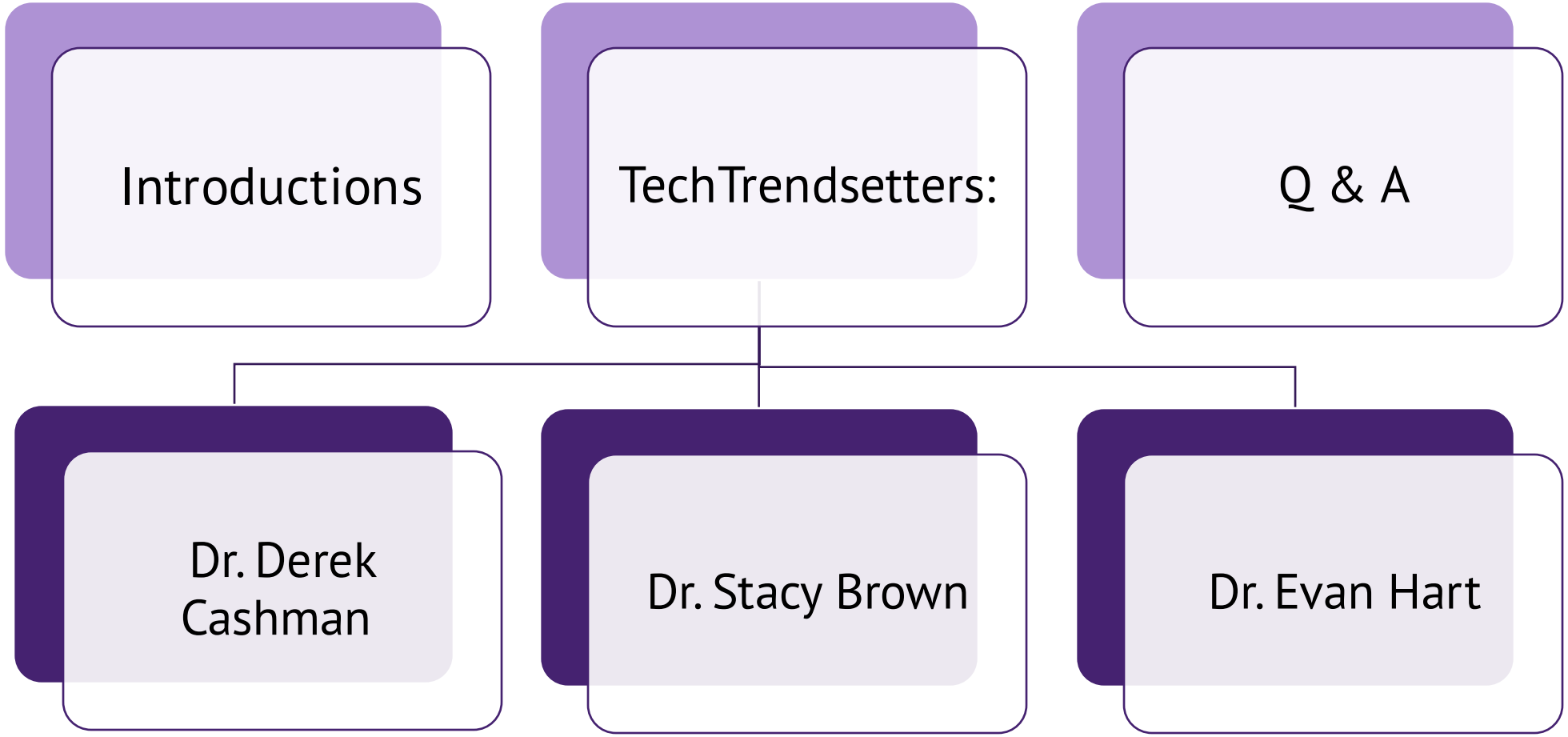
TechTrendsetter Highlight

- Dr. Derek Cashman
- Dr. Stacy Brown
- Dr. Evan Hart

Agenda


Introductions
TechTrendsetters:
Q & A
Dr. Derek Cashman
Dr. Stacy Brown
Dr. Evan Hart

Dr. Derek Cashman

Chemistry

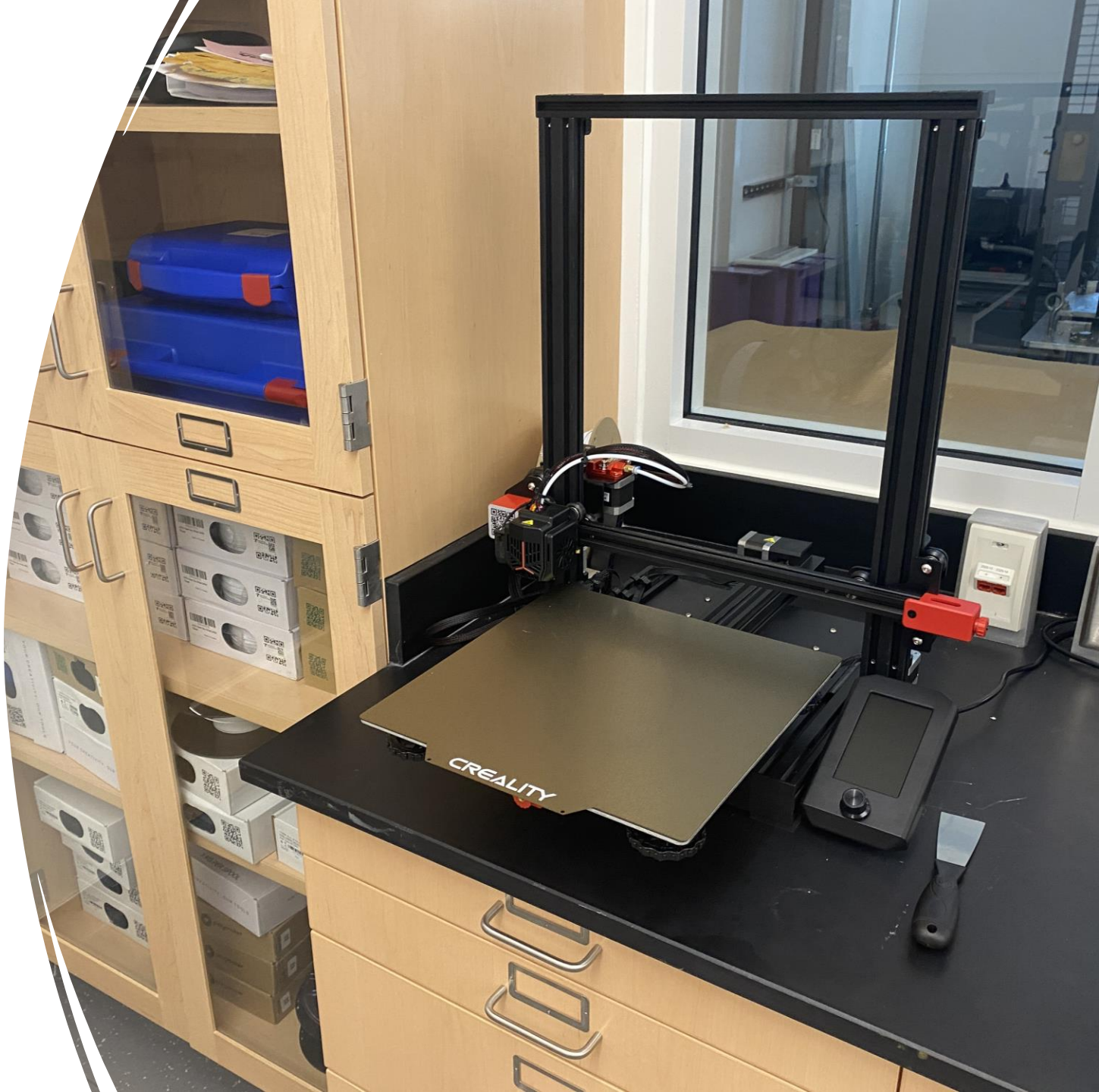
College of Arts & Sciences

Topics

- Course Design in CHEM 4620
- Learning objectives
- Molecular Modeling Tutorials
- 3D printing
- Takeaways from OLC

Course Design in CHEM 4620

- CHEM 4620: 1 section, in-person with online homework
- Technology:
    - Online activities for molecular modeling were developed using Chimera X and video tutorials were produced as an instructional guide for molecular modeling.
    - Students used 3D printing technology to produce hands-on models of substrates of biochemistry pathways for study.



