科技部補助專題研究計畫報告

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探索智能個人助理，自動語音辨識和聊天機器人技術在第二語言學習中的潛力

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報 告 類 別 ： 成果報告
計 畫 類 別 ： 個別型計畫
計 畫 編 號 ： MOST 109-2511-H-003-041-
執 行 期 間 ： 109年08月01日至110年07月31日
執 行 單 位 ： 國立臺灣師範大學英語學系（所）

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中 華 民 國 110 年 10 月 27 日

中 文 摘 要 ： 隨著科技的進步，智能語音助理(IPAs)已經能夠使用語音控制來協助使用者完成各種任務。因為智能語音助理能引發對話互動，研究者推測它們有助於第二語言學習，尤其是發音、聽力及口說能力。目前，很少實驗研究探討智能語音助理對於L2聽力與口說的影響。本研究探討Amazon Echo Show—一款熱門的智能語音助理對於L2學習者聽力及口說的影響，以及學習者對該工具的看法。本研究將兩個班級隨機分為控制組與實驗組，控制組接受一般的課程，而實驗組接受7次的Alexa課程(每次約50分鐘)。實驗前後，兩組都會進行多益聽力與口說模擬測驗，實驗組在實驗後填寫調查他們對於智能語音助理看法的問卷。實驗結果發現學習者的口說有顯著差異，表示學習者可以透過與智能語音助理互動來提高他們的口說能力，會有如此正面的影響是因為智能語音助理能供更多口說機會讓學生練習目標語言，學習者表示智能語音助理提供更多的口語互動，同時也能降低他們的口說焦慮。這些正面的研究發現顯示，研究者應該進一步探索智能語音助理的潛力，語言教師也該嘗試將它們融入課堂。

中文關鍵詞 ： 智能助理(IPAs)、聽力能力、口說能力、學習者觀點、互動

英 文 摘 要 ： With advances in technology, intelligent personal assistants (IPAs) have become available to assist users with a variety of tasks using voice commands. Because IPAs may induce dialogic interactions, researchers speculated that they may benefit second language learning, especially regarding pronunciation, listening and speaking skills. So far, very few experimental studies have examined the effects of IPAs on the improvement of L2 listening and speaking. The present study examined the effects of one popular IPA, the Amazon Echo Show, on L2 learners' listening and speaking skills as well as the learners' perceptions of the IPA. Two classes were recruited and randomly assigned as a control and an experimental group. While the control group continued with their regular lessons, the experimental group received seven Alexa sessions (each of around 50 minutes). Both groups took mock TOEIC listening and speaking tests before and after the experiment and the experimental group completed a survey exploring their perceptions of working with the IPA. A significant difference was found regarding speaking, suggesting that learners can improve their speaking skills through interacting with an IPA. This positive effect might be because the IPA provided more speaking opportunities and allowed the learners to practice the target language. The learners reported that IPAs offered more oral interactions and also reduced their speaking anxieties. These positive findings suggest that researchers should further explore the potential of IPAs and language teachers might try to incorporate them in the classroom.

科技部補助專題研究計畫報告

計畫名稱：探索智能個人助理、自動語音辨識和聊天機器人技術在

第二語言學習中的潛力

報告類別：□進度報告
　　　　　Ｖ成果報告：Ｖ完整報告/□精簡報告
計畫類別：Ｖ個別型計畫　　□整合型計畫
計畫編號：MOST　109－2511－H－003－041－
執行期間：109 年 8 月 1 日至 110 年 7 月 31 日

執行機構及系所：109-2511-H-003-041-

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本計畫除繳交成果報告外，另含下列出國報告，共 __0_ 份：
□執行國際合作與移地研究心得報告
□出席國際學術會議心得報告
□出國參訪及考察心得報告

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本研究具有政策應用參考價值：　□否　　Ｖ是，建議提供機關_____
　（勾選「是」者，請列舉建議可提供施政參考之業務主管機關）
本研究具影響公共利益之重大發現：Ｖ否　　□是
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中　華　民　國 110　年 10　月 10　日

