



Using Alexa for autonomous foreign language learning

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What is Amazon Alexa?



- Alexa is a cloud-based virtual assistant, also known as an intelligent personal assistant (IPA).
 - IPAs are “software agents that can automate and ease many of the daily tasks of their users” (Santos et al., 2016, p. 194).
- Can be used in a variety of ways by L2 learners:
 - Information - *Alexa, how do you spell technology?*
 - Skills/Apps - E.g., Magoosh Vocabulary Builder, Earplay
 - Socialbots - *Alexa, let's chat.* (Open-ended conversations)



IPA-Related L2 Literature

- Learner views & experiences
 - Provided opportunities for English speaking practice as well as implicit feedback on pronunciation (Dizon, 2017)
 - Enhanced motivation, reduced learning anxiety, and was useful for L2 learning (Moussalli & Cardoso, 2016)
 - Lowered L2 anxiety, made language learning more fun, and provided a means for authentic communication in the L2 (Tai & Chen, 2020)
- Capacity to understand L2 speech
 - Dizon (2017) and Chen et al. (2020) report that Alexa and Google Assistant respectively had difficulties fully understanding L2 speech.
 - Moussalli and Cardoso (2020) conclude that “L2 learners have no problems understanding Echo and that it adapts well to their accented speech” (p. 865)

IPA-Related L2 Literature

- L2 speaking and listening
 - Weekly interactions with the Alexa led to significant gains in L2 speaking but not L2 listening (Dizon, 2020)
 - Significant impact on willingness to communicate (Tai & Chen, 2020)
- Gaps in IPA literature
 - Aforementioned studies were conducted in controlled settings, i.e., feasibility or quasi-experimental studies under the observation of the researcher/s
 - Studies also examined only L2 English



Research Questions

1. What are Japanese EFL & L2 Japanese students' views of Alexa for autonomous second language learning?
2. What are Japanese EFL & L2 Japanese students' usage habits concerning Alexa for autonomous second language learning?
3. *What strategies do Japanese EFL students use to resolve breakdowns in communication with Alexa?
4. **How accurate is Alexa at understanding L2 Japanese speech?

*Case Study 1: L2 English

**Case Study 2: L2 Japanese

Methodology

- Participants
 - Case Study 1: 14 L2 English students from two Japanese universities
 - Echo Dot
 - Case Study 2: 6 L2 Japanese students from one Japanese university
 - Echo Show 5



Methodology

- Research Instrument: Survey
 1. Technology acceptance model-based (Davis, 1989) survey, adapted from Chen (2013), piloted in Dizon and Tang (2019)
 - Three constructs: usability, effectiveness, satisfaction
 2. Five open-ended written questions adapted from Lee (2011)



Methodology

- Data Collection
 - Case Study 1: Two months from July 2019 to September 2021
 - Case Study 2: Two months from February 2021 to April 2021
 - Usage data was collected via Alexa history page, which has a record (audio & text) of all commands
 - Informed written consent obtained
- Data Analysis
 - Likert Data (5-point scale): Mean, standard deviation, and % agreement values
 - Written Data: Coded and grouped into themes using Atlas.ti, a qualitative analysis software

Methodology

- Data Analysis in Case Study 1 (What strategies do Japanese EFL students use to resolve breakdowns in communication with Alexa?)
 1. Repeat - Repeat the same command
 2. Rephrase - Used different wording than previous command

EXAMPLE

- Student: "Alexa what is your favorite animation?" (animation was inaudible to Alexa and thereby not recorded in the text)

Student: "Alexa what is your favorite cartoon?"

