

## Artificial Intelligence – High School

### Part I: Signing up for your AWS Educate account (60 minutes)

#### Preparation

##### Lesson Purpose

The purpose of this lesson is to introduce students to the cloud and AWS Educate. Students will review the definition of the cloud, dive into examples of the cloud, and understand the role of a cloud service provider.

##### Lesson Objectives

By the end of this lesson, students will be able to:

- Explain the difference between cloud computing and desktop computing.
- Define cloud services provider.
- Identify the role that the cloud plays in delivering data, information, or applications when given a scenario.
- Access each component of their AWS Educate account.
- Describe the capability of each component of their AWS Educate account

##### Materials

For this activity students will need access to:

- A device with internet connection
- AWS Educate account

#### Introduction

##### Cloud Computing Introduction

Cloud computing is the delivery of IT resources via the internet, with pay as you go pricing. Introduce students to cloud computing by showing them the following video:

[https://educatetogo.s3.us-east-2.amazonaws.com/228\\_WhatIsCloud\\_v04\\_NK\\_Review+\(1\).mp4](https://educatetogo.s3.us-east-2.amazonaws.com/228_WhatIsCloud_v04_NK_Review+(1).mp4)

[https://www.youtube.com/watch?v=Bzh3ETuvEZ4&list=PLhr1KZpdzukeS6Qhhu3vonwWtHQYZSG\\_n&index=20](https://www.youtube.com/watch?v=Bzh3ETuvEZ4&list=PLhr1KZpdzukeS6Qhhu3vonwWtHQYZSG_n&index=20)

After showing students the video, facilitate an introductory conversation of student understanding of the content using the following discussion questions:

- What is your interpretation of cloud computing?

- Have you interacted with the cloud or cloud computing before?
- What do you think a day without the cloud would look like?

Students have interacted with the cloud when they stream videos on their phone, download a new application, or use a cloud-based email service. They also may be familiar with cloud storage for their photos and music. These are all examples of technology (IT) resources being delivered via the internet. Without the internet, these actions would not be possible. A day without the cloud would mean a day without the services they access via the internet.

### AWS Educate

Cloud computing is the future for many industries, including computer science, which is why introducing these concepts to your students as a part of your course is so important and so exciting. 90% of companies are currently operating on the cloud, and cloud computing has been ranked as a top in demand skill by LinkedIn since 2014. This demand has created a great need for cloud skills in the marketplace...and there is opportunity in all industries.

AWS Educate provides cloud learning content and access to cloud computing tools, at no cost, to allow students around the globe to learn these skills. In their AWS Educate account, students have access to earn badges, learn about careers in the cloud, and build in the AWS Management console with the same tools used by companies around the world.

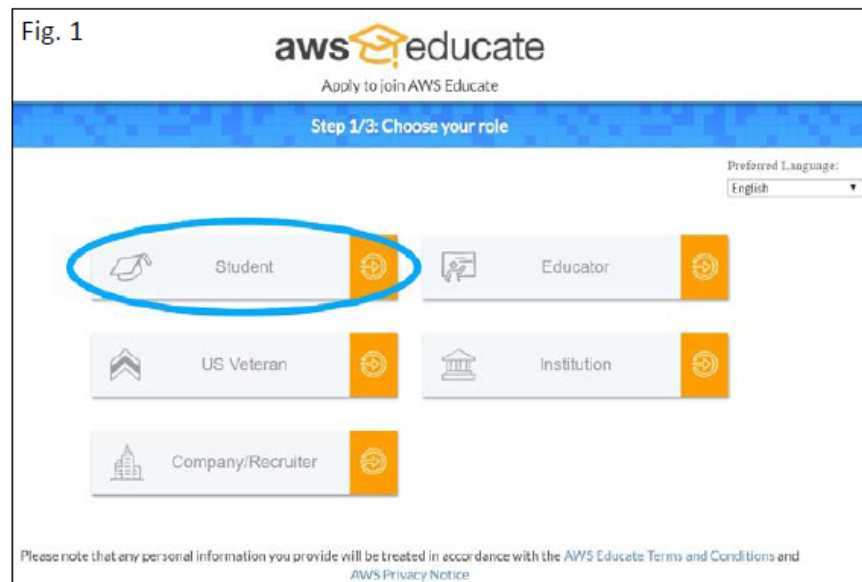
### Activity

#### Signing Up for AWS Educate

Students will now sign up for their AWS Educate account using the steps provided below. Once students have registered for their AWS Educate account, it may take up to 48 hours for the account to be approved. Once the account is approved, students can move forward with the next activity.

