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Enhancing Statistics and Data Science Education

The Future of an AI-Powered App

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Quick Survey

ChatGPT Introduction

ChatGPT = advanced language model by OpenAI

- Generates human-like text
- Solves problems using natural language

Excels in variety of applications

- Creates Content
- Personalizes learning
- Data analysis

ChatGPT in Data Science Education

Enhance classroom education

Strengthen lesson plans

Provide personalized learning experiences

Engage in self-tutoring

How?

Generate interactive content

Use app to support students and add classroom value

Teacher's Roles

Having a personalized GPT app allows teachers numerous possibilities:

App Creation

Create detailed and organized teaching guides directly from

- Course Objectives
- Course Textbook / Notes
- Syllabus
- Prior Quizzes

Engaging content that incorporates up-to-date real-world data that aligns with your current curriculum

Quiz Question Variability

Using GPT to generate a wide variety of quiz questions to test different skill levels

- Basic understanding to complex problem-solving.
- Create multiple-choice questions, short-answer questions, and coding exercises

Customized Assignments

Generate multi-step problems that require students to apply various data science techniques for practice

- Assignments can be customizable to student's interests

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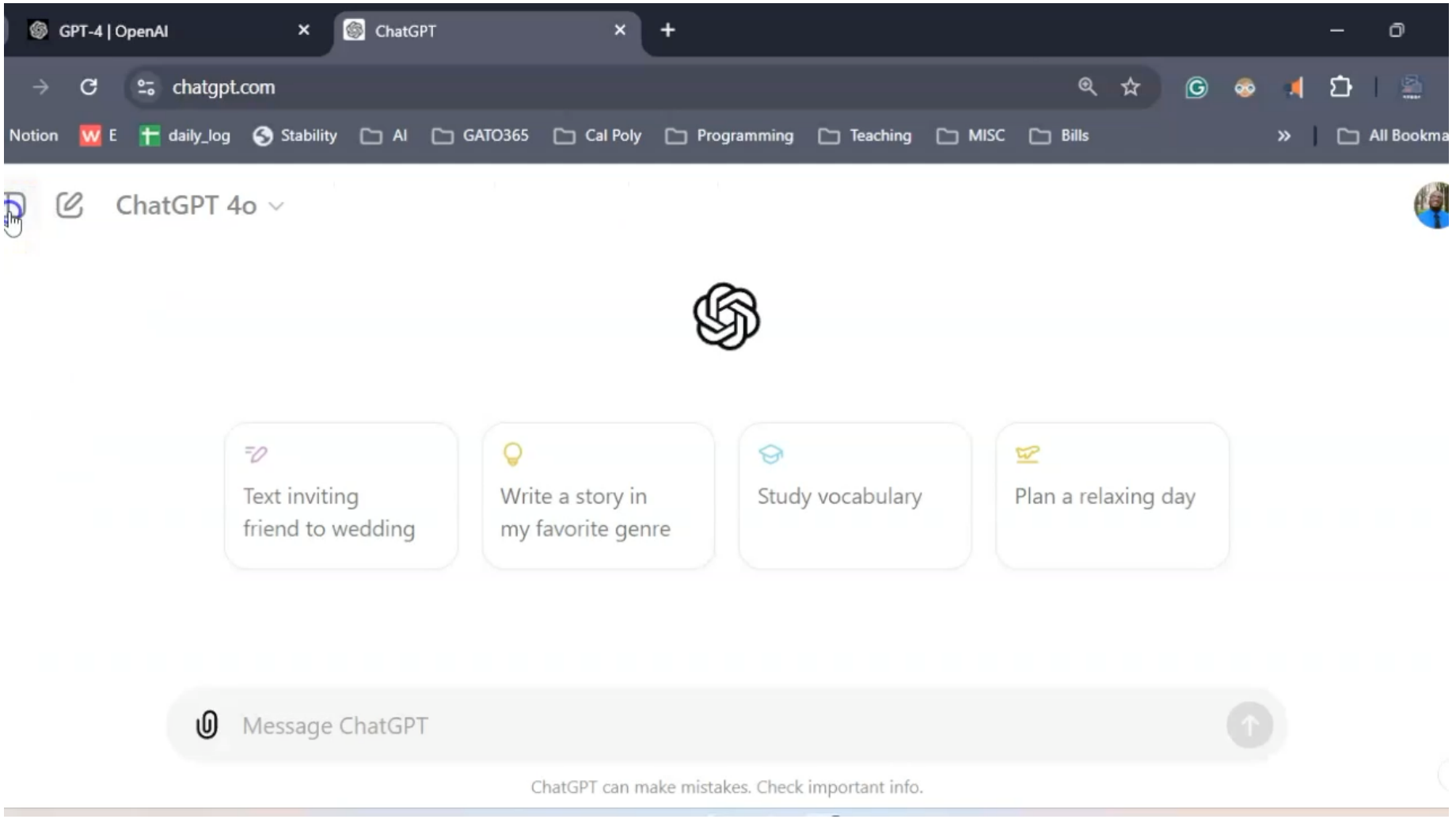
Demonstration