摘要

　　隨著科技的進步，智能語音助理(IPAs)已經能夠使用語音控制來協助使用者完成各種任務。因為智能語音助理能引發對話互動，研究者推測它們有助於第二語言學習，尤其是發音、聽力及口說能力。目前，很少實驗研究探討智能語音助理對於 L2 聽力與口說的影響。本研究探討 Amazon Echo Show—一款熱門的智能語音助理對於 L2 學習者聽力及口說的影響，以及學習者對該工具的看法。本研究將兩個班級隨機分為控制組與實驗組，控制組接受一般的課程，而實驗組接受 7 次的 Alexa 課程(每次約 50 分鐘)。實驗前後，兩組都會進行多益聽力與口說模擬測驗，實驗組在實驗後填寫調查他們對於智能語音助理看法的問卷。實驗結果發現學習者的口說有顯著差異，表示學習者可以透過與智能語音助理互動來提高他們的口說能力，會有如此正面的影響是因為智能語音助理能供更多口說機會讓學生練習目標語言，學習者表示智能語音助理提供更多的口語互動，同時也能降低他們的口說焦慮。這些正面的研究發現顯示，研究者應該進一步探索智能語音助理的潛力，語言教師也該嘗試將它們融入課堂。

關鍵字：智能助理(IPAs)、聽力能力、口說能力、學習者觀點、互動

Investigating the impact of the intelligent personal assistants (IPAs) on second language learning

With advances in technology, intelligent personal assistants (IPAs) have become available to assist users with a variety of tasks using voice commands. Because IPAs may induce dialogic interactions, researchers speculated that they may benefit second language learning, especially regarding pronunciation, listening and speaking skills. So far, very few experimental studies have examined the effects of IPAs on the improvement of L2 listening and speaking. The present study examined the effects of one popular IPA, the Amazon Echo Show, on L2 learners' listening and speaking skills as well as the learners' perceptions of the IPA. Two classes were recruited and randomly assigned as a control and an experimental group. While the control group continued with their regular lessons, the experimental group received seven Alexa sessions (each of around 50 minutes). Both groups took mock TOEIC listening and speaking tests before and after the experiment and the experimental group completed a survey exploring their perceptions of working with the IPA. A significant difference was found regarding speaking, suggesting that learners can improve their speaking skills through interacting with an IPA. This positive effect might be because the IPA provided more speaking opportunities and allowed the learners to practice the target language. The learners reported that IPAs offered more oral interactions and also reduced their speaking anxieties. These positive findings suggest that researchers should further explore the potential of IPAs and language teachers might try to incorporate them in the classroom.

Keywords: intelligent personal assistants (IPAs), listening skills, speaking skills, learners' perceptions, interactions

1. Introduction

Emerging new technologies have led to the development of devices like intelligent virtual assistants (IVAs) and intelligent personal assistants (IPAs). IPAs receive commands through systems such as automatic speech recognition (ASR) and comprehend these commands through technologies like natural language processing (NLP) (Goksel-Canbek & Mutlu, 2016). NLP involves the analysis of linguistic data and allows an IPA to respond to a user in natural language. With such innovations, users can easily ask their IPAs to perform tasks or provide services such as controlling home devices (e.g., turn lights on/off) or managing e-mail/to-do lists.

Because IPAs offer a rich set of capabilities, researchers have explored the possibility of using them for language teaching and learning. For instance, dialogues from textbooks have been integrated in Google Home smart speakers, allowing learners to use their IPAs to practice them (Ali, 2018; Tagawa, Jin, & Inoue, 2019).

