

# CITL TECHTRENDSSETTERS

## Redefining Classroom Boundaries

**Chelsea Dowell, DBA**

ECON 2020: Principles in Macroeconomics | Spring 2026



**Tennessee Technological University**

Economics, Finance & Marketing | Lecturer

### OLC Online Teaching Certification Program Electives

- ADA & Digital Accessibility
- AI-Powered Course Design
- Podcasting for Teaching and Learning

### OLC Key Take Aways

- Collaboration with instructors across disciplines provided valuable insights into shared challenges and innovative teaching approaches.
- OLC training strengthened my confidence in implementing safe, ethical, and discipline-aligned AI practices in the classroom.
- The AI trainings and structured research assignment directly reflect how economists use AI in professional settings today.
- Integrating IMPLAN input-output modeling enhances students' career readiness while reinforcing the application of core economic theory.

### Technological Innovation

- Virtual Reality Applications
- AI-Powered Analysis Tools
- Economic Impact Input-Output Modeling Software



Figure 1: AI-Generated Image Developed by Students for a Consulting Project

### Introduction

General education courses like ECON 2020: Principles of Macroeconomics are more than degree requirements; they're powerful launchpads for student success. Yet, when taught traditionally, they can sometimes feel distant from students' lives and ambitions. This initiative transforms that experience by integrating immersive technologies that make learning vivid, meaningful, and connected to the real world. Through hands-on experiential learning, industry-recognized credentials, and future-focused skill development in AI and data literacy, students don't just learn concepts; they live them. Along the way, they build confidence, uncover their strengths, and develop the skills needed to thrive in an evolving economy. Ultimately, this work empowers students to find their voice, embrace their potential, and step boldly into meaningful, purpose-driven careers.

### Objective

To increase retention and success in ECON 2020 by integrating Virtual Reality and ethical AI tools that make global economic concepts tangible, engaging, and relevant to students' lives and careers.

### Methodology

- **Virtual Reality Exploration:** Students use VR apps to visualize economic growth models and GDP measures across developing and developed nations.
- **AI Integration:** Ethical AI tools assist students in analyzing monetary and fiscal policies, reinforcing digital literacy and critical thinking.
- **Global Perspective:** Technology expands classroom boundaries, connecting students to real-world economic systems and fostering a sense of relevance.
- **Instructor Training:** Faculty receive guidance on ethical AI use to ensure responsible integration and maximize student benefit.



Figure 2: Image of Managerial Economics Students Consulting the Mayor of Byrdstown

### Successes

- Integrated AI and digital literacy credentialing into the economics curriculum, resulting in **263** students earning **1,236** credentials in Fall 2025.
- Supported student mastery of tools like IMPLAN, enabling Managerial Economics students to present economic development research to the Center for Rural Innovation and the City of Byrdstown, leading to community partners actively recruiting students for internships and fellowships.
- Helped four students secure job interviews by showcasing their service learning research projects on their résumés.
- One student was invited to speak at the Career Technical Education Advisory Board meeting, where he advised business leaders and school system board members on digital literacy and economic research, earning recognition for his consulting work and AI Digital Literacy Badge.

### Looking Ahead

- **266** additional students will soon have access to five new AI and digital literacy credentials to enhance their professional profiles.
- Students will apply their skills in ethical AI use to craft economist-style opinion editorials.

### Acknowledgements

- Frank Clark - TN Main Street Assistant Director of Community and Rural Development with TN Dept. of Economic and Community Development
- Sam Gibson - Mayor of Byrdstown
- Stephen Bilbrey - County Executive for Pickett County
- Stephanie Coutta - Service/Retail Representative (Gibson Tax Service) on the Dale Hollow Board of Directors
- Emily Gibson - Security Sales Consultant for Twin Lakes
- Dr. Michael Aikens - Acting Vice President for Research and Economic Development
- Kelley (Hunter) Gresham, Andrea Kruzka, & Stephanie Byrd - the Center for Rural Innovation
- Shanae Tyree - Director of Operations and Finance, Center for Rural Innovation
- Dr. Jason Beach, Mallory Matthews, Taylor Chesson, & Emmie Acuff - CITL

# CITL TECHTRENDSETTERS

## Redefining Classroom Boundaries

**Jonathan Wiley, Ph.D., LPC (VA), NCC, BC-TMH**

COUN 7840: Regional Mental Health and Addiction Services | Spring 2026



**Tennessee Technological University**

Counseling and Psychology | Assistant Professor

### OLC Online Teaching Certification Program Electives

- ADA & Digital Accessibility
- AI-Powered Course Design
- Podcasting for Teaching and Learning

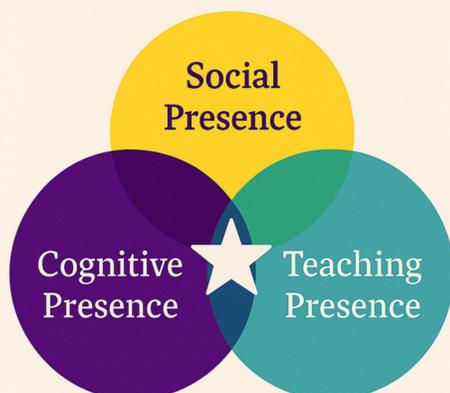
### OLC Key Take Aways

- Community of Inquiry Framework (Garrison et al., 2000)
  - Social Presence
  - Teaching Presence
  - Cognitive Presence
- Online tools enhance connection with students across in-person, hybrid, blended, and online learning environments.

