

# Teaching with AI

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Experience and future directions

Fabrício Góes / Marco Volpe

# Context

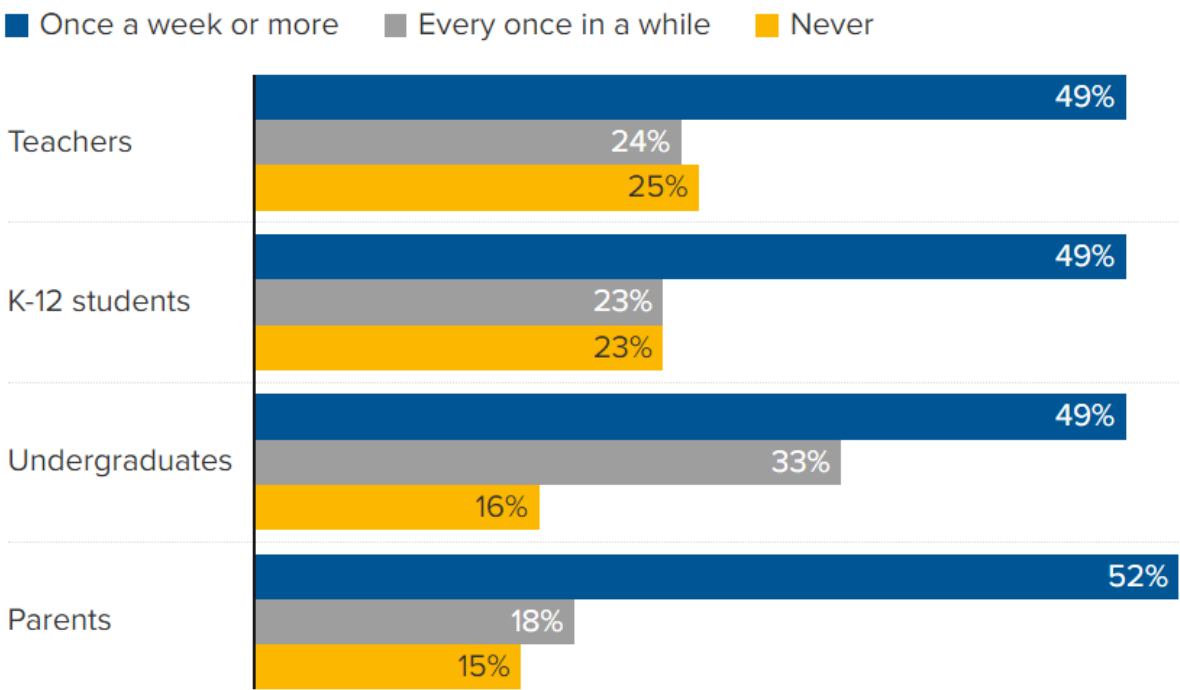
Online survey of 4,007 teachers, parents and students in the U.S. (May 2024)

About half of teachers, students and parents use AI chatbots at least once a week for work/school.

