# Facilitating Students' Conceptual Understanding in Economics with Vibe Coding

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40TH ASEAN COUNCIL OF TEACHERS + KOREA CONVENTION

NAVIGATING OUR FUTURE
STEERED BY TEACHERS;
ANCHORED IN RELATIONSHIPS;
PROPELLED BY AI

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# Vibe coding

In education, vibe coding refers to an approach where **AI tools are used to generate and refine code based on natural language prompts**, rather than traditional line-by-line coding. This allows users, even those without extensive programming experience, to **create interactive learning simulations**, educational games, and other tools by simply **describing what they want the software to do**.

# Vibe coding: 2 possibilities

## A STUDENT-FACING
### Vibe coding as a pedagogy

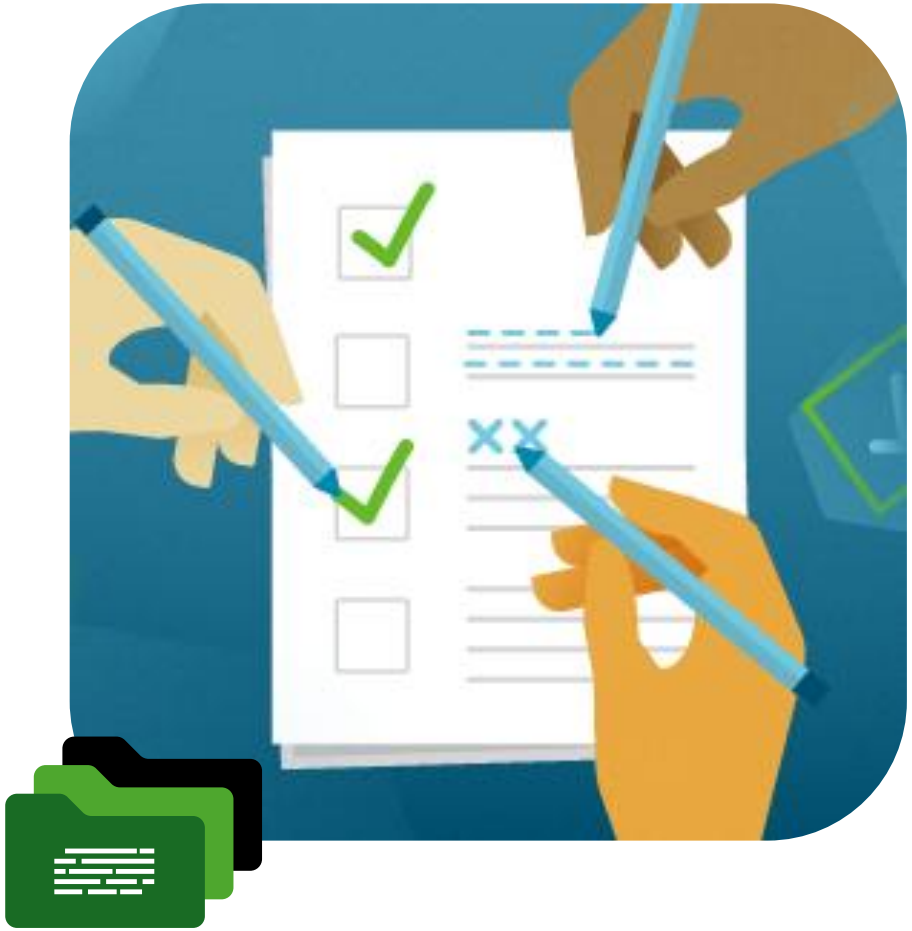
Students build, test and refine to learn.

1. **Construct models**
   Build a simulation to represent a concept
2. **Investigate & iterate**
   Predict, test, debug and improve
3. **Solve authentic problems**
   Prototype an app for a real-world need
4. **Explain their thinking**
   Justify design decisions and AI outputs

## B TEACHER-FACING
### Vibe coding as a resource

Teachers create tools that make learning visible.

1. **Interactive simulations**
   Explore cause-and-effect relationships
2. **Targeted practice**
   Quizzes with hints and formative feedback
3. **Branching scenarios**
   Experience decisions and consequences
4. **Concept visualisers**
   Manipulate diagrams, maps and models



# 01
# Current problem

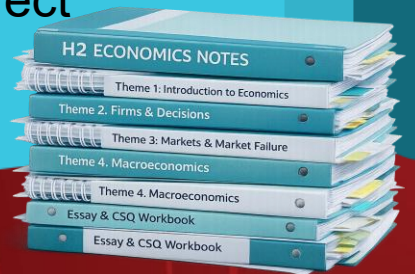
# Current situation

## Economic analysis

**Cause-and-effect relationships** between economic variables.

**Causes are context-dependent**, so different causes can lead to different effects.

**Diagrams** are essential analytical tools to illustrate cause-and-effect relationships.




## How students learn

Grapple with many diagrams as there are different contexts to explain one concept.

