Grilling Perspectives: Debating with AI about Burgers and Sustainability

An AI Lesson Plan

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Abstract

This lesson plan introduces debate and generative AI in both classroom and online settings. The context is tailored for courses in writing, communication, journalism, political science, humanities, or natural sciences course, aiming to explore a controversial topic and use AI. Emphasizing a collaborative approach, students engage with AI as a partner in debate and writing, using its expertise alongside their own to conduct an argument on the topic of meat, specifically beef burgers and plant-based burgers. AI serves as a tool to enhance communication skills within a framework of "human-machine collaboration" (Dobrin 2023, 8).

Keywords: Debate; Writing; Generative AI; Argumentation; Future Food; Beef Industry

Student Learning Objectives

Upon completion of this lesson, students should be able to engage with generative AI as partner in debate and writing, compose clear and logical arguments, and address important real-world issues using interdisciplinary perspectives.

Goals	Means	Outcomes
• To Learn the Standards, Practices, and Conventions of Professional Communication • To Value Collaborative Thinking and Writing as a Process • To Perfect Audience-Focused Techniques • To Become Familiar with the Discourse and Scientific Methods of Social and Behavioral Sciences • To Understand the Landscape of AI Platforms, Products, and Services • To Increase Literacy in Generative AI Tools	• Activities, Discussions, Lectures, Readings, and Podcasts on Important Real-World Issues • Videos and Readings on the Production and Consumption of Traditional Beef versus Plant-based Meats • Revising Work with Generative AI as Writing Coach • Evaluating (Alt) Meat and Their Origins, Products, and Impact • Crafting Evidence-Based Arguments • Reflecting on Process-Based Deliverables	Students will learn to compose and evaluate arguments in writing using claims and evidence, collaborating with generative AI as partner in thinking and writing, and applying problem-solving techniques.

1 Introduction

In the beef industry, there is significant attention on animal welfare and the nutritional aspects of beef among consumers. Environmental activists are seeking ways to reduce greenhouse gas emissions from livestock farming, while global meat demand surges. To discuss ways to reconcile meat production and consumption with eco-friendliness, this lesson plan invites students to engage in a debate with generative AI. Various roles include plant-based substitutes for meat products, local farm-raised sustainable meat, carbon-neutral vegetable-forward sausages, sustainably raised mature, organic local beef to cultivated meat or cell-based meat that is cultivated from the cells of animals. Deploying AI in the lesson serves as a tool to enhance communication skills within a framework of "human-machine collaboration" (Dobrin 2023, 8), where the human and machine discuss the future of burger and offer how to address the topic of concern going forward.

It's important to note that while GenAI platforms such as ChatGPT are powerful language models, their responses are generated on patterns and examples they have been trained on, rather than possessing real-time knowledge or true understanding. The information they supply can be inaccurate despite appearing correct, what are known as "hallucinations" (Dobrin 2023, 25). As such, it's advisable to verify information from reliable resources and use critical thinking when interpreting AI-generated responses. GenAI may function as a valuable collaborator, yet the success of writing in collaboration requires significant human participation and judgment.

The human-machine collaboration can work in authentic assessments such as debate. Like talking with a classmate, friend, or family member, a GenAI platform like ChatGPT can "talk" with you. The student assumes one role, ChatGPT assumes the other. Students practice critical thinking, research, analytical decision-making skills, and master topics in the process of debating with AI. When the topic is controversial, debate with a robot versus a person is more objective and less personal. Students can feel less inhibited to voice their opinion. Also, AI in debate provides a personalized learning experience where students can learn and debate at their own pace and engage with content that is relevant and interesting to them.

To demonstrate the debate in the classroom and online, we will consider a scenario in an undergraduate General Education course at the University of Florida, specifically Quest 2. The course introduces students to data, methods, and tools from diverse fields that are brought to address pressing issues facing our society and the planet today. I designed a Quest 2 course on Future Food, where we look to the future on how to feed our growing world.

