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American University of Sharjah

Creating Intelligent Education Systems

Artificial Intelligence in Teaching and Learning

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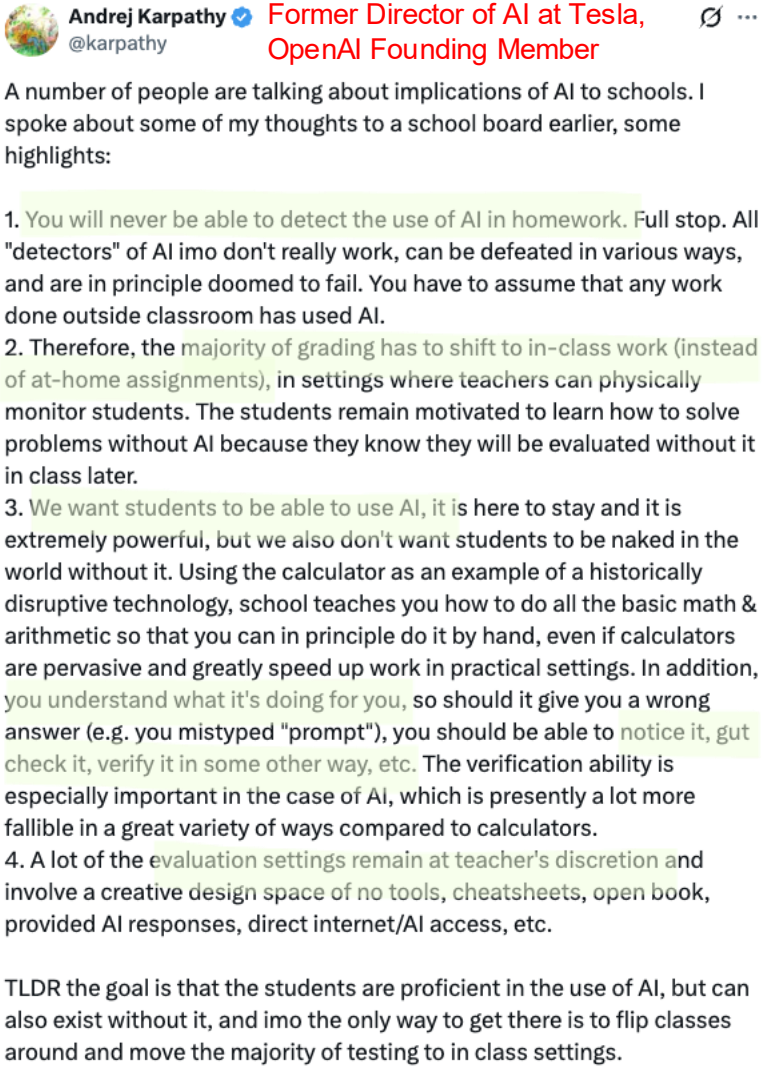
Wake-up Call: AI is Good at Assignments



Andrej Karpathy @karpathy

Former Director of AI at Tesla, OpenAI Founding Member

A number of people are talking about implications of AI to schools. I spoke about some of my thoughts to a school board earlier, some highlights:

1. You will never be able to detect the use of AI in homework. Full stop. All "detectors" of AI imo don't really work, can be defeated in various ways, and are in principle doomed to fail. You have to assume that any work done outside classroom has used AI.
2. Therefore, the majority of grading has to shift to in-class work (instead of at-home assignments), in settings where teachers can physically monitor students. The students remain motivated to learn how to solve problems without AI because they know they will be evaluated without it in class later.
3. We want students to be able to use AI, it is here to stay and it is extremely powerful, but we also don't want students to be naked in the world without it. Using the calculator as an example of a historically disruptive technology, school teaches you how to do all the basic math & arithmetic so that you can in principle do it by hand, even if calculators are pervasive and greatly speed up work in practical settings. In addition, you understand what it's doing for you, so should it give you a wrong answer (e.g. you mistyped "prompt"), you should be able to notice it, gut check it, verify it in some other way, etc. The verification ability is especially important in the case of AI, which is presently a lot more fallible in a great variety of ways compared to calculators.
4. A lot of the evaluation settings remain at teacher's discretion and involve a creative design space of no tools, cheatsheets, open book, provided AI responses, direct internet/AI access, etc.