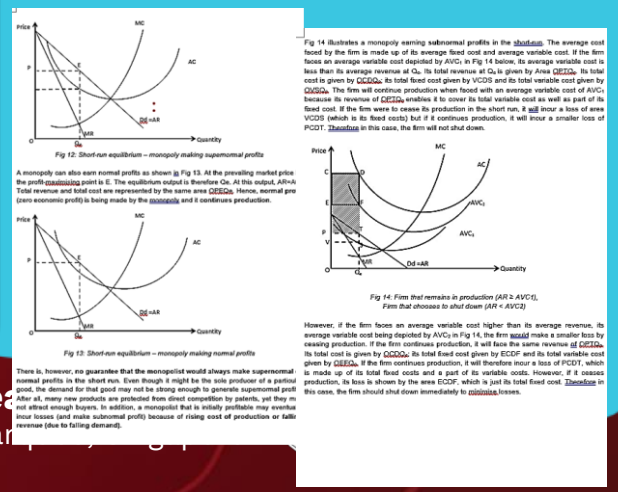
Try to memorize the diagrams without deep conceptual understanding.

Struggle to recall the right diagram for a given context in exams.

## Learning materials

Printed notes and slides offer only **static representations** of cause-and-effect relationships.

**Multiple diagrams** for different contexts



# Design considerations (1/2)

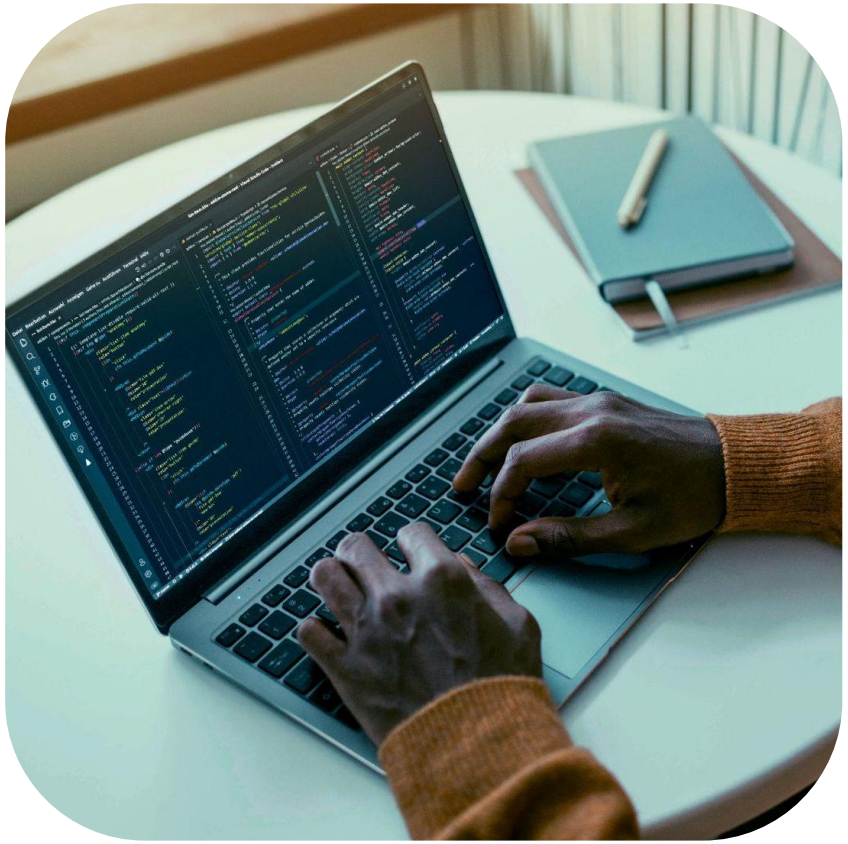
| What we considered as important in the design of the lesson | How this was enacted |
| --- | --- |
| **01 Alignment to subject-specific learning outcomes**<br>Students develop deeper understanding of the concepts through dynamic cause-and-effect representations. | • Interactive diagrams<br>• Students must first acquire foundational knowledge |
| **02 Active learning**<br>Students learn better by creating the diagrams themselves rather than learning from diagrams created by others (i.e. teachers). | • Students are the ones creating the interactive diagrams |
| **03 Student profile**<br>The use of AI tools should be age- and developmentally appropriate for students. | • Check against MOE guidelines<br>• Select the appropriate AI tool such as Gemini |
| **04 Desirable difficulties**<br>Students should face some difficulties in the creation process and be appropriately challenged. | • Choose a topic where a short, lazy prompt will fail. |

