



THE LONDON SCHOOL
OF ECONOMICS AND
POLITICAL SCIENCE ■

130 EST 1895
years

AGENTIC FRAMEWORKS IN PROGRAMMING EDUCATION

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[AI in Education Showcases](#)
(18 March 2026)

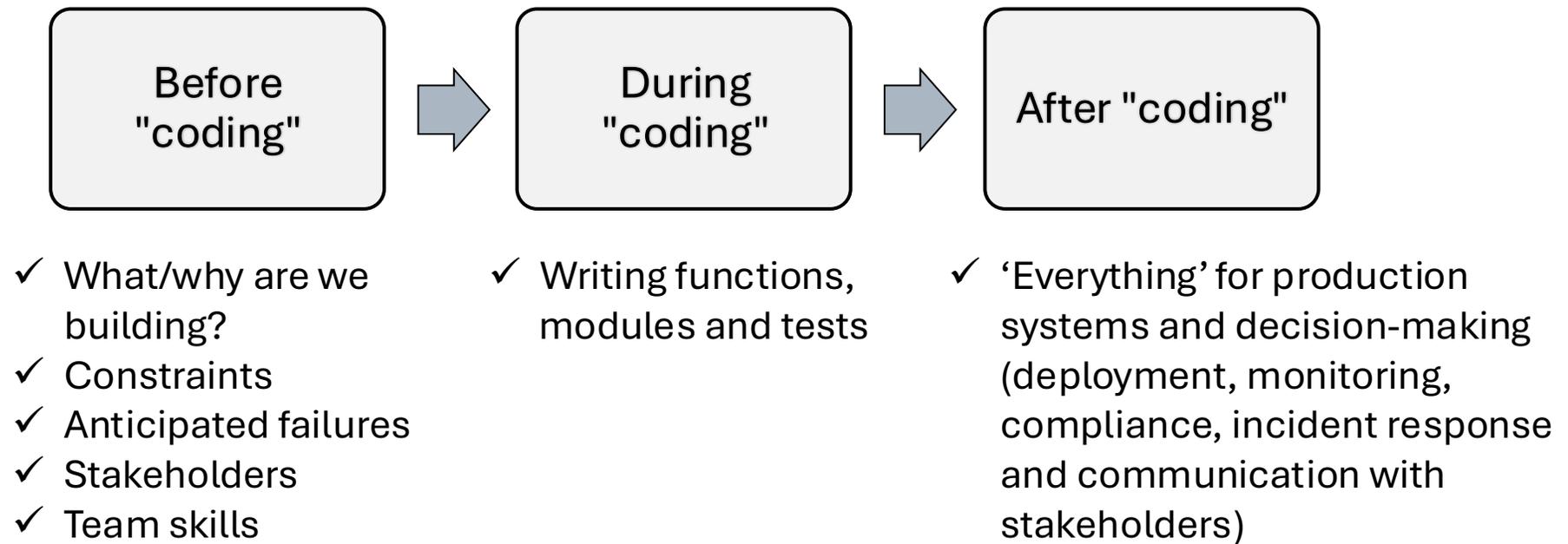
Capacity Building on Generative AI Tools
for Programming Education
(Talent Development Awards 2024-2025)



Programming – concept and cycle

Programming is writing **computer code** (or **program**) to solve a **problem**.^[1]

Usually, three stages:^[2]