Step 1. Go to: <https://www.awseducate.com/Registration>

Step 2. Select **Student**.



Step 3. When filling out the application: enter your institution name, enter your institution-issued email address, and fill in the remaining fields.

Institution Name

Country

City (where your school is located)

State (where your school is located)

First Name

Last Name

Department

Email

Title

Course Level

Course Numbers and Name

Link to class or school biography

Specialty

Promo Code

I'm not a robot

NEXT

Step 4. After completing the CAPTCHA, you will be asked to choose an account type. **Select Educate Starter Account.**

aws educate

Apply to join AWS Educate

Step 3/3: Choose one of the following

Click here to enter an AWS Account ID

Click here to select an AWS Educate Starter Account

NEXT

AWS Educate is Amazon's program to help students learn real-world cloud technology skills before graduating. It provides students and educators with the resources needed to accelerate cloud-related learning.

Step 5. After selecting **Next**, review the FAQs: <https://www.awseducate.com/faqs?app=2>.

Step 6. Open the link sent to your email to accept the AWS Educate terms and conditions and verify your email address.

Step 7. After completion, you will be redirected to a “Thank you!” page, confirming your application has been submitted and is under review. Applications are reviewed within 24 to 48 hours.

### Using AWS Educate with Amazon Comprehend

Now that you have your Educate account, let's get building in the cloud. Your AWS Educate account gives you access to cloud tools to develop technologies just like developers at some of the biggest and most innovative companies around the world. In this starting activity, you'll get to build in the cloud using artificial intelligence tools, and get your first try at cloud computing.

Cloud computing enables the development and delivery of exciting, groundbreaking technology resources. Artificial intelligence is one the fastest growing, and most innovative fields of technology supported by cloud computing.

Begin a discussion with students about artificial intelligence with the following discussion questions:

- When you hear the words artificial intelligence, what comes to mind?
- What do you currently use or know of that uses artificial intelligence technology?
- Artificial intelligence is often talked about in a futuristic manner. How can you see machines replacing human behaviors in the future?

Amazon Alexa is an example of artificial intelligence readily available in homes today. Show the following video to students as an example of the capabilities of artificial intelligence technologies such as Alexa:

[https://www.youtube.com/watch?v=8y-1h\\_C8ad8](https://www.youtube.com/watch?v=8y-1h_C8ad8)

Amazon Comprehend is an example of artificial intelligence available to developers today, and available to your students using their AWS Educate account. In this activity, you will introduce the Amazon Comprehend service and walk students through the use of the service in a lab activity.

Introduce Amazon Comprehend as an artificial intelligence powered service that makes it easy to find insights and relationships in text. Amazon Comprehend uses machine learning to analyze text to automatically identify the language of the text, extract key phrases, places, people, brands, or events; understand positive or negative sentiment; and automatically organize a collection of text files by topic.

To get started with the lab activity, students will need to access their AWS Educate account. Once students have logged into their AWS Educate account, they should proceed with the following steps:

- In your AWS Educate account, select **AWS Account** in the top blue banner of the web page
- If this is your first time accessing AWS Educate, read and agree to the Terms and Conditions
- Click the **AWS Console** button to access the AWS Management Console

Students are not viewing the AWS Management console. This is the same console experience that Netflix developers view when creating new technologies. The console is a library of development resources and services. Today, students will use the Amazon Comprehend service to analyze a body of text for insights and relationships.

- In the AWS Management Console, search for the service Amazon Comprehend using the search bar
- Click **Amazon Comprehend** when it appears in the search function
- On the Amazon Comprehend launch page, select the orange **Launch Amazon Comprehend** button

Students are now seeing the Amazon Comprehend dashboard. In this dashboard, developers have access to the different options within Comprehend. There are options for real time analysis, medical record analysis, and customization. For this activity, students will use Real Time Analysis.