### Technological Innovation

- Blended Research Collaboration Space
- Logitech Group Conference Cam
- Logitech Connect Portable Conference Cam
- Microsoft Teams- Course Teams via iLearn
- Microsoft Planner- Project Management App

### COMMUNITY OF INQUIRY



### Introduction

Graduate counseling students often face challenges in developing research and collaboration skills due to barriers of time, space, and access to authentic environments. These challenges can lead to disengagement and attrition. This initiative leverages emerging video technologies to create connected, collaborative spaces that foster engagement, confidence, and persistence.

### Objective

To improve retention and success among counseling graduate students by providing authentic, real-time research collaboration opportunities that strengthen academic skills and professional identity.

### Methodology

- **Connected Lab Spaces:** High-quality video conferencing tools link multiple counseling labs, enabling synchronous collaboration between students and faculty.
- **Authentic Research Engagement:** Students work on real-world mental health and addiction issues, applying theory to practice in a supportive environment.
- **Flexible Access:** Remote participation removes barriers of time and location, reducing stress and increasing program accessibility.
- **Collaborative Learning:** Group projects and peer interaction build community and belonging—critical factors for graduate student retention.

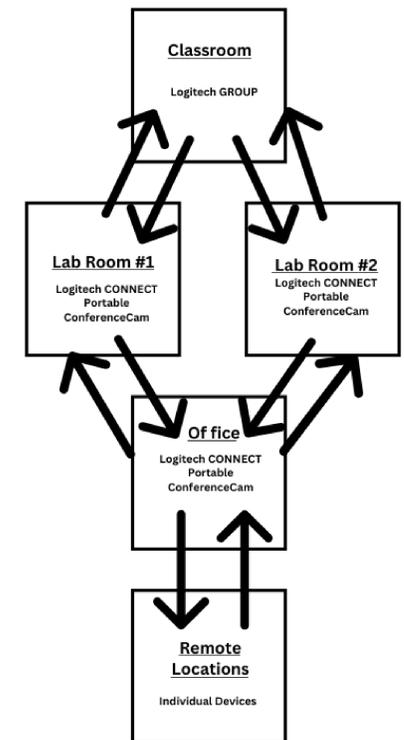


Figure 2: Diagram of the Blended Learning Model that Shows Interconnected Relationships Between the Classroom, Lab Spaces, Instructor's Office, and Remote Locations

### Looking Ahead

- Develop blended research and learning environments that integrate traditional in-person with the principles of the Community of Inquiry model.
- Establish blended research labs that utilize both personal and virtual connections, reducing reliance on physical research spaces.

### Key Sources & Acknowledgements

- Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education*, 2(2-3), 87-105. [https://doi.org/10.1016/S1096-7516\(00\)00016-6](https://doi.org/10.1016/S1096-7516(00)00016-6).
- Garrison, D. R. (2017). *E-learning in the 21st century: A community of inquiry framework for research and practice* (3rd ed.). Routledge. <https://doi.org/10.4324/9781315667263>
- Thank you to Dr. Heather Rippetoe for outstanding support and encouragement throughout the grant process, and to students from COUN 7840: Regional Mental Health and Addiction Services (Fall 2023), who helped inspire this project.

Figure 1: AI-Generated Community of Inquiry Diagram

# CITL TECHTRENDSSETTERS

## Redefining Classroom Boundaries

Kyle Murphy, Ph.D.

CHEM 3010: Organic Chemistry 1 | Fall 2025



Tennessee Technological University

Chemistry | Assistant Professor

### OLC Online Teaching Certification Program Electives

- ADA & Digital Accessibility
- AI-Powered Course Design
- Hybrid-Flexible (HyFlex) Course Design

### OLC Key Take Aways

- Provide captions and transcripts for all recorded lectures.
- Ensure LMS navigation is clear and consistent with proper headings.
- Add descriptive alt text and captions for complex STEM visuals like reaction mechanisms.
- Use AI tools for captioning and lecture summarization to improve accessibility.
- Generate practice problems and study aids with AI, ensuring instructor review.
- Establish clear ethical guidelines for student use of AI in coursework
- Offer three participation modes: in-person, synchronous online, and asynchronous online.
- Ensure consistent learning outcomes and equitable assessments across all modalities.
- Use PollEverywhere questions and discussion boards for engagement.

