# TECHNOChatbot AI

# **Teacher Guide**

Lessons for Middle & High School Students | Grades 8 - 12



# Technology Project using Scratch and Bot Libre

Design chatbots to answer questions and simplify tasks.

In this project, students become chatbot developers. They use both Scratch coding and a free bot-builder to design chatbots that improve the lives of others. To start they explore the practical applications of this AI technology and how it eliminates mundane, repetitive tasks. Once familiar with the possibilities of natural language processing, they design their own bots. First, they build a simple rule-based chatbot for an event that can answer attendees' questions using keyword matching. Next, they code a transactional chatbot that can do one job, which is take a customer order for a school fundraiser. Finally, they train a conversational chatbot to act as a virtual agent for an organization. It will answer questions, give directions, provide contact details, and more. Optional challenges explore the history of chatbots, large language models such as Chat GPT, and chatbot analytics.



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#### TechnoChatbot AI Overview

#### Introduction to TechnoChatbot AI

In this project, students become chatbot developers. They use both Scratch coding and a free bot-builder to design chatbots that improve the lives of others. To start they explore the practical applications of this AI technology and how it eliminates mundane, repetitive tasks. Once familiar with the possibilities of natural language processing, they design their own bots. First, they build a simple rule-based chatbot for an event that can answer attendees' questions using keyword matching. Next, they code a transactional chatbot that can do one job, which is take a customer order for a school fundraiser. Finally, they train a conversational chatbot to act as a virtual agent for an organization. It will answer questions, give directions, provide contact details, and more. Optional challenges explore the history of chatbots, large language models such as Chat GPT, and chatbot analytics.

#### Students complete the following tasks:

- In session 1, students explore the practical applications of chatbots. They chat with real business bots to critically examine strengths and limitations. Later, they prepare to create their own chatbots by registering for a Scratch account. This will be used in upcoming Sessions to build an event and order chatbot. To extend learning, an optional activity provides insight into key historical moments in chatbot development.
- In session 2, students build a chatbot for an upcoming school event using Scratch coding. It could be a prom, school dance, spirit day, talent show, or retirement party. The chatbot will answer attendees' questions. To make the bot appear intelligent, it uses if-then logic and keyword matching. Upon completion, students evaluate their chatbots' limitations. An optional activity about artificial intelligence expands students' knowledge of large language models.
- In session 3, students create an order chatbot using Scratch coding. It is a transactional chatbot, which can do one action. It will simplify the task of taking school fundraiser orders for items such as hats, cookies, or flowers. Just like a real salesperson, the bot will ask questions to help the customer make purchasing decisions. It will store their answers in a list. At the end of the conversation, the customer will be able to edit and then submit their order. This task expands students' knowledge of the practical applications of chatbots. In addition, it also introduces the use of lists, if-else logic, and broadcasting. An optional activity for using a chatbot to create a support ticket develops a deeper understanding of how this technology can be used to automate tasks.
- In session 4, students use the bot-builder app, Bot Libre, to design a virtual agent for a school or an organization. It will provide help to a new student or member. The chatbot will use natural language processing to answer common questions, provide directions, connect a user to information sources, and more. To start, they select a topic such as a local drama club, sports team, or art class. Next, they create a bot and then chat with it to discover what it does and does not know. Afterwards, they select an animated avatar and voice that will appeal to users. An extension activity emphasizes the need to be a responsible digital citizen by examining the Bot Libre terms of use and privacy policy.

- In session 5, students train their virtual agent to increase its intelligence. To start, they view pre-programmed responses to verify the chatbot's existing knowledge base. Next, they add a new greeting and modify default responses to make the bot friendly and helpful. The training continues by adding questions and answers for common requests such as directions and contact information. Students then share their chatbot with a friend to test the design. They analyze the conversation to improve responses. An extension activity explains how to import data into the chatbot to increase its ability to correctly reply to users.
- In session 6, students deploy their virtual agent. To prepare they use a checklist to verify that the chatbot can complete essential tasks. Once they are certain it is ready to use, they share their bot. This allows new members or students to get the information they need about an organization. An extension activity explores the importance of analytics in chatbot development.