3. Abandon - Gave up on a specific command

* Moussalli and Cardoso (2020)

Case Study 1 Results - Student views

Construct / Statements	M	SD	% Agreement
Usability 1: Learning to use Alexa was easy for me.	3.22	1.09	55.6%
Usability 2: It was easy for me to remember how to give Alexa commands.	3.67	0.87	66.7%
Usability 3: My interaction with Alexa was clear and understandable.	3.67	1.00	77.8%
Usability 4: Overall, Alexa was easy to use.	3.22	1.09	55.6%
Usability Total	3.44	1.00	63.9%

Case Study 1 Results - Student views

Construct / Statements	M	SD	% Agreement
Effectiveness 1: Using Alexa helped me a lot in English language learning.	3.22	1.09	44.4%
Effectiveness 2: Using Alexa gave me greater control over my learning of the English language.	3.22	1.09	55.6%
Effectiveness 3: Using Alexa improved my English language ability.	3.44	0.88	66.7%
Effectiveness 4: Overall, Alexa was useful in my study of the English language.	3.22	1.09	55.6%
Effectiveness Total	3.28	1.00	55.6%

Case Study 1 Results - Student views

Construct / Statements	M	SD	% Agreement
Satisfaction 1: It was interesting to use Alexa for English language learning.	3.89	0.93	77.8%
Satisfaction 2: I am willing to continue using Alexa for English language learning.	3.22	0.97	33.3%
Satisfaction 3: I was satisfied with the functions offered by Alexa.	3.44	1.01	55.6%
Satisfaction 4: Overall, I was satisfied with Alexa for English language learning.	3.11	1.05	55.6%
Satisfaction Total	3.42	1.00	55.6%

Case Study 1 Results - Student views

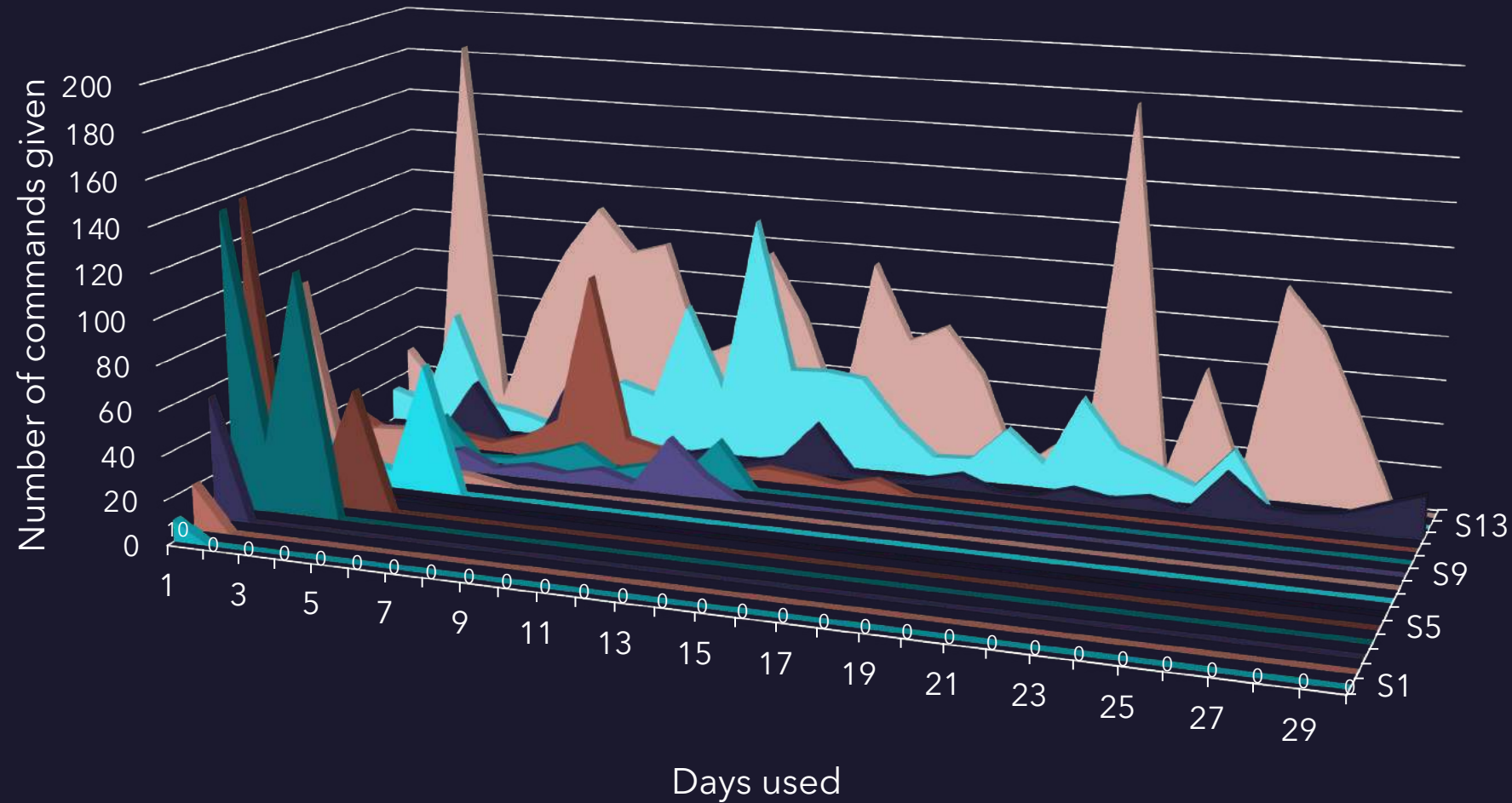
Theme	Number of participants who commented (percentage)	Example quotations
Enjoyment	4 (44%)	When I was alone in home, I interacted with Alexa and <u>had fun</u> .
Information	3 (33%)	I <u>listen to news from Alexa</u> . The news is NHK world, and soccer news which I am interested in.
Skills	3 (33%)	I thought if you really want to <u>improve your English accent and pronunciation</u> you can practice with her. So it's a <u>good speaking practice</u> .