TLDR the goal is that the students are proficient in the use of AI, but can also exist without it, and imo the only way to get there is to flip classes around and move the majority of testing to in class settings.

The Core Problem

AI tools can now complete most take-home assignments at a level indistinguishable from student work. Detection tools are unreliable.

The Opportunity

Rather than fighting AI, we can design assessments that leverage AI as a learning tool while still measuring genuine understanding.

New Reality: AI is Everywhere

We Cannot Control

- **Quality of AI-generated content improving daily**
- Students using AI outside the classroom
- AI detection tools giving false positives/negatives
- Access to multiple AI tools simultaneously

We Can Control

- **How we design our assessments**
- What happens in the classroom
- Teaching students to use AI responsibly
- Creating policies that reflect reality

How do we prevent AI usage?

How do we integrate AI usage meaningfully?

📝 In-Class Work

More weight on proctored assessments

🎯 Process Over Product

Evaluate how students think

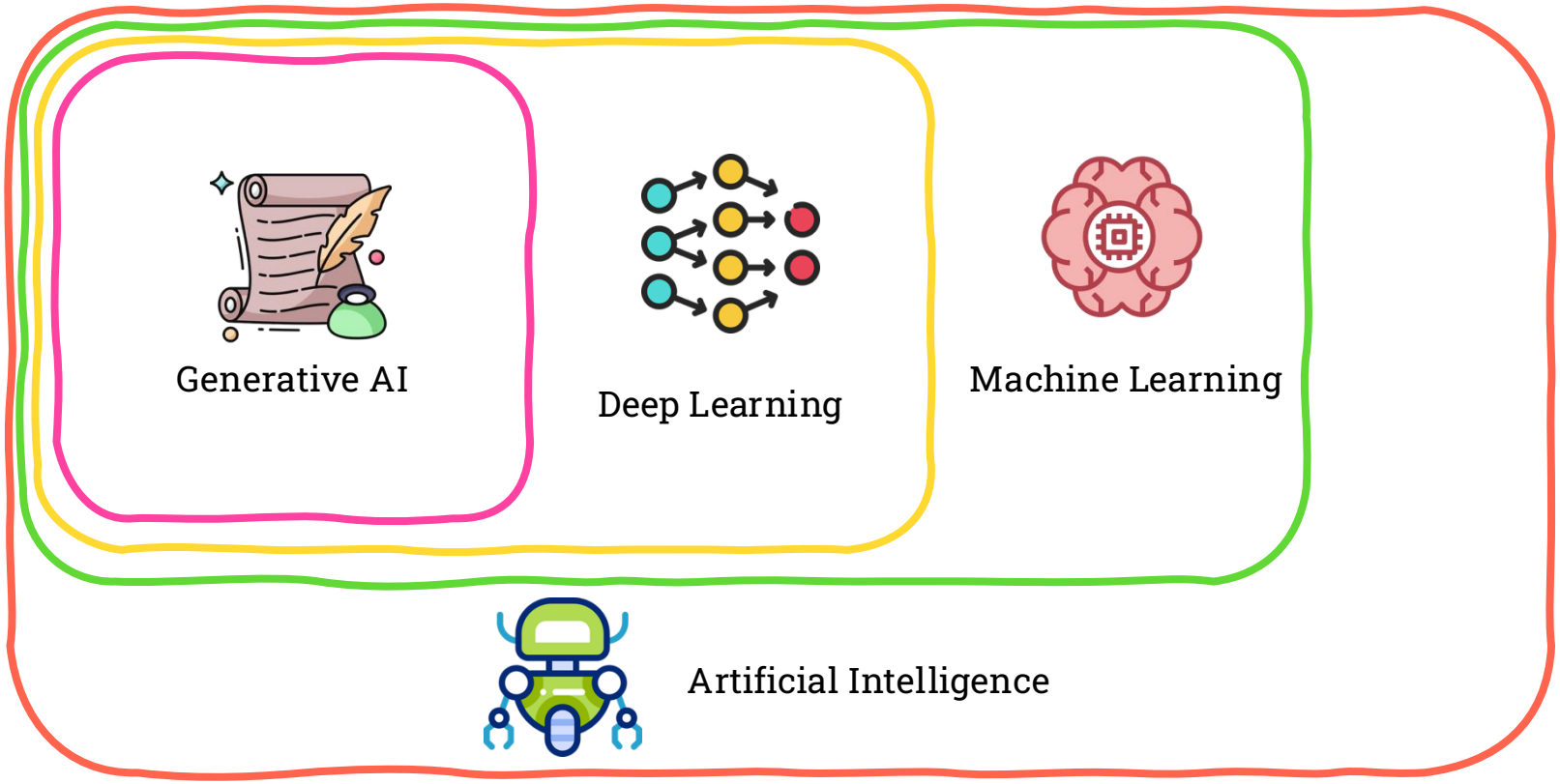
💬 Oral Defenses

Students explain their work verbally

📊 Declare Usage

Transparent AI acknowledgment

What is What in AI?