AI IMPACT

## AI is getting very popular among students and teachers, very quickly

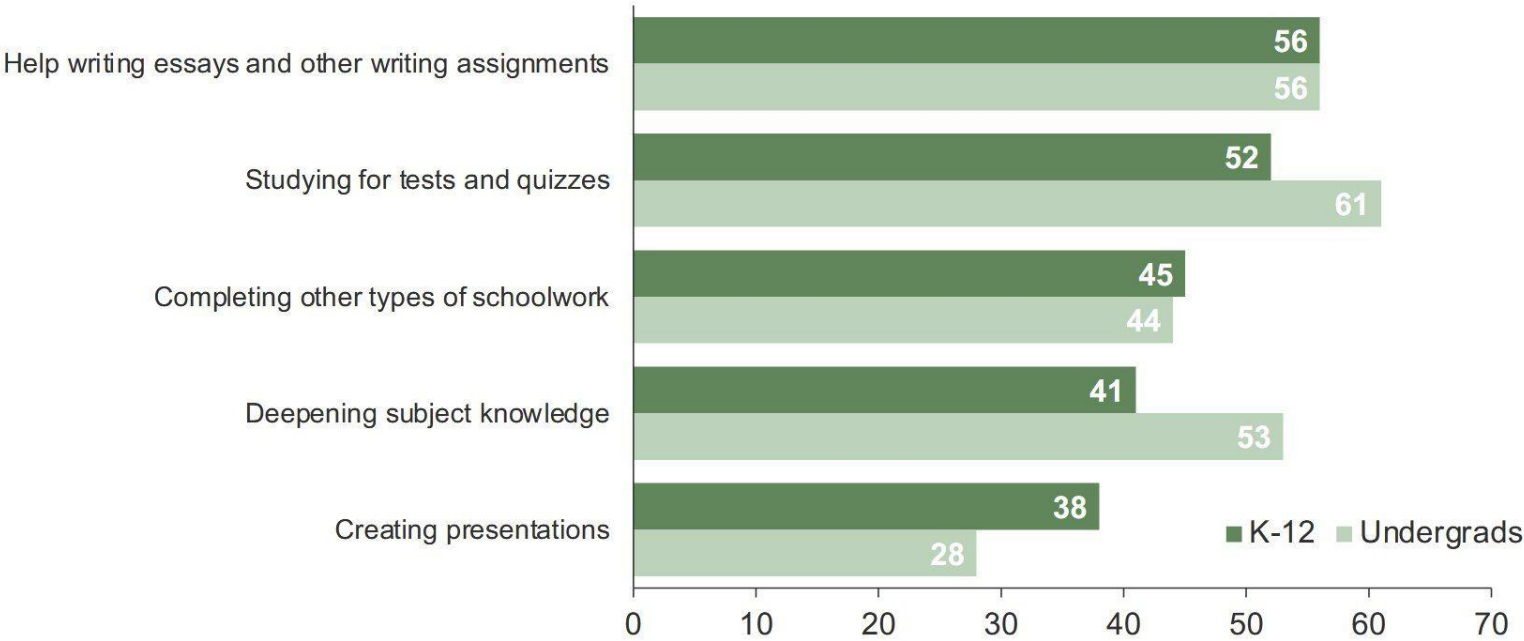
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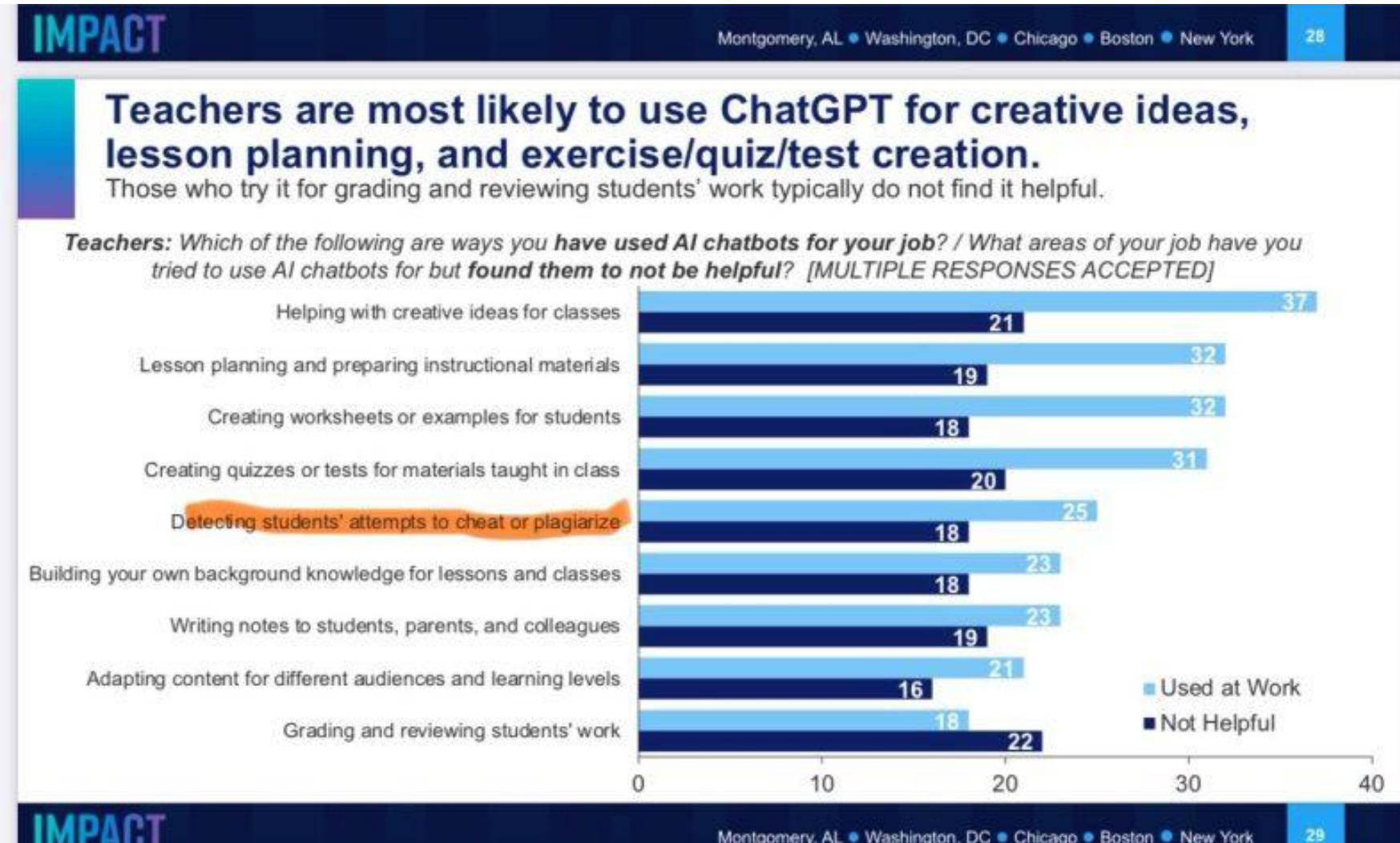
# How are students using AI?