Case Study 1 Results - Student views

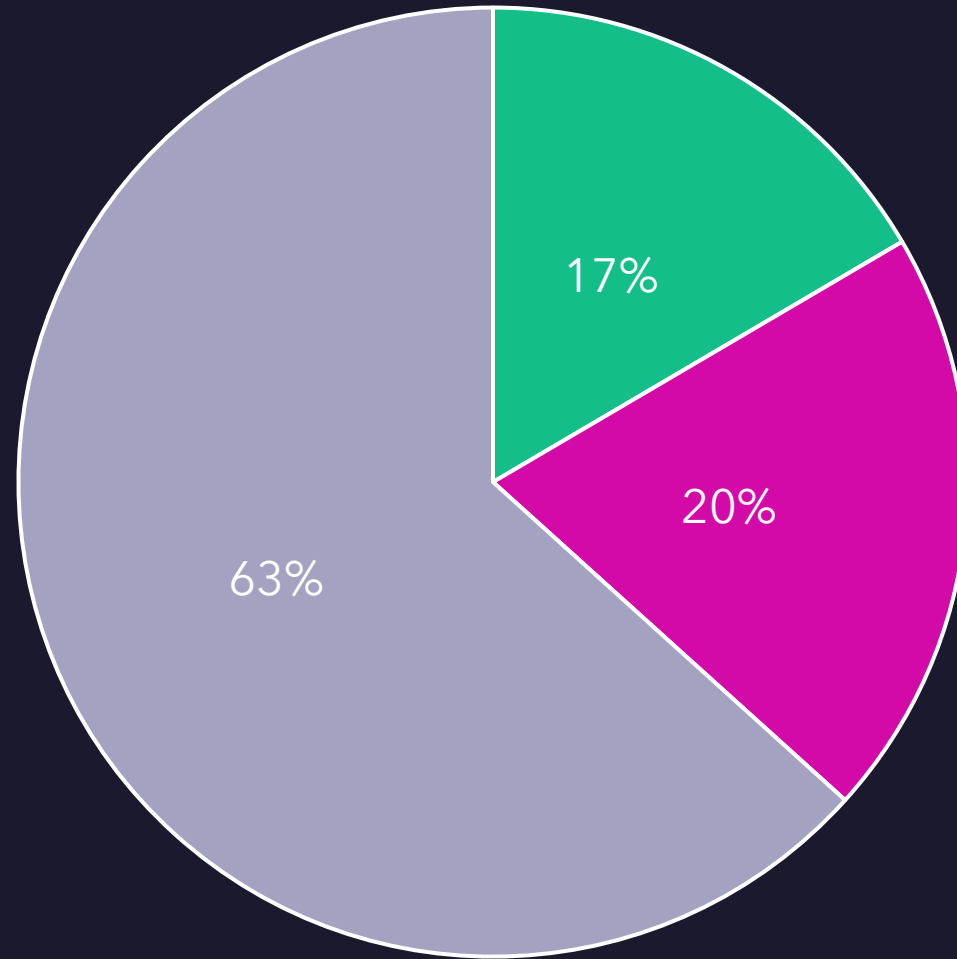
Theme	Number of participants who commented (percentage)	Example quotations
Issues	2 (22%)	...every time I went out, she <u>cut the internet connection or Wi-Fi</u> . So after I got home and tried to talk to her, she just said that "sorry, internet connection is not working."
Understanding	2 (22%)	I <u>couldn't understand what Alexa said</u> . I feel Alexa's speaking was too fast.
Reliability	2 (22%)	When I asked to Alexa a question in English, <u>Alexa didn't answer</u> , and said "Shall I play music?"