Learning Objectives

- Through the OLC course, the learning objectives of CHEM 4620 were revised and expanded to include specific objectives based on Bloom's Taxonomy.

- Seven learning objectives were written and introduced in the course. Three of them focused on the 3D modeling activities and 3D printing:

    1. To understand and recognize how the structure of a biological macromolecule is related to its function by investigating how the 3D structure of an enzyme is found by constructing a model using artificial intelligence technology.

Learning Objectives

- Seven learning objectives were written and introduced in the course. Three of them focused on the 3D modeling activities and 3D printing:

2. To learn the importance of the use 3D visualization software to interpret 3D biological data and to construct a model of an enzyme given only sequence data.

3. To recognize and describe the metabolic pathways involved in the conversion of carbohydrates, lipids and proteins to energy sources utilized by living cells and investigate how the 3D structure is important in this process through the construction of 3D printed models.

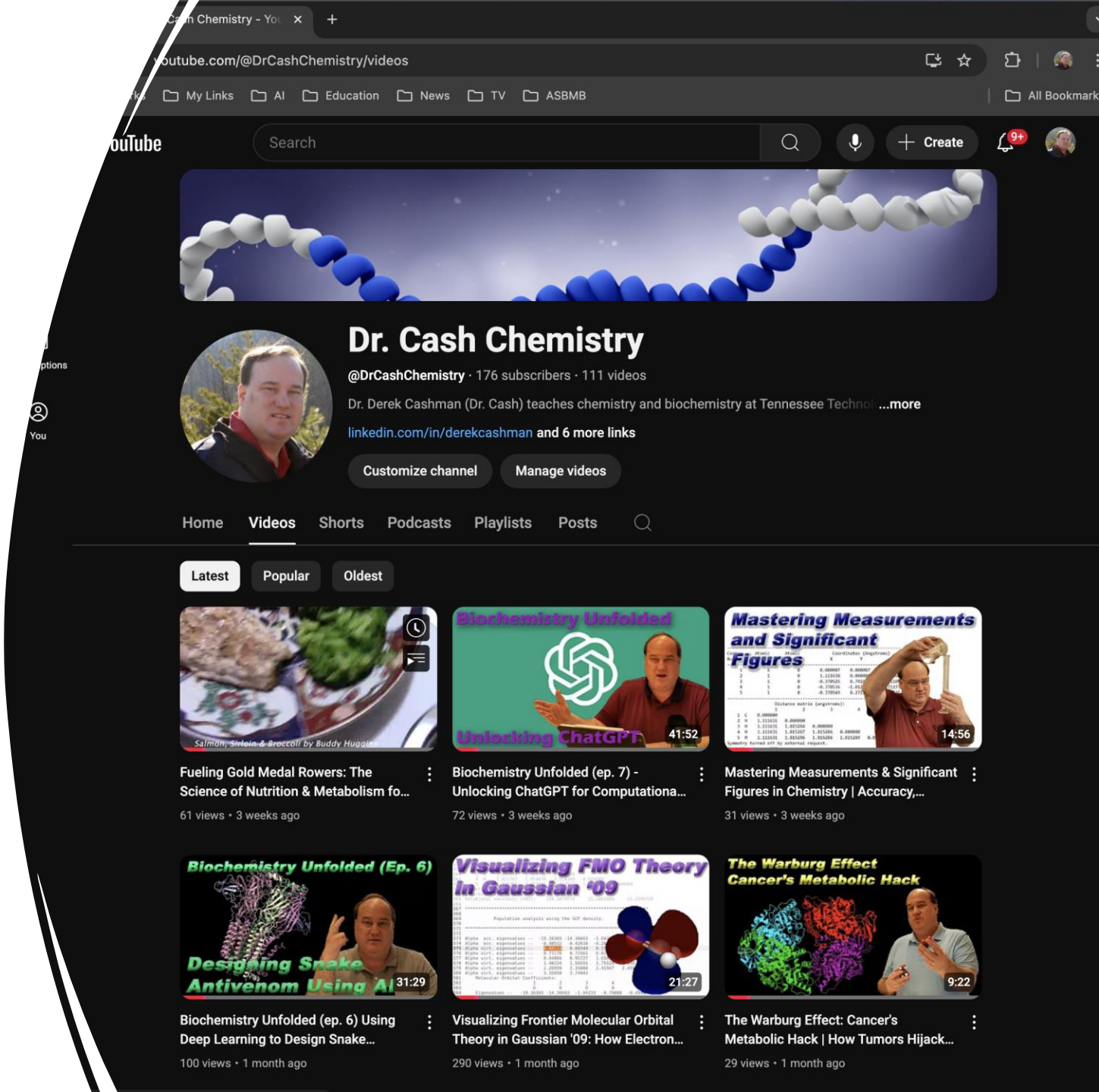
Molecular Modeling Tutorials

- A website was developed containing written and video tutorials for students to use as a guide in learning molecular modeling techniques as well as the use of AI for 3D modeling of proteins and biomolecules.

- Link to Website

YouTube Channel

- The video tutorials are hosted on my YouTube channel for easy access, even outside of Tennessee Tech.
- Link to YouTube: Dr. Cash Chemistry
- Since Fall, this channel has now grown to include tutorial and instructional videos for my spring classes as well.



3D Printing

- 3D printing was used to instruct students with a hands-on activity designed to familiarize them with the size and shape of substrates of glycolysis and the citric acid cycle.
- Software used for this activity includes MOE 2024, Autodesk Fusion, and UltiMaker Cura.
- In addition to the 3D printing activity, several questions were provided in the assignment focusing on the application of each molecule in metabolism.

