Capstone Design
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Panel 4D: AI & ChatGPT in Capstone

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Panelists: Elizabeth DeBartolo (RIT), Bryan Muñoz (UC Irvine), Matthew Bietz (UC Irvine)

Description: Is AI a tool or a crutch? What role does it play in Capstone, and how do we ensure students use it ethically and intelligently? The panelists hope to have a lively discussion about these questions and more.

Panelist Introductions:

- SS - career in industry, R&D, U of T in Austin in EE, teach capstone (first round last year), connection to AI through research but not yet in capstone
- MB - UC Irvine, Informatics, 4yrs - teaching mostly software (UX/UI) and informatics majors and grad level. Not active/frequent/developer of AI
- ED (Beth) - RIT, overseeing all their multiD capstones, enthusiastic user of AI
- BM - UC Irvine, involved in masters of data science, recruits and manages project intake and then hands off to faculty. User of all the AI models and develops an AI module for HS students and other misc programs

Questions/Discussion:

- Q: How has AI/chatGPT transformed the capstone landscape?
    - BM: It's changed how he evaluates the projects and the questions he asked - how is the company going to handle the data and the model and how will the students get access.
    - ED: ask students how they use it - either get a ‘no, other prof say bad’ or ‘use it to rephrase things’
    - MB: sponsors are buying into the hype - they want to do projects where they say ‘hey, we have this system, can we slap an AI on it?’ but not really sure what they are asking or what the need is or what’s involved. Also seeing students that are using AI to write sections of the report.

- Q: How does AI impact IP and confidentiality?
    - BM: says that companies can do NDA or IP agreements with the students but the university doesn’t get involved. Make it clear that the company should really ensure they are anonymousing the data and cleaning it so they are ok with it getting out. What data can the students feed into a model? Advise students to not do it this way.
    - BD: if the company doesn’t want to even share the problem they are working on, then it’s not a good fit for capstone - even asking the chatbot for help brainstorming would expose the data
    - BM: some universities have a special license of AI where the input is sandboxed so not used as part of training?

- Q: Does your university have an AI/chatbot policy?
  - ED: not yet - it's a work in progress
  - BM: some recommended boiler plate language you can use, but up to the professor. Should clearly discuss with the students the pros and cons of using it in specific ways in your class. And noting the plagiarism aspects. They find that students that are at the C/D level, GenAI can bring it to a B; but students that are at an A level already, it brings them DOWN to a B.
  - Generative AI in higher ed and beyond
    https://doi.org/10.1016/j.bushor.2024.05.005
    Nada Hashmi, Anjali S. Bal, Generative AI in higher education and beyond, Business Horizons, 2024, ISSN 0007-6813, https://doi.org/10.1016/j.bushor.2024.05.005. (https://www.sciencedirect.com/science/article/pii/S000768132400065X)
    - Abstract: Generative Artificial Intelligence (AI) is a method of machine learning that uses algorithms to create new content such as images, text, and video. In the last year, the popularity of generative AI has exploded. Websites like ChatGPT and DALL-E have become ubiquitous in everything from logo and NFT creation to social media content and artistic verse construction. While the popularity of generative AI is undeniable, the adoption of these technological tools has been splintered in higher education. This conceptual study examines the relationship between transparency and responsibility in the usage of generative AI. We extend to examine the relationship between training and application of skills within higher education. Finally, we propose a framework for how higher education can engage with generative AI such that students are better prepared for usage outside of school.
      - Keywords: Generative AI; Higher education; Typography
  - Have to think about the access issue - not all students have access to this
  - Have to think about the accessibility issue - it can be an important tool for students with a disability

- Q: Is AI a tool or a crutch?
  - ED: Example of her learning to program w/ Fortrat 77 and chat GPT can help her understand the syntax of python. But if just blindly applying it, then a crutch → in this situation, their job/value in the workplace could be replaced by AI; but if they can use it effectively, they still have value
  - BM: a place (?) has a grading policy where you can use whatever AI and chat gpt model they want, but they have to provide the output of the AI and they are graded on the value they added on top of the AI output.
  - On panel w/ university to determine policy guidance - have been doing listening w/ faculty and students. ⅔ of faculty are scared and don't want to use it. ⅓ want to use it as a tool that students can use appropriately.

- Q: Are there best practices for how to cite AI?
  - MB: asks students to cite it like they would anything else they are pulling from - sentences in quotes, etc

- BM: some journals have policies, such as including in appendices, or identifying sections of it applied
- ED: the marketing from the AI companies has been pitched as a collaborator, which seemed hoaky, but now seeing students using it - they really are often using it as a collaborator - not contributing directing content but helping format, etc. So maybe they should be in the acknowledgements?
- From audience: in the OpenAi license, they say both the input and output is yours
- Course hero website has a guide for students on how to cite
  - How to Cite AI Tools: A Guide for Students - Faculty Club
- But if you put content into grammarly or the microsoft other tools, would you cite it?
  - No… it's a spectrum - how to find the line?
- What happens if they don't cite? How would we note?
- MB: in upper division course on writing, he has them cite grammarly if they use it, but in capstone he doesn't. There have never been consistent citation standards and never will be - context dependant
- There is "turn-it-in" or "gpt zero" software to try and detect it, but it is not reliable enough to use it alone to rely on for student discipline.