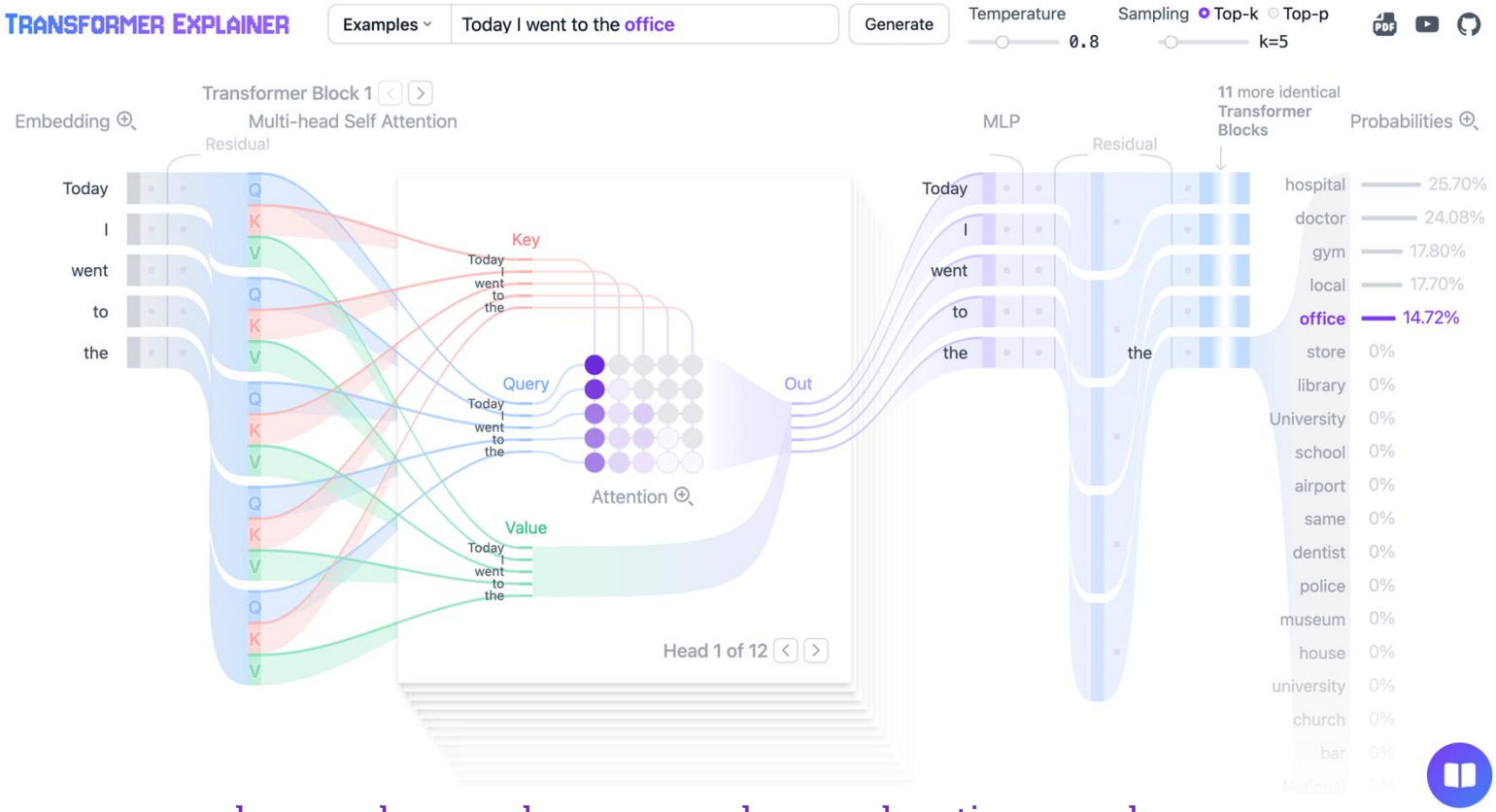


Generative AI is a specialized form of deep learning, which is itself a subset of machine learning within the broader field of artificial intelligence