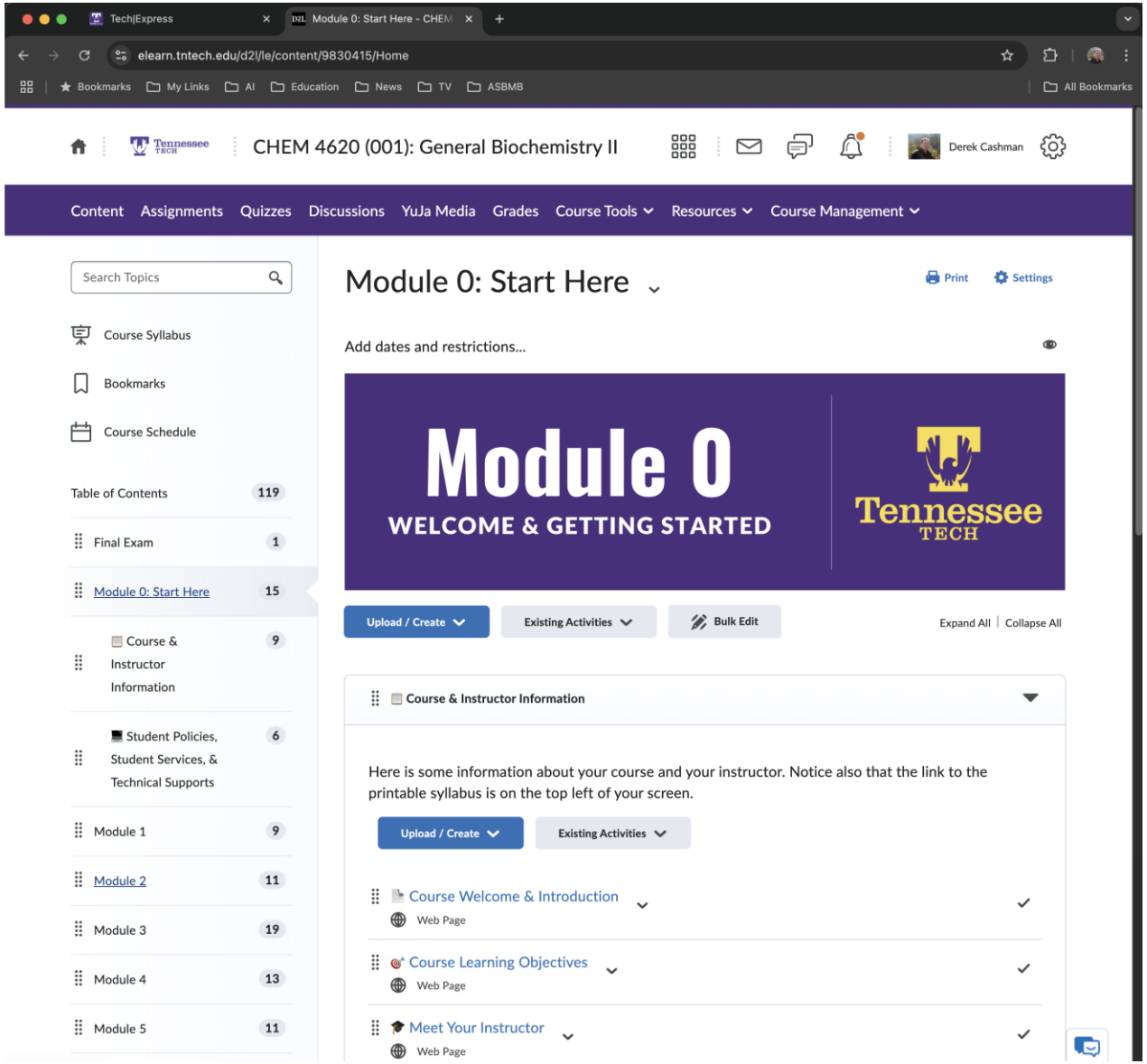
Takeaways From OLC

Three Electives were taken as a part of the OLC certificate in online teaching:

1. ADA & Digital Accessibility
2. AI Course Design
3. Podcasting for Teaching and Learning

OLC Elective: ADA & Digital Accessibility

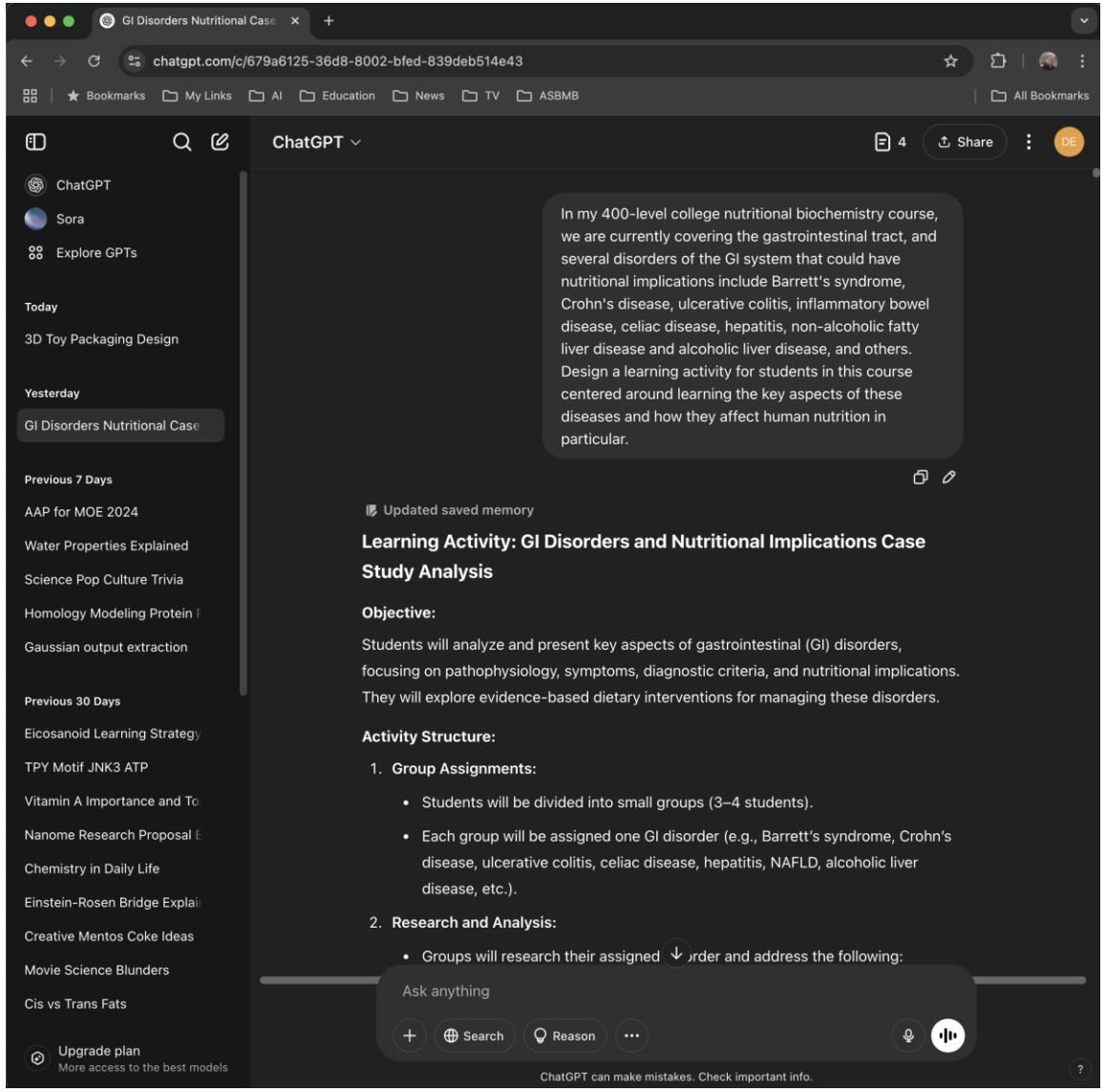
- The ADA & Digital Accessibility workshop was very helpful in instructing about all aspects of accessible course design.
- One key takeaway was the screen reader simulation.
- The second major takeaway was the focus on universal accessibility focusing on ensuring access for everyone, not just individuals with specific disabilities.