6\*) The following molecule below, norbornane (also known as bicyclo[2.2.1]heptane), has the 1 and 4 positions of cyclohexane "connected" by a CH<sub>2</sub> group (known as a bridgehead). It cannot exist as a chair conformation in the same way simple cyclohexanes can. Thus, in a Generative AI software, please prompt it the following question: "What conformation does the molecule norbornane exist as, and why?" Elaborate if the AI's response is accurate or not using online/textbook resources, and explain why. (1 pt)

Norbornane:



AI Answer via Chat GPT:  
Norbornane exists in a rigid, locked bicyclic conformation resembling a fused chair-boat structure. It is conformationally rigid because the bridging carbon atoms constrain bond rotations, minimizing strain and preventing interconversion between other possible forms.

According to the Open Stax text book, AI is correct. Norbornane is conformationally locked into a boat cyclohexane ring. The additional CH<sub>2</sub> group on carbons 1 + 4 are a primary reason for this locked structure. AI is also correct in classifying norbornane as a bicyclic since 2 rings would need to be broken to form an acyclic structure.

### Introduction

Organic Chemistry I (CHEM 3010) is a critical gateway course for STEM majors, often associated with high attrition rates due to its complexity. Traditional homework and problem sets provide practice but can leave students feeling isolated. This project integrates AI-driven learning tools to create a more supportive, interactive environment that fosters confidence and persistence.

### Objective

To increase student retention and success in organic chemistry by leveraging AI as a guided problem-solving partner, encouraging critical thinking, and reducing barriers to mastery.

### Methodology

- **AI Integration:** A subscription-based AI platform was incorporated into guided assignments, allowing students to interact with the tool for problem-solving.
- **Critical Evaluation:** Students assessed AI-generated solutions for accuracy and conceptual integrity, promoting higher-order thinking.
- **Instructor Facilitation:** AI use was structured and supervised to ensure quality learning outcomes, followed by an end-of-semester survey.
- **Cost Management:** A six-month subscription was funded through the grant's technology start-up budget, with an OER textbook and free Copilot access minimizing financial burden on students.

### AI Survey Results

- "Explaining AI's mistakes helped me spot my own."
- "(AI-generated study guides) were moderately useful—explains concepts, but poor visualization and mistakes in problem solving."
- "AI was right maybe 10–20%... Half the time couldn't even get the right molecule."
- "About 50% of the time, AI was at least partially correct. There was usually at least one thing in the AI explanation that did not line up with lecture principles."
- "At times, I found the AI homework problems interesting. However, they definitely challenged me more than most other homework problems."
- "Deciphering when AI was correct versus incorrect was the most frustrating part of using AI in this course."
- "I thought the AI generated lecture transcripts and study guides were helpful. At times, I found the AI homework problems interesting. However, they definitely challenged me more than most other homework problems."

| Metric                                       | Count (n=27) | Notes  |
|--|--------------|--|
| Valuable/Moderately Valuable                 | 21           | Concept reinforcement; organization; verification value                      |
| Limited/Not Valuable                         | 4            | Prefer traditional resources; visuals missing                                |
| Unclear/Non-codable                          | 2            | Blank or image-only forms  |
| AI Mostly Incorrect/Partial                  | 17           | 10–50% correct; conflicts; poor visuals                                      |
| AI Often Correct (simple items)              | 8            | Some report ~50% or 'usually right' on basics; a few outliers 'always right' |
| Did Not Use AI for Homework                  | 3            | Avoided due to prior experience/trust  |
| Verification Improved Understanding (Yes)    | 22           | Error-spotting; deeper reasoning   |
| Verification Not/Mixed                       | 5            | Mixed impact or preferred other resources                                    |
| Summaries Helpful                            | 17           | Concise review/organization  |
| Questions Underused/Issues                   | 12           | Lack of answer keys; style mismatch  |
| Would Use AI Outside Class (Yes, supplement) | 11           | Quick clarification/organization   |
| Would Not Use Outside Class                  | 14           | Trust/accuracy concerns; prefer notes/videos                                 |

Table 1: Student Perceptions of AI Tool Usefulness, Accuracy, and Verification Benefits (n = 27), with Qualitative Notes Highlighting Dominant Themes.

### Technological Innovation

- Free Generative AI technology as a self-evaluation tool for understanding critical concepts in organic chemistry.

### Looking Ahead

- AI is most effective for reinforcing concepts, organizing material, and critical analysis, but struggles with even simple mechanisms and organic chemistry visuals. Improved integration may include more guided prompts and provided visuals, but "better visuals" is an inherent problem with current generative AI.
- Trust in AI is limited, as most students prefer to use it as a supplemental resource. Though students value the opportunity to verify and critique AI answers, which enhances learning.
- AI is once again being integrated into a first-semester organic class for Spring 2026, with results and data being accumulated for potential conference presentations and peer-reviewed publication pending IRB approval.