Many researchers have suggested that IPAs might be helpful for language learning, especially regarding the development of pronunciation, listening and speaking abilities, because they may induce dialogic interactions, (Barcomb, Grimshaw, & Cardoso, 2017; Canbek & Mutlu, 2016; Dizon, 2021; Moussalli & Cardoso, 2016, 2020; Pyae & Scifleet, 2018, 2019; Sing, Embi, & Hashim, 2019; Underwood, 2017). According to interactionist theory, dialogic interactions can promote language development because it naturally provides opportunities for input, output and interaction (Long, 1996). In IPA-induced interactions, IPAs provide input (e.g., answering questions, providing information) and learners provide oral output (e.g., asking questions, making commands). The value of such interactions has been found to be twofold. Learners are provided with an interlocutor to have more speaking practice, which were often limited to teacher-students interactions and limited by large class size (Ortega, 2007). Additionally, learners are offered the opportunities to negotiate for meaning and receive feedback, which assist learners to notice gaps between their intended meaning and structures of target language (Pica, 2013). Learners are then able to modify their uses of target language (Long, 1996), which could be viewed as pushed output (Swain, 2005) or reformulation (Pica, 1992). There have been studies supported that negotiation of meaning and feedback could promote language development.

Other researchers have suggested that IPAs may engage learners in a meaningful interactive environment (Barcomb et al., 2017; Bibauw, François, & Desmet, 2019; Canbek & Mutlu, 2016; Seneff, Wang, Peabody, & Zue, 2004; Underwood, 1984).

2. Literature Review

2.1. Learners' perceptions and strategy uses of IPAs

Because IPAs may promote dialogic interactions, researchers have explored their use in language classes (Canbek & Mutlu, 2016; Chen, Yang, & Lai, 2020; Dizon, 2017; Moussalli & Cardoso, 2016; Tai & Chen, 2020; Underwood, 2017). They have also explored how language learners perceive the use of IPAs. The findings have generally been positive. Most learners enjoy using IPAs and think they help develop listening and speaking skills. For example, Chen et al. (2020) investigated the perceptions of 29 Taiwanese learners who used Google Home smart speakers. The results revealed that the learners were generally found the Google Home smart speakers motivating, enjoyed the interactive experience, and considered Google Home a useful tool to develop their listening and speaking abilities.

Dizon (2017) provides another example. The perceptions of four Japanese college learners on the use of the Amazon smart speakers were explored. The learners reported that the interactions with the Amazon smart speakers were very helpful in developing their listening and speaking abilities in English. Dizon (2017) commented that IPA-induced dialogues could be especially important for EFL learners who typically have relatively few opportunities to use English in real-life interactions.

The use of IPAs can also promote a willingness to communicate (WTC). This was shown by Tai and Chen (2020) who recruited 112 eighth-grade EFL learners and asked them to complete a WTC questionnaire before and after interacting with Google Home smart speakers. Analysis of the questionnaires revealed that interacting with the IPAs provided a less threatening learning environment, especially regarding speaking practice, and enhanced a willingness to use the target language.

Additionally, research has also been conducted on IPAs and the use of communication strategies (Chen et al., 2020; Dizon, 2017; Moussalli & Cardoso, 2016; Underwood, 2017). It seems that the learners use a variety of strategies to reduce communication breakdowns with IPAs. The communication breakdowns indicated IPAs provided no response or did not answer users' questions or commands. For example, Underwood (2017) designed a series of tasks and asked eleven primary school students to make good use of their IPAs over nine months. Based on the researcher's observations, the learners were able to repeat, reformulate or self-correct in order to obtain responses from their IPAs. Similarly, Moussalli and Cardoso (2020) found that learners used strategies like repeating or rephrasing questions to mitigate communication breakdowns with IPAs.

2.2 The effect of IPAs on language learning

Although many studies have found that learners are motivated to use IPAs for language learning, few empirical studies have been conducted to examine the effects of IPAs on language learning. To the authors' knowledge, Dizon (2020) was the first study to explore the effects of IPAs on listening and speaking abilities. Dizon (2020) adopted the Amazon Echo Dot and recruited two groups. An experimental group of 13 learners received Echo Dot sessions over a period of 10 weeks, while a control group of 15 learners did not. The results revealed that the experimental group significantly enhanced their speaking ability compared with the control group. No significant difference was found regarding listening ability and Dizon (2020) speculated that the reason may be that attention was not specifically drawn to the listening content.