# Implementation and Technology Integration Ideas

TechnoChatbot AI has 20 assignments divided into six Sessions. In TechnoChatbot AI, students become chatbot developers. They build chatbots using Scratch coding and the free bot-builder, Bot Libre. Each task requires students to apply computational thinking to design a bot that can mimic the flow of a real conversation. The activities are designed to provide an understanding of the practical applications of chatbots. Moreover, this project is a fun exploration of the power of artificial intelligence and natural language processing.

#### **Ideas for Implementation**

- Artificial Intelligence Unit: Natural language processing (NLP) is a type of artificial intelligence. It allows a computer to understand text and spoken language. Students explore the power of this technology throughout TechnoChatbot Al. However, it isn't until Sessions 4-6, when students use the bot-builder, Bot Libre, that they apply NLP to train a bot. If your time is limited, Assignments 1-2 and the Session 1 Extension Activity offer a simple introduction to how chatbots use artificial intelligence. You can explore large language models such as Chat GPT in the Session 2 Extension Activity.
- Computer Science Class: If you are interested in teaching coding skills, Sessions 2-3 uses Scratch blocks to build scripts. Students combine logic, variables, lists, and operators to design bots that can interact with a user. Please note, in the real world, Scratch is not used to design chatbots. However, the program can help students to think like chatbot developers using a program that is familiar.
- Digital Citizenship Outcomes: Developing chatbots requires students to join the Scratch community and create a Bot Libre account. Both platforms have guidelines that must be followed to remain a member. Behaving as a responsible digital citizen is essential. This is especially true when using Bot Libre, as it is available for a mature audience as well as teens. If you are teaching digital citizenship the Session 3 Extension Activity focuses on intellectual property and copyright. The Session 4 Extension Activity places a focus on terms of use and privacy.
- Workshop Series: If you are running a workshop series as part of an after-school program
  or community event, then you will need to select assignments from TechnoChatbot AI
  that fit the number of classes offered. Also, consider the age range and abilities of
  students. For younger students complete Sessions 1 to 3 to build two unique bots using
  Scratch. Alternatively for older students complete Assignments 1,2, and Session 4-6 to
  create an animated avatar using Bot Libre.

#### **Technology Integration Suggestions**

The TechnoChatbot AI project is primarily a STEM project about chatbot development and artificial intelligence. However, the activities also integrate into other areas of curriculum including computer science, information technology, data analysis, business studies, and araphic design.

- Computer Science: TechnoChatbot Al introduces programming concepts in Sessions 2-3. This project is not an introduction to Scratch. Instead, students use conditional logic to trigger output, operators for keyword matching, variables to store input, lists to manage user data, and broadcasting to control the flow of scripts.
- Information Technology/App Development: Building a chatbot is an introductory activity to building Al apps. Throughout the project students must apply logical thinking and problem-solving skills to predict what a user might ask. They then fine-tune the chatbot to improve its responses. As well, to create a positive user experience, they empathize with the user and adjust the design based on this perspective. These are transferrable skills to other app development tasks.
- Data Analysis and Problem-Solving Activity: The Session 6 Extension Activity has students study a graph and table that summarize chatbot analytics. Data includes total conversations, default responses, and confidence. Questions guide them to identify specific information as well as recommend how chatbot developers should use this data to improve a bot.
- Business Studies Course: TechnoChatbot AI focuses on the practical applications of
  artificial intelligence to reduce mundane tasks. It is a hands-on way to explore how
  chatbots can help businesses become more efficient while improving customer
  relationships. A strong emphasis is placed on recognizing the needs of the end-user.
- Graphic Design: Session 3 has students design an order screen for a chatbot using the Scratch paint editor. This task simulates the content a website landing page or an ecommerce app would require for a fundraising campaign. The focus is on developing a viable design solution that considers restrictions such as the placement of the input box and order list.