Next Token Prediction in Generative AI

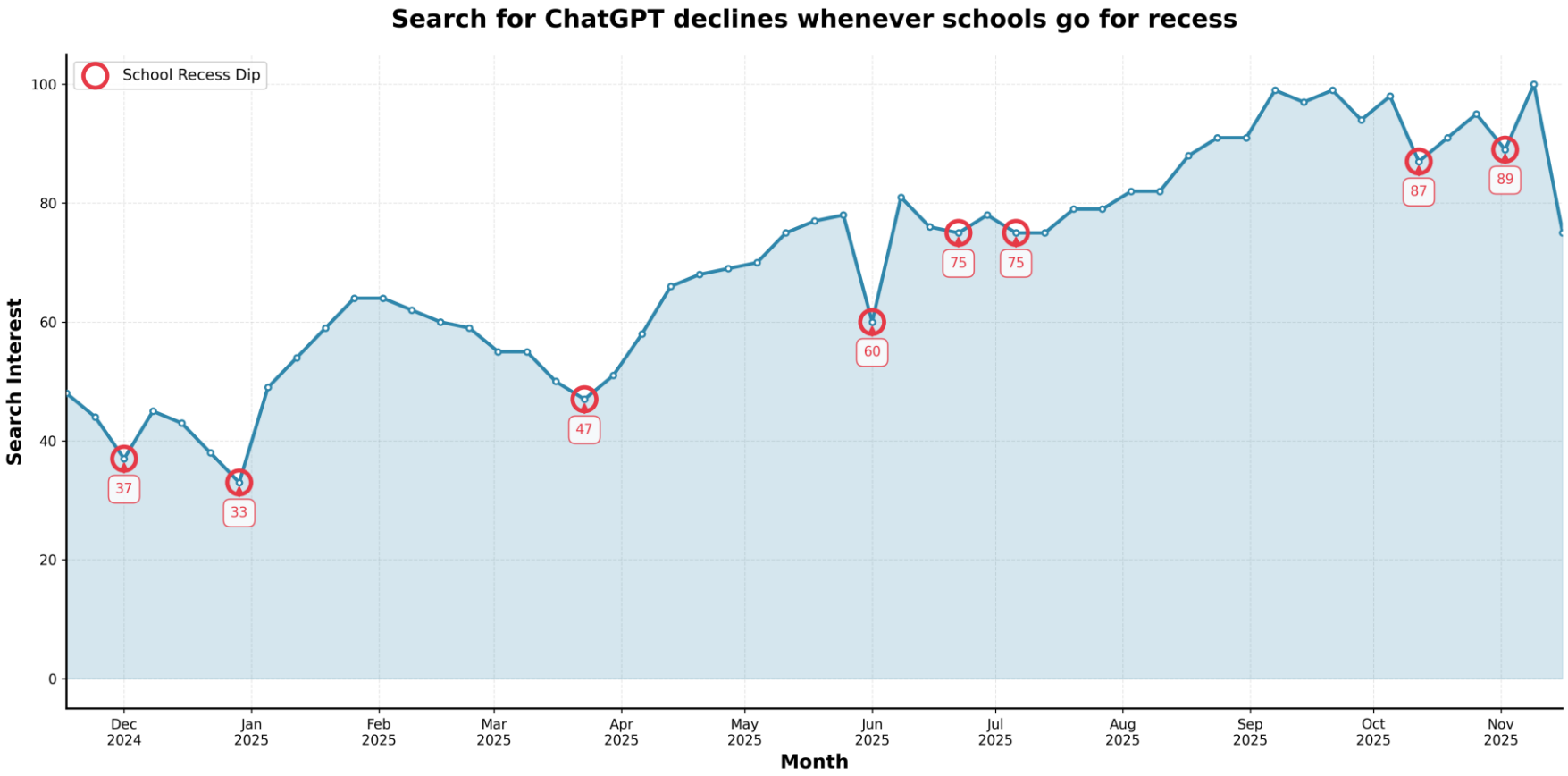
The Core Mechanism

- Large Language Models predict the most likely next word given everything that came before.
