Improving the English skills of native Japanese using artificial intelligence in a blended learning program

Hiroyuki Obari[1] and Stephen Lambacher[2]

Abstract. A constructivist approach to language learning can motivate students by activating their brains to create new knowledge and reflect more consistently and deeply on their language learning experience. The present study focused on assessing the use of the Artificial Intelligence (AI) speakers Google Home Mini and Amazon Alexa as part of a Blended Learning (BL) environment to improve the English skills of two groups of native Japanese undergraduates. The participants were 47 native speakers of Japanese, all third-year business majors at a private university in Tokyo. Pretest and posttest Test of English for International Communication (TOEIC) scores, as well as results from a post-training survey, were used in evaluating the overall effectiveness of the program. Gains in TOEIC scores indicated the BL program incorporating AI speakers improved the students' overall English skills, particularly listening comprehension. The results suggest the integration of AI, along with social media and 21st-century skills, may be an effective way to improve the English language proficiency of adult L2 learners.

Keywords: AI speakers, blended learning, intercultural awareness, mSNS, 21st-century skills.

1. Introduction

Recently, AI speakers can be experienced efficiently and smoothly using hand-held devices, which can enhance the construction of broader learning environments and viewpoints (Kepuska & Bohouta, 2018). AI/mobile technologies have succeeded in transforming learning methodologies. One such methodology adopted successfully in recent years is BL (Obari & Lambacher, 2014). BL combines

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traditional face-to-face classroom methods with computer-mediated activities, resulting in a more integrated approach to language learning. AI, mobile devices, and social media are key components of the next generation of this novel wave of educational instruction. Digital content is also transforming and expanding as AI and mobile technologies continue to develop and improve. The growth of mobile Social Networking Sites (mSNS) has enabled teachers to considerably increase the number of ideal learning opportunities through experiential learning activities with the help of these emerging technologies (Wong, Tan, Loke, & Ooi, 2015).

The main purpose of this study is to introduce two case studies carried out with the goal of ascertaining the effectiveness of a BL training program incorporating the AI speakers Google Home Mini and Amazon Alexa to improve the English proficiency of native Japanese, including 21st-century learning for developing intercultural awareness.

The following research questions were targeted:

- Could the participants improve their English proficiency and understanding of 21st century skills after exposure to the AI/BL activities?

- Was the application of AI/mobile learning helpful in improving the participants' English skills?

Pedagogy of 21st century skills with AI

Harvard researcher Tony Wagner identified the '7 Survival Skills' necessary for the modern workplace (Wagner, 2014):

- critical thinking and problem solving;
- collaboration;
- agility and adaptability;
- initiative and entrepreneurialism;
- effective oral and written communication;
- accessing and analyzing information; and
- curiosity and imagination.

In addition to the above 7 survival skills, we added another skill referred to as 'Coexistence with AI' – resulting in 8 survival skills for 21st-century education. In this study, we attempt to integrate these 8 survival skills for developing English proficiency and intercultural awareness.

2. Method

2.1. Participants

The study was conducted over a period of two semesters (September 2018 to July 2019). A total of 47 undergraduates participated, all native speakers of Japanese. Participants were divided into two groups: Group 1 (n=24) during the first training period (September 2018 to January 2019) and Group 2 (n=23) during the second training period (April 2019 to July 2019).

2.2. Training procedure

Technologies utilized in training included Google Home Mini, Amazon Alexa, ATR CALL Brix, mSNS programs Facebook, Twitter, and Line, as well as a number of other English language programs and applications. TOEIC was used as a measure to determine if the students' English skills improved and to help ascertain the overall effectiveness of the BL program. TOEIC was administered to Group 1 as a pretest in September 2018 and posttest in January 2019, and to Group 2 as a pretest in April 2019 and posttest in July 2019.

During AI speaker training, participants of both groups were divided into eight subgroups, with half using Google Home Mini and the other half using Amazon Alexa. The AI speakers were literally integrated into the daily lives of the participants over the four-month training period. A timer was regularly set while interacting with the AI speakers to practice English listening, speaking, and vocabulary skills with a variety of software programs.

Group 1 used Google Home Mini daily to improve English listening and speaking skills using the following programs: Best Teacher, Travel English, Let's play around with English, and BBC/CNN news. Group 2 used Alexa daily to improve their listening comprehension and vocabulary skills using the following programs: Kikutan, English Quiz by Arc, Liberty English, and Kindle. Participants of both groups used virtual reality goggles for interaction in a variety of authentic L2 learning environments.

While studying with the AI speakers, participants recorded short movie clips of their learning experiences, which they uploaded to Facebook. The participants also periodically maintained written diaries of their observations about the contents and duration of their studies, recording their thoughts using a smartphone.

At the completion of training, participants from all eight subgroups delivered presentations of their experiences and impressions of the BL-lesson training using the AI speakers, with a majority indicating the training had a positive effect on their English language learning.

In conjunction with the above AI training procedure, the following additional tasks were incorporated during training.

(1) Practice English using the AI speakers Google Home Mini and Amazon Alexa (as mentioned above).

(2) Watch online TED Talks, including Rick Warren's 'Purpose-Filled Life' (Warren, 2012) and other popular subjects, using their mobile devices; write 300-word summaries, create PowerPoint (PPT) presentations, and discuss summaries with a group of English native speakers.

(3) Study worldviews after viewing online lectures by several Oxford University scholars, which focused on ontological and epistemological issues, and deliver PPT presentations and create digital stories with iPads.