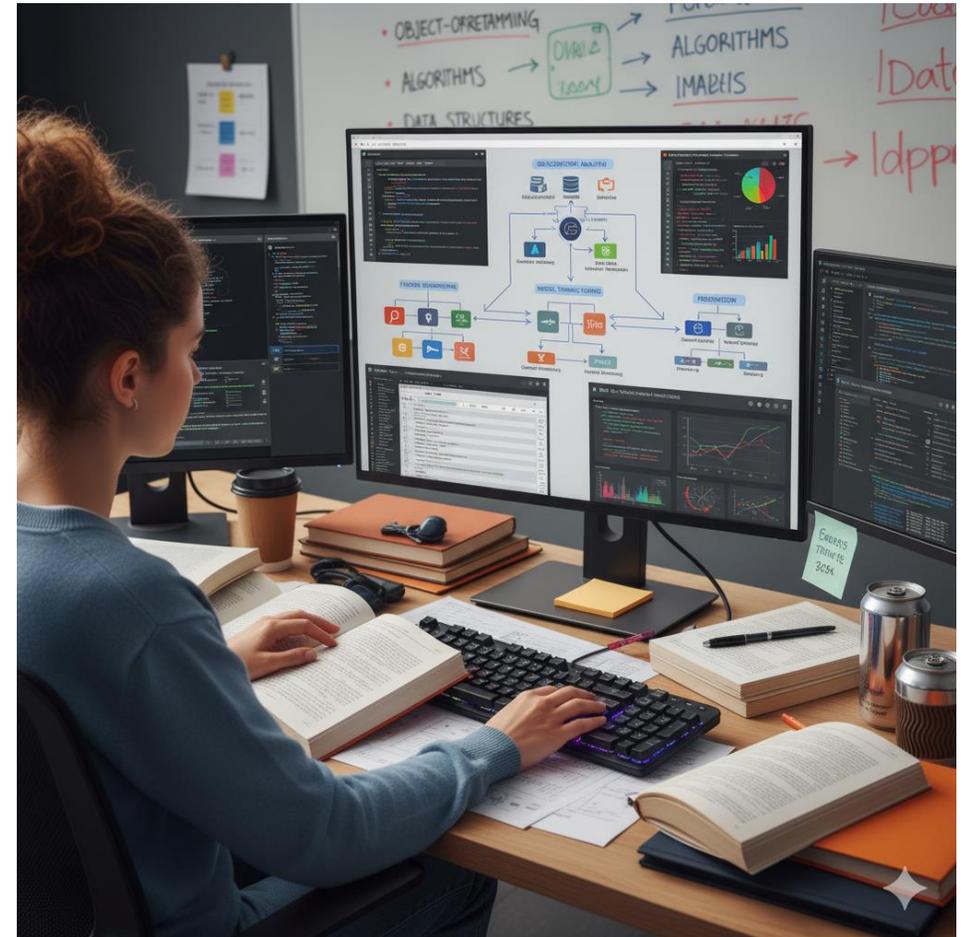


Programming education – school / HE

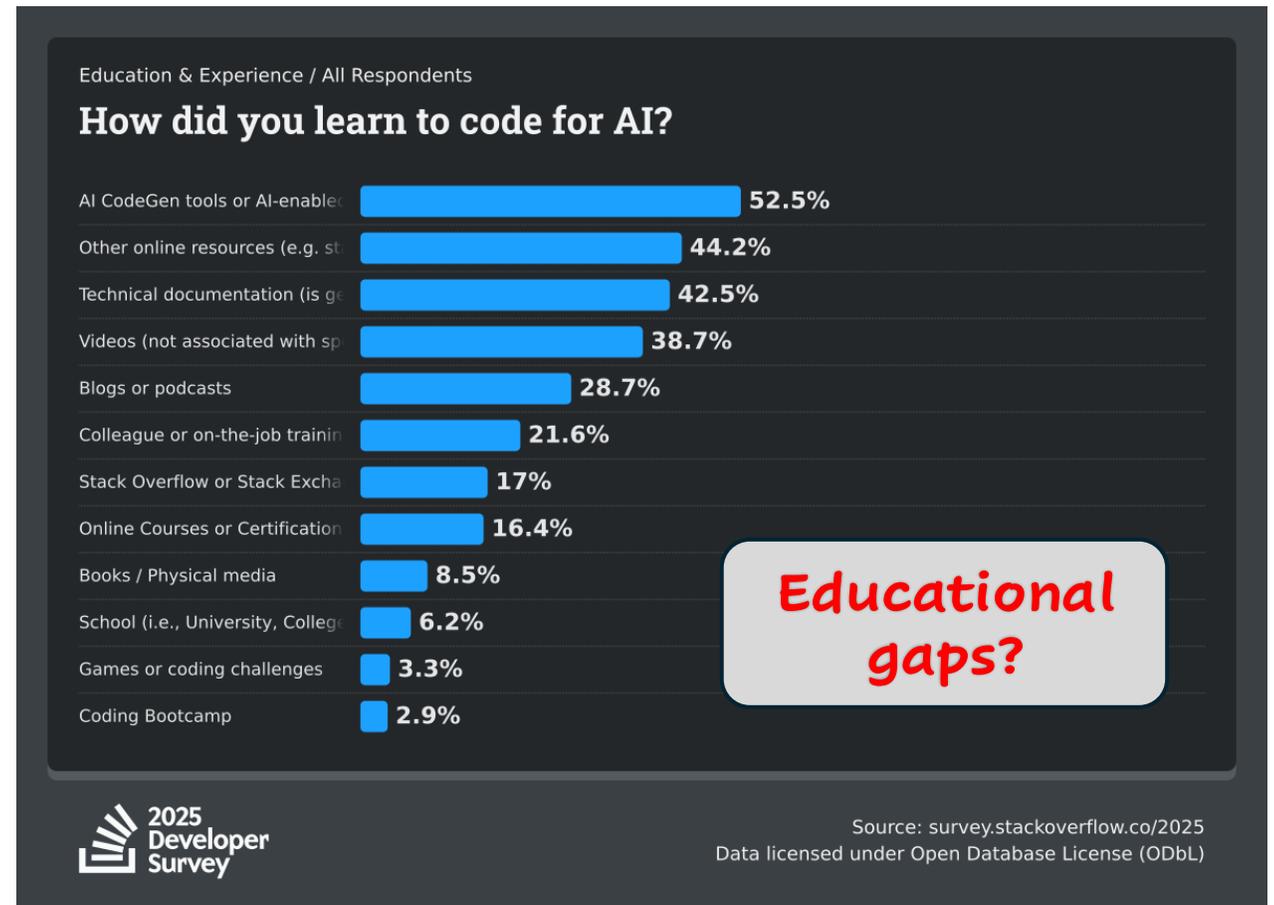
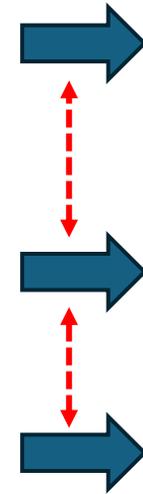
Mostly “mechanical” repetition of **coding patterns** over **boilerplate code** and “clean” data.

Most **academic practices do not** cover the entire cycle:

- ✓ Simplified “before coding” scenarios
- ✓ “During code” lacks better code structuring and debugging skills
- ✓ “After coding” scenarios usually missing



Programming education - elsewhere



'Vibe coding' named word of the year by Collins Dictionary. [3]

49,000+ responses from 177 countries across 62 questions focused on 314 different technologies. [4]

How agents fit into programming education?

Agents have the potential to **transform programming** from “typing” to “**understanding**” and “**orchestrating**” problem-solving systems.

“Before coding”

- ✓ Problem framing and design thinking

“During coding”

