it had a positive effect on their learning experience.

Case Study 2 included the following training tasks:

- practised English using AI speakers;
- watched online TED talks using mobile devices, wrote 300-word summaries, created PowerPoint presentations, and discussed summaries

with a group of English native speakers four times over an eight-month period;

- studied worldviews – a collection of attitudes, values, stories, and beliefs that influence our every thought and action about the world around us (Gray, 2011) – after viewing online lectures by several Oxford University scholars, and they also delivered PowerPoint presentations and created digital stories with iPads and presented their summaries to a group of English native speakers and discussed comparative worldviews; and
- interacted with English L1 speakers (8 American university undergraduates) who evaluated their presentations and discussed worldviews and cultural issues.

3. Results and discussion

3.1. TOEIC and OPIC results

In Case Study 1, mean TOEIC scores of Group 1 improved from 407 (*SD*:113) to 604 (*SD*:92), an increase of 197 points. Mean TOEIC scores of Group 2 improved from 447 (*SD*:93) to 598 (*SD*:147), an increase of 147 points.

In Case Study 2, mean TOEIC scores improved pretest to posttest from 461 (*SD*:136) to 681 (*SD*:141), an increase of 229 points. Mean OPIC speaking test scores also improved pretest to posttest from 3.9 (*SD*:0.9) to 4.7 (*SD*:1.25), respectively. The pre/posttest TOEIC results in both case studies were analysed using a series of t-tests, indicating the differences were statistically significant ($p < .01$).

3.2. Post-training survey

Post-training surveys were administered to all participants at the end of their respective AI/blended learning training to ascertain overall impressions of the programme. Responses to a few questions are summarised below:

- AI speaker was useful in improving my English skills: 84% agreed ($n=47$).
- AI speaker was useful in improving listening skills: 87% agreed ($n=23$).
- AI speaker was useful in improving speaking skills: 57% agreed ($n=23$).
- AI speaker was useful in improving reading skills: 13% agreed ($n=23$).
- AI speaker was useful in improving writing skills: 4.3% agreed ($n=23$).

- Presentation practice with PowerPoint helped improve English proficiency: 100% agreed (n=47).

In both case studies, participants' TOEIC scores considerably improved during the training period. However, the participants who used an AI speaker outperformed the non-AI speaker group in Case Study 1. Additionally, in Case Study 2, the integration of AI speakers and blended learning helped the participants improve their TOEIC scores by a mean of 229 points, while participants who did not use the AI speaker improved by roughly 150 points, although last year's group improved by a mean score of more than 200 points.

Survey results showed 84% of participants agreed the AI speaker was helpful in improving their English, particularly listening skills. Fifty-seven percent agreed the AI speaker was useful in improving speaking skills. The OPIC speaking test results with a mean increase from 3.9 (*SD*:0.9) to 4.7 (*SD*:1.25) would appear to verify these results. Conversely, only a small percentage of students agreed the AI speaker was helpful in improving reading and writing skills.

We acknowledge the limitation of our study in accurately assessing the efficacy of AI smart speakers exclusively in developing L2 skills since a variety of supplemental online programmes and activities were utilised as part of the AI/blended learning programme. What is most important in L2 learning is face-to-face interaction and how much comprehensible input is gained from various learning sources, whether it be analogue or digital environments (Polat, 2016). The distinction between classroom and outside-class activities was clearly drawn so each student could acquire as much comprehensible input as possible and be engaged in interactions and discussions using critical and creative thinking.

4. Conclusions

In line with Obari and Lambacher (2019), both TOEIC and OPIC speaking test and survey results revealed a combination of AI/blended learning lessons had a positive effect on the native Japanese students overall English language learning. Both their listening and oral skills improved, which may have been due to the integration of the language learning activities which concentrated on a social constructivist approach while utilising AI smart speakers. These results would appear to suggest that the integration of blended learning along with 21st century skills, including AI and VR, may be an effective way to improve the English proficiency of native Japanese adult learners.

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