- No understanding, no reasoning - just extremely sophisticated pattern matching trained on enormous amounts of text.



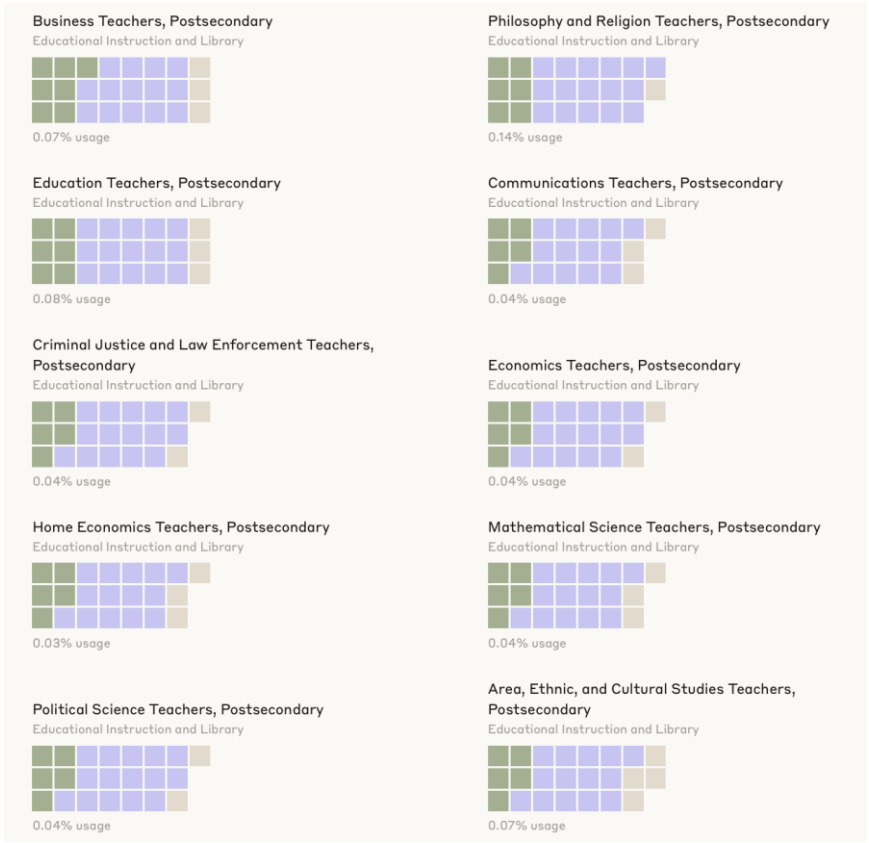
word → word → word → paragraph → explanation → code → answer