Although Dizon (2020) found IPAs to have positive effects regarding speaking, there were some limitations. First, only 13 leaners were engaged in the IPA-induced interactions. The findings, generated from a low number of participants, may not be generalized to other groups of learners. Second, the learners were engaged in a limited number of IPAs interactions, only ten sessions of 12 minutes. Over such a relatively short period of time, it is difficult to observe language development. Finally, Dizon (2020) adopted the Amazon Echo Dot, which did not have a visual display. Visual displays can provide rich visual support (e.g., subtitles, pictures, or video clips). Subtitles, for instance, have been shown to assist listening comprehension (Danan, 2004; Field, 2010; Osada, 2001; Vandergrift, 2011) and images and video clips have additive effects for language learning (Mayer, 2014; Mayer & Anderson, 1991, 1992; Paivio, 1990). The two channels (i.e., words and images) can complement one another and thus improve understanding.

With the above in mind, the present study aimed to explore the effects of IPAs on listening and speaking and to explore learner perceptions regarding the use of Amazon smart speakers. This study specifically included more participants, more interaction time with IPAs, and IPAs with a visual display. The research questions of the present study were:

Can Amazon smart speakers enhance learners' listening abilities?

Can Amazon smart speakers enhance learners' speaking abilities?

How do learners perceive the use of Amazon smart speakers for language learning?

3. Method
3.1 Participants

Two classes of college students in northern Taiwan were invited to participate

in this experiment. These students were in their second or third year of college and were required to take an elective English course in addition to Freshman English courses. The elective course was Learning English Vocabulary, an intermediate level course, and the class met for two hours a week over a period of 18 weeks. The two classes were randomly assigned as a control and an experimental group. There were 26 learners in the control group and 24 learners in the experimental group. The classes were subdivided into groups of four to five learners to complete the in-class activities. The participants were around 19-years-old with Mandarin Chinese as their first language. They had all received formal English education since the third grade of elementary school, and their English proficiency level was estimated to be around CEFR B1 level.

3.2 The Instrument

3.2.1 Amazon smart speakers

In order to explore the effects of IPAs, Amazon smart speakers were selected for the present study because it was the most popular IPA globally (Statista©, 2021). Of the various Amazon smart speakers, Echo Show was selected as it is equipped with a touchable LED screen, which provides visual support (e.g., subtitles, pictures, or video clips). Both the Echo Show 5 (960-by-480-resolution, 5.5-inch display) and Echo Show 8 (1280-by-800, 8-inch display) were used. In terms of their capabilities and services, there is no difference between the two devices. "Alexa" is used in the following content to refer to both these Echo Show devices. Each group was provided with one Echo Show to complete all Alexa sessions.

3.2.2 Alexa sessions

Seven Alexa sessions were planned. The topic of each session is listed in Table 1 below. Because the students had not interacted with Alexa before, the researcher/teacher designed a series of sessions to familiarize them with Alexa interactions.

Table 1. The Alexa sessions

Session	Topics	Example commands
1	Get to know Alexa (1)	Alexa, how old are you?
		Alexa, when is your birthday?
		Alexa, where are you from?
		Alexa, how much do you weigh?
		Alexa, what color do you like?

2	Get to know Alexa (2)	Alexa, do you like dogs?
		Alexa, do you like cats?
		Alexa, what is your favorite animal?
		Alexa, what is your favorite song?
3	Have a small talk with Alexa	Alexa, how is the weather in ____ today?
		Alexa, tell me your favorite movie.
		Alexa, tell me your favorite sport.
4	Getting more information from Alexa	Alexa, what is the definition of __?
		Alexa, what is a synonym for __?
		Alexa, what is an antonym for __?
		Alexa, how do you say __ in Chinese?
		Alexa, who is ___?
5	Getting more information from Alexa for fun	Alexa, read a poem.
		Alexa, sing a song.
		Alexa, tell me a story.
6	Games with Alexa (1)	Alexa, start Akinator.
		Alexa, start True or False.
		Alexa, start Animal Games.
		Alexa, start Animal Letter.
7	Games with Alexa (2)	Alexa, start Animal Detective.
		Alexa, start the Magic door.
		Alexa, start Tricky Genie

The learners had one session per week and each session lasted for about 50 minutes. At the beginning of each session the researcher/teacher took five minutes to explain the goal of the session (e.g., Session 1 was to ask more information about Alexa). The learners were then given a handout to complete during the session. For example, when the learners asked "Alexa, how old are you?" and Alexa responded "I was released November 6th, 2014.", the learners were required to write down six years old on the handout for Session 1. During each session the learners interacted with Alexa for about 45 minutes.

