

OPPORTUNITIES AND CHALLENGES OF USING AMAZON ECHO IN EDUCATION

Neil Davie and Tobias Hilber
*South Westphalia University of Applied Sciences
 Lindenstrasse 53, 59872 Meschede, Germany*

ABSTRACT

This paper offers a first look at the opportunities and challenges for educators offered by the Amazon Echo smart speaker. As with all new technologies, educators have been quick to wonder how and if it could be adopted for use in educational contexts. Although at present most Amazon Echo and compatible devices need to be connected to mains electricity and are therefore relatively immobile, the Echo is designed to be switched on and left on permanently meaning that it conforms with the ubiquity often given as a defining factor of mobile learning. A review of articles as well as personal experiments will explore the possibilities Echo offers, especially with regard to language learning, and attempt to clarify whether it does offer teachers and students an additional value in the classroom. The issue of privacy is also discussed.

KEYWORDS

Amazon, Echo, Alexa, Language Learning, Skills

1. INTRODUCTION

The original Amazon Echo device was given a limited US-only launch in 2015 and has since become available in 36 countries, including Canada, the UK, Germany and Portugal. Described as a smart speaker, the Echo reacts to voice instructions, then uses Amazon's Alexa operating system to connect to Amazon's servers to make queries and carry out commands.

2. THE AMAZON ECHO

Since the launch of the original Amazon Echo, the product has expanded to include a whole range of different devices, as shown in Table 1. Amazon has also licensed the Alexa software so that other companies like Sonos and Harman Kardon have also launched Alexa-power devices, these tend however to be high-range smart speaker systems.

Table 1. Amazon Echo & Alexa Devices

Device	Price (US \$ - Feb 2018)	Features
Echo Dot	49.99	Wifi, small size
Echo (2 nd generation)	99.99	Wifi, larger speaker
Echo Show	229.99	Screen & camera
Echo Look	199.99	Camera, no screen
Amazon Tap	129.99	Battery, Bluetooth
Fire TV Stick	39.99	TV required
Fire Tablet	49.99-149.99	7, 8 or 10" tablet

2.1 Requirements

The Amazon Echo is an internet-connected smart device running the Alexa software. A compatible internet connection which the device can connect to by wifi is the first operating requirement. Unfortunately, the Enterprise network in our university was not compatible with the Echo Dot we tested. Furthermore, an Amazon account is required in order to setup, configure and use the device. This configuration is done using the Amazon Echo app installed on a compatible smartphone. During the setup process the user can select the language the Echo should use (which also affects the range of functions available) as well as the “wake word” – the spoken command which causes the device to come out of sleep mode and await your command.

2.2 Standard Alexa Skills

The programs or commands which Alexa can perform (like the apps on a smartphone) are called “skills”. Setting up the Echo with English as the chosen language brings a range of skills which can be used in the classroom. At its simplest, the Echo can perform classroom management tasks like setting a timer. The timer can be paused and when requested will say how much time is remaining. Alexa can also pick a number or flip a coin which could both be used to choose an activity or select student from a group. There are also built-in commands which could be of special interest to language learners. For example, Alexa can act as a dictionary by asking “Alexa, what is the definition of...?” a chosen word and the device will (attempt to) give an answer or by being asked “Alexa, how do you spell...?”. It is also possible to use the Echo as a thesaurus by asking “Alexa, what is a synonym for...?” the word of your choice. Additional skills for language learning are also available. Most commonly these are Flashcard-style services typically link to established sites like Quizlet or Chegg. In addition, an Echo device can also be used to play listening comprehension audio files or calming music for relaxation or quiet study time.

3. LITERATURE REVIEW

The review of articles on the use of Amazon Echo in education found that only Echo Dot and Echo devices have reportedly been put into use. Reasons for this could be the lower costs of the devices, the fact they have been available the longest, and that due to the lack of camera they do not cause as many concerns about privacy. Due to the smaller speaker the Echo Dot has been found to be more suited to a smaller classroom or when attached to an external speaker. The Echo (2nd generation) has a larger speaker and is loud enough to be used with no additional speakers. The articles found covered pre-school, school and higher education levels. Arias (2017) explored the possibilities of using Echo to help a five-year-old daughter learn English as a foreign language. The interaction with Alexa was exciting and fun, a sentiment also expressed by Ellis (2017) with regard to classroom use. In addition, the possibility to use Echo to replace routine classroom tasks like selecting pupils or practicing vocabulary in preparation for standard tests.