Quiz Example

week_1_stat252_quiz2.py > ...

```python
from canvasapi import Canvas
from utilities import create_quiz_data, generate_quiz_description
# Initialize Canvas API
API_URL = 'https://canvas.calpoly.edu'  # Your Canvas instance API URL
# Read the API key from a file
with open("api-key.txt", "r") as f:
    API_KEY = f.read()


canvas = Canvas(API_URL, API_KEY)
course_id = "132563"

quiz_description = generate_quiz_description(num_questions = 12,
                                              due_time = "11:59 PM",
                                              due_day = "Sunday",
                                              time_limit = "60")

quiz_name = "Take Home Quiz 2"
quiz_data = create_quiz_data( quiz_name =  quiz_name,
                              description = quiz_description,
                              points_possible=12,
                              time_limit=10,
                             allowed_attempts = 3,
                              due_at   ='2024-08-05T06:59:00Z', ## Added 7 more hours to
                              lock_at  ='2024-08-05T06:59:00Z', ## Added 7 more hours to
                              unlock_at='2024-07-30T11:30:00Z') ## Added 7 more hours to

quiz = canvas.get_course(course_id).create_quiz(quiz_data)

```

Student's Roles

Before / During Class

Generate questions in JSON format after interacting with textbook to:

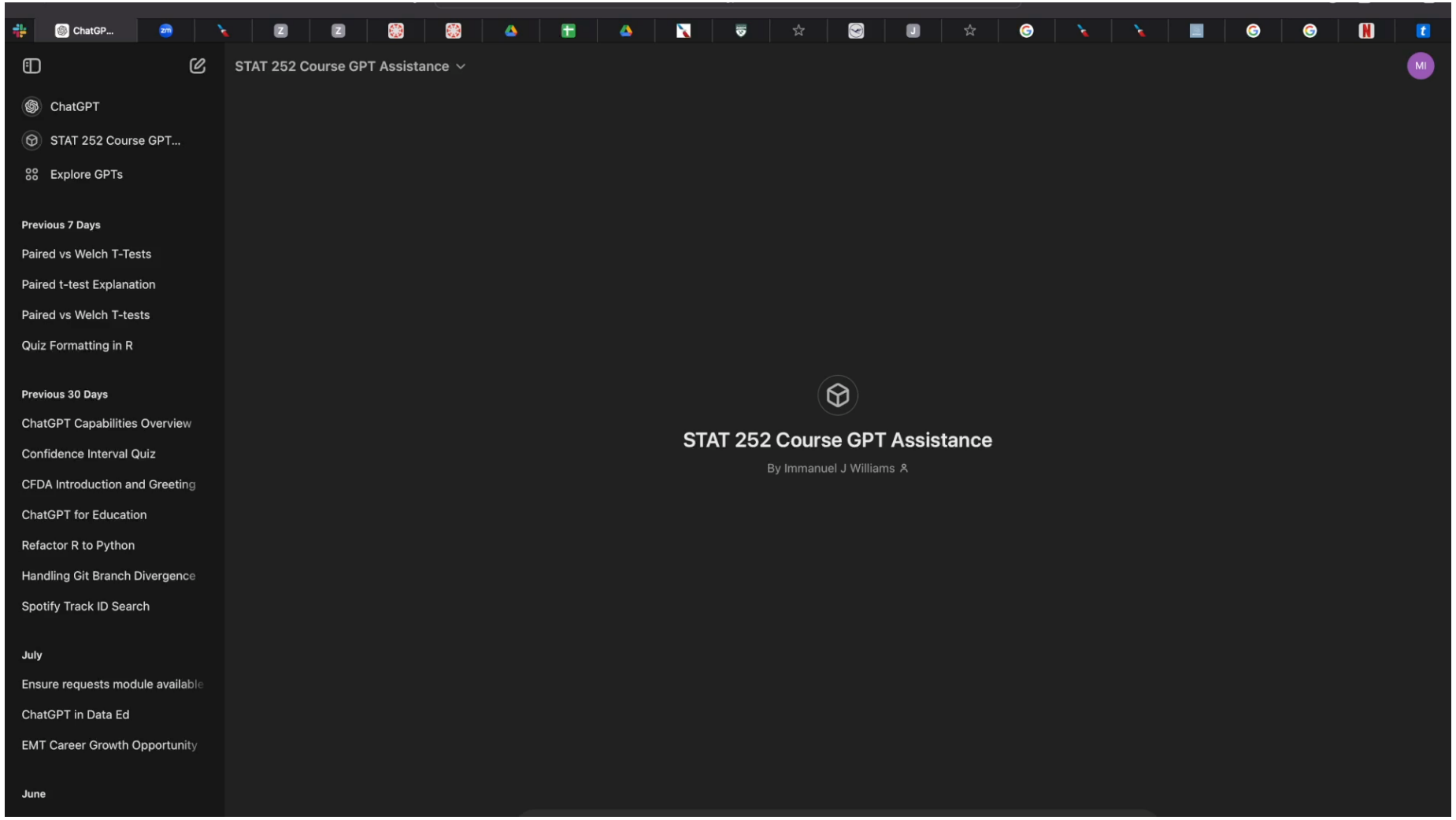
- Seek clarifications
- Summarize key concepts
- Digest formulas
- Breakdown textbook sections