- ✓ Collaborative implementation and rapid experimentation

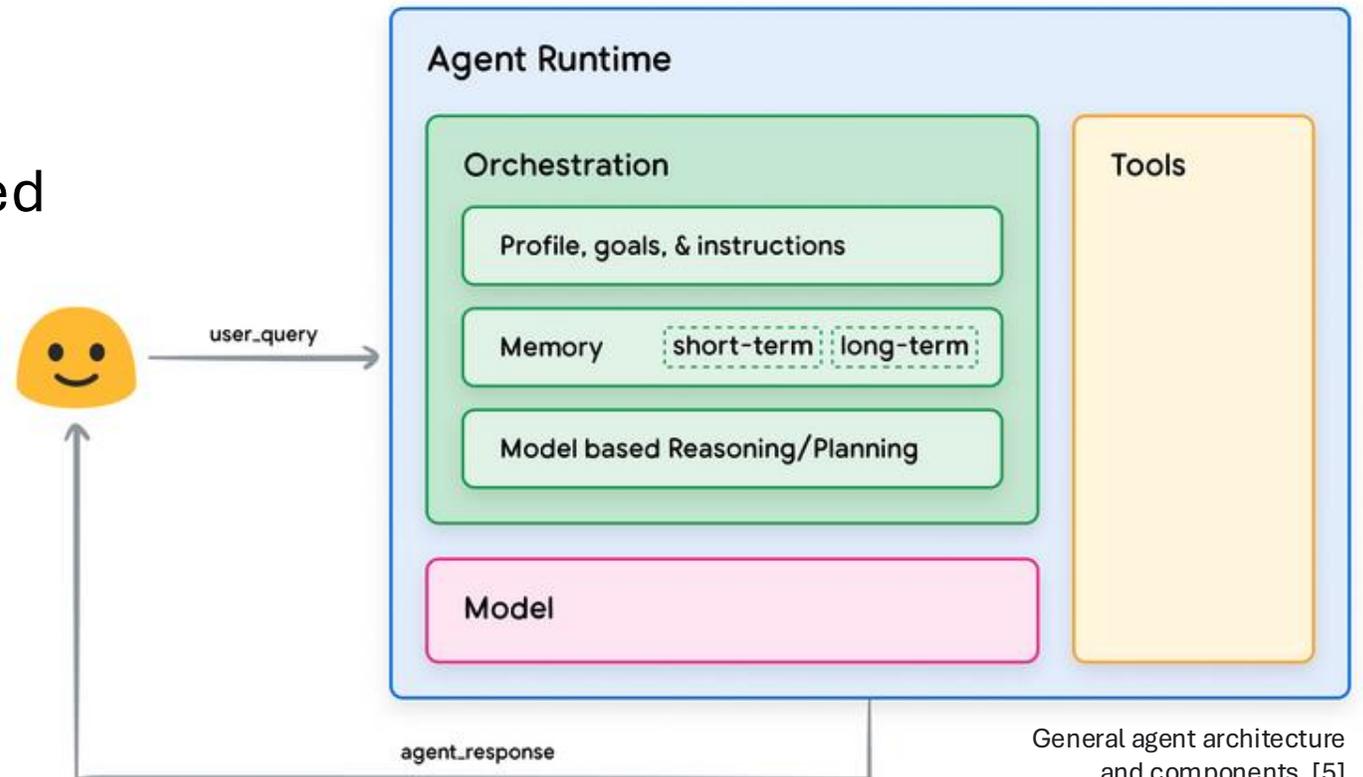
“After coding”

- ✓ Evaluation, refactoring, documentation, and presentation
 - ✓ *However, they can't help much on compliance and accountability!*
 - ✓ **Reflective learning** throughout the cycle!
-

Agent vs agentic frameworks

Agent framework: infrastructure, abstractions, and tools for building agents.

Agentic framework: emphasis on autonomy, planning, and goal-directed behaviour.



Agent vs agentic frameworks

```
GitHub Copilot
m.e.barreto@LSE-Mac-m ~ % copilot

GitHub Copilot v1.0.5
Describe a task to get started.

Tip: /instructions View and toggle custom instruction files
Copilot uses AI, so always check for mistakes.
```

```
* Claude Code
m.e.barreto@LSE-Mac-m ~ % claude

Claude Code v2.1.56
Sonnet 4.6 - API Usage Billing
/Users/m.e.barreto
```

```
Ready (m.e.barreto)
m.e.barreto@LSE-Mac-m ~ % gemini

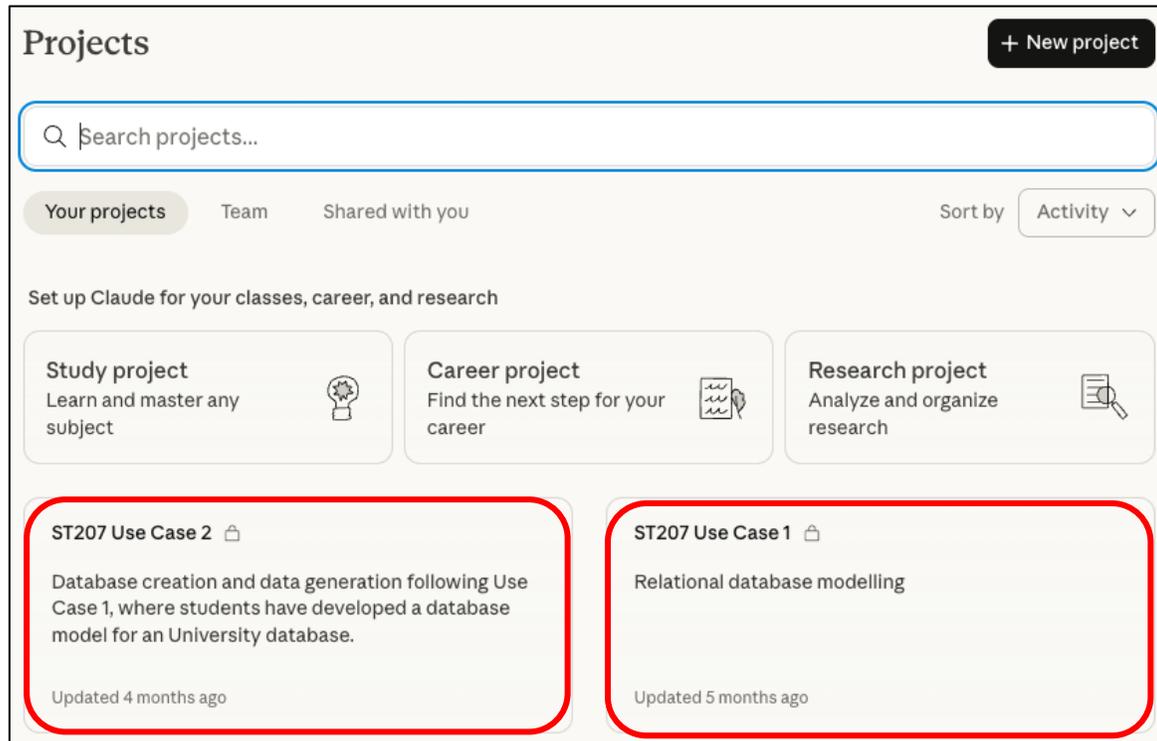
Gemini CLI v0.33.1
Logged in with Google /auth
Gemini Code Assist for individuals /upgrade
```



Agent-first IDE

Case study: ST207 – Databases (AT 2025)

Claude Projects: Database modelling



Design, Implementation & Analysis: Qurat-ul-ain Gul (Ann) / Marcos
 Revision & Feedback: Steven Williams
 Report: Qurat-ul-ain Gul (Ann)

Analysis:

- ✓ General usage and impressions
- ✓ Prompt usage and modifications
- ✓ Conceptual challenges
- ✓ Perceived usefulness (table)
- ✓ Engagement patterns (based on **GENIAL framework** [6])