# **Scheduling Assignments**

How long does it take to teach TechnoChatbot AI?

Several factors influence the amount of time it takes to teach. Most notably:

- existing student knowledge and skills,
- whether the task is completed independently or as a class discussion,
- length and frequency of classes,
- whether reviews, skill reviews and extension activities are included.

#### **Suggested Timeline**

TechnoChatbot AI  It could take 3-4 weeks to complete if your students attend class daily for 90 minutes, <i>and</i>	Timing (1 class=90 minutes)
you select several reviews, skill reviews and extension activities to complete.  Session 1 Introduction to Chatbots	1-2 classes
Assignment 1: What is a Chatbot?	45 minutes
Assignment 2: Explore Chatbots in the Real World	45 minutes
Assignment 3: Prepare to Build Chatbots with Scratch	45 minutes
Session 2 Design an Event Chatbot	2 classes
Assignment 4: Plan the Event Chatbot	30 minutes
Assignment 5: Build an Event Chatbot	60 minutes
Assignment 6: Deploy the Event Chatbot	45 minutes
Assignment 7: Evaluate the Event Chatbot	45 minutes
Session 3 Create an Order Chatbot	2-3 classes
Assignment 8: Plan an Order Chatbot	45 minutes
Assignment 9: Design the Order Screen	45 minutes
Assignment 10: Build the Order Chatbot	45 minutes
Assignment 11: Confirm Customer Order	45 minutes
Assignment 12: Collaborate to Test the Chatbot	45 minutes
Session 4 Design a Virtual Agent	2 classes
Assignment 13: Plan a Virtual Agent	45 minutes
Assignment 14: Register for a Bot Libre Account	45 minutes
Assignment 15: Build a Virtual Agent	45 minutes
Session 5 Train the Virtual Agent	2 classes
Assignment 16: Train Your Chatbot to be Helpful	45 minutes
Assignment 17: Train Your Chatbot to be Knowledgeable	45 minutes
Assignment 18: Test Your Chatbot, Then Train It More	45 minutes
Session 6 Deploy the School Assistant	1 class
Assignment 19: Virtual Agent Checklist	45 minutes
Assignment 20: Share Your Virtual Agent	45 minutes
	10-12 classes 900 minutes

#### How Can I Reduce the Number of Classes?

What if you do not have 10-12 classes (900 minutes)? Below are some suggestions:

- 1. **Focus on concept only**. Assignments 1-2 and the Session 1 and 2 Extension Activities introduce the practical application of chatbots and artificial intelligence.
- 2. **Build a simple rule-based chatbot only**. Assignments 4-7 apply Scratch coding blocks to build a basic chatbot that answers event attendees' questions. It uses keyword recognition to match a user's input to a response. This task has students think like a chatbot developer to predict user questions. It is a fun, simple activity for beginners.
- 3. **Build a transactional chatbot only.** Assignments 8-12 apply Scratch coding blocks to build a bot that records customer orders for a school fundraiser. It uses a dialog flow to sequence questions. This task has students consider how a chatbot can do a repetitive task with fixed steps. It is a more complex task that requires a higher level of thinking.
- 4. **Build a conversation chatbot only.** Assignments 13-20 use a bot-builder to create an animated avatar that acts as a virtual agent for an organization. They train the chatbot to answer common questions, provide directions, and connect users to helpful resources. This task mimics that role of a chatbot developer from design to deployment. It is ideal for students that have strong digital citizenship and computational thinking skills.