After Class

Student's can use app to:

- Create questions for practice assessment
- Create personalized study guides with a spaced repetition schedule for memory retention
- Review/digest previous quizzes/assignments

Student Video Example



Example

Sure! Here's a 10-question practice quiz on simple linear regression, tailored to align with your **STAT 252** course content and the formats from your past quizzes .

Simple Linear Regression Practice Quiz

Instructions:

- You are permitted to use your notes and R for this quiz.
- Answer each question fully, providing explanations where necessary.
- You have 45 minutes to complete this quiz.

AI Integration In and Out of the Classroom

Teacher & Student Uses

Create prompts with blanks that students fill in with topics they find unclear (Personalized learning experiences).

Fast Feedback

Group work can be enabled for students to share the outputs their Chat assistance gave them

Students can correct or confirm ChatGPT's responses

- Helps teachers understand students' comprehension (Active learning and critical thinking).

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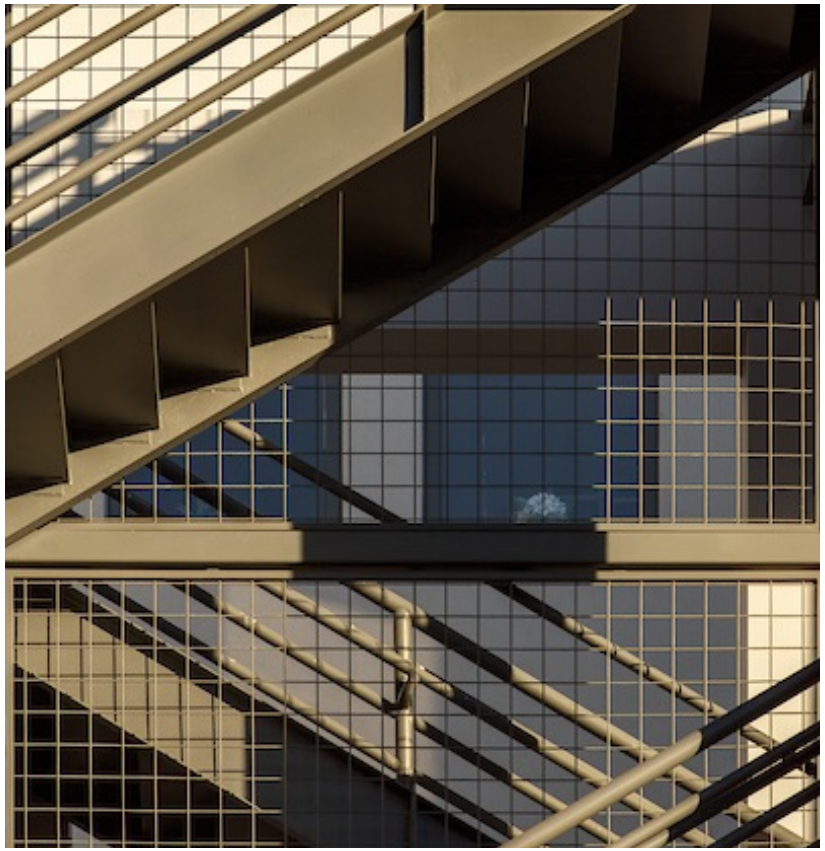
AI Integration In and Out of the Classroom