- In the Amazon Comprehend dashboard, select **Real Time Analysis**
- In the Input Text box leave the Analysis Type set as Built-in
- Sample text is provided in the text box. For the first use of this service, leave the text provided
- Click the orange **Analyze** button

Once the text has been analyzed, you can scroll to see the analysis of the text at the bottom of the dashboard. Amazon Comprehend has identified key words and categorized them. By changing to the Sentiment tab you can see the analysis of emotion in the text. This passage was rated as neutral. Give students a moment to explore the other data available for this passage. Ask the following questions in a mid activity discussion:

- What data were you able to see for this passage?
- How is this data useful to you?
- How could this data be used by a company?

Students will now use Amazon Comprehend to analyze their own text. In the dashboard, students should take the following steps:

- In the Amazon Comprehend dashboard, leave the analysis type as Built-in
- In the Input Text box, type a passage of your choice
- When you are finished typing your passage, click the orange **Analyze** button
- Once the text has been analyzed, review the results of the analysis by scrolling to the next section of the page.

Allow students time to experiment with different passages, encouraging them to discover different analytics for different types of text.

Artificial intelligence technologies are helping to invent the future of interactions between humans and machines. Innovations such as Amazon Comprehend bring lifelike features to technology, like the ability to analyze text and speech. To conclude the activity, ask the students the following discussion questions:

- How did the insights of your text change with different passages?
- Did you agree with the insights about your text that Amazon Comprehend provided?
- How can you see this technology being used in the real world?

If time allows, after discussing the service, review the customer use cases on the AWS website with students here and explore how these services are being used today:

<https://aws.amazon.com/comprehend/customers/>

## Part II: Using the Cloud (60 minutes)

### Preparation

#### Materials and Resources

For this course you will need the following materials and resources:

- Student Devices
- Internet connection – if possible, connect devices prior to student use
- AWS Educate Account
- Cloud Video: [https://s3.amazonaws.com/summitimagesmogrimes/What+is+the+Cloud\(2\).mp4](https://s3.amazonaws.com/summitimagesmogrimes/What+is+the+Cloud(2).mp4)
- Amazon Alexa Super Bowl Commercial: [https://www.youtube.com/watch?v=8y-1h\\_C8ad8](https://www.youtube.com/watch?v=8y-1h_C8ad8)
- Amazon Lex Service video: <https://www.youtube.com/watch?v=d3LYINqfuzI&feature=youtu.be>

#### Lesson Purpose

The purpose of this lesson is to introduce students to cloud computing by providing hands-on activities with the AWS Console. Students should leave this lesson feeling excited about the future of technology and their ability to be a part of it. The lesson should be upbeat and focused on how cool the cloud is!

#### Lesson Objectives

By the end of this lesson students will be able to:

- Identify cloud services used to build artificial intelligence applications.
- Explain how the cloud enables artificial intelligence.
- Define the key components of a chatbot: utterance, intent, confirmation, and prompt.
- Use Amazon Lex to create a custom chatbot for users to order pizza.

### Introduction

You may know Amazon as an online retailer that sells everything from books to games to electronics. Amazon is also leading the way in cloud computing through Amazon Web Services. Amazon Web Services provides tools to create innovative technology in the cloud. The cloud, or cloud computing, is the on-demand delivery of IT resources via the internet. These resources are the tools needed to build applications, store and access data, and even build online games.

#### What are Amazon Web Services and AWS Educate?

Amazon Web Services, or AWS, is a cloud computing service provider. This means that we provide services that help people store data, access data, and build applications in the cloud....all that you need is an internet connection. The coolest part? You can access it too, with your AWS Educate Account.

Your AWS Educate account gives you access to earn many different badges about cloud computing and other cloud technologies. It also gives you access to your AWS Educate Starter Account so that you can

build in the cloud at any time with no cost. Today we're going to use the cloud to explore and build technology in the cloud.

When we talk about technology of the future, artificial intelligence immediately comes to mind. Robots, smart home appliances, and smart devices like Amazon Alexa enable us to look at how technology is used in our daily life in a whole new way. When I say those words, "artificial intelligence," what do they mean to you?

Artificial intelligence, by definition, is the capability of a machine to imitate intelligent human behavior. Amazon Alexa is a great example of how Amazon is putting artificial intelligence in the homes of people around the globe. Alexa is the artificial intelligence behind the Amazon Echo smart devices. Amazon Alexa is a conversational voice-enabled technology that allows you to ask questions, access media, and control other devices. The capabilities of artificial intelligence are rapidly expanding – let's take a look at an Alexa video to start thinking big about what artificial intelligence could look like in the future.