#### How Can I Increase the Number of Classes?

What if I have more than 10 classes (900 minutes)? Or, what if your students are progressing at different rates and you need to differentiate instruction? Below are some suggestions:

- 1. **Assess learning using reviews.** Assign quizzes to evaluate knowledge of chatbots.
- 2. **Consolidate learning using skill reviews.** Provide practice activities that expand students' knowledge of chatbots. For example, students can develop bots that give cafeteria recommendations, generate support tickets, play games, and more.
- 3. Enrich knowledge of chatbots using extension activities. Challenge your students with activities that develop a deeper understanding about chatbots. There are tasks to learn about the history of chatbots, as well as the practical application of large language models. In addition, many extension activities improve bot development by exporting user data, importing a response list, and studying chatbot analytics.



# Session 4 Design a Virtual Agent

In this session, students use the bot-builder app, Bot Libre, to design a virtual agent for a school or an organization. It will provide help to a new student or member. The chatbot will use natural language processing to answer common questions, provide directions, connect a user to information sources, and more. To start, they select a topic such as a local drama club, sports team, or art class. Next, they create a bot and then chat with it to discover what it does and does not know. Afterwards, they select an animated avatar and voice that will appeal to users. An extension activity emphasizes the need to be a responsible digital citizen by examining the Bot Libre terms of use and privacy policy.

Assignment 13: Plan a Virtual Agent

Assignment 14: Register for a Bot Libre Account

Assignment 15: Build a Virtual Agent

Session 4 Review: About Conversational Bots

Session 4 Skill Review: Make a Game Bot

Session 4 Extension Activity: Be a Responsible Digital Citizen

# Assignment 13 Plan a Virtual Agent



You are going to design a virtual agent for your school or an organization. It will provide help to a new student or member.

You will use Bot Libre, a free bot-builder, to create your virtual agent. It will answer common questions, give directions, provide contact details, and connect a user to helpful information.

The chatbot will use an animated avatar to create a presence on a website, blog, or social media page. It will speak to visitors.

Before you begin, read about conversational chatbots and artificial intelligence. Afterwards, answer the questions to organize your ideas for your own bot.

#### What Is a Conversational Chatbot?

A conversational chatbot can mimic the flow of a real conversation. It uses **natural language processing**, which is a type of artificial intelligence to speak or write in a way that seems human. The chatbot has scripts that allow it to recognize the pattern of the words, decode their meaning, understand the context, and then provide an appropriate response.

#### How Does a Conversational Chatbot Work?

A conversational chatbot:

- 1. waits for a user to ask a question or make a request.
- 2. decodes the meaning of the input.
- 3. checks its knowledge base to find a correct response.
- 4. provides an appropriate reply that sounds like a real person.
- 5. informs the user it does not understand when it lacks confidence in its reply and is unsure.



Conversations are stored in a log. This allows the chatbot developer to notice when the bot is confused and cannot provide help. When this happens, the chatbot receives training to improve its responses. Over time, the chatbot can become quite intelligent.

#### Why Use a Conversational Chatbot?

Conversation chatbots are used to help people in real time. With a chatbot:

- customers can instantly get answers to their questions.
- customers do not need to waste time searching a website trying to find answers.
- employees no longer answer the same requests over and over again.
- businesses can send customers directly to a web page that has relevant information.
- businesses can provide customers with helpful resources such as a map or price list.
- businesses can connect with customers any time of day.

#### Plan a Virtual Agent

You are going to design a virtual agent for your school or an organization. It will provide help to a new student or member. It will be able to answer questions, provide directions, and more!

Think like a chatbot developer. Visit the group's website or social media page. Read their frequently asked questions or posts. What do people want to know?

1.	What organization will your chatbot help?	

Where are you a member or student? Is there a place you want to join? What are your hobbies or interests?

2. What is the URL of their website, blog, or social media page?



- 3. List three more questions a user might ask. Underline the keyword.
  - What is your address?
  - Who should I contact?

•

•

4. a. Where is the school or organization located?

Address:

b. Use Google Maps to find the location: https://www.google.com/maps/

 $\square$  Save a screenshot of the **map**.

