Large Lecture Consortium - How is AI impacting those of us teaching large lectures?

September 18, 2023

Large enrollment courses traditionally have structures that require creative and scalable approaches to teaching and assessment. Let's collaboratively brainstorm approaches to assessments in large courses that are practical and scalable.

Today's goals

- Brainstorm a range of practical approaches that those teaching large lectures can adopt to address the impact of systems such as Chat GPT on large lecture learning activities and assessments.

Outline

What are learning and assessing methods right now in the various formats of Large Lectures courses at Tufts?

(Keeping in mind that sizes may vary, some may have teaching assistants or course staff and others may not,

- e.g., Online discussion post written at home & posted to canvas graded by TA
    - If a student tried to generate a solution using Chat GPT would they then not learn the material I want them too?
    - If some students use Chat GPT to help them and others don't, will the activity still fairly and accurately evaluate their learning?
    - Could AI help a student test out and get feedback on their ideas before sharing with the class, or check their grammar, etc. before posting their answers?
- Multiple choice exams/quizzes taken online, synchronously or asynchronously
    - Are these open book or closed book?
    - Can students bypass examsecurity to use AI to select the "best" choice and how to incorporate clinical reasoning into a question to "confuse" AI
    - Some students may be aware of and use online AI plugins to answer multiple choice questions, eg. in a Canvas quiz (one eg of such a tool is Transcript)
    - Could students use AI Tools on their phones/tablets,etc. to generate solutions or relevant information?
- Multiple choice exams taken in person
    - Could AI be a study aid? Could a student give AI class notes or content and ask it to make MC questions? Would this even be useful/effective use of time?

    - SImilarly, can AI reword/revise lecture content/slides to help student understanding?
- Discussion board assignments, completed individually
    - 1) It depends on how the students use the response. If they just copy/paste without internalizing or reflecting, then they may not learn the material or reflect on it deeply enough.
    - 2) Other students will still be able to write and respond. I'm not sure if we'd be able to fairly evaluate their thinking if they used AI in their responses and replies to other students.
    - 3) It could absolutely be used to get feedback on their ideas before posting, but ideally those ideas originate from the student instead of AI.
- Case studies done in groups
    - 1) With case studies, the learning comes with the struggle of working through it in a group, looking through course materials, and learning to find reputable sources online. I think using AI would hinder learning, especially on these assignments.
    - 2) I'd hope the group setting would make students less likely to use AI. If all students use AI in a group, I'd imagine that it would be difficult to fairly evaluate what they know and were able to piece together on their own.
    - 3) The case study is more based on hypothesis development and explanation of their thoughts - I don't think AI would be as helpful in this case, as we provide credit even if it's not what we're originally looking for as long as they are backing up their thinking.
- Short answer and multiple choice homework, graded by a computer
    - Can we do this on Canvas? Or another tool?
    - What possible equity issues could arise by having AI grade short answer responses?
        - What biases might be present?
        - How much time would you want to spend filtering the AI grading to ensure that it matches your personal grading preferences?
    - Some of this is done using software created by textbook providers (but it tends to be expensive for the students). You can create these assignments yourself, but it tends to be time consuming.
- Written problem sets (students show work), graded by TAs
    - How can the TAs tell whether students are using AI to write solutions?
    - AI detection tools, despite their claims, don't work reliably. High rate of false positives (especially for non-native English speakers, and neurodiverse writers), and false negatives (it's very easy to fool an AI detection tool into evaluating a text as being human-written even when it was AI-written)
- In person exams, mix of multiple choice and open response questions
- Lab assignments and reports
    - Could students use AI to generate responses?
    - Might students use ChatGPT for assistance but unintentionally incorporate hallucinations in their work?

- Reflection journals (reflecting on their learning, how it connects to their life/community, what they are still wondering about) on Canvas
    - How can I make sure these are authentic?
- Poll everywhere in-class response (think-pair-share)
    - Could we use this as an attendance tool
    - Is this too fast / low stakes for a student to have interest/opportunity to use AI to explore the ideas/solutions to questions?
- Group research papers
    - Deciding on a paper topic/question can be intimidating…could students use AI to brainstorm ideas?
    - Can students feed drafts to ChatGPT and get feedback for revision?
    - What are the implications of using AI detection tools when grading papers?
- Projects
    - Could a student use AI For brainstorming?
    - What if some group members want to use AI and others don't? Are there shared expectations around it's use? Or what is 'allowed'
- Small group discussions integrated with AI
    - Who is generating the responses in AI, student or Faculty?
    - In person discussions or online?
        - Is there a software or program you're using to facilitate these discussions? Hypothesis, Perusall, Piazza, Canvas?
    - Please elaborate
- Practice opportunities in class, not for submission
    - Is this too fast / low stakes for a student to have interest/opportunity to use AI to explore the ideas/solutions to questions?
    -
    -
    -
    -

Thinking of the list above - what questions do we have about continuing these practices with new advances in AI?