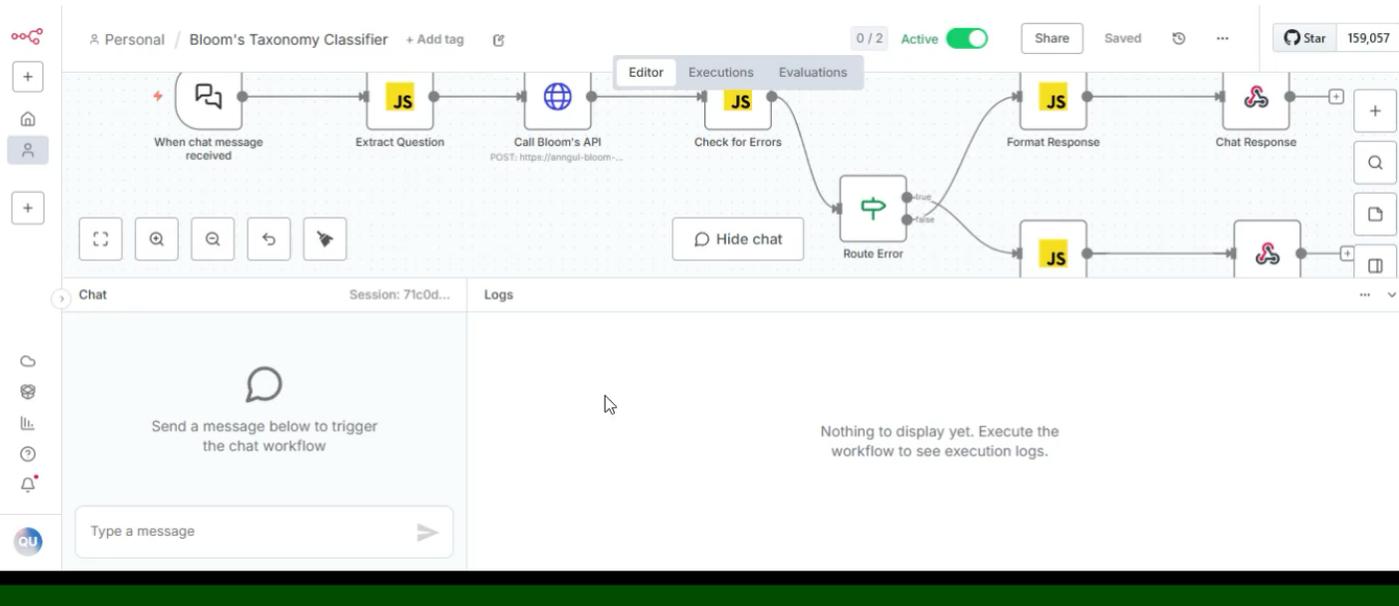
Likert Scale Rating	Use Case 1 (n=11)	Use Case 2 (n=4)
4 - Extremely Helpful	3 (27%)	1 (25%)
3 - Helpful	5 (46%)	2 (50%)
2 - Somewhat Helpful	3 (27%)	1 (25%)
1 - Not Helpful	0 (0%)	0 (0%)
Total Helpful (3 & 4)	8 (73%)	3 (75%)

GENIAL framework:

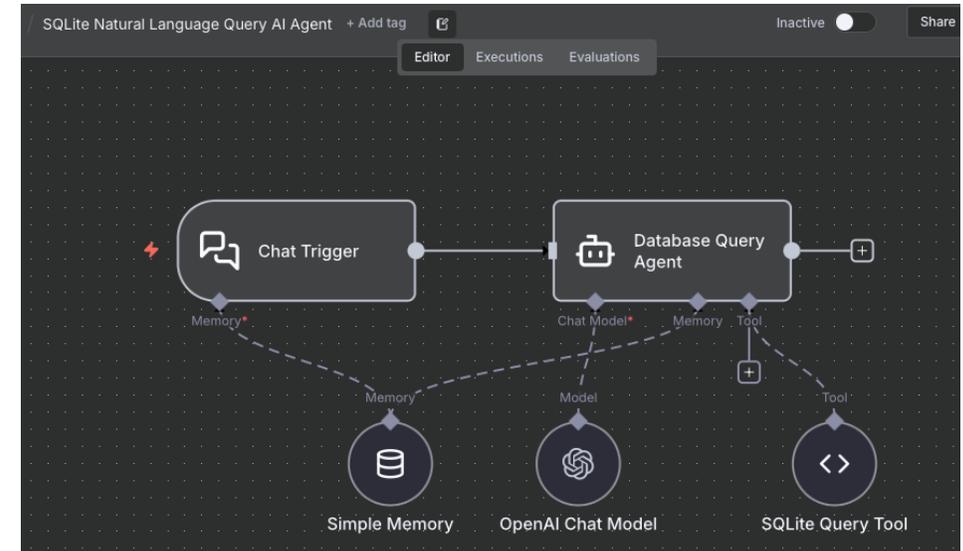
- ✓ **Use case 1:** 4 (reflective/resourceful), 4 (receptive), 3 (resistive)
- ✓ **Use case 2:** 1 (reflective), 3 (receptive)

Case study: ST207 – Databases (AT 2025)