**K-12 students are using AI chatbots the most for help with assignment and undergrads are using it the most for studying for tests and quizzes.**

*Students: Which of the following are ways you have used AI chatbots for school? [NOT ASKED IF 'NEVER' USE AI CHATBOTS] [MULTIPLE RESPONSES ACCEPTED]*



# How are teachers using AI?



# And in the UK?

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## Survey from Higher Education Policy Institute on 1,250 UG students in the UK (Feb 24)

- 53% have used AI to help them with **assessments**.
- The most common use is as an '**AI private tutor**' (36%), helping to explain concepts.
- 13% use AI to **generate text** for assessments, but they typically edit the content before submitting it.
- 35% of students who have used AI do not know how often it produces **made-up** facts, statistics or citations.
- A '**digital divide**' in AI use may be emerging. 58% of students from the most privileged backgrounds use AI for assessments, compared with just 51% from the least privileged backgrounds.
- A majority (63%) think their institution has a 'clear' **policy** on AI use.
- Institutions have not radically changed their **approach to assessments**, with only 9% students saying the approach has changed 'significantly', compared with 24% who say it has stayed the same.
- Most students (65%) also think their institution could **spot AI work**.

<https://www.hepi.ac.uk/2024/02/01/new-hepi-policy-note-finds-more-than-half-of-students-have-used-generative-ai-for-help-on-assessments-but-only-5-likely-to-be-using-ai-to-cheat/>

# AI Detection

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# Can teachers spot AI?