(4) Use ATR CALL Brix to practice TOEIC.

(5) Study the theory behind 21st century skills and with iPads deliver PPT presentations summarizing the contents.

(6) Interact with English native speakers who assessed the presentations and discussed worldviews and cultural issues with the participants – the native speakers were eight university students from the US.

(7) Periodically participate in supplementary interactions and discussions.

3. Results and discussion

3.1. Pretest/posttest TOEIC

The TOEIC pretest and posttest results of Group 1 (n=24) during the first training

period (September 2018 to January 2019) increased from a mean score of 422 (*SD*:115) to 617 (*SD*: 114), or equivalent to B1 CEFR[3].

Figure 1. Group 1 pretest vs. posttest TOEIC scores

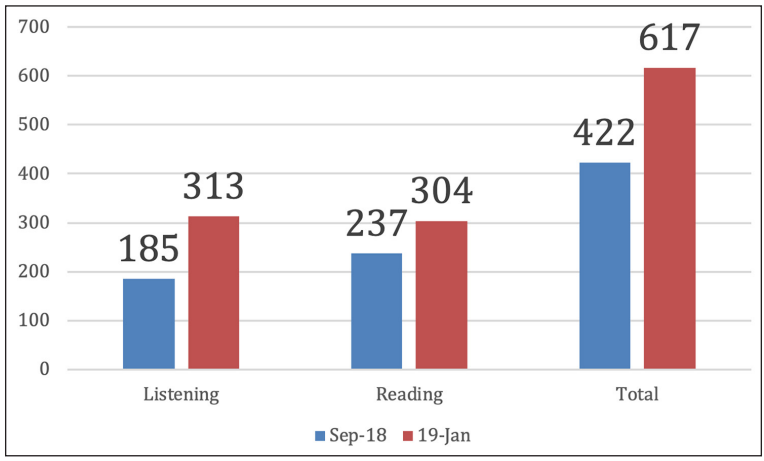
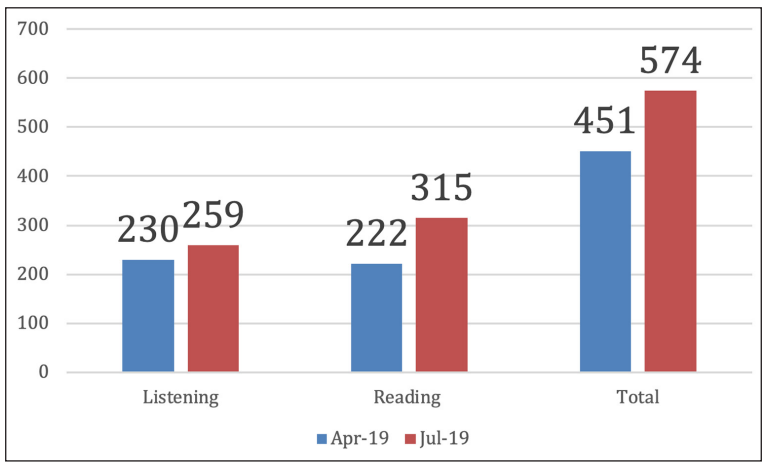


Figure 2. Group 2 pretest vs. posttest TOEIC scores



As shown in Figure 1, Group 1 improved both their listening and reading scores. Their listening scores, in particular, increased from a mean of 185 (*SD*=55) to 313 (*SD*=76). Similarly, the overall TOEIC scores of Group 2 (n=23) participants

3. CEFR (Common European Framework of Reference for languages) – language competencies defined at six levels from beginner to near native fluency: level A1 (the lowest) through A2, B1, B2, C1, and C2 (the highest).

increased from a mean of 451 (*SD*:125) to 574 (*SD*:93), or equivalent to B1 CEFR (Figure 2). The pre/posttest TOEIC results were analyzed using a series of t-tests, indicating these differences were statistically significant ($p<.01$).

3.2. Post-training questionnaire

Post-training surveys (n=47) were administered to both groups at the end of their respective AI/BL training period for the purpose of ascertaining their overall impressions of the program. Responses to a few of the survey questions are summarized as follows:

(Q1) The online lectures were beneficial in improving my English proficiency: 88% agreed.

(Q2) mSNS (Facebook, Line, Twitter) was helpful in studying English: 92% agreed.

(Q3) This program was useful in learning 21st-century skills: 90% agreed.

(Q4) The AI speaker assisted in improving my English skills: 84% agreed.

4. Conclusions

An assessment of the pretest and posttest TOEIC scores revealed the combination of the AI/BL lessons had a positive effect on students' overall English language learning experience. Students' listening and oral communication skills were improved, which may have been due to the integration of the language learning activities which focused on a social constructivist approach while utilizing the AI smart speakers Alexa and Google Home Mini. Additionally, the post-course questionnaire revealed both groups were satisfied with the online course materials and motivated by the AI/BL environment incorporating 21st-century skills. Students cited improved recognition of ambiguities within cross-cultural contexts and improved global communication skills. Students' oral summaries improved through interaction with the AI smart speakers and native English speakers. Taken as a whole, these results would seem to indicate the integration of AI smart speakers into the BL training program played a role in improving the students' overall language proficiency and in expanding their worldviews. Nevertheless, we should not fail to mention this study was merely a start with further research required,

including a more controlled experiment utilizing AI speakers exclusively during training, to more accurately evaluate noticeable gains in participants' improvement.

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