n8n workflow: **Bloom Taxonomy classifier + Database query agent**



✓ Prototyping only



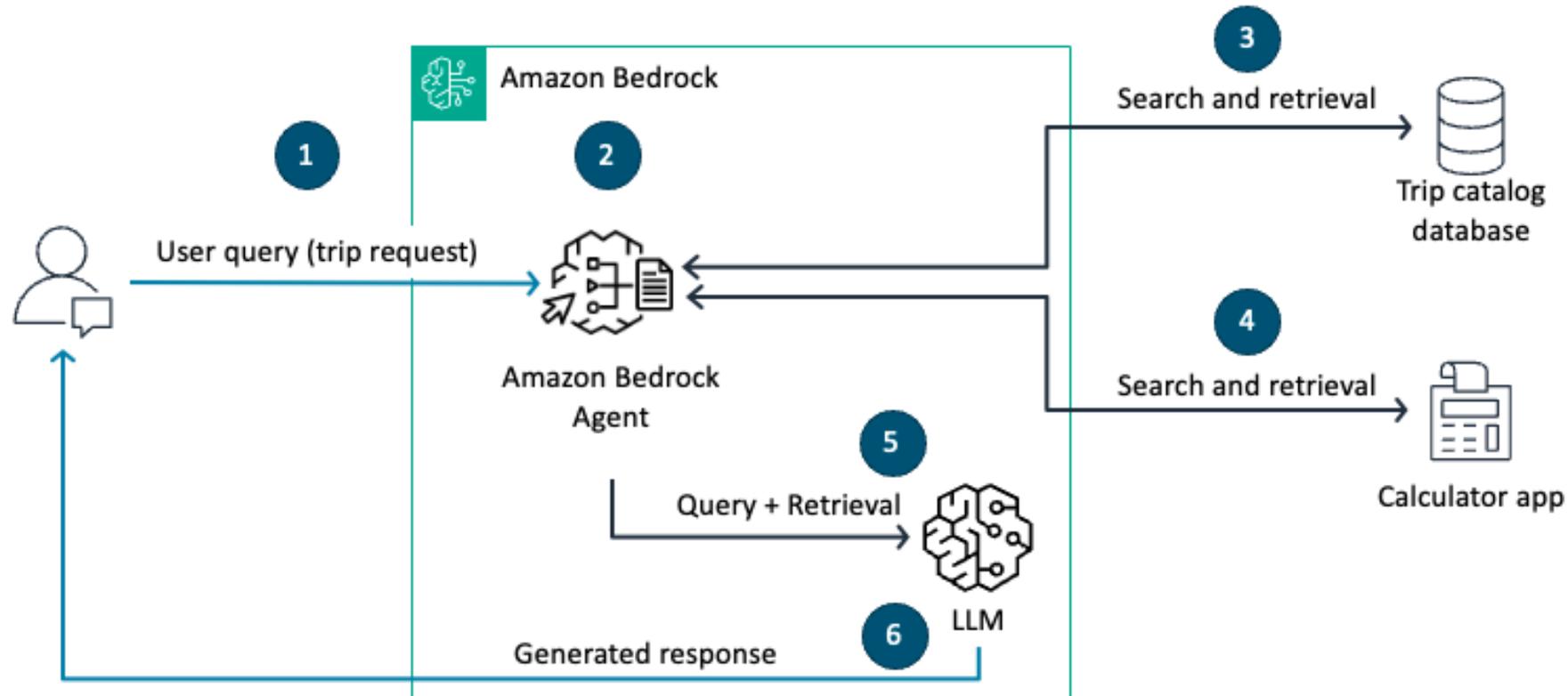
Design: Qurat-ul-ain Gul (Ann) / Marcos
Prototyping: Qurat-ul-ain Gul (Ann)

Case study: ST446 – Distributed Computing for Big Data (WT 2026)

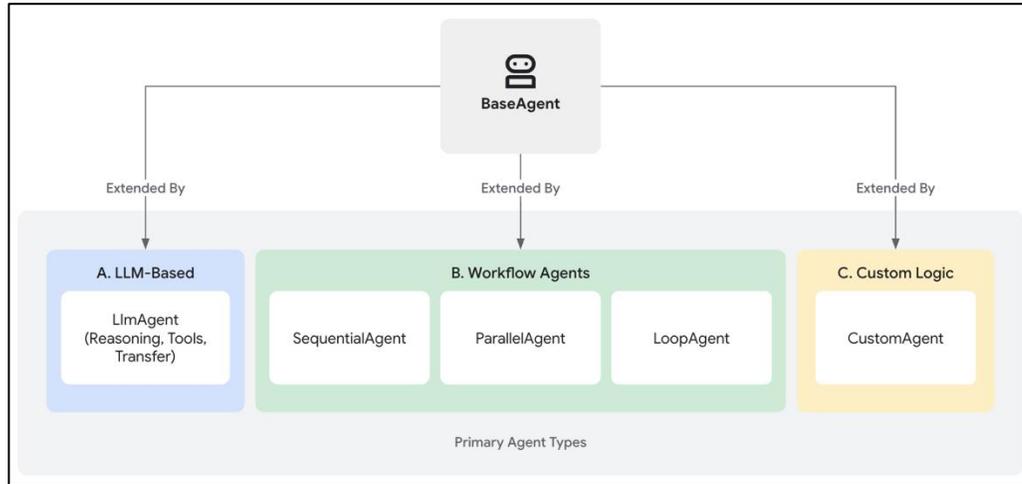


Amazon: Bedrock Agents

✓ Learner lab



Case study: Agent orchestration



✓ Prototyping only (for now)



```

instruction = f'''
Your role is a shop search agent on an e-commerce site with millions of
items. Your responsibility is to search items based on the queries you
recieve.

To find items use `find_shopping_items` tool by passing a list of queries,
and answer to the user with item's name, description and img_url
'''

shop_agent = Agent(
    model='gemini-2.5-flash',
    name='shop_agent',
    description=(
        'Shop agent for an e-commerce site'
    ),
    instruction=instruction,
    tools=[find_shopping_items],
)
  
```

Event 5 of 5

Event	Request	Response
Coordinator	Greeter	
TaskExecutor	google_search	

```

content:
  parts:
    0:
      functionResponse:
        id: "adk-b89d81f3-2228-45ca-8022-c494d64b6ebb"
        name: "transfer_to_agent"
        response:
          result: null
        role: "user"
      invocationId: "e-6143b271-56fd-406b-bc16-2f1fc8796020"
      author: "Greeter"
  actions:
    stateDelta:
    artifactDelta:
    transferToAgent: "TaskExecutor"
    requestedAuthConfigs:
    requestedToolConfirmations:
    id: "c969f51d-b0d7-429e-8f5a-4ecd2e4557e3"
    timestamp: 1767783189.004373
    title: "functionResponse:transfer_to_agent"
  
```

SESSION ID 59af099d-cc8f-454b-a55f-7e8dbab3664a

hi

transfer_to_agent

transfer_to_agent

Hello! I'm your Greeter assistant. How can I help you today?

what is the current time in london?