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Artificial Intelligence

Volume 6, June 2024, 100209



## Do teachers spot AI? Evaluating the detectability of AI-generated texts among student essays

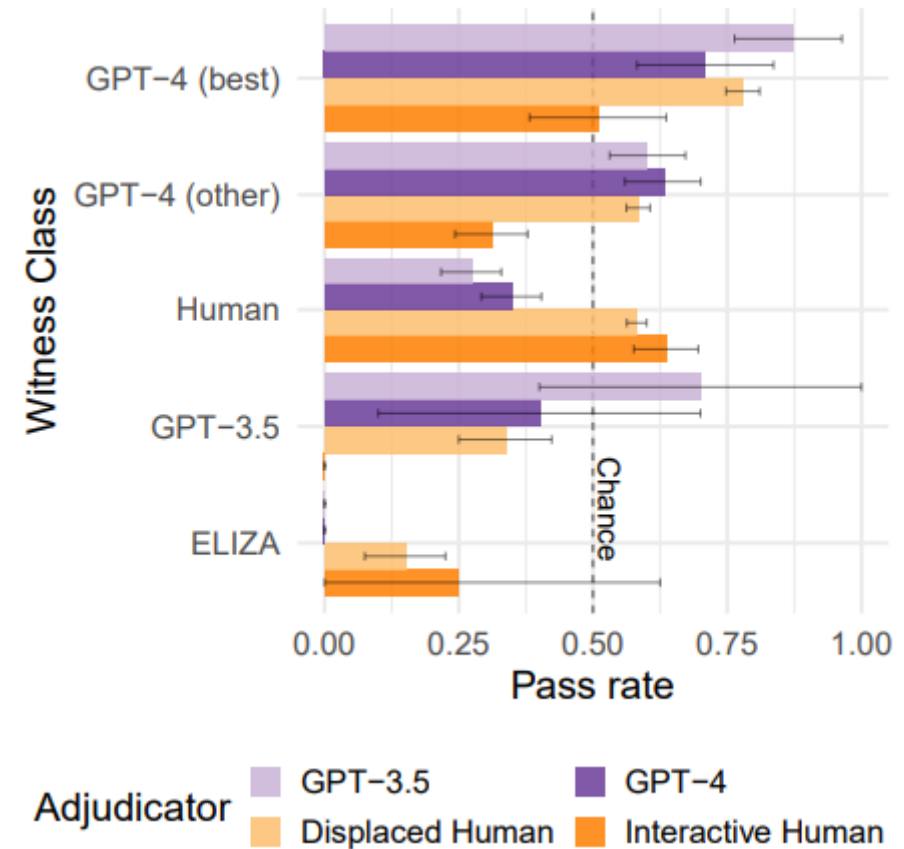
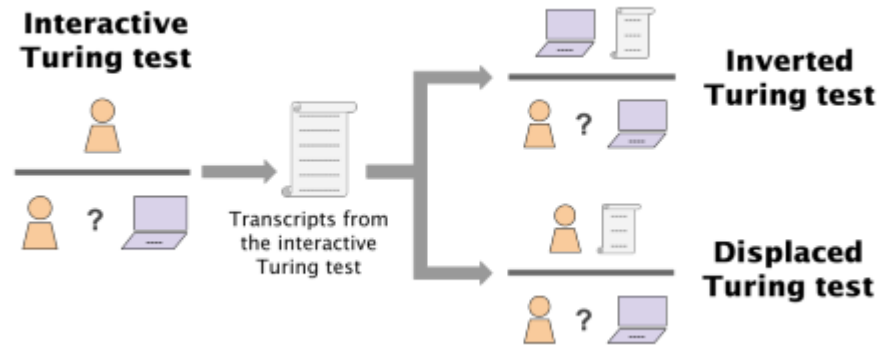
### Highlights

- Randomized-controlled experiments investigating novice and experienced teachers' ability to identify AI-generated texts.
- Generative AI can simulate student essay writing in a way that is undetectable for teachers.
- Teachers are overconfident in their source identification.
- AI-generated essays tend to be assessed more positively than student-written texts.

# Is AI better than humans at spotting AI?

**GPT-4 is judged more human than humans in displaced and inverted Turing tests**

**Ishika Rathi** and **Sydney Taylor** and **Benjamin K. Bergen** and **Cameron R. Jones**  
Department of Cognitive Science, UC San Diego





# Can OpenAI detect AI?

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January 31, 2023

## New AI classifier for indicating AI-written text

We're launching a classifier trained to distinguish between AI-written and human-written text.

**Our classifier is not fully reliable.** In our evaluations on a “challenge set” of English texts, our classifier correctly identifies 26% of AI-written text (true positives) as “likely AI-written,” while incorrectly labeling human-written text as AI-written 9% of the time (false positives). Our classifier’s reliability typically improves as the length of the input text increases. Compared to our previously released classifier, this new classifier is significantly more reliable on text from more recent AI systems.

# Can Turnitin detect AI?

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## AI Writing Detection

Turnitin's AI writing detection capability is designed to help educators identify text that might be prepared by a generative AI tool. Our AI writing detection model may not always be accurate (it may misidentify both human and AI-generated text) so it should not be used as the sole basis for adverse actions against a student. It takes further scrutiny and human judgment in conjunction with an organization's application of its specific academic policies to determine whether any academic misconduct has occurred.