OLC Elective: AI Course Design

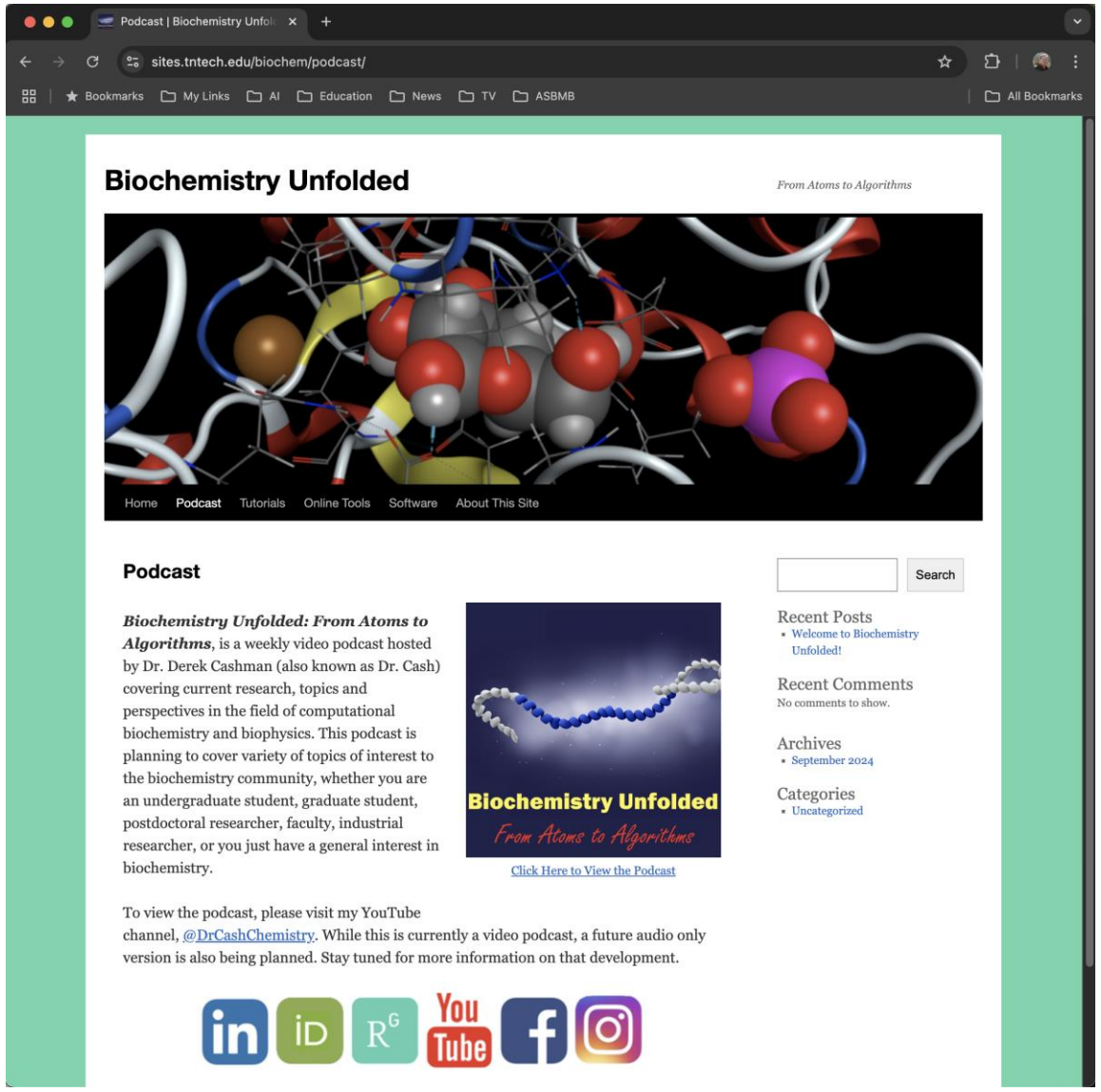
- The AI course design elective taught how to provide AI tools such as ChatGPT with effective prompts to design course materials, exam questions and other useful information.

- I also learned how to develop effective rubrics to be used for evaluating course projects and assignments.



OLC Elective: Podcasting for Teaching

- The elective on Podcasting for Teaching & Learning covered all of the aspects of designing and executing a podcast covering educational content.
- This included the technical aspects of proper equipment, and also the importance of developing a script.
- I used this information to develop a video podcast hosted on my YouTube channel: ***Biochemistry Unfolded: From Atoms to Algorithms***.



Reflections

- Through the completion of these modules and electives in online teaching, I modified the course learning objectives and activities in my General Biochemistry course to enhance the education of molecular modeling tools and artificial intelligence software.

- The additional molecular modeling activities reinforce a key concept of biochemistry – that the structure of a molecule or protein is critical in determining its function.

- The methods developed through the TrendSetter's grant have been used this spring to develop additional tutorials and activities for my spring classes.

Dr. Stacy Brown

Math

College of Arts & Sciences

Overview

- Math 1530: 2 sections, online and in-person
- Technology: Class set of TI 84 Calculators
  - An informal survey of my Spring 2024 course showed only about 25% have access to this technology with cost being the primary deterrent.
  - Because of the TrendSetter grant, all students in my Fall 2024 MATH 1530 had access to the required calculator

OLC Takeaways

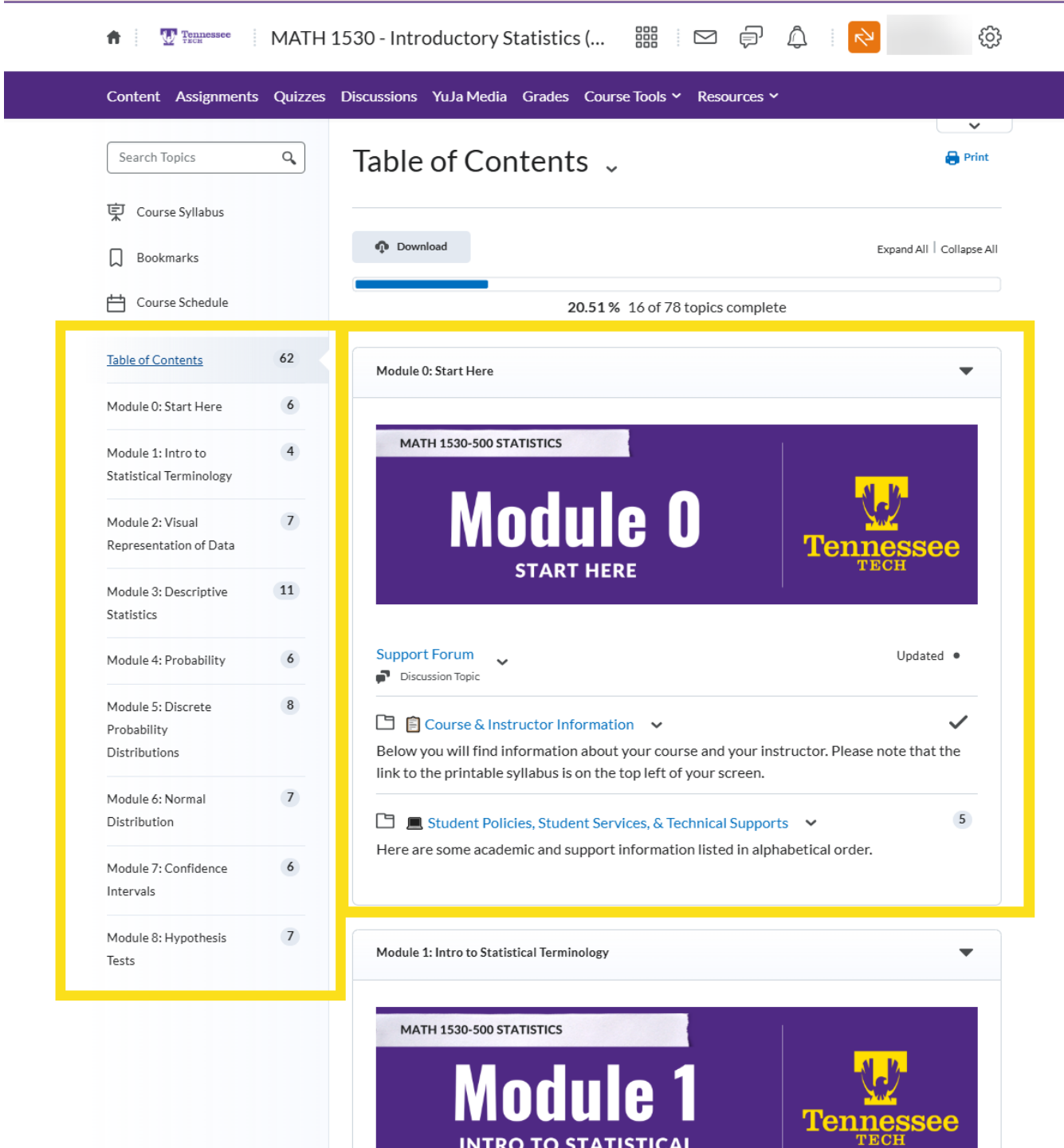
Students need frequent and effective communication from their instructor. Video communication and feedback can be invaluable.