Teacher's Outside the Class

Teacher's can use app to:

- Find trends in misconceptions
- Grade using course materials
- Evaluate student performance
- Assist where AI falls short



Future Implications

Pilot Study

Six teacher study

Half use AI education

Block on subject – statistics, data science, computer science

Grant Application

NSF – education research support

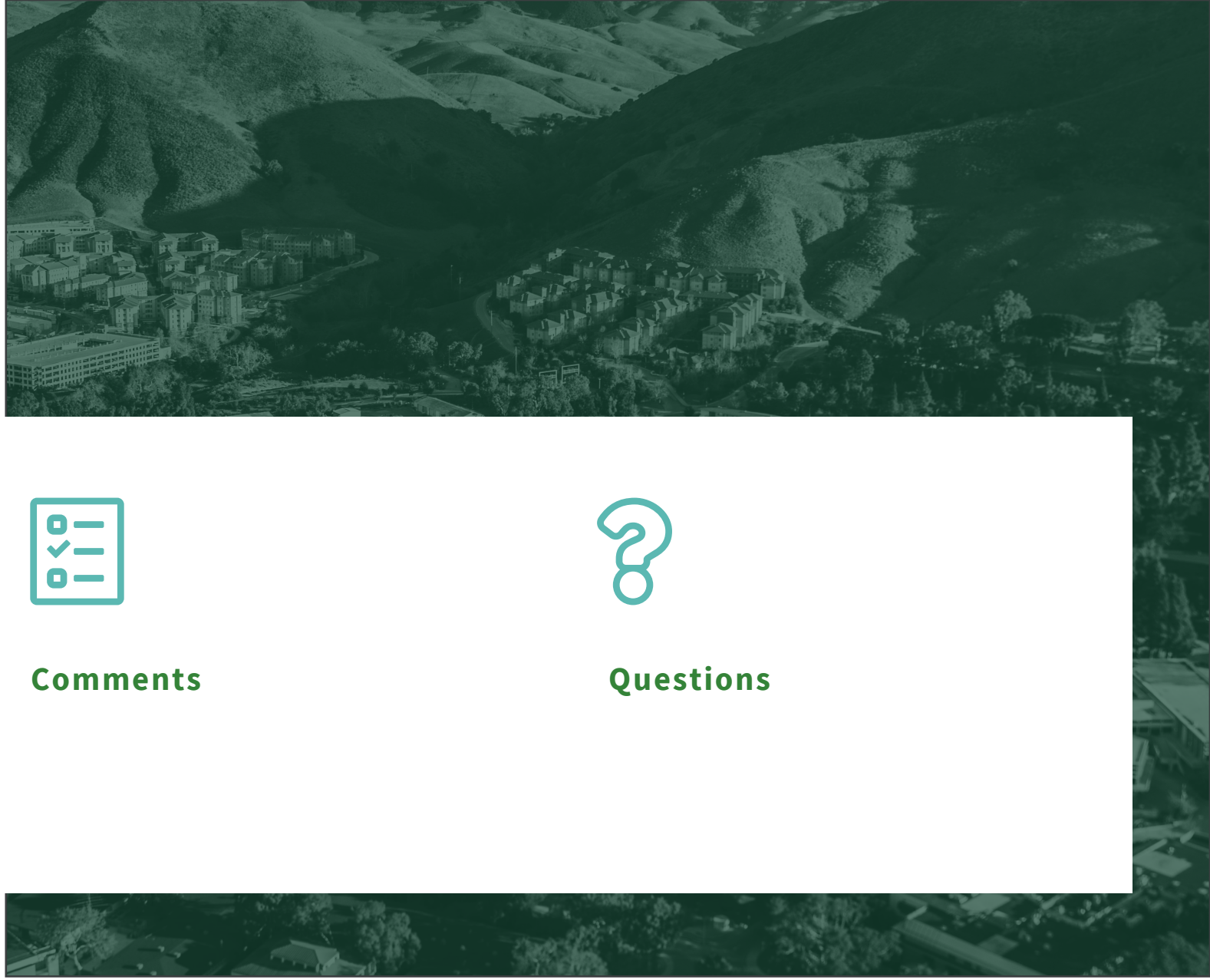
Spencer – education focused research projects

App Creation

Secondary Education

GATO365 – set students up for the data driven world

Thank You



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Comments

Questions

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