### Acknowledgements

Thanks to: TN TechTrendsetters Grant, the Center for Innovation in Teaching & Learning (CITL), and Lacy Means for assistance and guidance through this process and the OTC course in general.

Figure 1: AI-Generated Question Example

# CITL TECHTRENDSETTERS

## Redefining Classroom Boundaries

Udit Sharma, Ph.D.

ME 4730: Numerical Heat Transfer | Fall 2025



Tennessee Technological University

Mechanical and Nuclear Engineering | Instructor

### OLC Online Teaching Certification Program Electives

- ADA & Digital Accessibility
- Adaptive Learning Strategies and Tools
- AI-Powered Course Design

### OLC Key Take Aways

- **Presence as a Catalyst:** Moving beyond content delivery to foster Teaching, Social, and Cognitive Presence, ensuring students feel supported in a complex computational environment.
- **Accessibility by Design:** Implementing ADA standards and UDL (Universal Design for Learning) ensures that complex numerical data and MATLAB interfaces are navigable for all learners.
- **Adaptive Remediation:** Shifting from "one-size-fits-all" to personalized learning paths where feedback and quiz difficulty adjust based on student mastery of partial differential equations (PDEs).
- **Ethical AI Integration:** Moving from banning AI to "AI-Powered Course Design," teaching students to use Generative AI for code debugging and brainstorming while maintaining academic rigor.

### Technological Innovation

- Thermal Imaging Cameras
- Heat Conduction Kits
- Pitot Static Tube
- CFD

### Introduction

#### Student-Centered Computational Engineering

Retention in engineering programs is intrinsically linked to student success in high-stakes, "gateway" advanced courses. Traditional, passive lecture models often fail to bridge the gap between abstract mathematical theory and physical intuition, leading to decreased engagement and higher attrition. This initiative redesigns ME 4730: Numerical Heat Transfer as a student-centered ecosystem. By integrating collaborative team projects and individualized adaptive assessments, I shift the focus from rote memorization of numerical schemes to the active, immersive modeling of thermal systems, fostering the confidence and persistence necessary for professional engineering roles.

### Objective

The primary goal is to enhance student retention and mastery by synthesizing interactive adaptive tools with real-world collaborative applications. By making high-level concepts—such as finite difference formulations and stability analysis—more accessible through personalized learning paths, I aim to transform numerical heat transfer from a theoretical hurdle into an engaging, practical skill set applicable to aerospace, automotive, and energy systems.

### Methodology



#### Tactile Visualization:

- Utilized heat pipes and copper tubes to provide a physical baseline for transient heat conduction.
  - Employed an innovative balloon-shaping activity to conceptually demonstrate the behavior of solution domains and characteristic lines in hyperbolic and parabolic systems.



#### Adaptive Digital Learning:

- Implemented adaptive iLearn modules and MATLAB simulations that provide immediate feedback and remediation based on student performance.
  - Step-wise simulation tasks: Students begin with explicit schemes and transition to implicit methods as they demonstrate mastery of stability criteria.



#### Collaborative Modeling:

- Semester-long Team Projects: Students work in groups of 3-4 to model real-world scenarios (e.g., cooling systems or heat exchangers).
  - In-Person Milestones: Mid-semester and final presentations ensure collective accountability and peer-to-peer knowledge transfer.



#### AI-Enhanced Debugging:

- Integrated Generative AI as a "logic partner" for initial code structure and debugging, requiring students to document and verify AI outputs against analytical data.

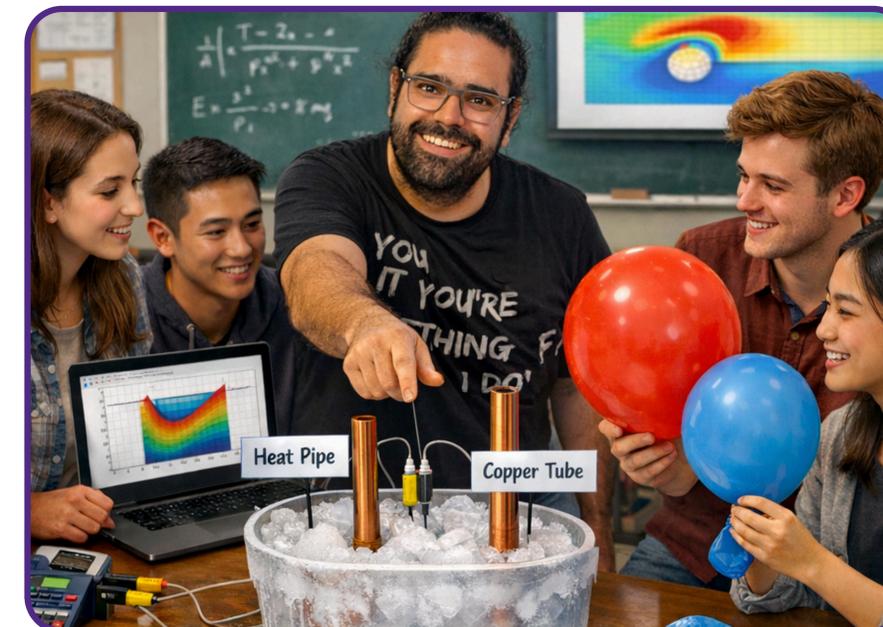


Figure 1: AI-Generated Image of the Class and the Expectations for the Experiment