Case Study 1 Results - Usage of Alexa

	M	SD
Total commands given	282.64	454.51
Commands given per day of use	29.72	26.06
Days used	10.64	10.31



Case Study 1 Results - Strategies



Repeat Rephrase Abandon

Methodology

- Data Analysis in Case Study 2 (How accurate is Alexa at understanding L2 Japanese utterances?)
 - Japanese native speaker listened to and transcribed the commands
 - Twenty-five commands were randomly chosen from five of the participants
 - If there was a match between human and Alexa transcription, this was categorized as an understood command

EXAMPLE

Alexa: "今日のジョークを教えて"

Human: "今日のジョークを教えて"

- If there was a mismatch between human and Alexa transcription, this was categorized as a misunderstood command

EXAMPLE

Alexa: "塩クリームは英語で何"

Human: "シウクリームは英語で何"

Case Study 2 Results - Student views

Construct / Statements	M	SD	% Agreement
Usability 1: Learning to use Alexa was easy for me.	3.67	1.03	66.7%
Usability 2: It was easy for me to remember how to give Alexa commands.	3.83	0.75	66.7%
Usability 3: My interaction with Alexa was clear and understandable.	3.67	0.82	83.3%
Usability 4: Overall, Alexa was easy to use.	4.00	1.10	83.3%
Usability Total	3.79	0.88	75.0%

Case Study 2 Results - Student views

Construct / Statements	M	SD	% Agreement
Effectiveness 1: Using Alexa helped me a lot in Japanese language learning.	3.67	0.52	66.7%
Effectiveness 2: Using Alexa gave me greater control over my learning of the Japanese language.	3.50	0.55	50.0%
Effectiveness 3: Using Alexa improved my Japanese language ability.	3.67	0.82	50.0%
Effectiveness 4: Overall, Alexa was useful in my study of the Japanese language.	3.83	0.41	83.3%
Effectiveness Total	3.67	0.56	62.5%

Case Study 2 Results - Student views

Construct / Statements	M	SD	% Agreement
Satisfaction 1: It was interesting to use Alexa for Japanese language learning.	4.17	0.75	83.3%
Satisfaction 2: I am willing to continue using Alexa for Japanese language learning.	4.00	0.63	83.3%
Satisfaction 3: I was satisfied with the functions offered by Alexa.	4.17	0.75	83.3%
Satisfaction 4: Overall, I was satisfied with Alexa for Japanese language learning.	4.00	0.63	83.3%
Satisfaction Total	4.08	0.65	83.3%