Establish clear expectations early in the course

Accessibility! Closed captioning in videos, descriptive alt text, and color contrast in my design style.

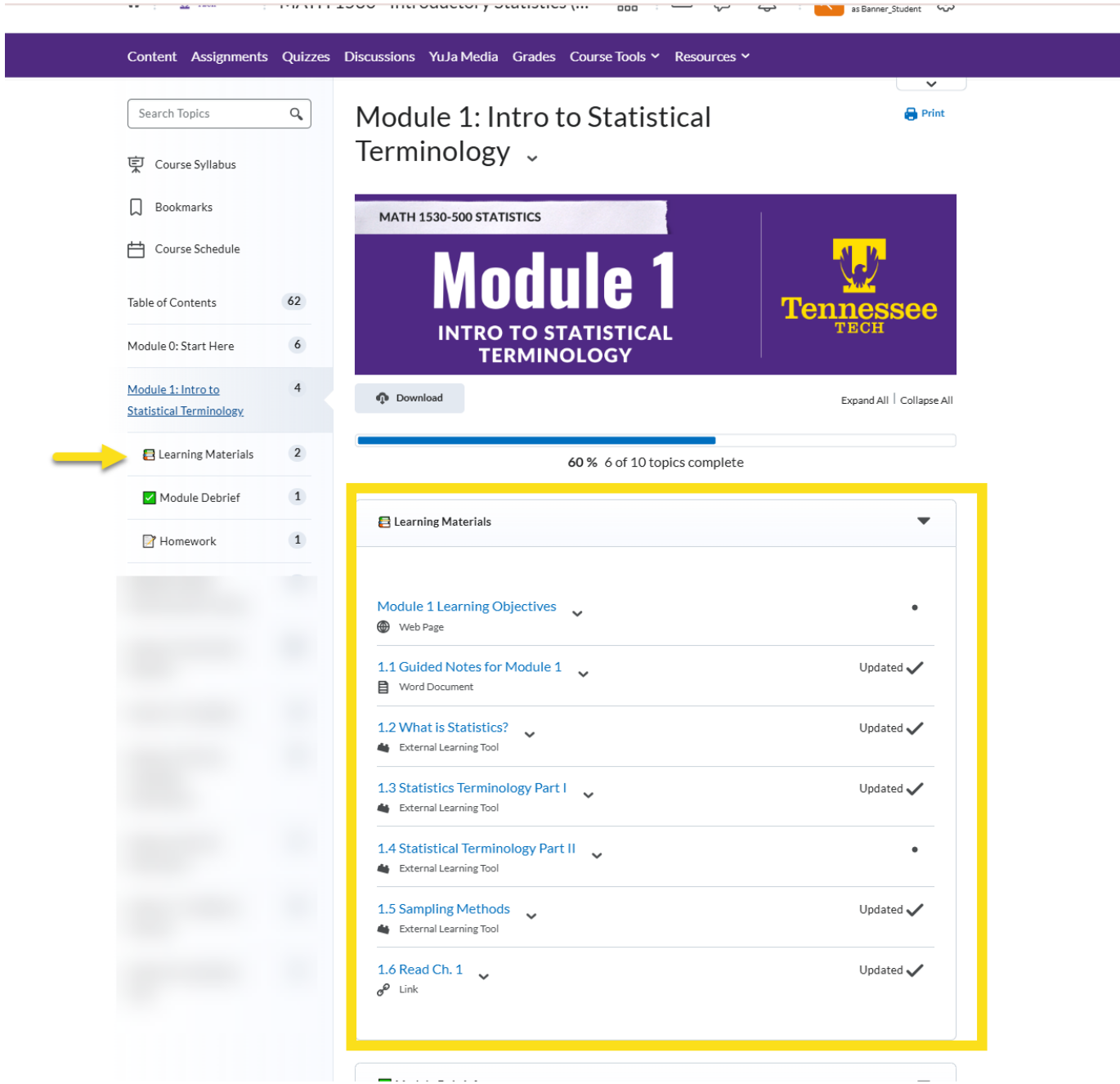
Course Navigation

- Worked with CITL to implement a Tech Course Template in iLearn, based on OLC rubric for best practices in online learning.
- 8 modules, with consistent use of 3 submodules (Learning Materials, Module Debrief, and Homework)



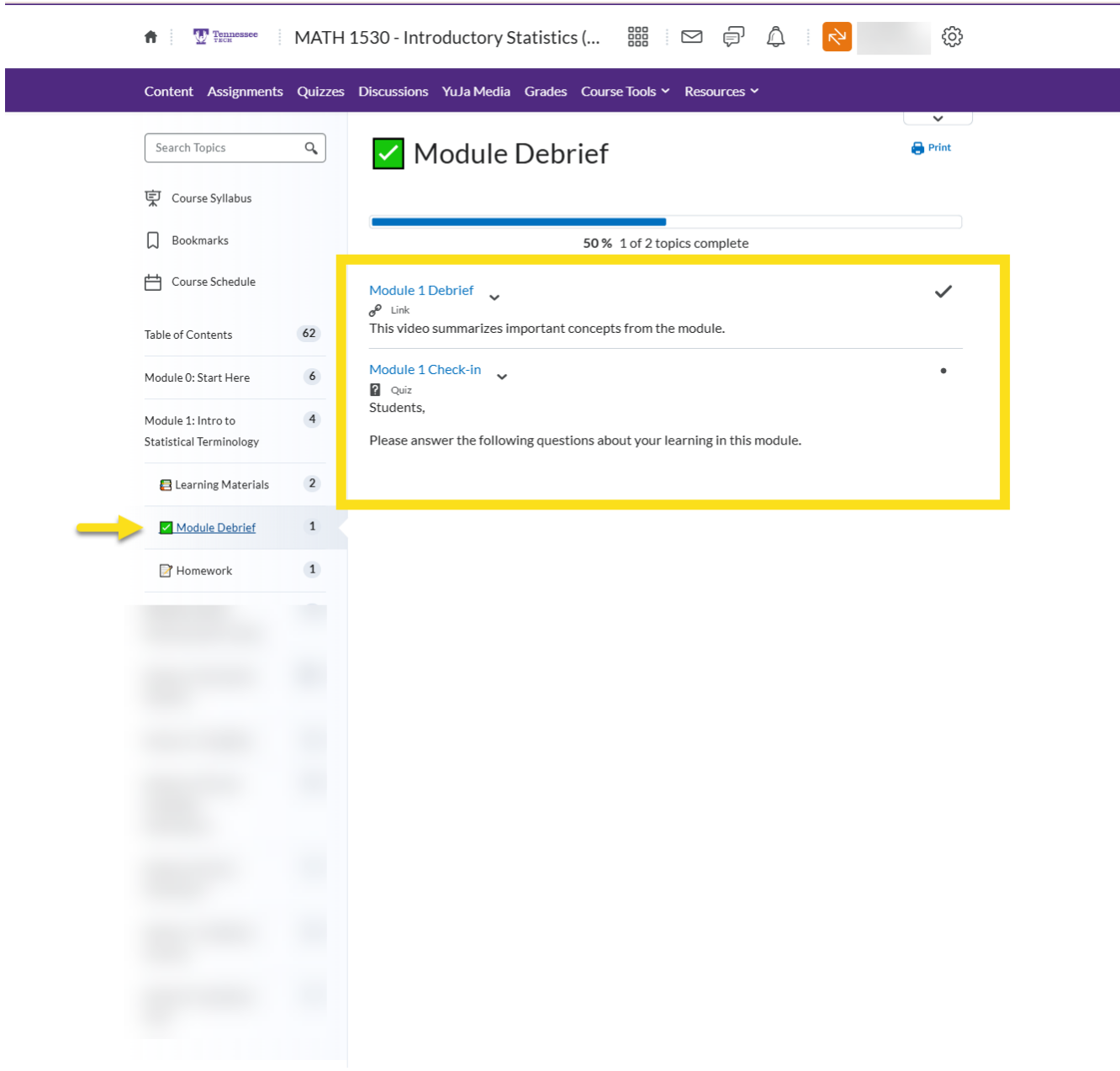
Course Organization

- The learning objective for each module is published within that module and all activities and assessments within this module support this objective.
- I included more frequent low stakes formative assessments in course, utilizing Yuja Playback Quizzes.
- Each module in my course has multiple low stakes assessments. For example, each module has lecture playback quizzes, check in quizzes and homework.
- These will be monitored and reviewed by me to remediate instruction if necessary.