Put your thoughts underneath each related assessment in the question above.

How do we proactively address these concerns through our course design?

1. Pick a current typical assessment approach and review the questions listed below it.

2. First, identify potential approaches that will adapt it to our concerns about AI. Approaches may need to consider separately at times the impact of AI on different purposes of assessment, e.g.,
    - Engaging students in the learning process
    - Evaluating student learning
3. Identify questions an instructor might consider when adapting their current approach. For example, in what ways do new approaches maintain, detract from, or improve
    - the **equity** of the learning task?
    - the **authenticity** of the learning task?
    - the alignment of the **desired learning** / course learning outcomes w/ the assessment task?

Breakout Discussion Notes

current assessment approach	**potential future approaches that will adapt it to our concerns about AI**	**what questions might an instructor need to consider when adapting their current approach**
Students write a short essay post to an online discussion board at home. This is graded by TAs, who give students feedback and a grade.	Written work in class with pen & paper (an 'old fashioned' low tech solution). Still graded by TAs. The in-class format might decrease their potential to outsource answers to AI, peers or search engines. possible modification, allow for writing during class using a laptop.	Should the work be open book or should students be asked to memorize information to prepare to answer the questions? How will students practice/prepare for this writing activity? E.g., do all students have the experience, skills, capacity of showing their knowledge through in-class writing? What inequities might this introduce - e.g., differing processing time, experience writing by hand, may present challenges to neurodivergent students and students with disabilities
	Students brainstorm during class with peers what concepts or ideas are important and what approaches might be fruitful in addressing this problem. This allows for synchronous, and social generation of solutions. A brief time in class for students to individually start to draft their responses. Then at home, without time pressure and with access to look up more information, they submit their written work online. In this case, even if they do use AI later, they still have the experience of thinking through and applying their knowledge.	
Main Room	Move to in class	• Students needing

Exams or quizzes in online	● Answering things during class time all together in the room with the professor instead of at home / in own space ● Lockdown browser ● Paper & pencil scanned online ● Running quizzes via Poll Everywhere - speed of processing Q&A, more controlled ● Perusal / Hypothesis - requiring students to do close reading at home instead of MC questions … groups of 10 students or so, annotation summarizer presents groups ideas … so faculty doesn't need to read all annotations …	extended time? ● Students needing low-distraction environments?
Room 2: Students complete a problem set on their own outside of class that is automaticall y graded through LMS or gradescope	1. Written statement that they will try on their own rather than relying on AI, and the cognitive/intellectual penalties from using AI 2. Put problem in AI and get a bogus answer; have them evaluate the AI-response. 3. Explain an answer to a question on a problem set (why is one answer correct, other options incorrect, etc.) rather than just have students answer MC questions without engaging with the course content more deeply	1. Is running our problems through AI training the AI to be able to better answer our questions? (self-learning) 2. If students use AI for reflecting, are they minimizing their outcomes in metacognition? 3. Is auto-grading okay for reflections/evaluations , or should TAs still be used to make sure these open ended responses are still in line with course content?

Discussion Notes -
Talking with Students about importance of thinking for themselves, and working without AI
Being able to critically think about impact of AI On their own learning if they use it, value of struggling with ideas, and why they are at Tufts
Thinking about skills changing in a world with AI,
An experts use of critiquing the use of AI vs. a student … how it might make things easier / more difficult to use things.
Different ways of interacting with AI in different context …
Centaurs - users of AI who use AI for discrete purposes and then integrate that into their own work/ideas
Others - trying to use AI to integrate their own thinking/work with AI throughout it…
Approaching 2 different populations differently in how outsourcing thinking vs. task.
Importance of being able to think about things on your own in order for AI to be helpful …
To know if AI generated sample question is relevant, need knowledge in the context to see if it is …
ChatGPT write me a grant please, won't lead to good output
What do students need to know?
How to find accurate information
Independently think on their own and understand the value of this

Summary Notes

Notes combined with similar discussion from an AI learning community, also focusing on large classes.

List of existing teaching activities in large lecture courses - annotated by questions, and potential alternatives or modifications addressing AI:

- Readings
  - Emphasize the purpose and value of reading assignments beyond just comprehension with students
  - Ask students to collaboratively annotate readings (e.g., Perusal / Hypothesis), groups of ~10 students, summarizer presents groups ideas rotating each week … so faculty doesn't need to read all annotations.
- In Class Activities
  - Many different kinds happen in classes including ad hoc formative assessments during lectures (as a means of interactivity as well as assessment)
  - Examples include free writing, muddiest points, minute papers, open-book/source activities,
  - Thought maps with AI integration
  - Ask reflective or "personal" questions that is more difficult to replicate with AI - what was your favorite?

