

CS 315 - Day 01, Learning is Hard

Demo notebooks & Hello Worlds in Python and Java.

Notes and previous videos in the LMS are a convenience and not meant to replace class attendance.

Expectation reminder: Attend class, have a **notebook** (check) for taking notes and in-class work, DO YOUR OWN WORK, start early on HW, and be sure to cite any sources you use in completing your work. Note the policy on collaboration and artificial intelligence.

Take 45 seconds to look over the following list of pairs of words, but do not write anything down.

A	B
bread/butter	ocean/breeze
leaf/tree	music/lrics
sweet/sour	sh e/sock
phone/book	movie/actress
chi s/salsa	gasoline/engine
high school/college	pen il/paper
river/bat	turkey/stuffing
fruit/vegetable	be r/wine
computer/chip	television/rad o
l nch/dinner	chair/couch

Without looking at the list of pairs of words, write down as many pairs as you can. You do not need to remember where any missing letters were nor which column a pair was in.

Comparing the pairs you wrote down to the following table, count how many pairs you wrote which are in column A and how many are in column B.

A	B
ocean/breeze	bread/b tter
leaf/tree	music/l rics
sweet/sour	sh e/sock
movie/actress	phone/bo k
gasoline/engine	chi s/salsa
high school/college	pen il/paper
turkey/stuffing	river/b at
fruit/vegetable	be r/wine
computer/chip	television/rad o
chair/couch	l nch/dinner

According to The Talent Code by Daniel Coyle (Coyle, Daniel. *The Talent Code: Greatness Isn't Born: It's Grown, Here's How*. Bantam Books, 2009), studies show that on average people remember 3 times as many pairs in column B, the one with missing letters.

The claim is that a microsecond of struggle (cognitive demand) makes all the difference.

An education must prepare a student to ask and explore questions in contexts that do not exist yet. That is, we need individuals capable of tackling problems they have never encountered and to ask questions that no one has thought of yet.

In-class w/ assigned groups of size four (4):

1. Intro: Name, POE, Icebreaker “What is your favorite drink?”

For each question that follows:

THINK about a possible answer on your own

DISCUSS your answers with the rest of your group

SHARE a summary of your group’s discussion

2. What are the goals of a College education?

3. How does a person learn something new?

4. What do you reasonably expect to remember from college in 20 years?

5. What is the value of making mistakes in the learning process?

Read the first 9 paragraphs of the article, <https://thehill.com/policy/technology/3922608-american-igs-rose-30-points-in-the-last-century-now-they-may-be-falling/#:~:text=Researchers%20across%20the%20globe%20have,an%20era%20of%20intellectual%20lethargy>, repeated below:

A new study of human intelligence posits a narrative that may surprise the general public: American IQs rose dramatically over the past century, and now they seem to be falling.

Cognitive abilities declined between 2006 and 2018 across three of four broad domains of intelligence, the study found. Researchers tracked falling scores in logic, vocabulary, visual and mathematical problem-solving and analogies, the latter category familiar to anyone who took the old SAT.

In the 12-year span, IQ scores dipped up to 2 points in the three areas of declining performance. Scores declined across age groups, education levels and genders, with the steepest drops among younger and less-educated test-takers.

IQ scores rose in just one area, spatial reasoning — a set of problems that measure the mind's ability to analyze three-dimensional objects.

The study, authored by researchers at Northwestern University and the University of Oregon, appears in the May-June issue of the journal Intelligence.

Researchers across the globe have been tracking an apparent decline in human IQs, starting around the turn of the millennium. Theories abound as to why scores are dropping, but the smart money says our cognitive skills may have plateaued, teetering into an era of intellectual lethargy.

If you want to ascribe blame, look no further than this screen.

Cognitive researchers hypothesize that smartphones and smart speakers, autocompletes and artificial intelligence, Wi-Fi and runaway social media have conspired to supplant the higher functions of the human brain. In its quest for labor-saving tech, the world may be dumbing itself down.

"We're all getting super lazy in our cognition because it's getting super easy to do everything," said Ruth Karpinski, a California psychologist who studies IQ. "We're using Waze and Google Maps to get where we need to go. We're losing our whole sense of compass."

1. Discuss this in your group. Do you agree? Pick someone in your group to report out.
2. Class discussion.

Read the first 8 paragraphs of <https://cacm.acm.org/news/the-impact-of-ai-on-computer-science-education/>, repeated below:

Last fall, Eric Klopfer decided to conduct an experiment in his undergraduate computer science class at the Massachusetts Institute of Technology (MIT). He divided the class into three groups and gave them a programming task to solve in the Fortran language, which none of them knew.

One group was allowed to use ChatGPT to solve the problem, the second group was told to use Meta's Code Llama large language model (LLM), and the third group could only use Google. The group that used ChatGPT, predictably, solved the problem quickest, while it took the second group longer to solve it. It took the group using Google even longer, because they had to break the task down into components.

Then, the students were tested on how they solved the problem from memory, and the tables turned. The ChatGPT group "remembered nothing, and they all failed," recalled Klopfer, a professor and director of the MIT Scheller Teacher Education Program and The Education Arcade.

Meanwhile, half of the Code Llama group passed the test. The group that used Google? Every student passed.

"This is an important educational lesson," said Klopfer. "Working hard and struggling is actually an important way of learning. When you're given an answer, you're not struggling and you're not learning. And when you get more of a complex problem, it's tedious to go back to the beginning of a large language model and troubleshoot it and integrate it."

In contrast, breaking the problem into components allows you to use an LLM to work on small aspects, as opposed to trying to use the model for an entire project, he says. "These skills, of how to break down the problem, are critical to learn."

This example has led Klopfer to confidently conclude that as AI steamrolls its way into every industry, computer science is not doomed. Other computer science experts agree that the more AI is used, the nature of jobs will change so humans must still be taught basic concepts like statistics and knowledge of how systems work.

"You still need the foundation to be effective computer scientists and software engineers," said Beena Ammanath, leader of trustworthy AI and ethical technology at Deloitte.

1. Discuss this in your group. Do you agree? Pick someone in your group to report out.

2. Class discussion.

3. Individually, ***hand-write*** a paragraph of at least 6 sentences summarizing today's class. You should first briefly summarize the in-class exercise, the two readings, and the class discussions.

Then, give your idea as to what the theme of today's class was. How might this material affect the teaching and learning in this class.

Finally, read the following article: <https://www.scientificamerican.com/article/chatgpt-is-changing-the-words-we-use-in-conversation/>, "ChatGPT Is Changing the Words We Use in Conversation," "***delve***," "***realm***" and "***meticulous***."