The assignment provided, *Debate with AI about Burgers and Sustainability,* engages students in a debate with AI about meat, specifically beef burgers, a popular food among students. Global meat consumption is expected to soar from 350 million tons of meat every year to more than 550 million tons by 2050, according to The World Counts (2024). Yet traditional meat production is unsustainable and is a large source of greenhouse gas emissions and thereby plays a major role in climate change. To meet the demand for meat and combat climate change, several alternatives to agriculture production are poised to take place at the dining table in the future.

Practicing debate is not about winning arguments, but rather it helps students develop and practice skills in critical thinking, communication, research, and decision-making, while also placing students in new perspectives. For example, AI can provide relevant and constructive feedback and scaffolding to help students improve their reasoning, analysis, and evaluation skills. These skills are important in students' academic and professional career. The debate about the production and consumption of meat and plant-based meat relates to current events and issues that students may encounter and/or may impact their career. Learning becomes alive and meaningful and tasty! The reflection questions further help

students to engage deeper with the course material. Artificial intelligence and authentic assessments are valuable, but finding the time to prepare, facilitate, and grade them can be a true challenge. The assignments in this paper are designed to leverage generative AI to help make authentic learning more feasible.

This lesson uses debate to explore the topic and concept more deeply. The assignment is completed by students independently, using ChatGPT as their partner.

2 Context of the Assignment

This lesson assumes some AI literacy of students. Not all students have experience with using AI tools. To introduce AI tools to students, scaffold the assignment by giving students a low or no-stakes chance to try a generative AI tool before requiring its use for this assignment. For example, during the first two weeks, ask students to sign into ChatGPT or Microsoft Copilot using their University of Florida account and create a poem, song lyrics, short story, or image that represents something important to them (e.g., culture, family, hobby, interest). These creations are shared in an introduction discussion board so that students can get to know one another and me as well! The Introduction Discussion with AI starts to build a sense of community early on where students identify similarities with each other and share perspectives and helps them get started and feel comfortable with these generative AI tools.

This lesson and AI debate are in the middle of the term, with preceding lessons about food and sustainability and succeeding lessons about solving current and future food-related problems.

The following section provides the lesson plan with an introduction, resources with readings, videos, and podcasts, and the assignment and rubric.

3 Unit: One Burger at a Time

3.1 Introduction

We look to the future on how to feed our growing world. With a predicted 10-billion population by 2050, sufficient food for everyone is becoming a pressing concern. Advances in agriculture and food technology can increase food production, reduce waste, and improve distribution.

Raising livestock for food is a major source of food yet a major strain on our natural resources and environment. There is a global demand for animal products, especially meat, eggs, and milk, as a source of nutritious proteins, vitamins, and minerals and for taste. Nevertheless, rearing and slaughtering animals for food raises ethical issues associated with animal cruelty as well as health concerns such as coronary heart disease and cancer. Alternatives to animal products, such as plant-based proteins in addition to tofu

and legumes, offer environmentally friendly and safer alternatives to animal products and tend to be tasty, convenient, and affordable.

In response to the rising consumer demand for meat alternatives, many food companies are developing innovative meat-free products. This involves creating foods with similar properties to existing meat products, such as veggie burgers or sausages, or developing alternative protein-rich products like tofu or tempeh.

Compare the components of beef and plant-based burgers by determining the production and processing methods of each product; evaluate the ingredients and nutritional differences between beef and plant-based products; and discuss different points of view in the agricultural industry concerning plant-based proteins and traditional beef.

This lesson covers a socioscientific issue and aims to provide tools to evaluate science within the context of social and economic points of view. Guiding the lesson is this question: How do we use research and knowledge and AI to help us make informed and reasonable decisions for the greater good?