**Play Video:** [https://www.youtube.com/watch?v=8y-1h\\_C8ad8](https://www.youtube.com/watch?v=8y-1h_C8ad8)

## Activity

### Amazon Lex

AWS offers a service called Amazon Lex that allows users to develop conversational chat bots using Amazon Alexa technology. Amazon Lex uses natural language understanding to recognize the intent of text, which allows for lifelike conversations. Let's watch a short video about Amazon Lex and how people are using it today!

**Play Video:** <https://www.youtube.com/watch?v=d3LYINqfuzI&feature=youtu.be>

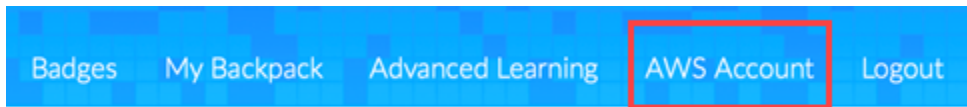
Amazon Lex can be used for all sorts of interactions including commands, questions, and controlling other devices. What could you imagine using Amazon Lex for?

Let's start building our chatbot! Follow along closely with the instructions. We will walk through the steps of getting set up together, and then you'll have the chance to build your chatbot on your own.

Project the steps on the screen using the teacher computer. Model each step for the students using the teacher computer and projector.

Step 1. Log in to AWS Educate.

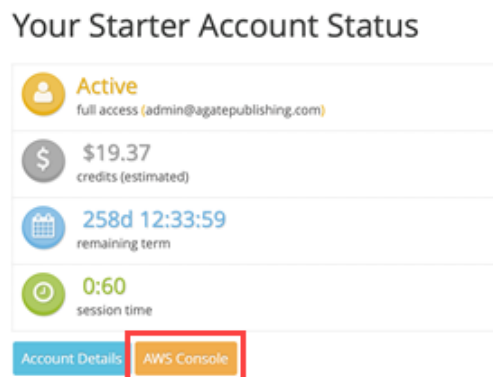
- Go to [awseducate.com](https://awseducate.com).
- Log in to your AWS Educate starter account.
- Click Login to AWS Educate and sign in using your AWS Educate account.
- Students should have an AWS Educate login from the "Introduction to AWS Educate" module. If not, please review that activity and create an account.
- Once logged in to the AWS Educate portal, select **AWS Account**.



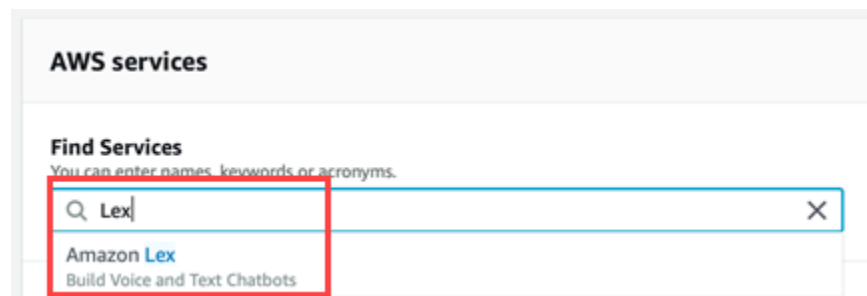
Step 2. On the new screen, select **AWS Educate Starter Account** in the center of the screen.



Step 3. On the next new screen, click on **AWS Console**.



Step 4. Navigate to Amazon Lex. Click the search bar and search for and then click **Amazon Lex**.



The Amazon Lex product page will now be displayed. This page provides more information about Amazon Lex. Read the Amazon Lex description above the Get Started button on the bottom of the page as a class.



Review the key vocabulary:

- Intent: The intent is the goal that the user wants to achieve. “Why did I start this chatbot? What do I want the chatbot to be able to do?”
- Utterances: These are phrases that the user types or speaks to the chatbot. For example, “Alexa, what’s the weather? Alexa, what time is it?”
- Prompts: These are questions the chatbot will ask the user to gather more information. For example, if you ask Alexa what the weather is, she will need to know where you are.
- Slots: These represent data the user provides to the chatbot in response to prompts.
- Confirmations: These confirm the information the user has input; each typically requires a yes/no response from the user.
- Fulfillment: This is the logic needed to complete the intent.

Click the **Get Started** button.