### Looking Ahead

- The next phase of this curriculum development focuses on deepening the collaborative experience and expanding our technical toolkit. Future iterations will:
- Expand Collaborative Frameworks: Increase the frequency of low-stakes peer-review sessions to build a stronger community of practice.
- Full Hardware Deployment: Reintegrate planned thermal imaging and pitot tube setups to provide a broader range of experimental data for CFD comparison.
- Refined Adaptive Paths: Use data from this semester's reflections to create even more granular "just-in-time" support modules for the most challenging topics, like non-linear systems and error mitigation.

### Acknowledgements

- Special thanks to:
  - Tennessee Technological University, Department of Mechanical and Nuclear Engineering.
  - Dr. Sally Pardue and Carrie Robinson for their invaluable guidance, administrative support, and dedication to engineering education.
  - The Center for Innovation in Teaching and Learning (CITL) for providing the resources and opportunity to participate in the OLC workshop series and grow as an educator.

# CITL TECHTRENDSETTERS

## Redefining Classroom Boundaries

Luke Anderson, Ph.D.

SEED 5120: Materials & Methods of Teaching English | Spring 2026



Tennessee Technological University

Curriculum and Instruction | Lecturer

### OLC Online Teaching Certification Program Electives

- ADA & Digital Accessibility
- Increasing Student Interaction and Engagement
- Assessment Strategies that Engage Students

### OLC Key Take Aways

- Utilize available technology for supplementing instruction, helping facilitate self-learning and peer interaction during the course.
- Create accessible courses so all students may access content equally. Many easy adjustments make a significant difference for accessibility (e.g., alternative text for images).
- Online courses are often lacking in formative assessments, so providing frequent, low-stakes checks for understanding. Creator+ options in iLearn help facilitate interactive checks for understanding.
- Overcome social, administrative, and motivational barriers to student engagement. Two methods are ensuring an easy course interface and providing more multimedia options for interacting with course content.

### Foundations of Online Teaching Course Changes Made: Improved Course Interface

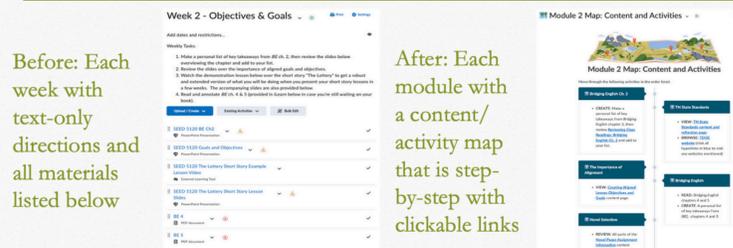


Figure 1: Foundations of Online Teaching Course Changes Made: Improved Course Interface

### Introduction

Graduate students in online programs often face challenges with engagement and connection, which can lead to lower satisfaction and higher attrition rates. The former online version of SEED 5120: Materials & Methods of Teaching English was lacking in interactive experiences, which were available in its undergraduate counterpart. This project addresses these gaps by creating a dynamic, engaging online environment that supports persistence and success.

### Objective

Increase retention and success among online graduate students by redesigning SEED 5120 into a more interactive, visually appealing, and user-friendly version that fosters a sense of belonging and academic confidence.

### Methodology

- **Authentic Learning Experiences:** Integrate real-world literacy instruction examples at key points in the course to connect theory with practice.
- **Interactive Design:** Redesign the course in iLearn for improved navigation, engagement, and accessibility.
- **Technology Integration:** Utilize new online tools for more dynamic instruction.
- **Community Building:** Encourage peer interaction and discussion to reduce isolation and strengthen student networks.
- **Expanded Content Library:** Collaborate with three secondary English teachers to provide diverse classroom examples through video, enriching course materials.

### Acknowledgements

- I would like to acknowledge my TTU CITL mentor, Heather Rippetoe, for her tireless efforts and consistent joy when helping with the course redesign; my OLC mentor, Dr. Silvia Braidic, for her feedback and guidance; Dr. Jason Beach and Emmie Acuff for their efforts in facilitating the TechTrendsetter grant program; and the three secondary teachers who volunteered for filming, Jason Crockett, Amelia Hancock, and Allison Payne.
- The takeaways come from various course materials provided through the Online Learning Consortium (OLC).