3.2.3 Pre- and post-tests in listening and speaking

In order to examine the learners' listening and speaking abilities, a pre- and post-test design was administered. The learners of both groups were required to take mock

TOEIC listening and speaking tests before and after the experiment in a computer lab. It took about 45 minutes to complete the four parts of the mock TOEIC listening test: photographs, questions, conversations, and talks. The TOEIC listening test results were shown on computer screens directly after the learners had completed it. The learners each took a screenshot of their test result and uploaded it to an online teaching platform offered by the school. The researcher/teacher then collected their test scores. The highest possible scores of the listening test were 120 points.

The three parts of the mock TOEIC speaking test took about 12 minutes to complete: read a text aloud, describe a picture, and answer questions. The learners' voice recordings were collected through the online teaching platform and then evaluated by two teachers who have taught English for more than 10 years. The teachers adopted the TOEIC Speaking Proficiency Level Descriptors to evaluate the learners' oral performance (Educational Testing Service, 2018), which has eight levels, from 1 (poor) to 8 (excellent). The speaking test results were presented in terms of 100 points for ease of presentation and comparison.

3.3 Procedures

Both groups underwent the same procedure: TOEIC pre-tests on listening and speaking, instructions, and TOEIC post-tests on listening and speaking. Regarding in-class instructions, the researcher/teacher adopted online materials and movies as the major teaching resources as the class was mainly focused on learning vocabulary. The control group only received vocabulary lessons, while the experimental group received vocabulary lessons and the Alexa sessions. Because the experimental group had both vocabulary lessons and Alexa sessions, the content of the vocabulary lessons was reduced by half. Figure 1 below illustrates the flow of the experiment.
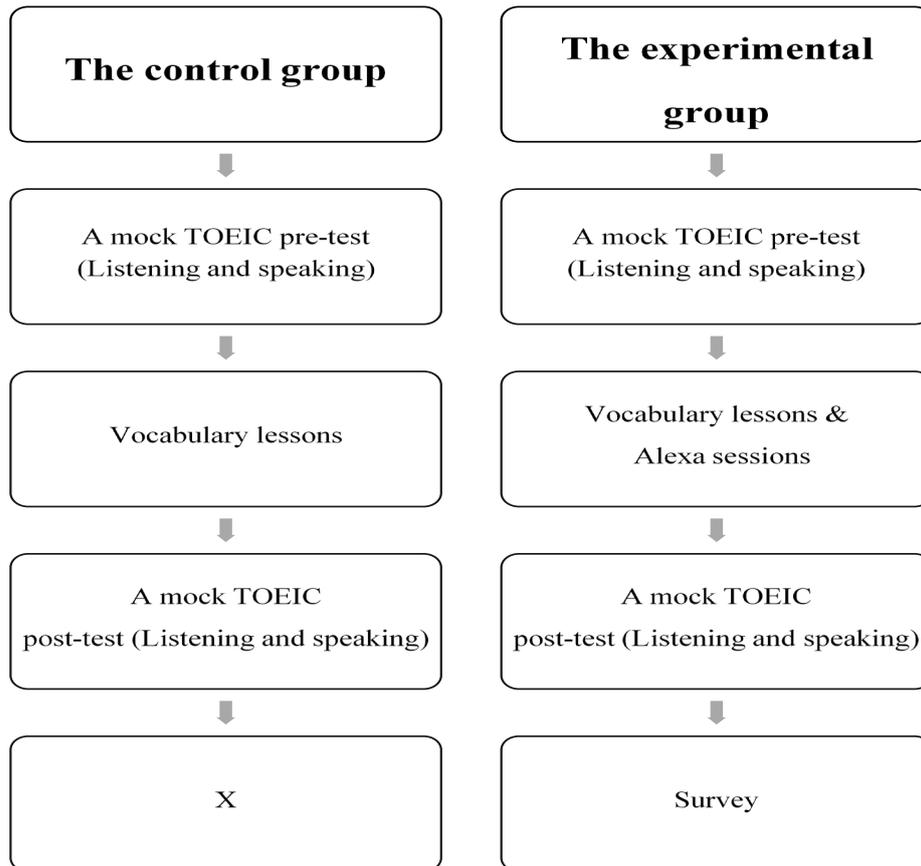
The control group	The experimental group
⬇	⬇
A mock TOEIC pre-test (Listening and speaking)	A mock TOEIC pre-test (Listening and speaking)
⬇	⬇
Vocabulary lessons	Vocabulary lessons & Alexa sessions
⬇	⬇
A mock TOEIC post-test (Listening and speaking)	A mock TOEIC post-test (Listening and speaking)
⬇	⬇
X	Survey