Step 5. Set up your chatbot. Click **Custom Bot** on the left side of the main menu. Name the bot OrderPizza. (Note: There are no spaces in the name.) Make the following initial settings:

- Select **None** for voice output. Students can change this later on their own if they so choose.
- Select **5 Minutes** for the session timeout. This is how long the bot should wait before ending the chat session.
- Select **No** under “COPPA: Please indicate if your use of this bot is subject to the Children’s Online Privacy Protection Act (COPPA).” (Note: We are not creating a bot that will gather private information on children younger than 13.)
- Click the blue **Create** button.

Step 6. Create your first intent.

- Click the blue + Create Intent button.

## Getting started with your bot

Welcome to your bot editor. You can start



- A new pop-up window will appear.

Add intent ×

[+ Create intent](#)

[↑ Import intent](#)

[🔍 Search existing intents](#)

[Cancel](#) [Add](#)

- Click **+ Create intent**.
- Title the intent OrderPizza (no spaces).
- Click the blue **Add** button.

Create intent ×

Give a unique name for the new intent

OrderPizza

[Previous](#) [Add](#)

Step 7. Build your utterances. These are phrases the user will use to start the conversation with the chatbot. Think about what the intent means. Use those brainstorm as we build utterances, slots, and fulfillments.

Type the following utterances:

- I'd like to Order Pizza
- I want pizza
- Pizza Please

▼ Sample utterances ⓘ

I'd like to Order Pizza | +

I want pizza ×

Pizza Please ×

Step 8. Build your first slot.

- Look at the left side of the console in the editor. Click + next to Slot types.

Intents +

OrderPizzaNew

Slot types +

No slots created

- Click + **Create slot type**.

Add slot type ×

+ Create slot type

↑ Import slot type

Cancel Add

- Title the slot PizzaType (no spaces).

- Describe the slot as Types of pizza.

### Slot type name

PizzaType

### Description

Types of Pizza

- Keep the default Expand Values selected.

### Slot Resolution

- Expand Values ⓘ
- Restrict to Slot values and Synonyms ⓘ

- Add additional values in the Value section by hitting the + sign to add additional rows. These are the different types of pizza users can order.

### Value ⓘ

Pepperoni	<input type="text"/>	<input checked="" type="checkbox"/>
Cheese	<input type="text"/>	<input type="checkbox"/>
Sausage	<input type="text"/>	<input type="checkbox"/>
Veggie	<input type="text"/>	<input type="checkbox"/>

- Cheese
- Pepperoni
- Veggie
- Chicken
- One or two more types of pizza
- Click **Add slot to intent**.

**Add slot to intent**

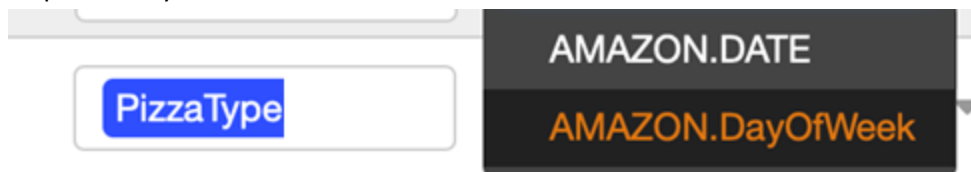
You should see your slot added to the intent under the slot heading in the dashboard as slotOne.

- Click in the box with slotOne to rename this PizzaType (no spaces).



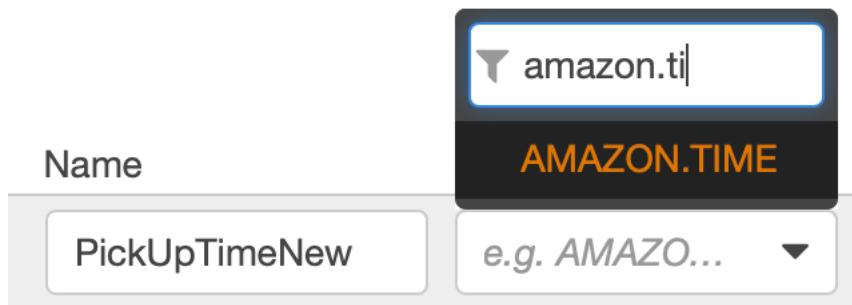
- Change the prompt from “What city?” to “What type of pizza would you like?” This is telling the chatbot to ask the user what type of pizza they would like when they type the original utterance.

Step 9. Build your second slot.