### Assessment Strategies that Engage Students Course Changes Made: Formative Assessments

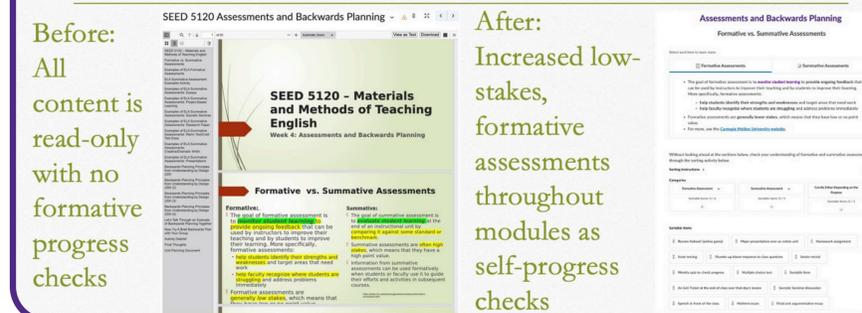


Figure 2: Assessment Strategies that Engage Students Course Changes Made: Formative Assessments

### Successes

- Positive student reception of SEED 5120 course upgrades during the 2026 spring semester (interface, interactive components, and integrated technology like the Perusall group annotation program).
- Consistently monitor for course improvement opportunities that enhance student experience in all courses based on OLC takeaways. Upgrades have already been made to six additional courses beyond SEED 5120.

### Technological Innovation

- Virtual Reality Classroom Simulations
- Expanded Video Library
- Enhanced iLearn Course Design
- Increased Online Tool Integration

### Looking Ahead

- Complete filming and editing authentic 3D secondary ELA classroom experiences for Vision Lab. Upon completion, integrate these into methods course as examples of key strategies.
- Develop virtual practicum course that utilizes 3D videos to supplement what is taught during methods course.

# CITL TECHTRENDSSETTERS

## Redefining Classroom Boundaries

**Cara Sisk, Ph.D., CCLS**

Masters Degree in Child Life | Fall 2026



**Tennessee Technological University**

Human Ecology | Associate Professor

### OLC Online Teaching Certification Program Electives

- ADA & Digital Accessibility
- Assessment Strategies that Engage Students
- Giving Effective Feedback

### OLC Key Take Aways

- The OLC program has set me up for success not only for teaching this one course, but to now create the next 12 online graduate courses to start implementation of our MS Degree in Child Life in the fall of 2026.
- The rigorous courses have provided me with vital exposure to best practices in online teaching and learning experiences for creating high-quality online courses.
- Initially, it was difficult to ensure that the asynchronous online course would have the same relational connection and positive student experience as my on-campus course. Now, I am confident that my priorities of building relationships with students and among students while teaching child life can be successful online as well.

### Course Navigation

- Course Navigation Modules 0-15
- Modules Consistent Sequence
  - Read
  - Watch
  - Due
- Module 0 provides:
  - iLearn Course Navigation
  - Learning Objectives
  - Professor Intro Video
  - Course Information
  - Online Netiquette
  - 15 Week Schedule

- Welcome Message provides direct links to:
  - Module 0
  - Course Syllabus
  - Question & Answer Discussion
  - Instructor's email

### Introduction

Graduate students in fully online programs often face challenges with engagement and connection, which can lead to attrition. Tennessee Tech's School of Human Ecology is launching a fully online Master's in Child Life. This program requires translating hands-on clinical practice into a dynamic virtual environment to support persistence and success.

### Objective

To increase retention and success among online graduate students by creating an interactive, technology-enhanced curriculum that fosters professional identity, confidence, and community.

### Methodology



**Technology Integration:** Learn and apply emerging tools and digital strategies to design engaging online courses.



**Interactive Learning:** Develop activities and assessments that replicate real-world child life scenarios in a virtual format.

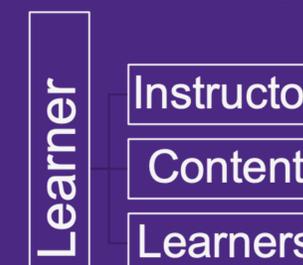


**Student-Centered Design:** Incorporate best practices in online pedagogy, accessibility, and feedback to ensure inclusivity and engagement.



**Skill Development:** Teach students to use digital tools effectively, preparing them for professional practice in diverse settings.

### Interactions in Online Learning



### Instructional Design

#### Alignment of...

1. Learning Objectives
2. Learning Activities
3. Learning Assessments

Figure 2: Course Design Best Practices

### Successes

- Fall 2025, I have successfully created 5 fully online graduate courses for the Child Life MS Degree. I am confident in my course creation abilities because of the OLC course and the support received from the CITL and my Instructional Designer.

### Technological Innovation

- Effective Teaching Technologies
- Digital Accessibility Tools
- Online Assessment Strategies

### Looking Ahead

- Future planning for Spring 2026 includes creating 5 more fully online graduate courses for the Child Life MS Degree, which I am confident I can do successfully.