<https://help.turnitin.com/ai-writing-detection.htm>

<https://www.degruyter.com/document/doi/10.1515/opis-2022-0158/html>

# Breaking AI text detection

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*[Submitted on 17 Mar 2023 (v1), last revised 19 Feb 2024 (this version, v3)]*

## Can AI-Generated Text be Reliably Detected?

Vinu Sankar Sadasivan, Aounon Kumar, Sriram Balasubramanian, Wenxiao Wang, Soheil Feizi

applying watermarking techniques that imprint specific patterns onto them. In this paper, we show that these detectors are not reliable in practical scenarios In particular, we develop a recursive paraphrasing attack to apply on AI text, which can break a whole range of detectors, including the ones using the watermarking schemes as well as neural network-based detectors, zero-shot classifiers, and retrieval-based detectors. Our experiments include passages around

<https://arxiv.org/abs/2303.11156>

# AI Text Detection is a Hard Problem

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- **Advanced technology** – AI-generated text can be highly sophisticated and human-like.
- **Evolving technology** – AI models continuously evolve, keeping detection methods playing catch-up.
- **Diversity of models** – There are several LLMs around and they have all been trained on different data.
- **Context/Style Shifting** – AI can adapt to various styles and contexts, making detection harder.
- **Mixed authorship** – Texts can combine AI-generated and human content (even small tweaks).

*Automated AI text detection is not 100% reliable – it would require human revision, which is also unreliable.*

# Can teachers spot AI students?

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## A Third of My Online College Students are AI-Powered Spambots. Now what?

Professors are anxious about how students might use AI to cheat on assignments. What do we do if some of these students aren't real at all?

I am an adjunct faculty instructor at a community college. I teach in-person, online synchronous, and online asynchronous Art History and Art Appreciation courses. My current summer course load includes an online asynchronous Art Appreciation course. This is a course where all of the content is online and there are no specific live meeting times (such as a weekly Zoom seminar.) Students access all readings and videos for the

*“They’re called “Pell runners” — after enrolling at a community college they apply for a federal Pell grant, collect as much as \$7,400, then vanish.”*

# Experience using AI on BSc in Creative Computing

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# What is the BSc in Creative Computing?

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- It is a multi-disciplinary and inclusive course on Applied Computing, where students learn how to develop applications such as games, interactive attractions, virtual reality experiences etc.
- Students develop programming skills but their interest usually lies in the humanities and arts.
- Students also attend to modules in other departments and we are eager to also welcome students from other departments to attend our modules.
- We've been embedding AI in our modules for the last 3 years, even before ChatGPT was released.



# Welland Park Experience (Market Harborough Museum)

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<https://www.cultureleicestershire.co.uk/exhibitions/harborough/>  
<https://tnm6.github.io/mh15/>



# The Disappearance of Dr Winston (AI RPG Game)

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# AI in our modules (2023/2024)

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- **Creativity and Computing (Year 1)**
  - Introduce the fundamentals about Creativity and how it intersects with Computing
  - Assessment: **Essay, Essay Plan Presentation**
- **Concurrent Design (Year 2)**
  - Applied module where students in groups learn how to develop a prototype of an attraction to a real client (usually the National Space Centre).
  - Assessment: **Product Development, Presentation (in person) and Progress Reports**
- **Computational Creativity (Year 3)**
  - Prompt Engineering to develop AI applications for the creative domain.
  - Assessment: **Weekly Practical Exercises, Project Development**

# Creativity and Computing

# Creativity and Computing

- We start by providing the **ultimate prompt** for generating an essay automatically to make them **aware that you know about AI**. Then we ask them to generate an essay using it on ChatGPT.



Act as **an undergraduate student**, your job is to **create an essay in academic style** about a **topic** with a certain **word count**. I will provide you a **list of references** and you should use only them. The focus of the essay should be supported by the references provided. It should have a references section at the end in **a specific reference style**. You should **ask me as many questions as necessary to do the job**. You should ask one question at a time, and I will respond to each question. When you have enough information to generate the essay, you should generate it. Do you understand?

Got it! To get started, could you please provide the topic of the essay and the specific word count you're aiming for?

creativity and computing

Great topic! For the essay on "creativity and computing," I'll need to know the exact word count you're aiming for. What's the target length for the essay?