# Design considerations (2/2)

| What we considered as important in the design of the lesson | How this was enacted |
| --- | --- |
| 05 **Differentiated instruction**<br>The task is accessible and impacts all students positively even if they start with different levels of readiness. | • Differentiated tasks were designed<br>• Students to self-select based on their readiness |
| 06 **Science of learning**<br>Learning sticks when neural pathways are repeatedly activated. | • Iterative prompting |
| 07 **Strategic thinking**<br>Students should review their knowledge first, plan their strategy of prompting and craft their prompts properly before they act. | • Limit prompting to only 3 rounds |
| 08 **Formative assessment**<br>Teachers can gauge whether students have learnt. | • Have students share conversation logs with teacher<br>• Have students present their end products |

# 02

# Lesson sequence and student artefacts



# Lesson sequence

1. **Teacher Demo**
   Applet walk-through: LRAC & Cost-Revenue diagram — seeing what AI-generated interactives can look like

2. **Prompting Tips**
   Structure: DIAGRAM TYPE + ECONOMIC CONCEPT + specific axes, curve shapes, controls

3. **3 Rounds of Prompting**
   Groups of 3 — rotating who types each round. Each round iterates on the same applet to improve it

4. **Share & Present**
   Groups submit artefact + convo link, then present their interactive to the class

5. **Reflect**
   Google Form survey — what made a prompt work, and what did you learn about the economics?

# Lesson activities

Generate an interactive to show the distinction between the diagrams of internal and external economies of scale using LRAC curves

For weaker students

Generate an interactive to show different profit levels with an AC shift (fixed costs change)

For average students

Generate an interactive to show different profit levels with an AR/MR shift

For stronger students

# Evidence of learning (1/3)

Interactive LRAC Economies of Scale Diagram

Shared by ryan

This is a copy of a chat between Claude and ryan. Content may include unverified or unsafe content that do not represent the views of Anthropic. Shared snapshot may contain attachments and data not displayed here.

Report

R Can you generate an interactive to show the distinction between the diagrams of internal and external economies of scale using LRAC curves

I'll create an interactive diagram that shows the key differences between internal and external economies of scale using Long Run Average Cost (LRAC) curves. This will help visualize how costs behave differently in each scenario.

Internal vs External Economies of Scale - LRAC Curves
Interactive artifact

I've created an interactive visualization that clearly demonstrates the distinction between internal and external economies of scale using LRAC curves. Here are the key features:

**Interactive Elements:**

- **Toggle Views**: Switch between internal economies, external economies, or compare both
- **Animation**: Watch how scaling works dynamically
- **Responsive Design**: Works on different screen sizes

**Key Visual Differences:**

1. **Internal Economies of Scale:**
   - Shows a single downward-sloping LRAC curve
   - Represents a firm moving along its cost curve as it expands
   - Demonstrates how in... ...ough their own growth

Start your own conversation

GN

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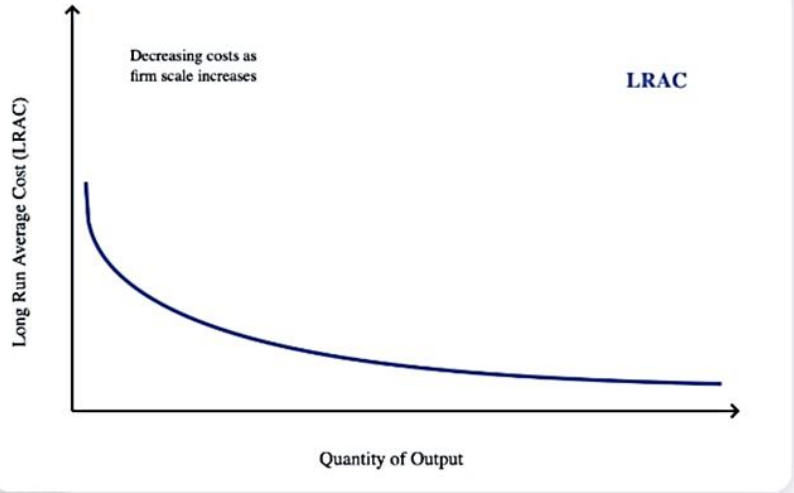



Claude content

## Internal Economies of Scale

Internal economies of scale occur when a single firm reduces its long-run average costs by increasing its scale of production. The LRAC curve slopes downward as the firm becomes more efficient through:

- **Technical economies:** Better machinery and production methods
- **Managerial economies:** Specialized management roles
- **Financial economies:** Better access to capital markets
- **Marketing economies:** Spreading advertising costs over larger output