### Acknowledgements

Thank you to the Center for Innovation in Teaching and Learning for their support, and a special thank you to Mallory Matthews who continues to support me in creating high quality online graduate courses!

Figure 1: Course Navigation

# CITL TECHTRENDSETTERS

## Redefining Classroom Boundaries

**Gourab Bhattacharya, Ph.D.**

GEOL 3210: Geology for Engineers | Spring 2026



**Tennessee Technological University**

Earth Sciences | Assistant Professor

### OLC Online Teaching Certification Program Electives

- ADA & Digital Accessibility
- AI for Collaborative Brainstorming
- Leading in the Age of AI: Future-Ready Policies and Practice

### OLC Key Take Aways

- **Intentional Online Design:** Effective online instruction requires purposeful alignment between learning objectives, activities, and assessments.
- **Accessibility as a Foundation:** ADA compliance and universal design principles improve learning outcomes for all students.
- **AI as a Pedagogical Support:** Generative AI tools can enhance instructional planning, collaborative brainstorming, and formative assessment when used transparently and ethically.

### Technological Innovation

- Macrostrat
- Virtual Earthquake
- ChatGPT Pro, Google Gemini
- Padlet

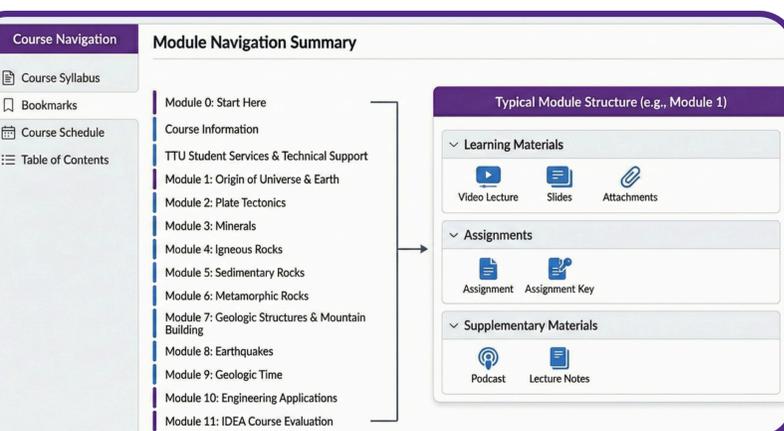


Figure 1: Module Navigation Summary

### Introduction

GEOL 3210: Geology for Engineers is a required gateway course that supports engineering student progression at Tennessee Technological University. Historically delivered face-to-face, the course is transitioning to a hybrid format in Spring 2026 to address persistent challenges related to student engagement, scheduling flexibility, and accessibility. This redesign leverages educational technology to better align course delivery with the learning needs of a diverse engineering student population.

### Objective

To improve student retention, confidence, and academic success by developing an interactive, technology-enhanced online lecture component that complements in-person laboratory instruction. The redesigned course emphasizes active learning, real-world data analysis, and equitable access to instructional resources.

### Methodology



**Asynchronous Video Modules:** Ten short, structured lecture modules developed using Yuja Media, each including six to eight 3-4 minute video lectures arranged in a module playlist with closed captions and downloadable transcripts to meet accessibility standards.



**Embedded Active Learning:** Comprehension checks and Poll Everywhere prompts are integrated within videos to reinforce key concepts and promote continuous engagement.



**Applied Technology Assignments:** Students analyze real geologic and geospatial datasets using tools such as Macrostrat and Virtual Earthquake.



**Equity and Access:** All instructional technologies are open-source or institutionally supported, minimizing financial and technical barriers for students.

### Acknowledgements

This project was supported by the Center for Innovation in Teaching and Learning (CITL) TechTrendsetters Program at Tennessee Technological University. The author acknowledges OLC instructional resources, institutional technology support services, and open-source geoscience software communities that enabled this redesign. Many thanks to Bethany Bovard at the OLC, and Lacy Means, Elizabeth Acuff, and Jason Beach at the CITL for providing quick solutions and feedback.



Figure 2: Padlet Assignment

### Successes

The TechTrendsetters grant supported the development of a structured hybrid framework for GEOL 3210, including ten accessible asynchronous lecture modules. The redesigned course integrates professional geoscience tools (e.g., Macrostrat, Epicenter determination methods), enabling students to engage with real-world datasets and improving instructional consistency, accessibility, and engagement.

### Looking Ahead

Spring 2026 will serve as the full implementation and assessment phase. Future efforts will evaluate student engagement and performance relative to prior offerings, refine content using learning analytics and feedback, and expand interactive and virtual field-based components to support scalability across gateway STEM courses. Advanced software-based learning using V3GEO for 3D spatial analysis and IRIS for advanced seismic analyses will be introduced. The course currently has an 87% accessibility score on iLearn Panorama. The goal is to take it to 95% or higher.