1000

Got it, 1000 words. Could you please provide the list of references you'll be using for this essay?



# Creativity and Computing

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- Then, they are asked to **reflect (critical thinking) about the generated essay**:
  - What is the quality level of it?
  - Can you do better than that?
  - Do you think you would get a high mark for this essay?
- Lastly, we present to them the **weaknessess of the model** and **how we can say** that this looks like AI generated.
- We **incetivize them to use Generative AI**, rather than ban it.

# Creativity and Computing

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## Title: The Creative Evolution of User Experience: A Case Study of Airbnb's Redesign

### Introduction:

Airbnb, a trailblazer in the travel and hospitality industry, has continually redefined the way people experience accommodation. In its quest for excellence, Airbnb embarked on a transformative journey with a significant redesign, leveraging the power of computing to enhance user experience (UX) and unleash new realms of creativity.

### Objectives of Redesign:

The redesign of Airbnb's platform was fueled by a set of ambitious objectives, ranging from elevating user satisfaction to addressing challenges identified through user feedback. This iterative process sought not only to refine the visual aesthetics but also to redefine the very essence of how users interacted with the platform.

### Computing in Personalization:

At the heart of Airbnb's redesign was a strategic integration of computing, particularly through the implementation of machine learning algorithms. This move enabled Airbnb to move beyond a one-size-fits-all approach, tailoring recommendations and experiences based on individual user behavior and preferences. The amalgamation of computing and creativity was evident in the platform's ability to offer personalized suggestions that resonated with users on a deeper level.

### Enhancing Creativity Through Design:

The redesign did not merely aim for functional improvements but also sought to elevate the creative aspects of the user interface. Airbnb's design team harnessed computing capabilities to experiment with color schemes, typography, and overall aesthetics. The result was a visually engaging platform that not only met user expectations but also surpassed them, offering a fresh and dynamic visual experience.

Where are the references?  
How do you know it is true?

GPT style usually uses ":",  
someone would suspect is  
GPT generated.

Amalgamation is not  
commonly used. GPT  
exaggerates or use  
uncommon vocabulary.

Single paragraph for each  
topic is not long enough.

# Creativity and Computing

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- Provide guidelines on how to use it:
  - Start writing a sentence and ask it to complete
  - Read the sentence and improve it with your writing skills
  - You **should control the flow (direction) of the text** (not GPT)
  - This is a support tool for writing an essay (think as **an advanced writing assistant**)
- Make them **aware of the risks** of using AI
  - GPT-3 was tested with groups of students and teachers (GPT 4 is probably better)
    - It didn't get an "A" grade on any assignment
    - Most of the time it got "C" or "D"
  - There is **no guarantee** that the generated **text is not a copy** (plagiarism) of other work (**Turnitin can still detect plagiarism**)
  - If you don't know how to use it properly, it might take more time than writing excellent text on your own

# Creativity and Computing (Assessment)

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- Students write their essays during the **weekly seminar** session.
- We try to **sit and discuss** with each student about their **progress** in a weekly basis.
- They must deliver an **essay plan (30%)** which consists of the main ideas, arguments and structure of the essay in the form of **a video recording over slides**.
- The **final essay (70%)** is a traditional essay of no more than 8 pages. They submit only the text through Turnitin (detects only plagiarism, not AI-generated). Students are required to report how and where they used Generative AI.



# Creativity and Computing (Pros and Cons)

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- Pros

- Students are treated as **responsible adults** (awareness of the risks and benefits of using generative AI)
- Students are still **supervised** during the essay writing informally
- Essay plan **presentation** still requires them to work on it

- Cons

- **No way** to prove that the final essay was not **AI-generated**
- Presentations even with **video and voice are not AI-proof**

# Presentations are not AI-proof - AI Generated Voice

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- It was originally recorded in Portuguese. It translates to English using my own voice and accent.



# AI Tools for Voice Cloning

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- HeyGen (<https://app.heygen.com/>) – used in the previous slide
- Descript
- Fliki
- Murf AI
- PlayHT
- Elevenlabs
- Lovo.ai

# How can we address the Cons? (Traditional Way)

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- **More responsibility:** In the final essay, we can ask students to **sign a declaration** that all AI-generated text has been referenced.
- **More supervision:** Students must **submit the progress of their essay** on a weekly basis as a way for us to generate evidence of their progress. This will be a criterion in the rubric.
- **Add AI rubric criterion:** Students must use AI more like a **Cyborg** (hybrid text) than a **Centaur** (AI write some full parts and the student write others – advanced copy and paste).
- **More weight on other criteria:** Creativity, originality and style could become more important than be grammatically correct. It depends entirely on your module ILOs.