3.2 Objectives

At the end of this unit, you will be able to:

1. Identify the various points of view around a controversial food product, i.e., burgers.
2. Discuss the importance of consumer choice and how it relates to beef vs. plant-based proteins.
3. Expand your knowledge of traditional beef vs alternative proteins.
4. Consider whether or not alternative meat companies can call their products "meat," "beef," or "burger."
5. Determine how data can help us make decisions for the greater good.
6. Increase literacy in generative AI tools and recognize their limitations.
7. Compose clear and logical arguments in writing.

4 Assignment: AI Debate with Burgers: Burgers from Different Points of View

4.1 Purpose

Engage in a debate about burgers with ChatGPT or another generative AI tool to evaluate science within the context of social and economic points of view. Learn about the production and processing methods of beef and plant-based burgers, evaluate the ingredients and nutritional differences between beef and plant-based products; and discuss different points of view in the agricultural industry concerning plant-based proteins and traditional

beef. We will keep in mind this question: How do we use this research and knowledge to help us make decisions for the greater good?

4.2 AI in this Assignment

This assignment allows for use of generative AI (e.g., ChatGPT) as the opponent in your debate. Arguments presented to AI throughout the debate should be constructed by you, as well as reflection or discussion that takes place after the debate.

4.3 Tasks

Estimated completion time: 2 hours.

4.3.1 Part 1: Debate

- Decide what point of view you are interested in. The role doesn't necessarily have to be one you agree with.
    - FDA
    - Beef Producer
    - Food Marketer
    - Nutritionist
    - Consumer in Favor
    - Consumer Opposed
- Study the information on your card and learn about your role's point of view. What other facts and information could be added to support your role's point of view? How do we use this research (polls, stats, interviews) and knowledge to help us make decisions for the greater good?
- Start a new chat with ChatGPT or another generative AI that will allow you to share your conversation.
- For the first message, insert the following prompt:
    - Let's debate. Please ask me to present three points supporting my stance on a topic, backed by evidence. You can accept my viewpoints when compelling arguments are made. Alternate between asking questions and providing counterarguments, but keep the conversation moving. Be kind and flexible in your responses.
    - I am [advocating for plant-based meat sales like Beyond Burgers and Impossible Burgers]. Please counter from the perspective of a concerned consumer, focusing on ingredients sourced from genetically engineered yeast. Feel free to argue with me, but keep questioning if my argument isn't convincing.
- Then, debate with ChatGPT for several rounds. Refer to at least three artifacts and two references from this unit's resources (readings, podcast, and videos) throughout the debate.

    - Tip: If the generative AI is reluctant to carry out the task, try re-writing your prompt. Clear and specific prompts encourage a more successful output. See example prompts.
- Your debate should show that you've successfully convinced Gen AI of your viewpoint.
- When completed, click the "Share" button and insert URL into this assignment.

4.3.2 Part 2: Reflection

Generative AI is not allowed for this task. Write a 250-word minimum reflection describing your impressions of the AI's ability to do the task.

Answer the following questions:

1. What strengths and weaknesses did you notice in the AI's arguments?
2. Did the debate with the AI reveal any biases or assumptions, either in your own arguments or in the AI's responses?
3. What implications do the capabilities of AI have for shaping public discourse and the pressing issue of climate change?
4. Overall, how do we use this research and knowledge to help us make decisions for the greater good?

4.4 Resources

Review the unit's materials, including readings, videos, and podcasts, to gain background for the debate and shape your perspective. Research your role, gathering relevant artifacts such as video clips, news articles, opinion pieces to inform and defend your stance.

4.4.1 Assignment Resources

- See card for different points of view of plant-based burgers.
- See examples for ChatGPT Prompts for searching about meat and plant-based meat burgers
- ChatGPT

4.4.2 Readings

1. Burgers: Beef and Plant-Based Meat provides the background of agriculture and beef and plant-based meat and key vocabulary terms.
2. "The Science in Social Science" will help you recognize how social and behavioral sciences have produced technologies and engineering that dominate our everyday lives such as marketing, polling, management, and public health programs.