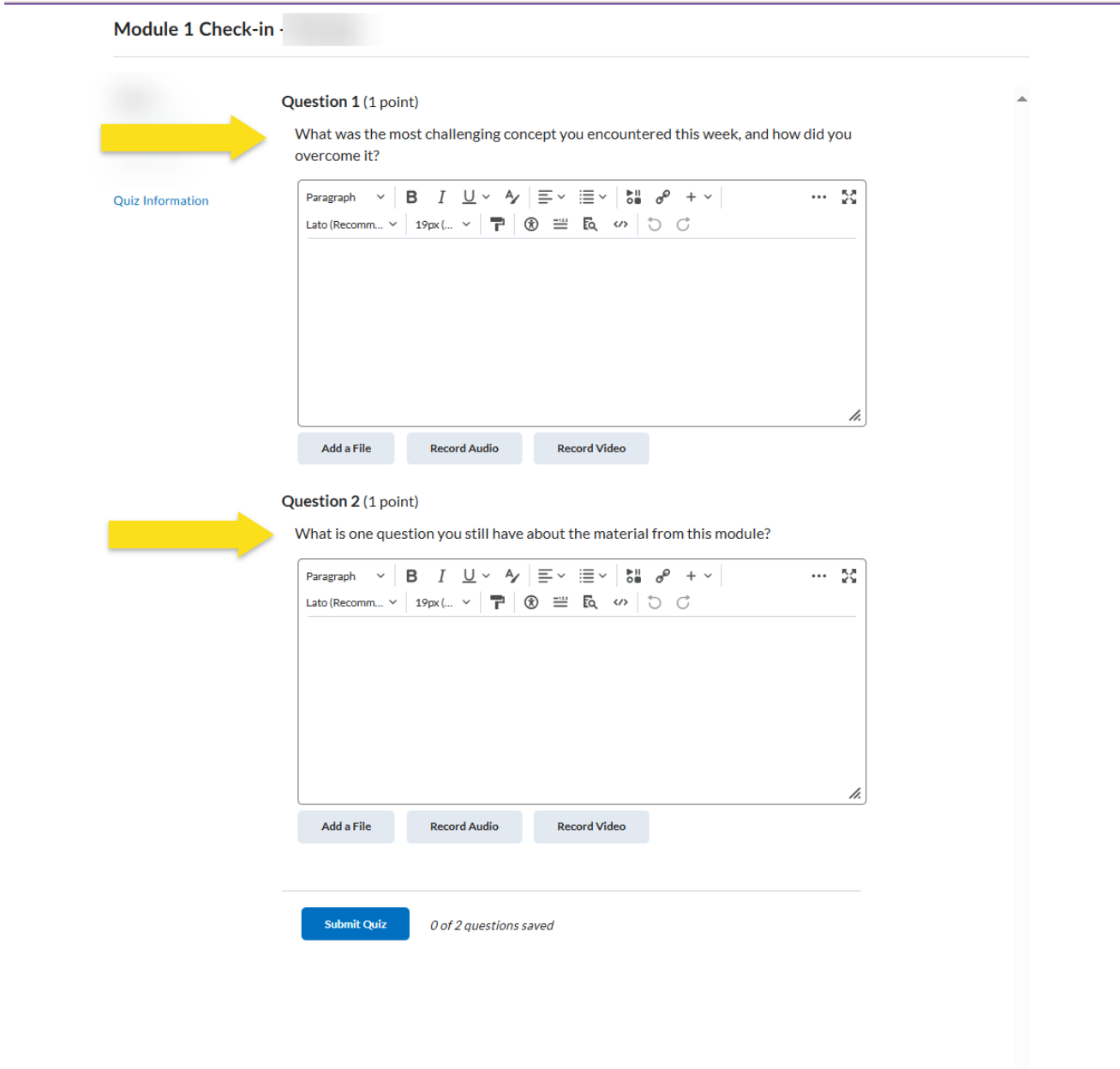
Module Debrief

- To personalize the learning for students, I included a Debrief sub-module where I work through the problems that they request in a Yuja video.
- The Module Check-in helps facilitate just-in-time instruction or help for students before they move on to the next module.