# The Next Level – Integrating AI in the loop

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- **AI as a Supervisor** (used during the essay writing)
  - Craft a prompt for an **“essay supervisor” persona** (Socratic style)
  - Students must **submit their dialogues** with their “essay supervisor” in a weekly basis as evidence that they have been working on their essay
  - Craft a prompt **to summarize and highlight main aspects in the dialogues** that are important to support your marking and feedback
  - Add a **criteria into the rubric** on “interaction with AI supervisor”
- **AI as an Examiner** (used in the final essay submission)
  - Craft a prompt of an **“examiner” persona**
  - Students must upload their essay and use the prompt and go through an **interview about their essay**
  - Students will **submit the interview dialogue** along with the essay



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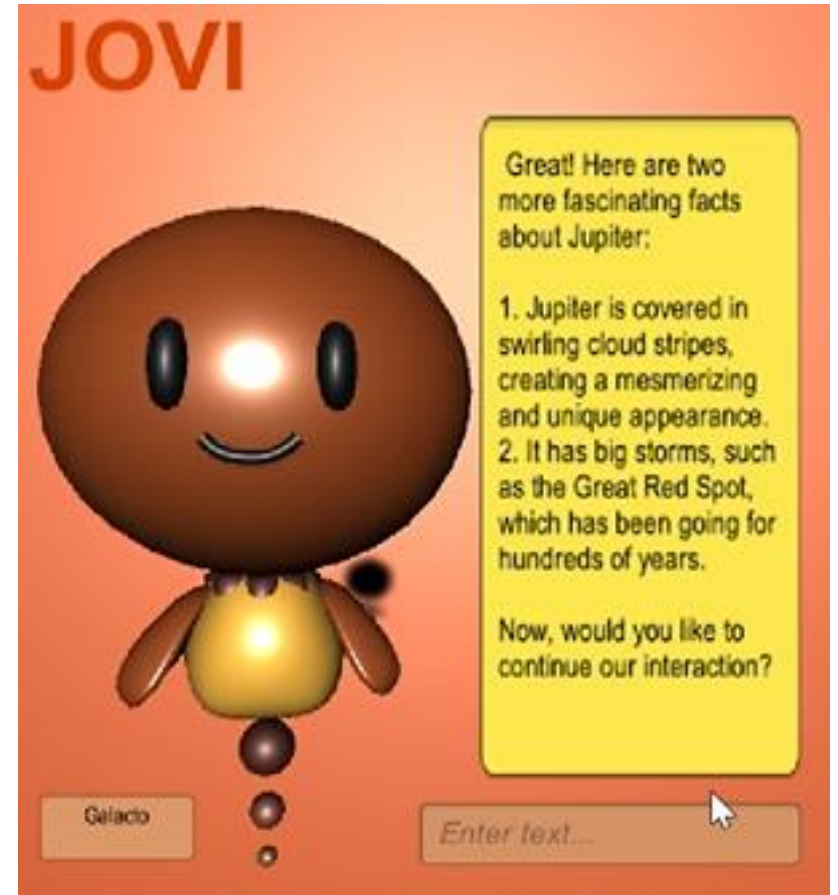
# Concurrent Design

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# Concurrent Design

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- Students had to develop **AI avatars** in groups of 5 students (each with a different role) to the **National Space Centre**.
- They **had to use Generative AI** in anyway they could, including the core of the application.
- **AI still cannot produce this kind of complex application** that requires the use of many different technologies (animation, gaming, chating etc.).
- **It is expected that students use some code generated by AI**, but it will be a minor part of the project.



# Concurrent Design (Assessment)

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- Students have to produce a **Business Plan Deck (50%)** and a **Prototype (50%)**.
- They have **meetings with the module convenor** and have to **submit weekly reports** on what they have done, what they are planning to do and any issues preventing them to move forward. They have 3-hour group sessions to develop the project.
- The rubric criteria for evaluation involves **Teamwork and Sprints** (tasks done per week per group member).
- The final prototype and business deck are submitted with **a video presentation and code**, but they also have a **in-person presentation** involving the client (NSC).