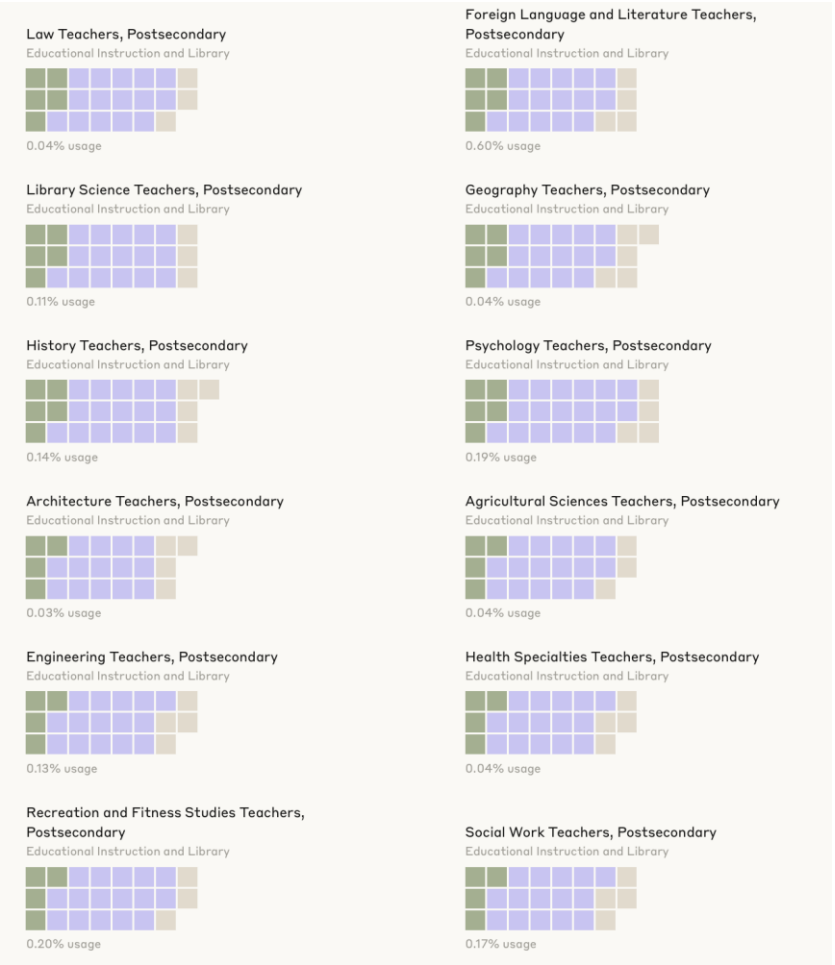
Students are Driving A LOT of Usage

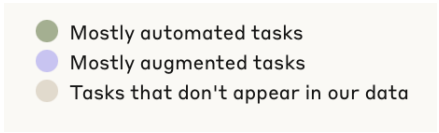


Source: Google Trends

Teachers are Using Them Too!







Source: Anthropic Economic Index

AI Usage Policy Framework

Levels 0, 1 or 2 based on Course Learning Outcomes

No AI Usage

- All work must be entirely student-produced without AI assistance

Best For:
- Foundational skill courses
- Writing composition basics
- Mathematical reasoning
- Critical thinking development

Assessments:
- In-class Exams
- Proctored Exams
- Hand-written Assignments

Guided AI Usage

- AI allowed for specific tasks with mandatory declaration and constraints

Best For:
- Programming courses
- Research methodology
- Data analysis courses
- Technical writing

Assessments:
- Mixed Assignments
- Proctored Quizzes & Exams
- Oral Exams

Full AI Integration

- AI is core tool — focus shifts from interpretation, critique and application

Best For:
- Advanced Analytics Courses
- Professional Skill Courses
- Capstone Courses
- Thesis Research Projects

Assessments:
- Proctored Exams
- Output Quality Checks
- Oral Exams

Implementing the Framework

Key Principles for Any AI Usage Policy

1

Explicit Policy in Syllabus

State clearly which category your course falls into. Specify which assignments allow AI, which don't, and what "AI usage" means.