An important distinguishing feature of the Amazon Echo is the voice interface which means that no special control system or commands have to be learnt. Learningabledkids (2017) emphasize this as being a benefit for children with reading difficulties, for example, people with dyslexia and non-readers. Selak (2017) emphasizes that this simplicity allows first and second-grade students to have more control over their own learning and thereby free their teachers up to deal with more complicated tasks.

The very uniqueness of this device is however also identified as a weakness in several articles. Although Metz (2017) finds that even pre-kindergarten children now have access to huge amounts of information, the voice activation interface

“...can still be difficult even for the clearest-speaking adults, and young kids often don't enunciate that well”

Selak adds that managing expectations is an important factor in introducing the Echo to the classroom – the device will not be able to understand and answer all questions and students should not expect it to. In addition, there is presently no way to limit the content the device has access to or restrict what it does.

4. CUSTOM SKILLS

Amazon themselves have also identified the educational potential of Echo and Alexa. They even describe it as being a transformational technology. One of the first tutorials published by Amazon to encourage educational use provides a six-step model to develop a quiz application. This quiz allows educators, having created the necessary Amazon developer accounts, to copy and paste the Javascript code to create a quiz skill about the topic of their choice. The example skill is a quiz about the states of the US, their capitals and the year they joined the United States. In addition to acting as a quiz, the skill can also act as a reference work and give details when asked about a particular state.

Once the appropriate accounts have been created, reusing the existing code is a simple process. Providing a set of questions and answers already exist it is possible to create a fully-functional quiz within an hour. Apart from editing the text, an icon and skill description for the appstore are required. As a test, we adapted the sample to create a quiz about Scotland to use with students ahead of an excursion. The students all found using the Echo and the skill to be entertaining and different. As previous articles have suggested, especially for non-native English speakers, there were problems with the voice recognition which caused the skill to misunderstand an answer or judge a correct answer to be false. Students however adapted to this limitation and accepted it.

5. PRIVACY

Only one of the articles examined mentioned the topic of privacy (Simpson, 2017). In order to function correctly the Echo device has to be permanently switched on, connected to the internet and listening for its wake word command. According to Amazon it will only then become active. Security experts (Wueest, 2017, Stegner, 2018) have however raised concerns about this and the potential risk of the devices being abused by hackers too. There are also reports of Echo devices randomly speaking or of adding items to shopping lists without being asked to.

6. REVISING MODELS FOR EVALUATING TEACHING TECHNOLOGY

The prevalent models of technology acceptance, Davis's TAM (1989) and Venkatesh's UTAUT model (2003), include neither cost nor privacy which are now very real concerns for educators wanted to introduce new technologies into their classrooms. It would therefore seem wise to add these factors when considering the use of a device like the Amazon Echo. Both cost and privacy are relative factors which have to be considered in relationship to the perceived educational benefits of the device, see figure 1. If the lower cost Echo Dot device is acceptable for an institution then cost will play a less important role. If a more expensive model is required then the educational benefits would need to be higher to outweigh the negative concerns.

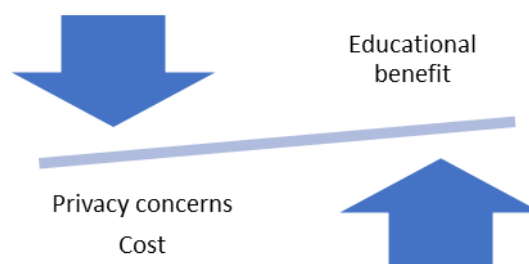


Figure 1. Teacher Considerations

7. CONCLUSION

The most fundamental requirement for using an Amazon Echo in the classroom is a functioning internet connection. The compatibility problems with Enterprise networks mean that for some schools this rules out the use of such devices. If a connection is available, the school, teacher, parents and pupils all have to be aware of the potential privacy issues regarding the use of such a device. The built-in and additional skills already available offer basic functions to both students and learners alike. The problems of speech recognition can present a challenge but they do also encourage students to think about their pronunciation and how human-computer interaction works.