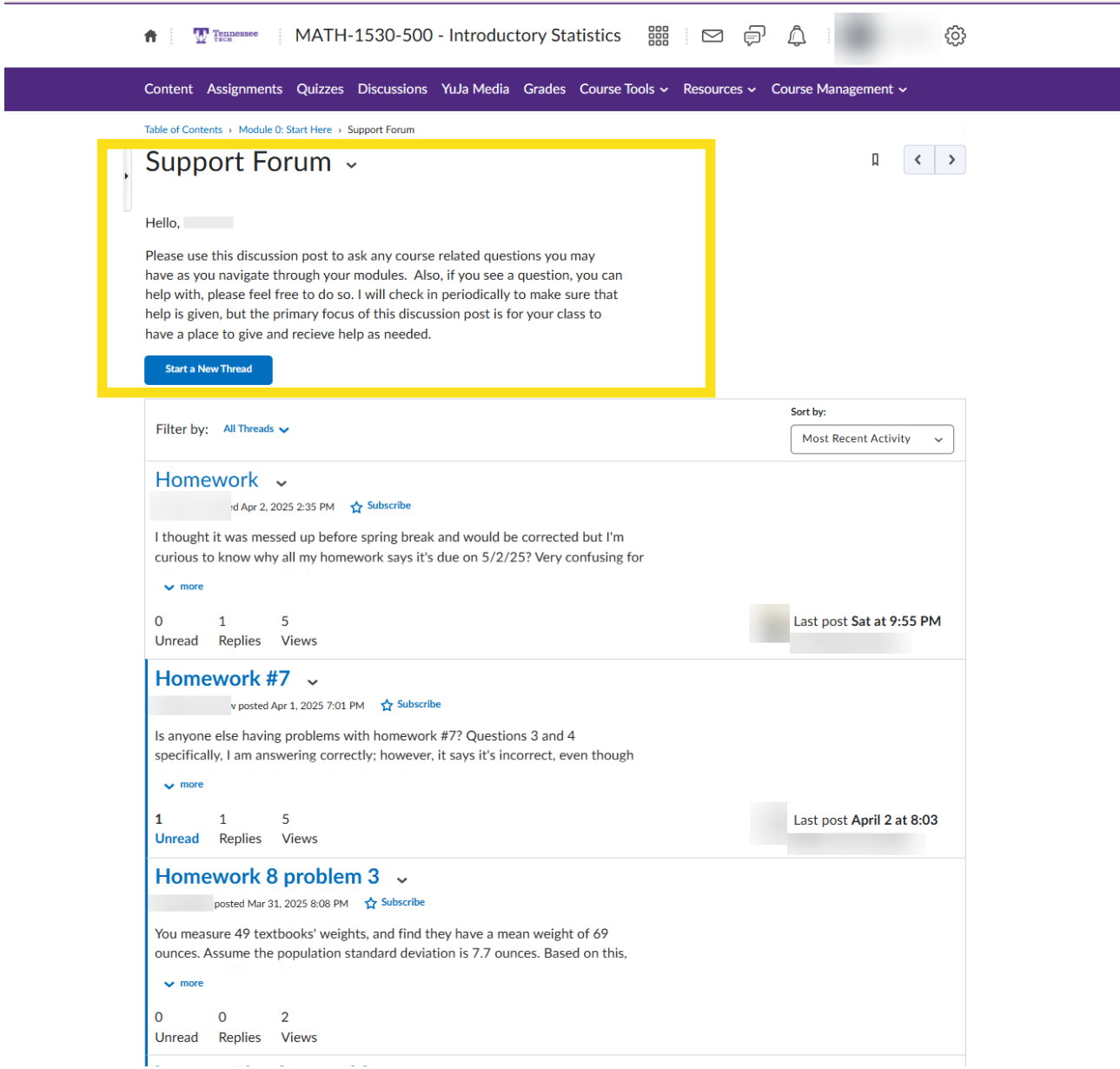
Module Check-In

- For consistency, I used the same two questions for each module Check-In.
  - What was the most challenging concept you encountered this week, and how did you overcome it?
  - What is one question you still have about the material from this module?



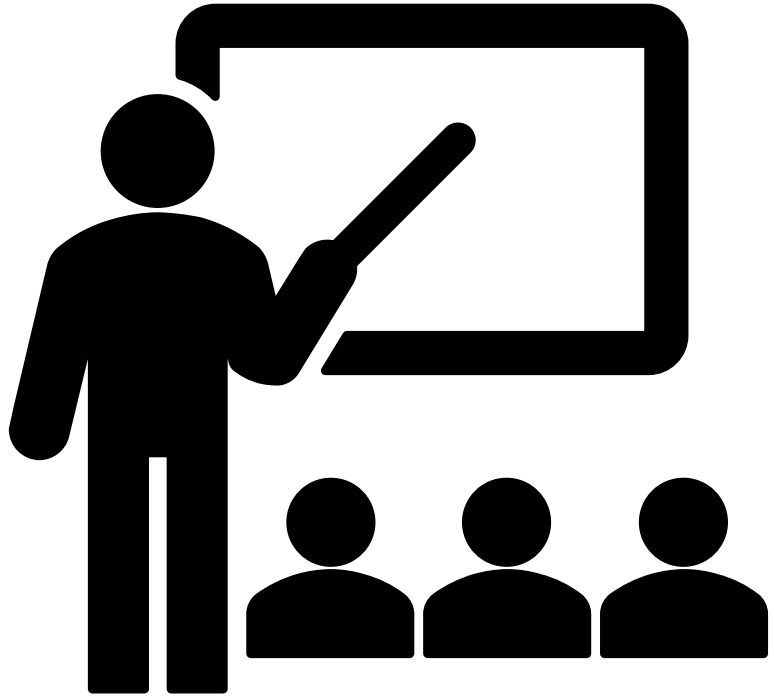
Support Forum

- The Support Forum, located in Module 0, was widely used by students.
- I moderated and answered questions, but students also interacted and helped each other.
- Going forward, I'm going to include this forum within the modules, based on student feedback from MID.



Next Steps

During the summer, I plan on further enhancing the course for a blended option of Math 1530.



Dr. Evan Hart

Geology

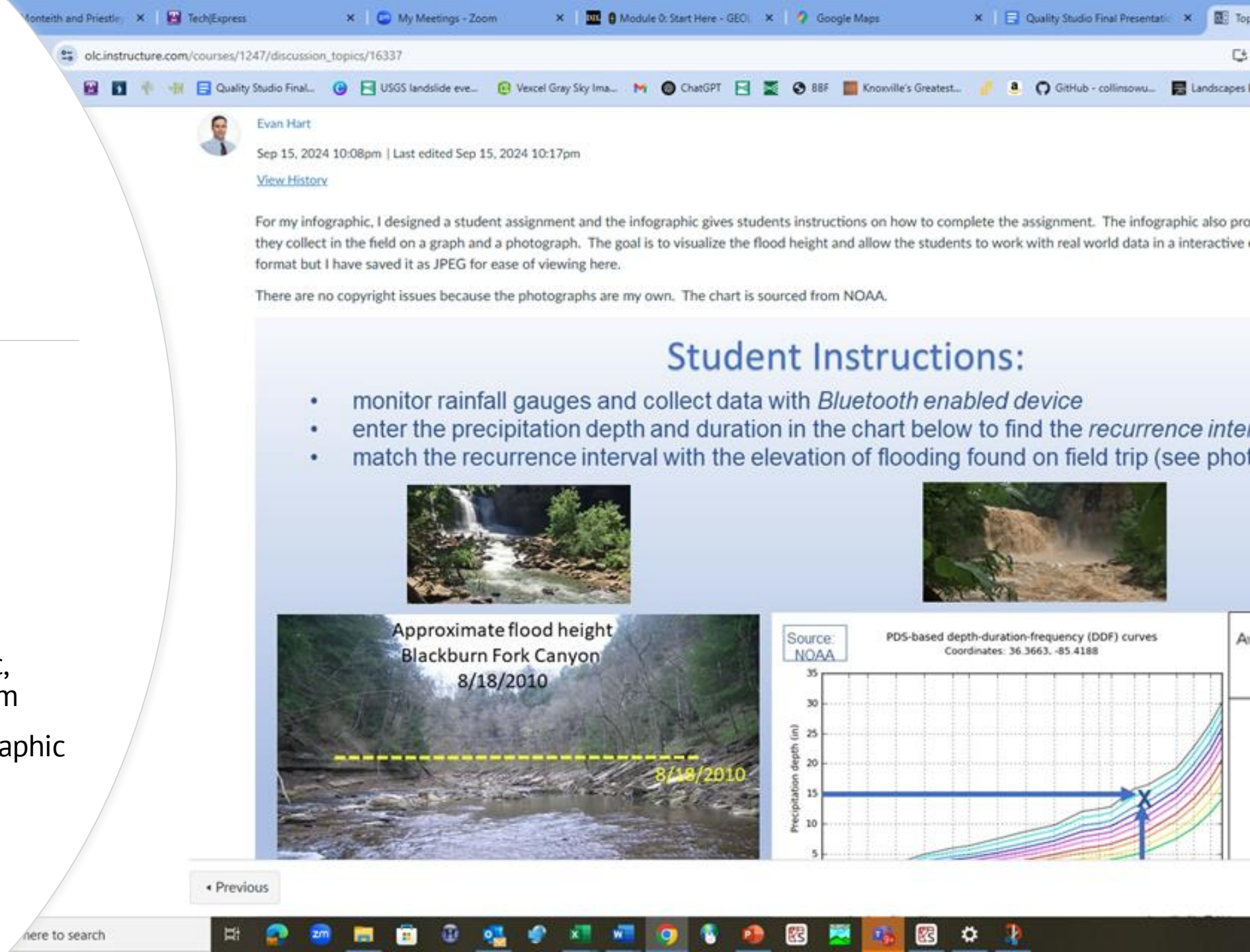
College of Arts & Sciences

Geology 3200 Grant Overview

Elective 1: Infographics

Key learning points:

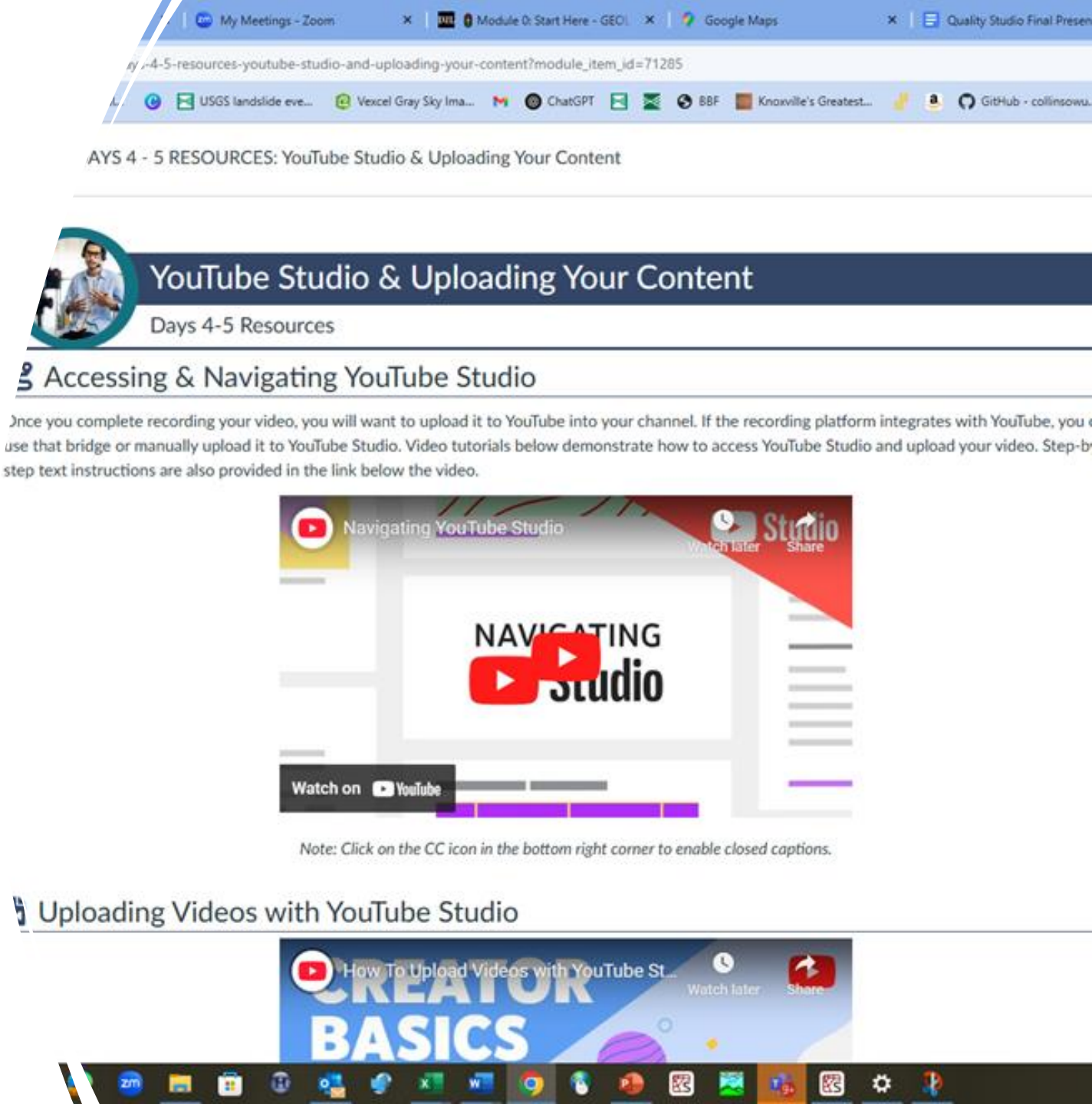
- History of Infographics
- Accessible infographics
- Teaching with infographics
- GEOL 1045 course has component where students make their own infographic, share and comment on them
- I have also designed infographic to go in my lectures

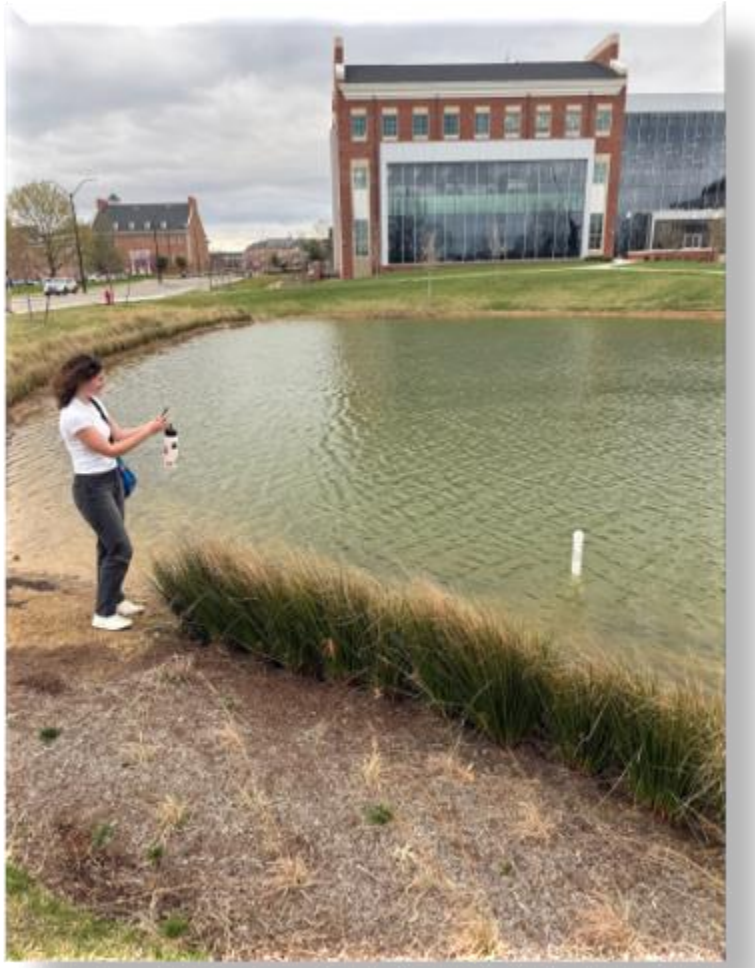


Elective 2:
YouTube for Teaching

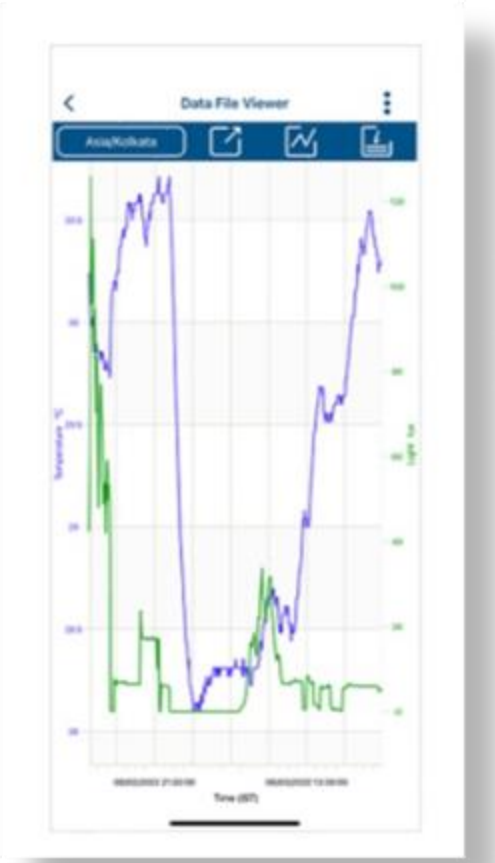
Key learning points:

- Playlists
- Making a YouTube Channel
- Adding text to your videos
- GEOL 1045 course has component where students make their own YouTube Video and share it with classmates and discuss





Technology: GEOL 3200—
Bluetooth logger installed in TTU pond



Technology: GEOL 3200—students access pond level, temp, and conductivity data from their device

Thank you!

- Feedback Survey
- iLearn (D2L) Pulse Survey
- CITL Summer Intensive Registration

Next Week's Session: Unlocking the Power of Copilot - A Beginner's Guide to Generative AI

Register