    - Structured in-class peer assessment work, e.g. gallery walk, fishbowl style activities
- Small Group or paired discussions
    - Address potential conflicts and learning opportunities regarding AI use within groups.
    - Analyze AI-generated responses within case studies as a learning exercise.
    - Encourage personal reflection.
    - Clay and Lee (2023) provide an interesting viewpoint of using AI as another "voice" in the discussion and having students analyze its response regarding a case study.
    - Debates (pro/con, etc)
- In-Class Exams (Midterm/Finals or even quizzes):
    - Target higher level questions - Explore ways to incorporate clinical reasoning or situational judgment
    - Explore ways to limit access to AI tools during computer-based exams (e.g., lockdown browser)
    - Poll everywhere questions - one at a time as a whole class, question goes by too fast to move between or have time for cheating…
    - In person proctoring
    - Paper & Pencil exams (blue book, scantrons, worksheets - ?ways of uploading written answers to computer for grading)
    - Potential to use AI tools for quiz preparation or as a resource during exams. Explore AI-driven quiz and flashcard creation tools for student preparation.
- Take Home Exams
    - Write out by hand,
    - Include other formats than writing, such as show your math work, or images/sketches.
    - Include reflections / process
    - Make open book to lower incentive for AI
- Essays
    - Encourage students to use AI as a writing assistant to articulate their thinking more effectively.
    - Incorporate more reflection as part of the essay-writing process.
    - More process focus - turning in milestones, working on pieces during class, discussing / getting peer feedback on components along the way
    - Reflections on process, tools, topic, time spent creating work
    - Move portions of work to in-class writing and peer conversations during class
- Student Research Projects
    - Introduce the process of research and using AI as a tool, rather than relying solely on AI-generated content.
    - Utilize AI for brainstorming and idea generation, with proper acknowledgment and citation.
    - Spending in class time on developing research questions, research discovery and skills / activity of finding sources

    - Encourage group work (Discuss with students how to incorporate AI into group work agreements.)
    - Highlight the importance of struggle and group collaboration in learning.
    - Encourage hypothesis development and explanation of thoughts rather than heavy AI reliance.
- Laboratory Experiments:
    - A helpful ‘debugger’ when things go wrong, looking for alternative approaches
    - Discuss the responsible use of AI as a resource for information but not as a substitute for critical thinking.
    - Talk about student responsibility for identifying hallucinations suggested by AI system.
    - Consider AI as a resource for finding alternative approaches or background information.
    - Maybe a resource to search for solutions to answers on lab writeups?
- Homework
    - Encourage students to try solving problems independently before turning to AI for assistance.
    - Incorporate questions that require students to explain their answers, fostering a deeper understanding of course content.
    - Reflect on the ethical implications of using AI to grade open-ended responses and consider the role of TAs in assessing the quality of student reflections.
    - Allow AI use to brainstorm (with acknowledgement/ citation)
    - students submission in LMS or Gradescope Risk: These assessments are aimed at practicing skills that students do need to develop, and if they end up using AI to get answers, they would not be working on developing those skills themselves.
- Online Discussions
    - Include requirements for quoting from course materials and responding to quotes.
    - Allow students to use AI but require them to disclose its use and its source in the post
    - Directing responses to quote from source readings, include replies to peers works,
    - Allow for multiple submission types (e.g., mind maps, illustrations, videos, uploading a drawing, slide decks) instead of written responses etc.
    - Emphasize the importance of students not solely relying on AI-generated responses but engaging with course materials and reflecting on the content themselves.
    - Encourage students to use AI to check grammar and get feedback on their ideas before posting.
    - Address concerns about fairness and evaluation when some students use AI in their responses while others don't.
- Coding Projects
    - Ensure students understand the limitations of AI in coding tasks.
    - Use AI as a debugging tool or for finding background information.

Questions about AI often transversed individual activities and included things like:

- What are different ways students might use AI to ”outsource their thinking” for a variety of contexts/tasks/disciplines?
- When and where might students use AI to augment their learning?
- What conditions encourage/discourage AI use?
    - Physical & Logistical - such as in class / at home, in groups, on paper vs. online, formats of work - writing, images, etc.
    - Design - types of questions or activities or prompts, role of reflection, etc.
- When might students unintentionally incorporate hallucinations (false information) into their work?
- What are ways we might use AI in our activities / assessments with our students?
- What is the role of expertise in critically analyzing what AI output is useful, and integrating it into work/thought?