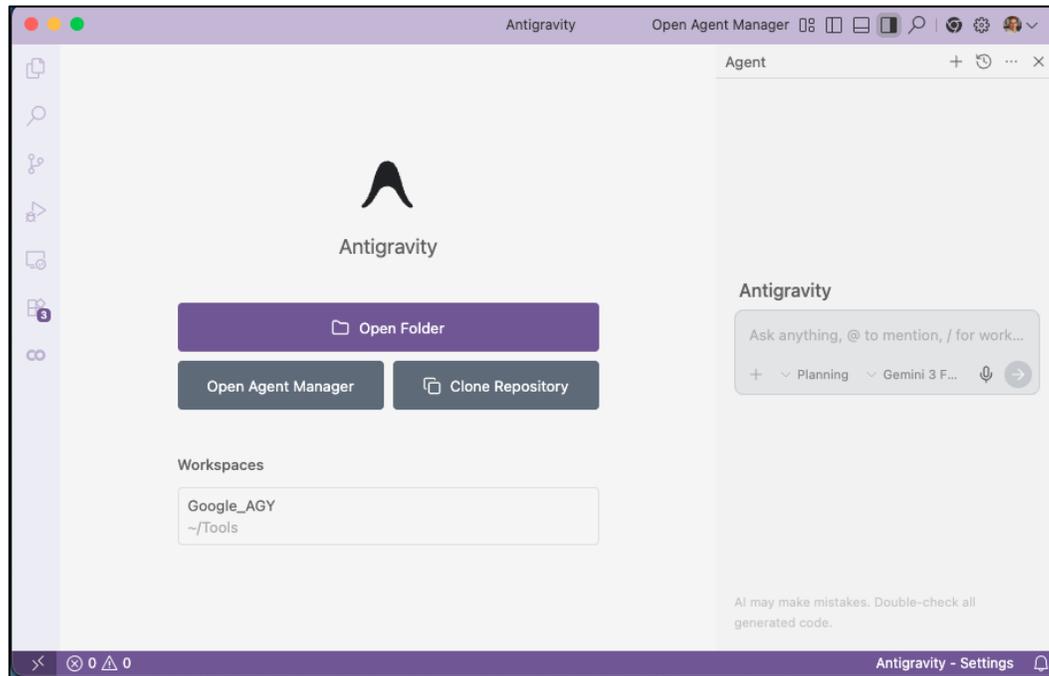
transfer_to_agent

transfer_to_agent

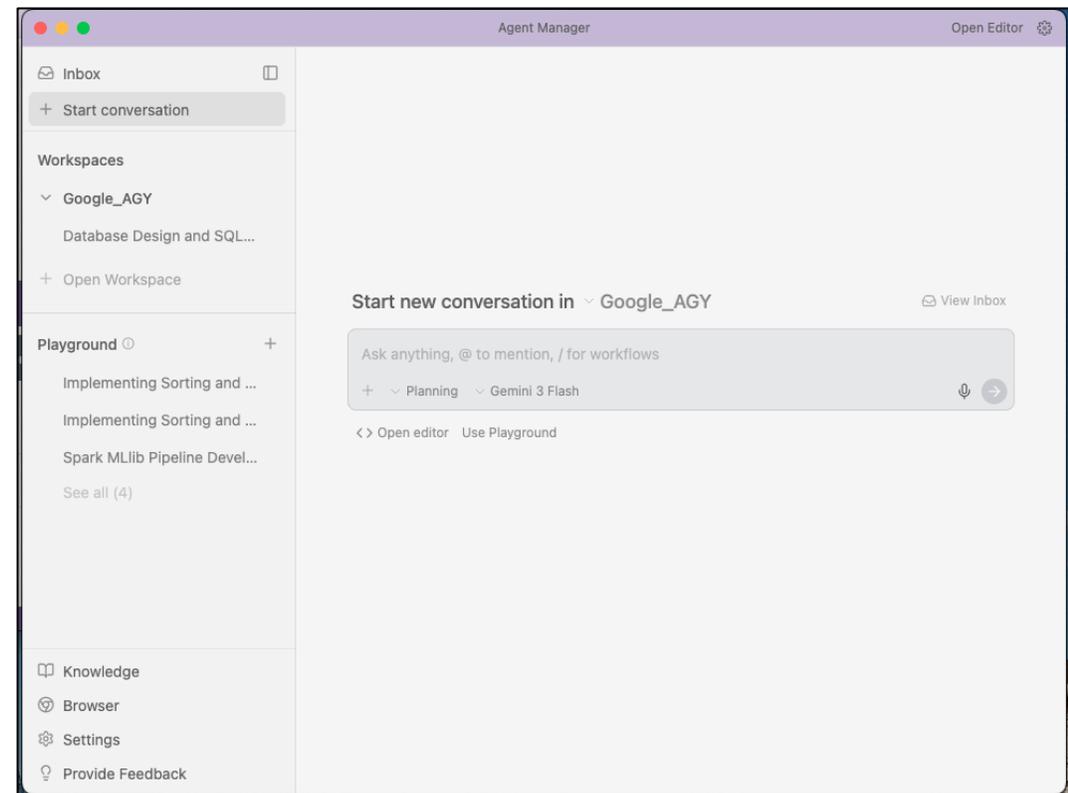
Type a Message...

Case studies: AY 2026-2027

Google Antigravity: Database and machine learning pipelines
(selected STxxx courses)

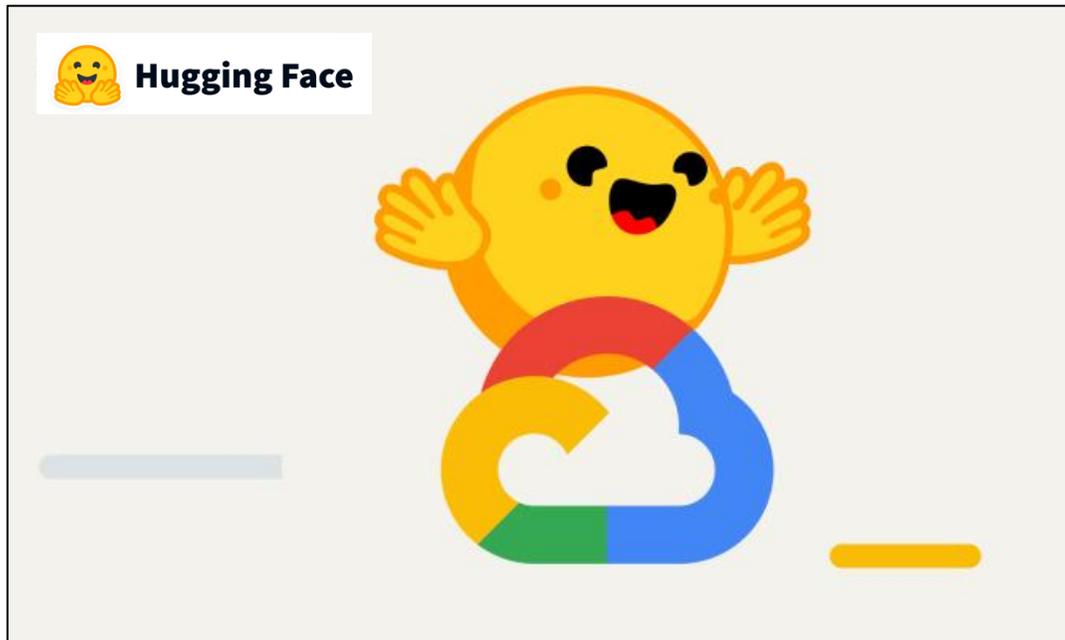


(demo)