#### Ideas:

sports team band robotics contest art classes chess club dance committee school council math league yearbook theatre group guitar lessons spelling bee summer camp code challenge science fair poetry corner

- 5. a. Who or how should a person contact the school or organization? (For example: name, phone number, or email)
  - b. If available, find a link to an online contact form or staff directory.

# Assignment 14 Register for a Bot Libre Account

You will create a virtual agent that will be an animated avatar that can chat with new students or members. To design it, you will use Bot Libre, which is a free bot-builder. A **bot-builder** is an application that allows user to create chatbots without knowing programming.

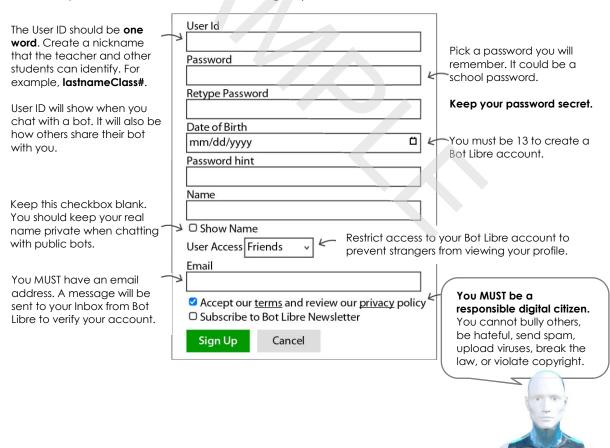
Many companies use bot-builders because they have features that make them simple to use. Plus, they easily embed the bot onto a website, blog, or social media page.

In this assignment, you will register for a Bot Libre account.



#### Sign Up for a Bot Libre Account

- 1. a. Visit <a href="https://www.botlibre.com/">https://www.botlibre.com/</a>
  - b. Click Sign Up. Sign Up
  - c. Complete the fields and then click Sign Up.



**IMPORTANT:** An email will be sent to your Inbox. You MUST click the link to verify your email address.

#### (Optional) Customize Your Profile Icon

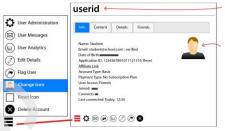
In the top left corner is a profile icon. By default, it is a boy. This icon shows when you chat with a bot. **It represents YOU!** Let's change it.



2. a. Click your profile. Select User Details.



b. Click Menu. Select Change Icon.



Your **userid** is how a person will add you as a user to view their bot.

The icon is your profile picture. It shows when you chat with a bot.

c. Click Browse media library.



- d. Change the Rating to Everyone. Click Search.
- e. Click Next to view the icons. Click on one you like.



The icon must be appropriate for school.



f. Your user icon will now be changed:



#### Sign Out

3. Click your profile. Select Sign Out.

**DIGITAL CITIZENSHIP:** Complete the Session 4 Extension Activity about terms of use and privacy.

# Assignment 15 Build a Virtual Agent

In this assignment, you begin to create your chatbot. You will:

- create a new bot
- chat with the bot
- select an avatar
- change the voice

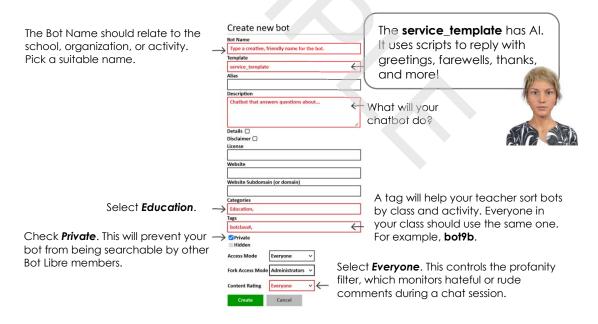


#### **Sign Into Bot Libre**

- 1. a. Visit <a href="https://www.botlibre.com">https://www.botlibre.com</a>
  - b. Click Sign In. Sign In
  - c. Enter in your User ID (or email) and password. Click Sign In.