2

Mandatory Declaration

When AI is permitted, students must declare: which tool(s) used, for what purpose, and include relevant prompts or conversation logs.

3

Weighted In-Class Assessments

Increase weight of proctored, in-class work. This ensures foundational understanding exists regardless of take-home AI usage.

4

Education Before Enforcement

Teach how AI tools work. Dedicate class time to explain models, limitations, and responsible use.

Case Study: ISA 383 (Python for Business)

How I use Guided AI in a Programming Class

Course Objective

Teach Python programming fundamentals. Students must understand syntax, logic, and problem-solving - not just produce working code.

Why Guided, Not Full?

If AI writes all the code, students don't build mental models of programming. They need to struggle with basic concepts first.

AI Usage Rules for ISA 383

✓ Allowed

Debugging help, explaining error messages, understanding documentation

✗ Not Allowed

Generating complete solutions, writing functions from scratch

Required Declaration

Submit AI interaction logs: prompts used, responses, how applied

Assessment Weight

30% in-class quizzes (no AI), 10% oral examination, 5% lab participation, 50% assignments/project (guided AI with declaration)

Case Study: BDA 625 (Data Mining & Machine Learning)

How I use AI in an Advanced Masters' Machine Learning Class

Course Objective

Apply ML algorithms to real business problems. Understand when to use which model, interpret results, communicate findings.

Why Full AI?

The learning objective is interpretation and application: not coding syntax, not Python.

The Focus Shift

Less "can you code a random forest?" More "why would you choose random forest here?"

What Students Are Assessed On

🎯 **Model Selection Justification**

Why this algorithm? What alternatives considered?

📊 **Results Interpretation**

What do metrics mean? Business implications?

⚠️ **Limitations & Assumptions**

What could go wrong? Data quality? Bias?

💼 **Stakeholder Communication**

Can you explain to a non-technical executive?

⚖️ **Assessment Weight**

30% in-class quizzes (no AI), 10% oral examination, 50% assignments/project (guided AI with declaration)

Note: Students still declare AI usage, but focus is on demonstrating they understand and can defend the output.

AI as an Intelligent TA for Instructors

Leverage AI for the Grudge Work so you can focus on Teaching

📝 Assessment Design

- Generate diverse quiz questions
- Create multiple exam versions
- Draft rubrics with criteria

📚 Content Development

- Adapt materials for different levels
- Create worked examples
- Generate practice problems

✅ Feedback Support

- Draft initial feedback on submissions
- Identify common mistake patterns
- Create model answers

Example Prompt for Creating Quiz Questions:

"Generate 5 multiple-choice questions testing understanding of Python list comprehensions. Include 2 easy (syntax), 2 medium (output prediction), and 1 hard (debugging). Use my class materials that I'm providing."

Important Caveat: LLMs are LLMs

Always review AI-generated content. Check for accuracy, appropriate difficulty, and alignment with learning objectives.

Time Savings

Tasks that took hours now take minutes. Use saved time for higher-value activities: office hours, research, curriculum innovation.

Which Model to Use?

Depends on use case!

ChatGPT

A Swiss Knife, Jack of All Trades
- Writing Help, Coding Help, General Purpose, Image Generation

Claude

Intelligent Assistant
- Writing Help, Coding Help, General Purpose, Image Generation

Gemini

Highly Capable
- Writing Help, Long Memory Tasks, General Purpose, Image Generation
- **Free for AUS Students, Faculty and Staff**

NotebookLM

Learning New Things
- Feed in Videos, Lecture Slides, Papers, etc.
- Create podcasts and audiobooks
- **Free for AUS Students, Faculty and Staff**

Students: Be transparent in your usage. Don't use for assessments if not allowed.