- Q: Wanting to do more projects w/ companies to do AI projects - what are the parameters you look or to determine that it's a good fit? (eg, number of datapoints, etc)
  - MB: no clear answer, but wary of these types of projects. OpenAi is already trying to integrate things with companies through API. You can often get quite far with APIs in just a few days → not really enough there often for a longer capstone project. This can hide all the issues underneath and students can't really evaluate it or get into it deep enough and think through the implications. IDEO has a saying: "failures of IA are opportunities for design" → this type of attitude could lead to good capstone projects
  - BM: ensure you are pushing back on what is it that they really want and how they would use it → keep asking what it is they really want and how to guide them to a reasonable place

- Q: Who is teaching their students how to prompt?
  - MB: has an assignment for advanced writing students - every single word of the final output has to be created by chatGPT; they also have to submit a notebook of every prompt they gave to it and what they were thinking about it and reflecting on it and why, etc.

- Q: Are there companies that require that students NOT use AI/chatGPT?
  - MB: we'd treat that like we would on any other project - yes, that can be a requirement of the project.
  - BM: when screening projects, asking what the companies are concerned about and what students should not use, what agreements will need to sign, etc. Then yes, can pull it out.

- Q: What are some creative ways you've used AI tools to streamline your work?
    - ED: use it all the time, especially when a student from CS comes in with a question that she doesn't even understand - takes notes and then later feeds it into ChatGPT to better understand so then she can follow-up with them in email. Also take a lot of notes from interviews with clients about the project - can take the full pages of notes and ask chatGPT to start with a preliminary set of requirements. Saves time
    - BM: uses it to build marketing campaigns and language/copy for recruiting more projects - has seen it work well.
    - ED: sometimes at the end of term, there's a lot of stress and snippy emails coming out - asking the students/staff to put the email into an AI before sending it and trying to dial back the emotion so it's not escalating things.
    - From Audience: use it to build assignments and prompts; such as a reflective assignment on emotional EQ
    - From Audience: use it on the scoping side… didn't catch more details
    - From Audience: used it with a student that really struggled to be intelligible in presentation/writing → worked with him to use chatGPT on it and really improved his writing
    - From Audience: we were able to have a team use chatGPT to really help an ME team understand an EE board they got from China and the poorly written manual and modify the code to adapt it to make it do what they wanted → saved months!

- Q/Comment: How are these models about to do what they do: "stochastic parrots". Sucked in data and info from all over, strips off attribution, and then is able to apply it. So a big ethical question around how info in scientific articles is being used but doesn't end up being cited as such.
    - Language has always been structured and hence makes it fairly good candidates for predictions. However, there have been and always will be errors. This is similar to other areas of science, where we make predictions, but they usually really try to put a level of confidence on it. A 95% confidence interval for a chatGPT can make a marketable product, but what is the experience for the other 5% -> this can be a large number of people.
    - ED: similar to the difference between intelligence and wisdom (eg, in dungeons and dragons) - do you know a lot of things and have a lot of confidence, or can you appropriately know what is good and not.
    - SS: example of google providing answers to questions and rather than pointing to a source and having users go there for the answer, they instead summarize the answer and cite the source, but users won't actually click through and double check.

- Q: What about using it for grading?
    - BM: faculty are being paid to grade, they should grade; but could use AI tools for more feedback.
    - MB: worry about the long tail and error rate. Worry about how the efficiency gain is used if we do this - if we can spend less time on grading, would we spend more time on other quality interactions with students, or would we just be expected to be able to take on more students?

- Q: Other concerns around AI?
    - BM: concern around synthetic data - these large language models are running out of actual text they can use, so are using themselves to generate more text to use to train itself… this can really bake in the biases…
    - ED: Students using AI to write papers that professors are using AI to grade them…
    - ED: energy usage required
    - MB: quote from someone: “technology is neither good nor bad, but neither is it neutral”. But generally optimistic…

- Q: How could we even use it to grade first principles and equations, where it needs symbolic representation?
    - ED: maybe through taking in an image input and connecting it through different things…
    - MB: but most are using the grading for report type things

- Suggestion from audience: Idea for how to get more confidence level info from an AI - have it generate 3 different responses and see how consistent or different these were. If quite different, might be a sign of hallucination.

- **Summary: Key take-aways**
    - MB: Treat it as an experiment and share what you learn
    - ED: Don’t be afraid, but don’t depend blindly
    - BM: Use all the models, be an active user

Other questions not covered:

- What role does AI play in Capstone?
- How do we ensure students use AI tools ethically and intelligently?
- How do we help students to draw the line between appropriate and inappropriate use? Do WE even agree on where that line is?
- What are the consequences of encouraging vs discouraging use of AI tools?
- How do we evaluate the appropriateness of AI-centric projects proposed by external partners?