Figure 1. The procedure of the experiment

3.4 Data analysis

The data of the present study included (1) the mock TOEIC listening and speaking test scores of the two groups and (2) the survey results of the experimental group. To evaluate the speaking test, two teachers used the TOEIC Speaking Proficiency Level Descriptors (Educational Testing Service, 2018). Reliability between the two teachers was calculated using Cohen's kappa, the result being relatively reliable (k=0.83).

To analyze the TOEIC listening and speaking test scores, analysis of covariance (ANCOVA) was adopted to compare the listening and speaking abilities of the two groups whilst controlling for the pre-test.

4. Results

4.1 The statistical results of listening and speaking tests

A one-way ANCOVA was conducted to determine if there was a statistically significant difference between the two groups regarding listening and speaking. The statistical results are shown in Table 2 below. After controlling for the listening pre-test, no significant effect on listening ability was found, $F(1, 47)$=3.296, p=0.076.

However, a significant effect regarding speaking ability was discovered, $F(1, 47)=20.867$, $p=0.000$.

Table 2. Statistical results of ANCOVA

		Mean		F	p	η²
		Pre-test	Post-test			
Listening	Control group	84.46	90.38	3.29	0.07	0.06
	Experimental group	83.00	96.78			
Speaking	Control group	76.61	76.95	20.86	0.000*	0.307
	Experimental group	77.75	81.17			

5. Discussion

5.1 The effects of Alexa on the learners' listening and speaking ability

Because IPAs can promote the rich interactions which are an important factor in language learning (Barcomb et al., 2017; Canbek & Mutlu, 2016; 2018; Long, 1996; Moussalli & Cardoso, 2016; Sing et al., 2019; Underwood, 2017; Underwood, 1984), a number of researchers have underscored the importance of exploring the effects of IPAs on listening and speaking abilities (Dizon, 2020; Zhang, Beckmann, & Beckmann, 2018). The present study examined whether learners could significantly enhance their listening and speaking abilities by interacting with Alexa. It was found that they could indeed enhance their speaking. This finding is in accordance with the finding of Dizon (2020). The IPA-induced interactions consisted of output from the learners and input from the IPAs. With IPAs, the learners may produce more output in response to Alexa, an interlocutor. The speaking practice could be especially valuable for those learners who have few opportunities to practice speaking.

Furthermore, the IPA-induced interactions offered the learners opportunities to negotiate meaning and receive feedback, allowing them to notice errors and modify their language. The opportunities to notice interlanguage problems and to solve them might help the development of speaking skills.

Alexa also potentially allowed the learners to improve their speaking abilities due to the presence of meaningful interactive learning contexts (Barcomb et al., 2017; Bibauw et al., 2019; Canbek & Mutlu, 2016; Seneff et al., 2004; Underwood, 1984).

