

The Amazon Echo: A Usability Study

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Abstract

Background: The Amazon Echo is a home assistant device which allows people to interact verbally with online software tools or smart home devices and electronics. The purpose of this study was to test the usability of the device by conducting a variety of user-centered analyses. **Method:** Researchers performed a usability heuristics evaluation to gain an understanding of the system's features and functions from a top-down perspective. An Out of Box Experience (OOBE) was conducted to capture users' attitude of the device. Next, several tasks were performed which represent users' everyday interactions with these devices. Participants then completed the system usability scale (SUS) to rate their experience. **Results:** Time on task was measured to analyze quantitative data and participants were asked to rate the difficulty of each task. Preliminary results indicate a setup time of approximately five minutes. Microsoft product reaction cards were used to capture initial and post-trial reactions to the device. Easy to use and efficient are two common terms appearing in the participant's explanation of their feeling towards using the device. **Conclusions:** By collecting this information, our research team can paint an entire picture explaining benefits and flaws encountered by users and experts alike.

Step 1: SME Heuristic Evaluation

Heuristics Evaluation of [Amazon Echo]
By [Donald Ventrice] Date [2.8.2018]

- 1. Visibility of system status**
 - Always keeps users informed about what is going on. - **Partially, not terribly intuitive**
 - Provide appropriate feedback within reasonable time. - **Yes, 100%**

Evaluation
Shows that it's thinking-Blue light at top of device.
- 2. Match between system and the real world**
 - Speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. - **Very competent**
 - Follow real-world conventions, making information appear in a natural and logical order. - **Natural, doesn't sound too much like a computer voice, but questions must be asked in certain ways.**

Evaluation
Alexa seems competent, but doesn't know everything.
- 3. User control and freedom**
 - Users often choose system functions by mistake.
 - Provide a clearly marked "out" to leave an unwanted state without having to go through an extended dialogue. - **Satisfactory, easy return to menu**
 - Support undo and redo. - **Does not support redo, such as control-z**

Evaluation
Easy to set reminders.
- 4. Consistency and standards**
 - Users should not have to wonder whether different words, situations, or actions mean the same thing. - **Only one-way to ask questions.**
 - Follow platform conventions.

Evaluation
Can delete certain things via voice, but not everything vocally.
- 5. Error prevention**
 - Even better than good error messages is a careful design which prevents a problem from occurring in the first place. - **Responds with "Sorry, I can't do that"**

Evaluation
Does not indicate error, only says what it heard and responds "Sorry, I can't do that"
- 6. Recognition rather than recall**
 - Make objects, actions, and options visible. - **Only on app.**
 - User should not have to remember information from one part of the dialogue to another.
 - Instructions for use of the system should be visible or easily retrievable whenever appropriate.

Evaluation
Instructions only on app, not the device itself.
- 7. Flexibility and efficiency of use**
 - Accelerators -- unseen by the novice user -- may often speed up the interaction for the expert user so that the system can cater to both inexperienced and experienced users.
 - Allow users to tailor frequent actions.

Evaluation
Must learn the language to speak properly with Alexa.
- 8. Aesthetic and minimalist design**
 - Dialogues should not contain information which is irrelevant or rarely needed.
 - Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.

Evaluation
Very simple design to understand controls on the device. Could work against novice user.
- 9. Help users recognize, diagnose, and recover from errors**
 - Expressed in plain language (no codes)
 - Precisely indicate the problem
 - Constructively suggest a solution.

Evaluation
Clear when it doesn't know what/how to do something, but offers no constructive solution.
- 10. Help and documentation**
 - Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation.
 - Help information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.

Evaluation
If you ask a question and the answer is known, it will give you steps for completion.

Step 2: User's Tasks

Amazon Echo Usability Study - Tasks

Download and Connect
1. Scenario: You just purchased a new Amazon Echo unit.
Task: Download and connect the unit to the app.

Alarm
2. Scenario: You have an important meeting at 9:00 am tomorrow morning.
Task: Set an alarm at 7:30 am for that day. Once you have set the alarm go to the app to cancel it.

Reminder Set and Deletion
3. Scenario: You are going to work and need to remind yourself to pay your phone bill online.
Task: Use the Amazon Echo to remind you to pay your phone bill for tomorrow at 5:00 pm.

Reminder Set and Deletion
3. Scenario: You are going to work and need to remind yourself to pay your phone bill online.
Task: Once you have created the reminder using the Echo view the reminder in the app and change the time to 5:30 pm.

Reminder Set and Deletion
3. Scenario: You are going to work and need to remind yourself to pay your phone bill online.
Task: Set Alexa to send a push notification to your mobile device when your reminder is delivered.

Enable a Skill
4. Scenario: You are a well informed individual and enjoy listening to the news after you get off work.
Task: Enable your choice of a news skill.

News task:
5. Scenario: You have just gotten up and want to hear the latest news.
Task: Get the latest news. While Alexa is speaking, manually increase the volume (do not use voice command).

Mute Device
6. Scenario: You are listening to the news and do not want to accidentally activate Alexa.
Task: Mute the microphone on the device.

Voice Profile
7. Scenario: You want Alexa to distinguish between your voice and your roommates to keep him from accessing the unit.
Task: Have Alexa set your voice profile.

Change Wake Name
8. Scenario: You have a friend named "Alexa"
Task: Using the Alexa app, discover how to change the wake name.

Change Wake Name
8. Scenario: You have a friend named "Alexa"
Task: Change the wake word for the Echo from "Alexa" to "Computer."

Step 3: SUS

Please, rate the following statements indicating how much you either disagree or agree with them.

	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly Agree
I think I would like to use this system frequently.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I found the system unnecessarily complex.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I thought the system was easy to use.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think that I would need the support of a technical person to be able to use this system.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I found the various functions in this system were well integrated.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I thought there was too much inconsistency in this system.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would imagine that most people would learn to use this system very quickly.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I found the system very cumbersome to use.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt very confident using the system.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I needed to learn a lot of things before I could get going with this system.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Methods

- Out of box experience (OOBE)
 - Pre-study survey
 - Demographics
 - 10 Task - Random order
 - Adjective List
 - Post-study survey
 - System Usability Scale
- Participants**
- 5 participants (1 Female)
 - Median Age - 27
 - ERAU Graduate Students
 - 1 Participant owns an Echo Device

Results

- Average Setup Time - 5:17
- System Usability Scale - Perceived Ease of Use - Above Average
 - Median - 75.5 (SD = 9.91)
- Push Notification feature was difficult for users to interpret
 - Can not be performed via voice command
 - Does not provide feedback for task completion
 - No expectation where feature is located

Adjective List



Quotes

- "Certain lingo is confusing, such as Skills"
- "I don't even know where to begin with Push Notification"
- "Setup process is a breeze. Step by step"

Future Research

- Compare Echo against other smart home devices.
 - Google Home
 - Apple Homepod
- Test usability of connecting smart devices
 - TP Link - Connects electronics to Echo