Case Study 2 Results - Student views

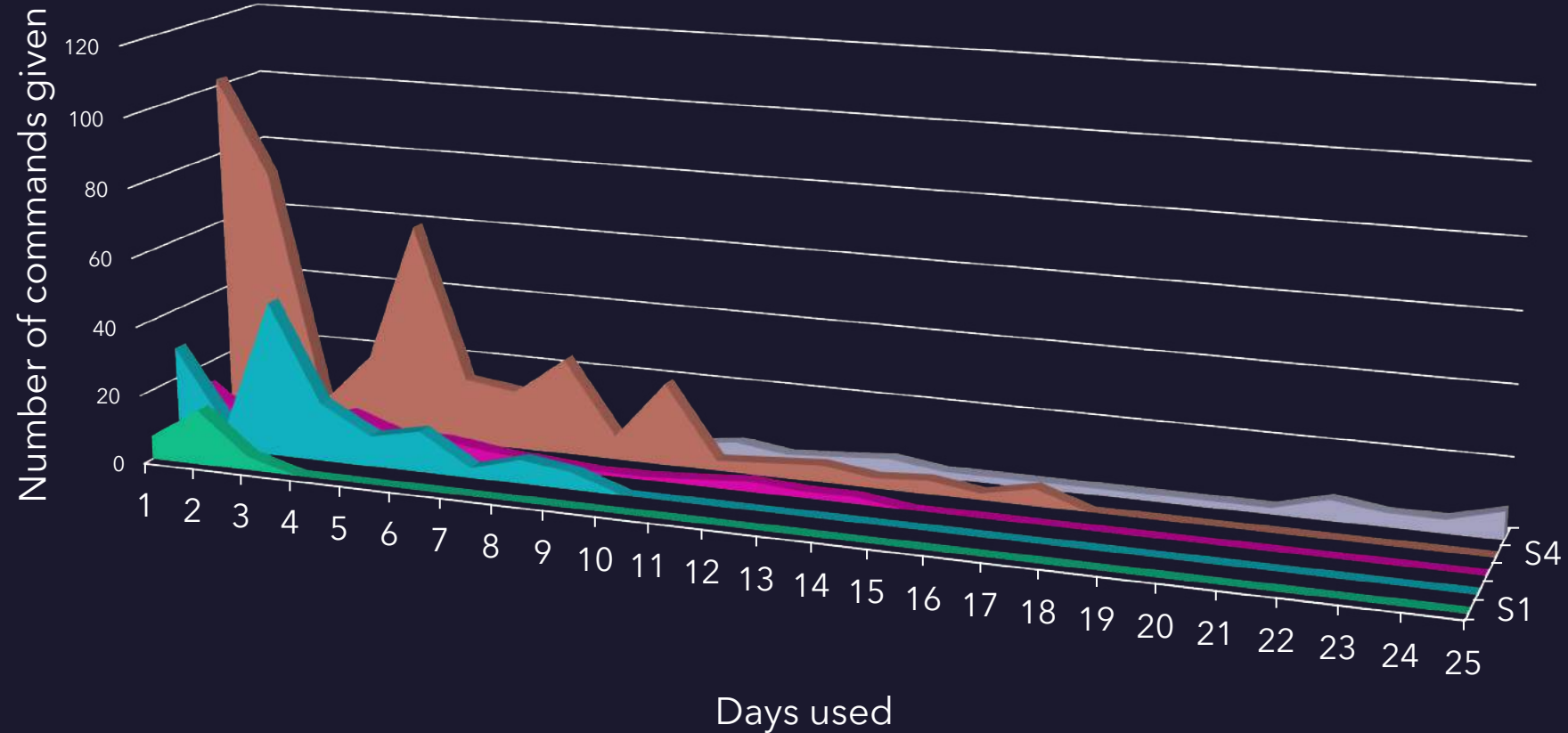
Theme	Number of participants who commented (percentage)	Example quotations
Enjoyment	4 (66%)	I <u>really enjoyed interacting with Alexa</u> . I not only used Alexa for studying purposes but also used it as a <u>medium for entertainment</u> .
Information	4 (66%)	I often use it to <u>inquire about the weather</u> and <u>listen to news</u> every morning.
Language Development	4 (66%)	I <u>learned a lot of new Japanese words</u> . I think Alexa helped me to <u>improve my Japanese pronunciation</u> , too because interacted with it in Japanese