#### Create a New Bot

- a. From the Welcome screen, click Create New Bot.
   Or if the teacher created a Workspace for you, then ask how to create a new bot.
  - b. Complete the fields and then click Create.



#### **Chat With the Bot**

The service bot uses a female avatar by default. You can change it later. First, you need to chat with your bot to discover what it knows and what it does not know.

3. Click Chat.



4. a. Your chatbot knows how to greet people. Type hi. Press Send.

Test more greetings: hello hey good morning afternoon



b. Your chatbot knows how to reply to say thank you. Try it.

thanks
thank you
ty

c. Your chatbot knows how to respond to names in conversations. Try it.

what is your name my name is Student

d. Your chatbot has knowledge of the date and time. Try it.

what day is it what time is it

e. Your chatbot knows how to do basic math. Try it.

2 + 2

5 \* 5

f. Your chatbot can reply to goodbyes. Try it.

bye good bye farewell

5. Ask questions about your school or organization. For example:

who should I contact how much does it cost to join where are you located

When the bot does not know the answer it will reply, I do not understand. However, sometimes it gives a response that does not make sense. You need to train it.



6. Disconnect. →



#### (Optional) Select an Avatar for Your Chatbot

- 7. Pick an avatar that suits the school, organization, or activity:
  - a. Click Admin Console. 🛟
  - b. From the left pane, click Avatar.
  - c. Select Change.

#### Need ideas? Pick a bot that ...

- looks like the user.
- looks like a person who works at the school or organization.
- seems smart and friendly.
- creates a positive presence on a website, blog, or social platform.



d. Pick Featured Avatars. Change the Rating to Everyone. Click an avatar you like.

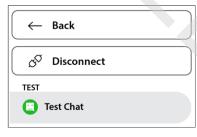


**TIP:** To find more, click *Categories*. Pick an option, then search. **9** 



#### **Test Chat**

8. a. From the left pane, click Test Chat.



This method is best for testing the avatar as it keeps you in the Admin Console.

- b. Type hi. Does the voice suit the chatbot?
- c. Close the chat window. X

ERROR:

If you see the error, "No bot has been selected", click your profile at the top of the screen. Select My Bots. Click your bot. Click Admin Console. •

#### Select a Voice for Your Chatbot

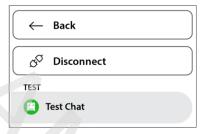
- 9. a. From the left pane, click Voice.
  - b. Select a voice and then click Test. When you find one you like click Save.



#### TIPS:

- pick a voice that is easy to understand
- change the test speech to words your bot might speak

c. From the left pane, click Test Chat.

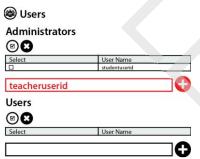


#### (Optional) Add Teacher as an Administrator to Your Bot

10. a. From the left pane, click Users.



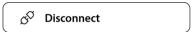
b. Type your teacher's **userid** into the Administrators box. Click



YOUR TEACHER WILL BE ABLE TO VIEW AND EDIT YOUR BOT.

#### Disconnect the Bot and Sign Out

10. a. Click Disconnect.



b. From your profile, click Sign Out.

In the next assignment, you will train your bot to be more helpful.

### Session 4 Review: About Conversational Chatbots

#### **Chatbot Terms**

Match the term to its definition.

- \_\_\_\_\_1. conversational chatbot
- A. icon or character used to represent a chatbot to give it personality
- D 2. natural language processing
- B. nickname or alias used in place of a person's real name

A 3. avatar

C. chatbot that can mimic the flow of real conversation

B 4. user id

 Al technology that translates human text and spoken word into a form a computer can understand

/4

#### How Does a Conversational Chatbot Work?

5. Number the steps in the correct order.

decode the meaning of the user's input
provide a reply that sounds like a real person
wait for the user to ask a question or make a request
check knowledge base to find a correct response

/4

#### Why Use a Conversational Chatbot?

- 6. Pick two ways customers can benefit from using a conversational chatbot:
  - a. chatbot knows more than a real person who works in customer service
  - b. customer always gets the correct answer from the chatbot
  - c. customer can get directions or links to helpful resources from the chatbot
  - d. customer does not need to waste time searching a website for answers

/2

**TOTAL: /10** 

## Session 4 Skill Review: Make a Game Bot

You will apply your knowledge to invent a virtual friend using Bot Libre. It will play Checkers, Tic Tac Toe, Connect4, I Spy, and more!