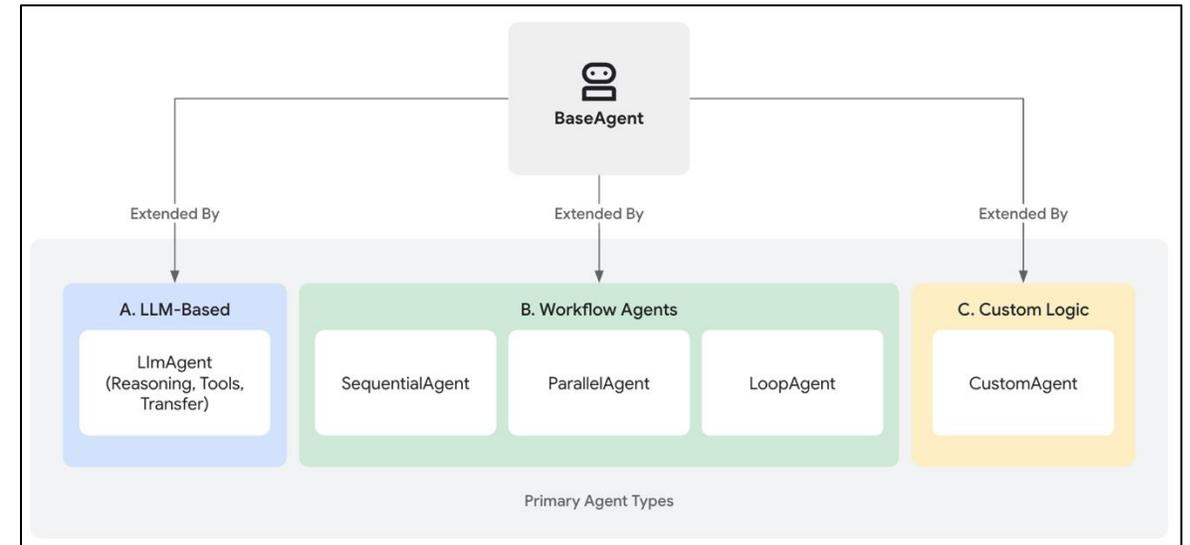


Case studies: AY 2026-2027

Other tools: **Data science and machine learning pipelines**



- ✓ Focus on open models and reproducible pipelines
- ✓ Mixture of infrastructure and autonomy



References

- [1] BBC Bitesize. **Introduction to programming.** [[link](#)]
 - [2] M. Wyss. **Should You Still Learn to Code in 2026?** [Medium](#), February 2026
 - [3] L. Cress. **'Vibe coding' named word of the year by Collins Dictionary.** [BBC News](#), November 2025.
 - [4] Stack Overflow. **2025 Developer Survey.** <https://survey.stackoverflow.co/2025>
 - [5] J. Wiesinger, P. Marlow, V. Vuskovic. **AI Agents.** Google, September 2024
 - [6] Cardoso Silva, J., Sallai, D., Kearney, C., Panero, F., & Barreto, M. (2025). **Mapping Student-GenAI Interactions onto Experiential Learning: The GENIAL Framework.** SSRN Preprint. <https://ssrn.com/abstract=5674422>
 - [7] I. Bouzaiane, C. N. Kompalli. M. Barreto. **Curriculum gaps and transition barriers:** evidence for equitable workforce policy in the AI era. [LSE-Fudan Annual Conference on Global Public Policy](#). November 2025.
 - [8] Daily Dose of Data Science. <https://www.dailydoseofds.com/>
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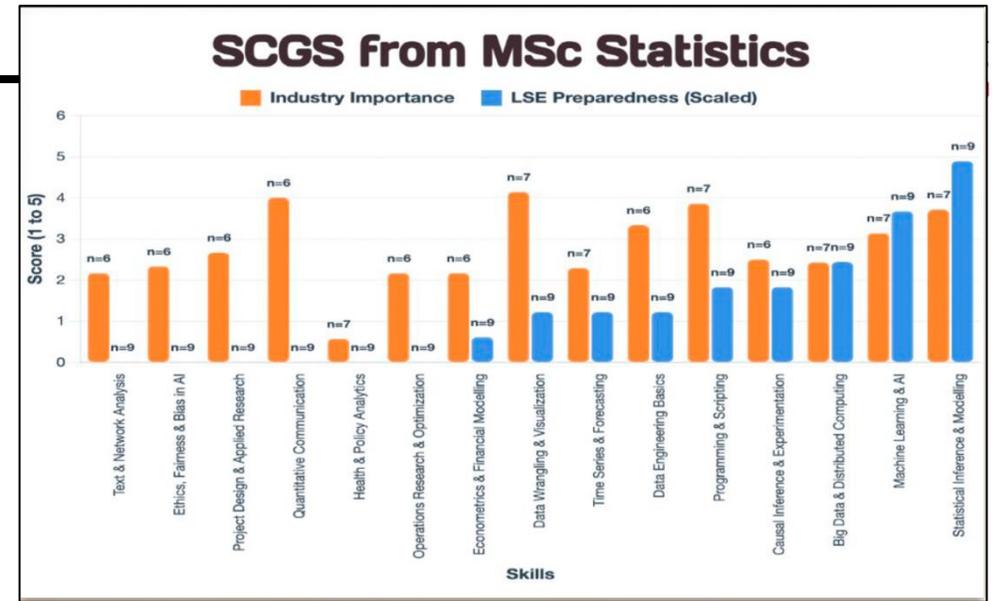
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Extras