Interacting with Alexa allowed the learners to actively use the target language to create their intended meaning. As has been noted (Engwall et al., 2021), interactive tasks allow learners to use language in meaningful contexts. For example, Alexa played the role as Narrator, providing information and thus stressing the learners' listening comprehension (Engwall et al., 2021). In such contexts, the learners organized their language to ask for information from Alexa, and listened to Alexa's response. When the tasks were designed with specific goals and the machine had a clearly defined role, the learners would use the target language in a meaningful way. Therefore, it seems possible that more extensive use of IPAs might help learners to use the target language more actively.

It was interesting to note that there was no significant difference between the two groups regarding the learners' listening ability. Dizon (2020) had a similar finding and explained that this might be because attention was not specifically drawn to Alexa's responses. Dizon (2020) suggested that learners could be required to write down Alexa's responses. However, in the present study the learners were specifically required to write down Alexa's responses and still no significant difference was found. Some studies have indicated that listening ability is difficult to improve and might need more time to develop (Pollard, Black-Hawkins, Cliff-Hodges, Dudley, & James, 2014). Therefore, it is possible that there were not enough Alexa-based sessions. If the learners were allowed more Alexa sessions or were exposed to more Alexa interactions, a significant improvement regarding listening might be observed. Another possible reason for the lack of significant improvement on listening ability might be related to the contents of the TOEIC listening test, which includes business-related vocabulary. The Alexa skills used in this study did not particularly focus on providing such vocabulary, focusing instead on general English listening skills.

5. Conclusion

The present study examined whether IPAs could enhance L2 listening and speaking and how learners perceived their use. It was found that the use of IPAs did indeed enhance the learners' speaking abilities, possibly due to the IPA-induced highly interactive learning environment. IPAs can provide EFL learners with more speaking practice, and the IPAs-induced interactions allowed the learners to produce more L2 output and receive more L2 input. These interactions could be especially valuable for EFL learners who have very few opportunities to interact with others in English. Interacting with IPAs allows learners to deliver messages, such as asking for more information, in the target language.

Although no significant improvement was observed regarding listening, it could be that more IPAs interactions may be necessary as in general the enhancement of

listening ability takes longer. Moreover, the learners' perceptions of using the IPAs was also largely positive.

For future research, it is suggested that more participants at different proficiency levels should be invited to interact with different IPAs. This would help uncover the full potential of IPAs regarding language teaching and learning. Furthermore, it seems that visual support is helpful in language learning as, based on the findings of previous studies (Danan, 2004; Field, 2010; Mayer, 2014; Mayer & Anderson, 1991, 1992; Osada, 2001; Paivio, 1990; Vandergrift, 2011), it assists comprehension. With this in mind, it could be beneficial to conduct studies comparing the effects of different IPAs with and without visual displays on language development. Finally, more learning activities (Google actions and Alexa skills) could be designed and incorporated into IPAs. As Engwall et al. (2021) pointed out, there are four roles for machines in machine-human interactions (Interviewer, Interlocutor, Narrator, Facilitator). Taking advantage of these roles would generate engaging learning activities which could help develop L2 listening and speaking skills.

6.   References

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科技部補助計畫衍生研發成果推廣資料表

日

期：　年　月　日

科技部補助計畫	計畫名稱：探索智能個人助理、自動語音辨識和聊天機器人技術在第二語言學習中的潛力
	計畫主持人：陳浩然
	計畫編號：MOST　109－2511－H－003－041－
	領域：
研發成果名稱	（中文）探索智能個人助理、自動語音辨識和聊天機器人技術在第二語言學習中的潛力
	（英文）Investigating the impact of the Amazon Alexa on the development of L2 listening and speaking skills

成果歸屬機構		發明人 (創作人)	