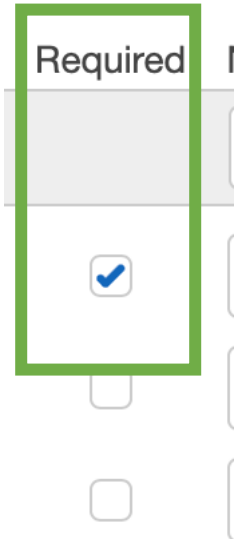
- Scroll down on the screen to see your first slot.
- In the gray box above your first slot, type a new title for your second slot.
- Title the slot PickupDate (no spaces).
- Select the dropdown menu under **Slot Type**.
- Scroll down to choose **AMAZON.DATE** from the dropdown menu. You can also search.
- Type the prompt “When would you like your pizza?”
- Click the blue + button at the end of the row to add the slot.

Step 10. Build your third slot.



- Scroll down on the screen to see your first slot.
- In the gray box above your first slot, type a new title for your third slot.

- Title the slot PickUpTimeNew (no spaces).
- Choose AMAZON.TIME from the dropdown menu.
- Type the prompt “What time would you like to pick up your pizza?”
- Click the blue + button at the end of the row to add the slot.
- Make all three slots required by clicking the Required checkbox next to each slot.



Step 11. Create a confirmation prompt. This lets the user know that the action they have requested has been completed.

- Scroll down under Slots to the Confirmation prompt section.
- Select the checkbox next to Confirmation prompt.

### ▼ Confirmation prompt ⓘ

Confirmation prompt

- Use the names of the slots you created: PizzaType, PickupDate, and PickupTime.
- Type “Is this correct: you would like to order {PizzaType} pizza on {PickupDate} at {PickupTime}?”

▼ Confirmation prompt ⓘ

Confirmation prompt

Confirm

Is this correct: you would like to order {PizzaType} pizza on {PickupDate} € ⚙

Cancel (if the user says "no")

Ok, your pizza order is cancelled. ⚙

*Note: Be sure to type the slot names exactly as they are typed in the slots section. All words, capitalizations, and spacings must match exactly between confirmation and slots.*

- Set the "No" answer to a response of Ok, your pizza order is cancelled.

▼ Confirmation prompt ⓘ

Confirmation prompt

Confirm

Is this correct: you would like to order {PizzaType} pizza on {PickupDate} € ⚙

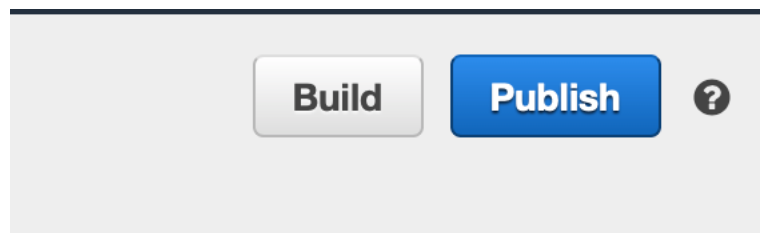
Cancel (if the user says "no")

Ok, your pizza order is cancelled. ⚙

- Leave all other settings at their defaults.
- Save your intent by clicking **Save Intent** at the bottom of the screen.

**Save Intent**

- Build your bot by clicking **Build** in the upper-right corner.



The build process could take a minute.

Step 12: Test your bot.

- Click Test Chatbot on the far-right side of the screen—a new side pane will open to test the bot.
- Have a partner test your bot by typing in the new side pane.
- Note:
- Be sure to type out the entire date (for example, May 31, 2019).
- Be sure to type out the time (for example, four p.m. or noon).

Be aware of these troubleshooting tips and tricks:

- Be sure to save each slot and intent immediately, or the data will be lost.
- The confirmation command must have slots typed exactly as they are in slots. Be sure all words are consistent in upper- and lowercase letters and spacings.

### Class Reflection and Conclusion

Debrief the activity by discussing the following questions with the students:

Today you invented an AI-powered chatbot that made it easier to order a pizza. You were able to do this by using Amazon Lex and the cloud.

- What was the easiest part of the creation process?
- What was the most difficult?
- How else could we have used Amazon Lex today? What other chatbots could we have created to help solve a problem?
- What problems would you like to see artificial intelligence help solve in the future?
- Are there any other questions or thoughts about AI or Amazon Lex?