# Concurrent Design (Pros and Cons)

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- Pros
  - AI enables students to do a **project more complex** than the ones they used to do.
  - **In-person presentation** with external client makes students take the project more seriously and lecturers can argue students.
  - **Weekly meetings** with students ensure that they are on track and lecturers can check their actual progress.
  - AI supports a lot students on **coding issues**
- Cons
  - Once **AI becomes more proficient** at coding those complex systems, we might need to introduce oral examination (interviews) about the final code submitted.

# The Next Level – Integrating AI in the loop

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- **AI as a Client**

- Craft a prompt for a **“client” persona** and students can use **it to interview and collect requirements** for the development of the prototype.
- Students can also ask for **feedback on their current project**.

- **AI as a Colleague**

- Craft a prompt for each role in the group (developer, designer, leader, business person etc.).
- This enables **group work as an individual assessment**, where students interact with their virtual group members. All interactions are submitted as evidence.

- **AI as a Manager**

- Craft a prompt for a **“manager” persona**, who monitors the performance of a group of students and assign tasks.

# Computational Creativity

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# Computational Creativity

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- Students have also to develop a **group project** using Generative AI. Each student has a different role as in Concurrent Design. They have weekly supervision meetings in project supervision sessions.
- Differently from Concurrent Design, students have to do **weekly experiments** using Prompt Engineering techniques in the creative domain and write a short reflection about the results achieved. This is done during lab sessions and involves the generation and evaluation of:
  - Poetry
  - Jokes
  - Narrative (Stories)
  - AI gallery exhibition, comics
  - Creativity tests



A typical day in Krypton



Oh look! There's SUPERMAN!



But wait, what's that?

# Computational Creativity (Assessment)

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- Students have to produce a **Prototype (70%)** and a **Portfolio (30%)**.
- The Prototype is similar to the one in Concurrent Design.
- The **Portfolio** is the set of weekly experiments and is marked based on the **prompts generated, dialogues with the models and student's reflection (video and text)**.
- The rubric criteria has a single criteria that reflects the overall quality of the weekly experiments submissions.

# Computational Creativity (Pros and Cons)

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- Pros
  - Students are focused on **learning Prompt Engineering** and how to apply it to build a real-world application.
  - Students are **required to use AI**, so no major worries about AI-generated content.
- Cons
  - As **students get more proficient in using AI**, the module has to shift its content to more advanced techniques.
  - Constant update of the material.
  - Students are limited by **using free models and their limitations**. Most students end up paying for unlimited use of the latest and most advanced AI models.

# The Next Level – Integrating AI in the loop

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- **AI as a Task/Exercise**

- Instead of writing **a problem statement in a list of exercises**, we move to crafting **prompts of personas** and students must talk to those personas to solve a problem or create an artifact.
  - Interview a historical figure or Darth Vader
  - Discuss and evaluate the jokes created by a particular comedian
  - Critique and ask their opinion on stories created by a particular writer
  - Come up with a new idea for a movie by discussing with a particular film director

- **AI as Peers/Advisors/Audience/Auditors**

- Craft prompts of people with different backgrounds and opinions and ask them to provide feedback on the student work.

# Practical Challenges

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# Challenges for The Next Level

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- There is **no University's platform where you can craft your AI assistants** and students can use them for free, making it hard to monitor all students interactions with the AI.
- The closest existing system that does it is **Khanmigo** from Khan Academy, but it isn't available in the UK (<https://www.khanmigo.ai/>).
- **Subscriptions** to the latest AI models are around **£20 per month**, which can be expensive for some students.

# Discussion

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- Assessments can be **more resistant to AI cheating** using traditional methods by adding:
  - More responsibility
  - More supervision
  - More rubric criteria (AI criteria included)
  - More evidence (dialogues)
- In practice, we **haven't had any major issue** using AI in our modules.
- In order to fully use the power of **AI as an true assistant**, we need more institutional support and infrastructure. Still, we can **move to the next level** without it.
- The more you evaluate the **final product** instead of the **process**, the more vulnerable you will be to AI-generated content.
- It is a good time to experiment new approaches with AI.