Further scientific work will be required to establish the genuine and longer-term benefits of the Amazon Echo. However, the initial findings suggest it can be a useful addition to the classroom.

REFERENCES

- Alhadlaq, A. et al. 2017 *Privacy in the Amazon Alexa Skills Ecosystem*. <https://petsymposium.org/2017/papers/hotpets/amazon-alexa-skills-ecosystem-privacy.pdf>
- Amazon.com. 2018 *Alexa in education*. <https://developer.amazon.com/de/alexa/education>
- Amazon.com. 2018 *Build an Alexa Quiz Game Skill in Six Steps*. <https://developer.amazon.com/public/solutions/alexa/alexa-skills-kit/content/quiz-game-skill>
- Arias, C. 2017 *How I am improving my daughter's English skills using Amazon Echo*. <https://medium.com/@caioarias/how-i-am-improving-my-daughters-english-skills-using-amazon-echo-f5eeca3ce245>
- Blankenburg, J. 2017 *Technical Tutorial: Build an Alexa Quiz Game Skill Using Our New Template*. <https://developer.amazon.com/de/blogs/alexa/post/fa962f53-4d7e-47a2-933b-302b833d716c/technical-tutorial-build-an-alexa-quiz-game-skill-using-our-new-template>
- Davis, F.D. 1989 *Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology*. MIS Quarterly, Vol. 13, No. 3 (Sep., 1989), pp. 319-340. <https://www.jstor.org/stable/249008>
- Druga, S. et al. 2017 *"Hey Google is it ok if I eat you?" Initial explorations in child-agent interaction*. <https://www.media.mit.edu/publications/hey-google-is-it-ok-if-i-eat-you-initial-explorations-in-child-agent-interaction/>
- Ellis, B. 2017 *Alexa: Your new teaching assistant*. <https://www.tcea.org/blog/alexa-teacher-assistant/>
- Erin*tegration. 2016 *Using the Amazon Echo Dot and Alexa in the classroom*. <https://www.erintegration.com/2016/12/26/amazon-echo-dot-and-alexa-in-the-classroom/>
- Kim, J. 2017 *How the Amazon Echo Show Will Revolutionize Higher Education*. <https://www.insidehighered.com/blogs/technology-and-learning/how-amazon-echo-show-will-revolutionize-higher-education>
- Learningabledkids. 2017 *Amazon Echo enables your child's learning independence*. <http://learningabledkids.info/assistive-technology/amazon-echo-for-independent-learning/>
- Metz, R. 2017 *Growing up with Alexa*. <https://www.technologyreview.com/s/608430/growing-up-with-alexa/>
- Morris, K. 2017 *30 ways to use Amazon Echo Dot in the classroom*. <https://kaysemorris.com/30-ways-use-alexa-classroom/>
- Nazerian, T. 2017 *Amazon Pushes Echo Smart Speakers on Campus*. <https://www.edsurge.com/news/2017-08-28-amazon-pushes-echo-smart-speakers-on-campus>
- Selak, B. 2017 *Amazon Alexa in the classroom*. <http://www.coolcatteacher.com/amazon-alexa-classroom/>
- Simpson, J. 2017 *Amazon Echo in education?* <http://www.edugeek.net/blogs/simpsonj/2291-amazon-echo-education.html>
- Stegner, B. 2018 *7 Ways Alexa and Amazon Echo Pose a Privacy Risk*. <https://www.makeuseof.com/tag/alexa-amazon-echo-privacy-risk/>
- Venkatesh, V. et al. 2003 *User Acceptance of Information Technology: Toward a Unified View*. MIS Quarterly, Vol. 27, No. 3 (Sep., 2003), pp. 425-478. <http://aisel.aisnet.org/misq/vol27/iss3/5/>
- Warren, E. 2016 *30 ways the Amazon Echo can assist struggling learners*. <https://learningspecialistmaterials.blogspot.de/2016/02/30-ways-amazon-echo-can-assist.html>
- Wueest, C. 2017 *Everything You Need to Know About the Security of Voice-Activated Smart Speakers*. <https://www.symantec.com/blogs/threat-intelligence/security-voice-activated-smart-speakers>