AI
~~Computers~~ are useless. They can only give you answers.

— Pablo Picasso

AI
~~Computers~~ are like bicycles for mind.

— Steve Jobs

Questions?

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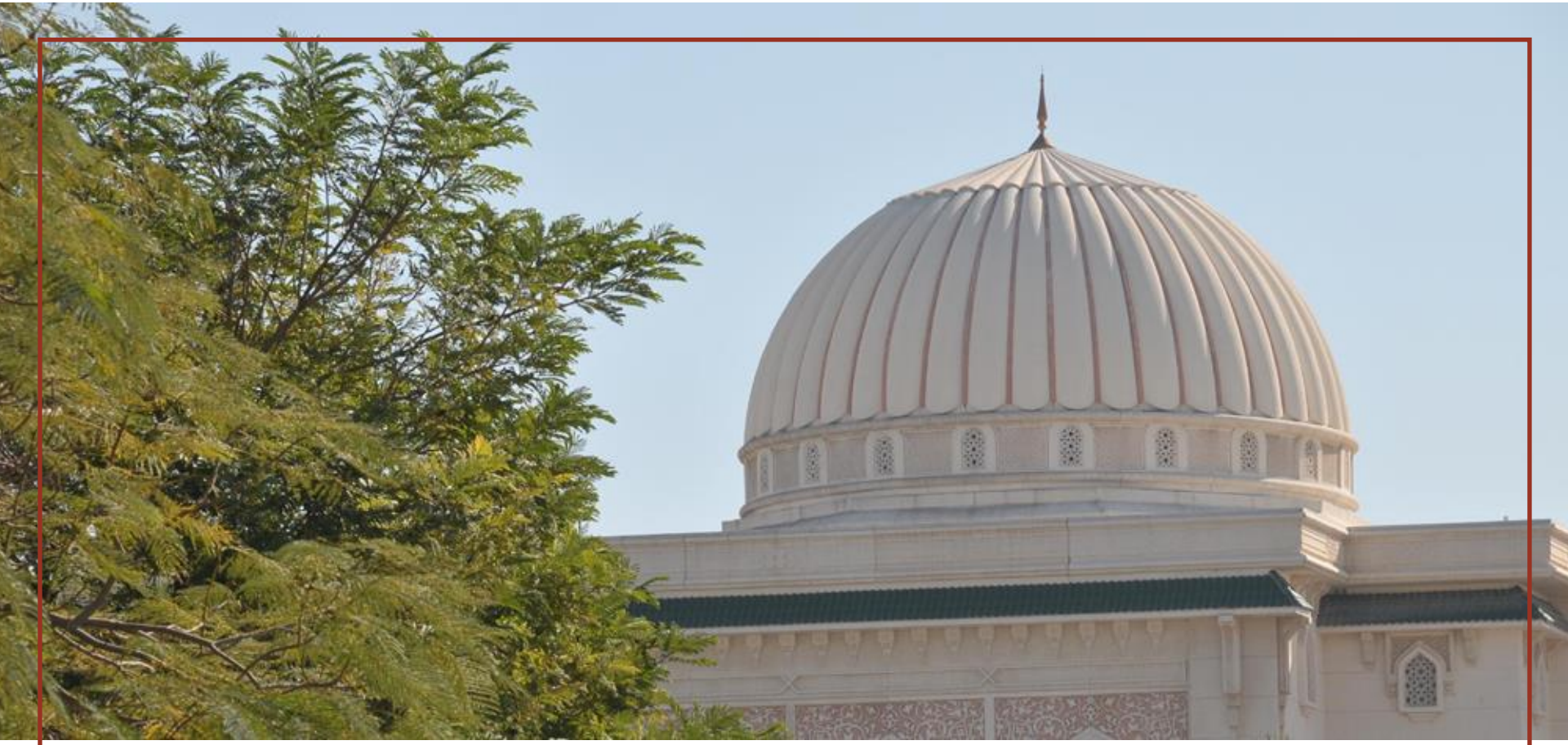

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