Task-based Robot-assisted learning to support L2 Speaking Practice

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Abstract: This study examined the impact of task-based robot-assisted interactive presentation creation on the students' speaking skills. The study used a paired-sample t-test to compare students' English speaking scores before and after the intervention, with robot-assisted interactive presentation creation as the independent variable and English speaking skills as the dependent variable. The results of the study showed a significant improvement in students' English speaking skills after the intervention. The study's results provide evidence for the effectiveness of robot-assisted instruction in enhancing English speaking skills among students. The interactive nature of the presentations created with the help of robots may have contributed to the significant improvements observed in this study. By engaging students in the creation of their own presentations, the intervention may have increased their motivation to improve their English speaking skills.

Keywords: Robot-assisted language learning, task-based learning, English speaking

1. Introduction

The productive skills enable language learners to produce language in spoken and written forms. These language skills are an integral part of communication as they proffer EFL learners the ability to harness their language knowledge into real-life practice. However, many Asian language learners pay more attention to their receptive skills that are listening and reading rather than productive skills, namely, speaking and writing because of the nature of school curriculum (Putri et al., 2017). Syzenko and Diachkova (2020) explained that compared with receptive skills, productive skills and other critical thinking competence like reasoning and problem-solving tend to be neglected in the EFL curriculum in Asia. A lack of opportunities for real language use render learners' acquisition of extensive knowledge about the target language (know what), while they are not strong when using the language in a contextual way (know how). Hsieh (2016) added that most EFL teaching materials are based on textbooks aiming at preparing EFL learners for a variety of language examinations instead of focusing on real-life connection. This means that grammatical correctness takes precedence over pragmatic accuracy because of the supremacy of fundamental syllabus (Blake, 2016). As a result, many EFL learners tend to be passive learners who only gain information or knowledge without engaging with the received information or the previous learning background. They tend not to interact with others, share opinions, or contribute to a dialogue for a more thorough discussion (Fu & Yang, 2019). To encourage learners to be more proactive, creating authentic learning situations where learners can develop their productive language skills is the key. To achieve this, one of the prevalent solutions to building EFL learners' productive language skills is artificial intelligence (AI). AI has caught researchers and educators' attention to integrate it into educational fields in recent years since AI specialists are craved in the employment market. Ministry of education in Taiwan has proposed an AI and emerging technology project in 2019 to cultivate students' AI competencies by encouraging teachers to incorporate robots with school subjects. Robot-assisted learning could provide essential affordances for knowledge construction and learner-centered pedagogy due to the varied and flexible characteristics of robots. Through the assistance of robots, teachers could easily promote personalized and adaptive learning in their teaching, enabling students to effectively master target knowledge with focused remediation. Although robots offer various benefits for learners and teachers to facilitate their learning, the challenges and difficulties of integrating technology with language learning still are worth further exploration (Tafazoli & Gomez-Parra, 2017), especially in developing learners' productive competence. Through a task-based instructional design using codes and robots, students are expected to present their ideas in both speaking and writing while applying their critical thinking and problem-solving competence. By doing so, more opportunities are created to assist students in building their productive competence while working with robots. This fills the gap of what has been missing in the current EFL curriculum in most of the Asian countries, a lack of developing productive language competence. This study thus applied a task-based instructional design with the integration of robots to engage students in creating interactive presentation through coding and multimedia design so as to facilitate students' productive skills. The guided questions are shown as follows. (1) What were the effects of task-based instruction using codes and Dash to perform the interactive presentations on EFL students' speaking skills?

2. Method

2.1 Participants

The participants will be chosen in a two-credit undergraduate course for first year students entitled "Oral Communication" at the University of Science and Technology. This course is part of the required core curriculum for students from the Department of English. Approximately 60 first-year students are expected to register in the "Oral Communication" course, with English proficiency levels ranging from 500 to 600 – following TOEIC scores. This range of scores indicates that they could read and write simple texts and hold a basic conversation about familiar topics or those of personal interests. Each student's willingness to participate in this study will be confirmed each year by their signing of a consent form, as well as keeping them informed about the research scope and data to be collected. All related documents will be submitted to the Human Subject Committee for approval.

2.2 Research design

The instructor, who serves as the principal investigator, will offer a required course "Oral Communication" which will run for 18 weeks. Besides teaching English skills, the course aims to develop students' coding skills to perform robot activities. In addition to the course, students will receive in-class teaching and after-class online coding practice for six weeks. In the first week, learners will be introduced to coding content and the Blockly app tool, and be informed about the RALL content-creating project. From the second week onwards, students will first focus on hands-on practice with programming in order to build up their coding skills and complete robot activities. They will work individually and in groups to get familiar with the coding practice including sequencing and debugging. They will work on some exercises provided by the code.org workspace to complete a variety of robot activities. During the 7th and 8th weeks, students will start to plan their rundown of the storytelling for interactive presentations. They will adapt a story and twist a bit on its content to make something original and show the story through manipulating Dash robots by coding. They will complete a project planner worksheet and a digital story planning sheet. After the group discussion, they will start to work on their coding to manipulate Dash robots for the story presentation part. During this process, they may need to debug their codes if errors occur in their coding. They will write down their story, make some recording to manipulate the robots etc. By the eighth week, students will present their story through the RALL project to demonstrate their speaking skills. The instructor will also evaluate the performance based on the rubrics for speaking skills and give feedback.

2.2.1 *Data collection and analysis*

The collected data will include 60 students' productive language competence on their individual initial speaking skills based on the designed rubric assessment (pre-test on speaking skills) and their productive language competence on their individual speaking skills after learning coding based on the designed rubric assessment (post-test on speaking skills). A paired-sample t-tests will be performed. The t test was intended to compare the mean of pre-and post-tests for speaking skills. Thus, the purpose of these the paired-sample t test will reveal the mean difference between pre-and post-tests for speaking tasks.

3. Results

3.1 *Students' improvement in English speaking skills after performing interactive presentation*

The study utilized a paired-sample t-test to investigate the impact of robot-assisted interactive presentation creation on students' English speaking skills. The study's independent variable was the intervention of robot-assisted interactive presentation creation, while the dependent variable was students' English speaking skills. The results of the study indicate a significant improvement in students' pre- and post-intervention English-speaking scores in terms of accuracy ($p < .00$), fluency ($p < .00$), and overall speaking ability ($p < .00$). Furthermore, the effect size was found to be large in accuracy ($d = 1.65$), fluency ($d = 1.62$), and overall English-speaking ability ($d = 1.75$), suggesting a significant improvement in students' English-speaking accuracy, fluency, and overall ability after the intervention. These findings provide strong support for the hypothesis that robot-assisted interactive presentation creation has a positive impact on students' English-speaking skills.

4. Discussion and conclusion

The objectives of this study are to explore the effects of robot-assisted multimodal composition on EFL students' productive competences through engaging them in creating multimodal presentation with the aid of robots and coding. The results revealed that the students made significant progress in developing fluent and accurate speaking performance, which provide a coherent line of argument from educational practices in developing productive competences through multimodality coupled with robot technology, which has been missing from the literature. Therefore, this study can inform EFL educators and researchers ways to engage EFL learners in practicing using the target language for productive output through the affordance available in social robots.

5. References

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