# CITL TECHTRENDSETTERS

## Redefining Classroom Boundaries

Samantha Hutson, Ph.D., RDN, LDN

HEC 6410: Nutrition and Aging | Fall 2025



Tennessee Technological University

Human Ecology | Associate Professor

### OLC Online Teaching Certification Program Electives

- ADA & Digital Accessibility
- Engaging Learners in Online Discussions
- Facilitating Online Group Work

### OLC Key Take Aways

- **ADA and Digital Accessibility:** Gained insight into assistive technologies and explored practical strategies for improving course accessibility, including the use of alternative text for images and methods for evaluating document accessibility.
- **Engaging Learners in Online Discussions:** Examined pedagogical, social, managerial, and technical roles in online learning environments, with emphasis on the 3Cs and a Q framework (compliment, content-focused comment, connection to course material, and a question) to promote meaningful discussion.
- **Facilitating Online Group Work:** Reviewed research on the effectiveness of collaborative learning, including its impact on problem-solving skills and content retention. Identified best practices such as optimal group sizes (3-5 students) and key models of effective group work, including open-ended tasks, activities incorporating multiple perspectives, jigsaw-based resource sharing, and small-group discussions within large classes.

### Introduction

Online graduate programs often face challenges with engagement and skill application, which can lead to attrition. The Community Health and Nutrition program prepares students for diverse professional roles, but its asynchronous format requires innovative strategies to keep students connected and motivated. This initiative uses AI-driven simulations to create authentic, interactive learning experiences that foster confidence and persistence.

### Objective

To increase retention and success among graduate students by integrating AI tools into coursework, enabling realistic counseling practice, and improving digital literacy for future professional settings.

### Methodology

- **AI-Powered Simulations:** Students conducted typed and verbal “counseling sessions” with AI-generated clients, receiving feedback to refine their skills.
- **Skill Development:** Activities focused on building communication, critical thinking, and technology proficiency—essential for career readiness.
- **Course Redesign:** Online Learning Consortium resources guided updates to improve engagement and accessibility.
- **Progressive Practice:** Students applied feedback iteratively, reinforcing learning and confidence.
- **Student Engagement:** Designed and implemented instructional strategies that increased peer-to-peer, learner-to-content, and learner-to-instructor interaction.

### Simulated Counseling Session Instructions and Deliverables:

Open ChatGPT and initiate a roleplay using the prompt provided in italics above.

Conduct a 10-15 minute session where you:

- Build rapport
- Use motivational interviewing techniques
- Provide nutrition education
- Set one short-term SMART goal with the client
- Bonus goal: one long-term SMART goal with the client

**Written Submission (3-4 pages, double-spaced):**

**Session Summary:**

- Describe the main nutrition concerns identified during the session
- Identify where you used motivational interviewing techniques and how you could improve on that skill
- Summarize the SMART goals and counseling strategies used

**Clinical Rationale:**

- Provide evidence-based explanations for your nutrition recommendations

Figure 2: AI-Simulated Counseling Session Instructions & Deliverables

### Technological Innovation

- Microsoft Copilot
- ChatGPT
- AI Clinical Case Studies
- Perusall
- Podcasts

### Looking Ahead

- Continue refining assignments and modules to integrate a wider range of instructional tools and formative learning activities across all courses.
- Apply established accessibility practices consistently in courses to support inclusive design, improve navigation, and ensure equitable access to course content.
- Incorporate emerging educational technologies to diversify instructional approaches, support varied learning preferences, and encourage student exploration of academic resources.

### Key Sources & Acknowledgements

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- The author acknowledges Mallory Matthews, Instructional Designer at Tennessee Tech’s Center for Innovation in Teaching and Learning (CITL), for her valuable contributions and instructional design expertise.

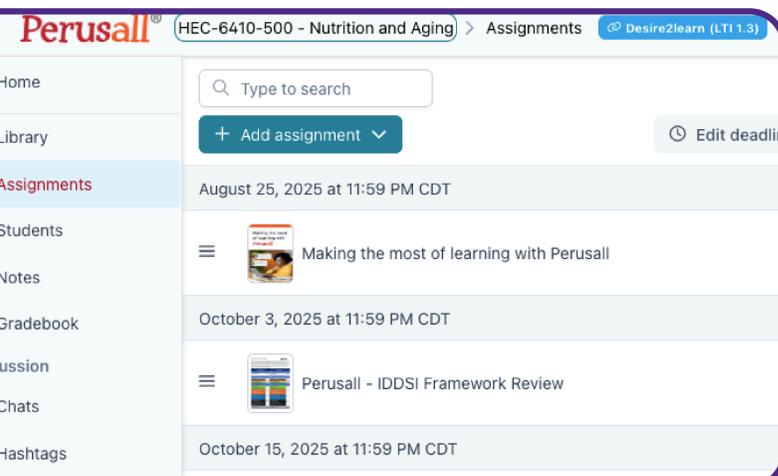


Figure 1: Perusall AI-Generated Case Study