SCGS: Skill coverage gap score
PRGS: Perceived readiness gap score

LSE-Fudan Annual Conference
 on Global Public Policy. [7]

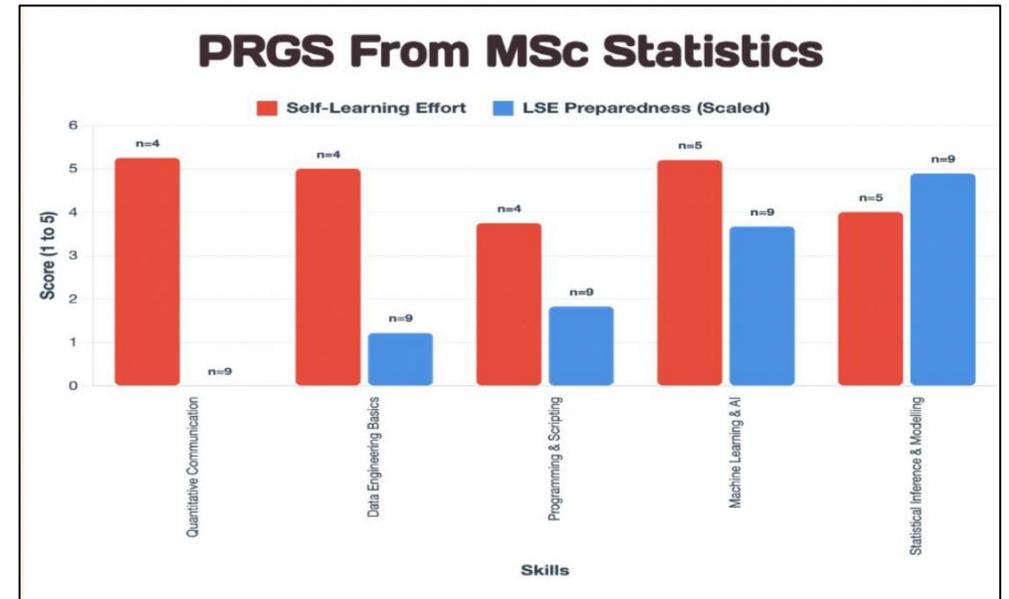


LSE Change Makers 2024-25: 80 alumni from Dept of Statistics

Further extended to O*NET, AIOE Index and BLS Employment Projections data to answer the following questions:

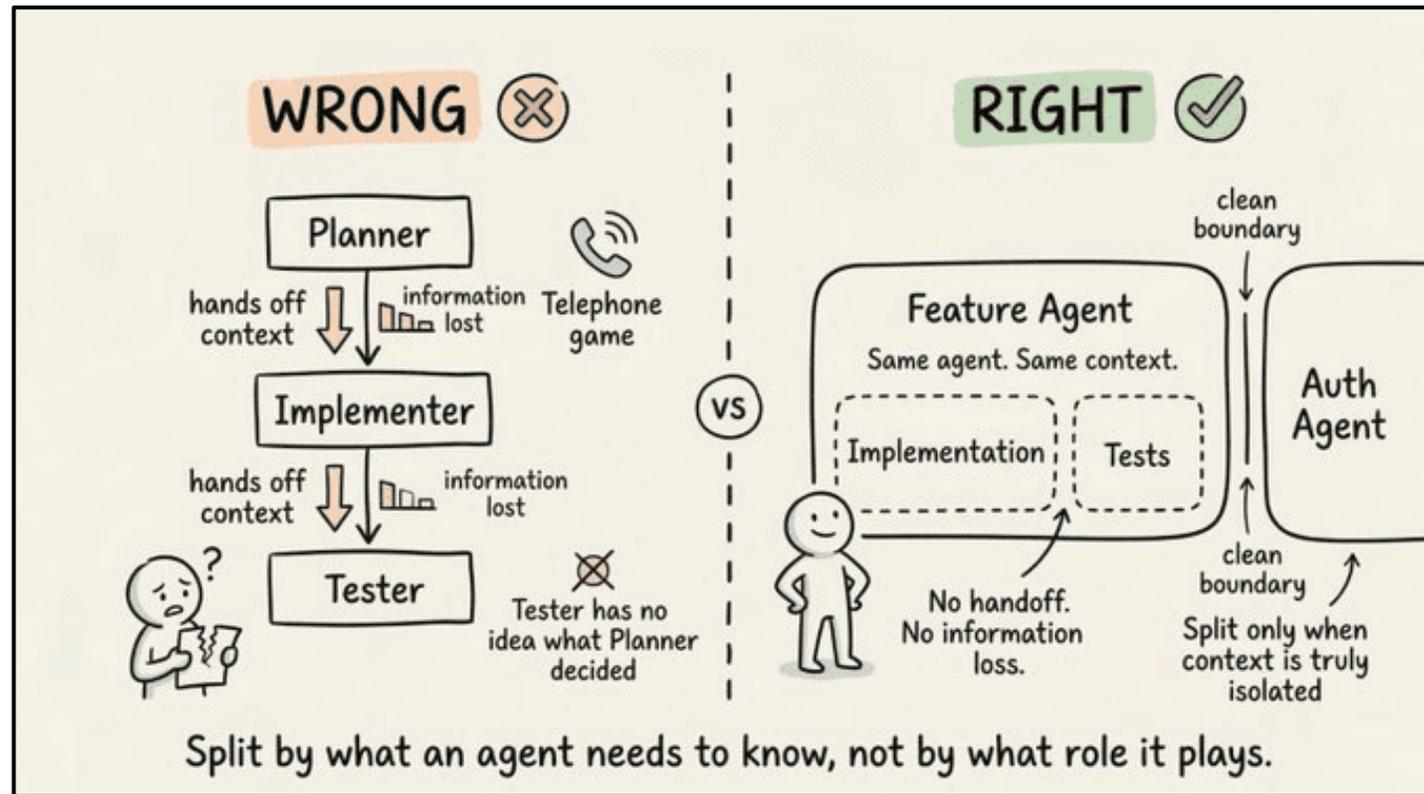
RQ1: Which curriculum-to-occupation skill gaps create the greatest barriers to entering high demand AI augmented roles?

RQ2: What skill overlap patterns enable feasible transitions from declining high AI exposure occupations into growing roles?



Extras

Orchestration: context-centric decomposition



Extras

Orchestration patterns