技術說明	（中文） 隨著科技的進步，智能語音助理(IPAs)已經能夠使用語音控制來協助使用者完成各種任務。因為智能語音助理能引發對話互動，研究者推測它們有助於第二語言學習，尤其是發音、聽力及口說能力。目前，很少實驗研究探討智能語音助理對於 L2 聽力與口說的影響。本研究探討 Amazon Echo Show—一款熱門的智能語音助理對於 L2 學習者聽力及口說的影響，以及學習者對該工具的看法。本研究將兩個班級隨機分為控制組與實驗組，控制組接受一般的課程，而實驗組接受 7 次的 Alexa 課程(每次約 50 分鐘)。實驗前後，兩組都會進行多益聽力與口說模擬測驗，實驗組在實驗後填寫調查他們對於智能語音助理看法的問卷。實驗結果發現學習者的口說有顯著差異，表示學習者可以透過與智能語音助理互動來提高他們的口說能力，會有如此正面的影響是因為智能語音助理能供更多口說機會讓學生練習目標語言，學習者表示智能語音助理提供更多的口語互動，同時也能降低他們的口說焦慮。這些正面的研究發現顯示，研究者應該進一步探索智能語音助理的潛力，語言教師也該嘗試將它們融入課堂。

	（英文） With advances in technology, intelligent personal assistants (IPAs) have become available to assist users with a variety of tasks using voice commands. Because IPAs may induce dialogic interactions, researchers speculated that they may benefit second language learning, especially regarding pronunciation, listening and speaking skills. So far, very few experimental studies have examined the effects of IPAs on the improvement of L2 listening and speaking. The present study examined the effects of one popular IPA, the Amazon Echo Show, on L2 learners' listening and speaking skills as well as the learners' perceptions of the IPA. Two classes were recruited and randomly assigned as a control and an experimental group. While the control group continued with their regular lessons, the experimental group received seven Alexa sessions (each of around 50 minutes). Both groups took mock TOEIC listening and speaking tests before and after the experiment and the experimental group completed a survey exploring their perceptions of working with the IPA. A significant difference was found regarding speaking, suggesting that learners can improve their speaking skills through interacting with an IPA. This positive effect might be because the IPA provided more speaking opportunities and allowed the learners to practice the target language. The learners reported that IPAs offered more oral interactions and also reduced their speaking anxieties. These positive findings suggest that researchers should further explore the potential of IPAs and language teachers might try to incorporate them in the classroom.
產業別	外語學習
技術/產品應用範圍	智能個人助理如 Google assistant 及 Amazon echo 可協助外語，尤其是聽力及口說部分。
技術移轉可行性及預期效益	提升外語聽力及口說部分

註：本項研發成果若尚未申請專利，請勿揭露可申請專利之主要內容。

109年度專題研究計畫成果彙整表

計畫主持人：陳浩然　　　　**計畫編號：**109-2511-H-003-041-

計畫名稱：探索智能個人助理，自動語音辨識和聊天機器人技術在第二語言學習中的潛力

成果項目			量化	單位	質化 （說明：各成果項目請附佐證資料或細項說明，如期刊名稱、年份、卷期、起訖頁數、證號...等）
國內	學術性論文	期刊論文	0	篇	
		研討會論文	0		
		專書	1	本	修改中：人工智慧與英語學習 預計 2022 出版
		專書論文	0	章	
		技術報告	0	篇	
		其他	0	篇	
國外	學術性論文	期刊論文	1	篇	Investigating the impact of the Amazon Alexa on the development of L2 listening and speaking skills. (minor revision) (submitted to Interactive learning environment)
		研討會論文	0		
		專書	0	本	
		專書論文	0	章	
		技術報告	0	篇	
		其他	0	篇	
參與計畫人力	本國籍	大專生	0	人次	
		碩士生	2		周君璘、張容榕 協助兩位學習電腦輔助語言學習相關知識
		博士生	0		
		博士級研究人員	0		
		專任人員	0		
	非本國籍	大專生	0		
		碩士生	0		
		博士生	0		
		博士級研究人員	0		
		專任人員	0		
其他成果 （無法以量化表達之成果如辦理學術活動、獲得獎項、重要國際合作、研究成果國際影響力及其他協助產業技術發展之具體效益事項等，請以文字敘述填列。）					