Case Study 2 Results - Student views

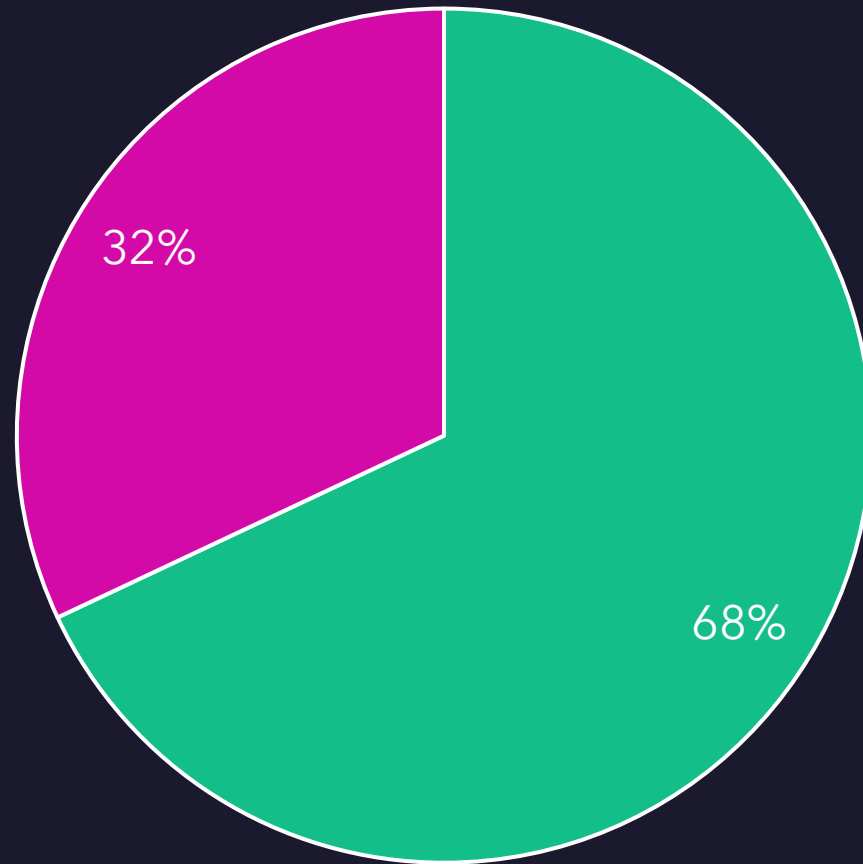
Theme	Number of participants who commented (percentage)	Example quotations
Learning Curve	4 (66%)	After setting up the Echo, <u>I was struggling with so many different possibilities...</u> I tried typing on the keyboard like a normal iPad. However it didn't work. It seems to me that how to command Alexa through the voice that is the most difficult thing.
Understanding	2 (33%)	Maybe sometimes my Japanese is not good so <u>Alexa doesn't understand what I say</u>

Case Study 2 Results - Usage of Alexa

	M	SD
Total commands given	142.60	145.37
Commands given per day of use	10.49	17.44
Days used	13.60	8.29



Case Study 2 Results - Alexa Accuracy



■ Understood ■ Misunderstood



Summary

1. What are Japanese EFL & L2 Japanese students' views of Alexa for autonomous second language learning?

- L2 learners have moderately favorable views
- Findings are in line with previous IPA research (Dizon, 2017; Moussalli & Cardoso, 2016; Tai & Chen, 2020)

2. What are Japanese EFL & L2 Japanese students' usage habits concerning Alexa for autonomous second language learning?

- Varies widely from learner to learner, with some giving 100+ commands in a given day
- More than half continued beyond five days of use



Summary

3. What strategies do Japanese EFL students use to resolve breakdowns in communication with Alexa?

- Abandonment (63%), Rephrasing (20%), Repeat (17%)
- In contrast to findings by Moussalli and Cardoso (2020) and Chen et al. (2020)
 - Observed and videorecorded

4. How accurate is Alexa at understanding L2 Japanese speech?

- Moderately accurate (understood 68% of commands analyzed)
- Higher than the 50% found in Dizon (2017)



Implications & Future Directions

- Implications

- Extend L2 speaking opportunities outside of the classroom
- Low-stress, fun environment; thus suitable for students with foreign language anxiety
- Students may need guidance/training for sustained L2 interaction with Alexa
 - Research on self-directed language learning through technology (e.g., Botero et al., 2020) illustrates the importance of learner training

- Future Directions

- Study the use of IPAs with learners of other less commonly studied L2s (e.g., Spanish, French, Chinese)
- Conduct empirical research involving IPAs for autonomous language learning




Thank you!



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