4.4.3 Additional Recommended Resources

- Pimentel, David, and Marcia Pimentel. 2003. "Sustainability of Meat-Based and Plant-Based Diets and the Environment." *The American Journal of Clinical Nutrition* 78 (3): 660S-663S.

- Peters, Christian J., Jamie Picardy, et al. 2016. "Carrying Capacity of U.S. Agricultural Land: Ten Diet Scenarios." Edited by Anne R. Kapuscinski and Ernesto Méndez. *Elementa: Science of the Anthropocene* 4 (January).

4.4.4 Videos

- Watch the plant-based documentary *Forks over Knives* to understand the link between chronic diseases and eating meat products.
- Watch *Eating less Meat won't save the Planet. Here's Why.* to hear the defense of beef versus plant-based food.
- Learn more about *Heme - The Magic Ingredient in the Impossible™ Burger* that makes plant-based burgers more closely resemble beef burgers.

4.4.5 Podcasts

- Listen to a cook's point of view on "Tasting the Impossible Burger" from *The Splendid Table*.
- Learn more about "Alternative 'Meat' vs. Traditional Beef" on *Ag Future: Innovation in Agri-Food*.

4.5 Criteria for Success

In this debate, you should have at least three main points to argue your stance. Each argument should have at least one piece of evidence to support it. Equally important to the debate is the reflection that takes place afterward. You will need to describe your experience, interpret any challenges, biases, or limitations, and evaluate what could have improved the debate. Refer to the rubric for details of assessment.

4.6 Assignment Variations

The assignment can be in-class or online. For in-class, arrange students in groups, students discuss the issue with their group, and then they share back with the class. For online discussion boards, students can create visual presentations and respond to other students' presentations and points of view.

Instead of individually, the debate with ChatGPT can be in collaboration with a partner or small groups. Active learning and collaborative projects engage students in material and provide opportunities to practice the kind of group work that they might engage in during their careers.

As you move through your semester, you might need to create lesson plans, provide feedback, and write learning objectives and rubrics. Try using ChatGPT to create lesson plans that align to the module's topics and student learning objectives for that topic. ChatGPT can help you use the right tone and clarity in your communication. However, be sure to write with your own voice and not just copy the output. Please use the output of ChatGPT as suggestions rather than completely substituting the chatbot's writing for your own. This helps your communication be authentic.

The workplace of the future will be impacted by AI, but those who rise to the occasion will have human traits of creativity, ambition, and curiosity.

4.7 Rubric: AI Burger Debate

Criteria	Ratings			Pts
Evidence and Support Provides at least three points to argue their stance, supports each point with credible evidence, and establishes logical connections between the evidence and the argument.	**30 pts** Exemplary	**15 pts** Adequate	**0 pts** Developing	30 pts
Clarity of Stance and Timeliness • States stance on a topic clearly and presents points in a logical and organized manner. • Submits assignment by the due date.	**10 pts** Exemplary	**7 pts** Adequate	**0 pts** Developing	10 pts
Reflection • Reflection provides a thorough and insightful analysis of the AI's arguments, discussing strengths and weaknesses, and recognizes biases and assumptions present in the debate. • Reflection addresses implications for public discourse and climate change. • Meets 250 minimum word count	**30 pts** Exemplary	**15 pts** Adequate	**0 pts** Developing	30 pts
Total Points: 100				

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Generative AI Use

This work is original and entirely the author's own. AI was not used in the composition; however, it was used in the examples for generative AI prompts.

Biography

Kelsi Matwick is an Assistant Professor in the Department of Humanities and Communication at Embry-Riddle Aeronautical University. As a language and food scholar, she has published works on humor, narrative, celebrity chefs, comic posters, and linguistic landscape. In 2024-2025, she will teach American culinary diplomacy in Japan as a Fulbright Scholar.

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