- 1. Sign into Bot Libre: <a href="https://www.botlibre.com">https://www.botlibre.com</a>
- From the Welcome screen, click Create New Bot.
   Or if the teacher created a Workspace for you, then ask how to create a new bot.
- 3. Type a Bot Name. Select the **games\_template**. Complete the fields. Click Create.



A tag will help your teacher sort bots by class and activity. Everyone in your class should use the same one. For example, **game9b**.

4. Click Chat.



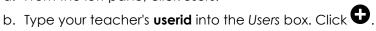
- 5. Play games with the chatbot. When done, disconnect.  $\Box$
- 6. (OPTIONAL) Pick an avatar that suits playing games with kids:
  - a. Click Admin Console.
  - b. From the left pane, click Avatar.
  - c. Select Change.
  - d. Pick Featured Avatars. Change the Rating to Everyone.
  - e. Pick an avatar.
  - f. From the left pane, have a Test Chat.



- 7. Pick an voice that kids will like.
  - a. From the left pane, click Voice.
  - b. Pick a voice.
  - c. Test your chatbot.



- 8. (Optional) Share bot with your teacher. They MUST have a Bot Libre account:
  - a. From the left pane, click Users.



# Language & Voice Speech Provider Bot Libre • English: GB: Male: Spike Voice Modifier Default This is a test, testing, 12345678910

#### **Answer Questions About the Game Bot**

- 1. What name did you give your chatbot?
- 2. Describe the avatar and voice you picked for the chatbot. Why did you pick it?

- 3. Your chatbot expresses emotions. This happens with words or sometimes the tone of their voice. Does it make the chatbot seem like a real person? Why or why not?
- 4. Play TicTacToe with the chatbot. Was it easy to play? Why or why not?
- 5. Play I Spy with the chatbot. Pick guess. How could this game be improved?
- 6. Why might a person want to play a game with a chatbot, instead of a real person?

# Session 4 Extension Activity: Be a Responsible Digital Citizen

To use Bot Libre, you must agree to their terms and conditions. Read the Terms of Service and Privacy Policy, then answer the questions. TIP: Scan the text using the **bold** words in a question,

#### **Terms of Service**

- 1. Visit <a href="https://www.botlibre.com/terms.jsp">https://www.botlibre.com/terms.jsp</a>.
  - a. List 4 things that you may **not** do according to Bot Libre's Rules and policies.
    - violate copyright

- bully; collect personal information
- use content that is hateful
- upload viruses; act unlawful; send spam
- b. What will happen if user carries out a violation of any of the rules or policies?

terminate account, delete bot instances

- c. Do you think this is a fair agreement? Why or why not?
- 2. a. If you **delete** your bot, could it still appear for a period of time?

yes, it exists in backup copies

b. How do you think this might this affect a person's decision to play an inappropriate joke or other questionable activity with a bot?

There is proof of the inappropriate behavior.

3. Bot Libre tries to keep the website safe. What can you do to help?

flag bot instances, responses, users, and posts that violate rules and policies

#### **Privacy Policy**

- 4. Visit https://www.botlibre.com/privacy.jsp.
  - a. Write the email of a **contact** at Bot Libre to get information or support.

support@botlibre.com support@botlibre.com

b. How much of any bot **conversation** does Bot Libre store in memory?

every interaction is recorded into the bot's memory

c. What is the benefit of making your bot **private**?

not public, only available to the bot creator and users they share the bot with