# Evidence of learning (2/3)

Interactive LRAC Economies of Scale Diagram

Shared by ryan

Create an interactive Long Run Average Cost curve artifact that demonstrates the differences between internal and external economies and diseconomies of scale.
The interactive should include the following:
1. Animation of movement along the curve to show internal economies and animation of shifts of the curve to show the external economies.
2. Axes of the curve labelled as y = costs and x = output
3. Point on the curve labelled with Q on the x axis representing quantity and C on the y axis for costs, with a dotted line drawn to both axes.
4. Middle of curve (minimum point) should be labelled with a dotted line named QMES, which represents the Minimum Efficient Scale output.
5. Arrows below the x-axis that show all points to the left of the QMES as the internal economies of scale, and all points to the right to be internal dise Claude content of scale

I'll create an interactive LRAC curve that demonstrates both internal and external economies/diseconomies of scale with all the specific features you requested.

Interactive LRAC Curve - Economies and Diseconomies of Scale
Interactive artifact

I've created a comprehensive interactive LRAC curve that includes all the features you requested:

**Key Features Implemented:**

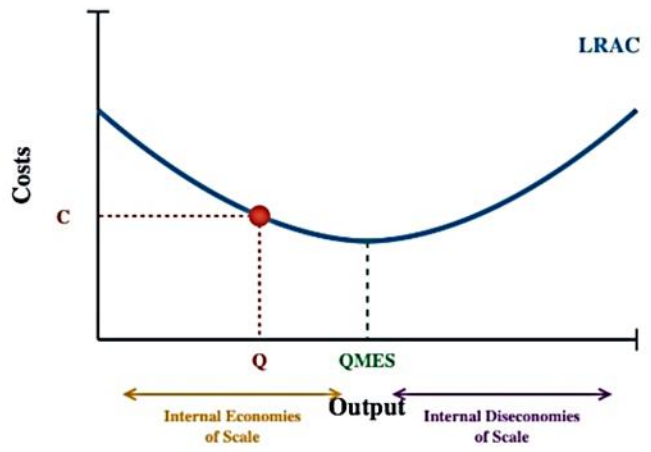
1. **Animations:**
   - **Movement along curve:** Shows a point moving along the LRAC curve to demonstrate internal economies and diseconomies
   - **Curve shifts:** Shows Start your own conversation n for external

GN

v1 Copy

Show External Economies | Show External Diseconomies | Reset Curve

- LRAC Curve
- Current Point (Q, C)
- QMES - Minimum Efficient Scale
- Internal Economies of Scale (left of QMES)
- Internal Diseconomies of Scale (right of QMES)



# Evidence of learning (3/3)

Interactive LRAC Economies of Scale Diagram

Shared by ryan

axis for the original curve?

Let me know these details and I'll update the interactive accordingly!

R

1. the three curves are the original LRAC curve the one shifted down and the one shifted up
2. The cursor only needs to interact with the original LRAC curve
3. vertical dotted line going down from the point on the normal LRAC curve to the x-axis, and going up from the point to the LRAC curve shifted up
4. Just remove the buttons and keep all three curves visible at all times
5. Just the original curve
6. yes they should remain

Perfect! I'll update the interactive to show all three curves simultaneously with cursor interaction on the original LRAC curve, and dotted lines connecting the corresponding points vertically.

Interactive LRAC Curve - Economies and Diseconomies of Scale
Interactive artifact · Version 2

Perfect! I've updated the interactive to show all three LRAC curves simultaneously with the following features:

**Three Curves Displayed:**

1. **Original LRAC curve** (blue, thickest line)
2. **LRAC with External Economies** (green, shifted down)
3. **LRAC with External Diseconomies** (orange, shifted up)

Interactive Cursor Functi

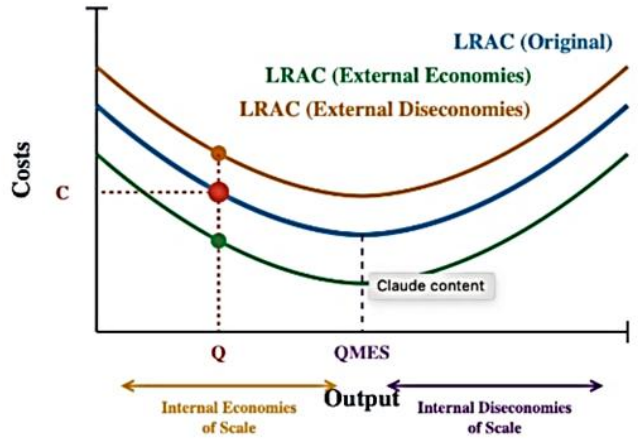
Start your own conversation

GN

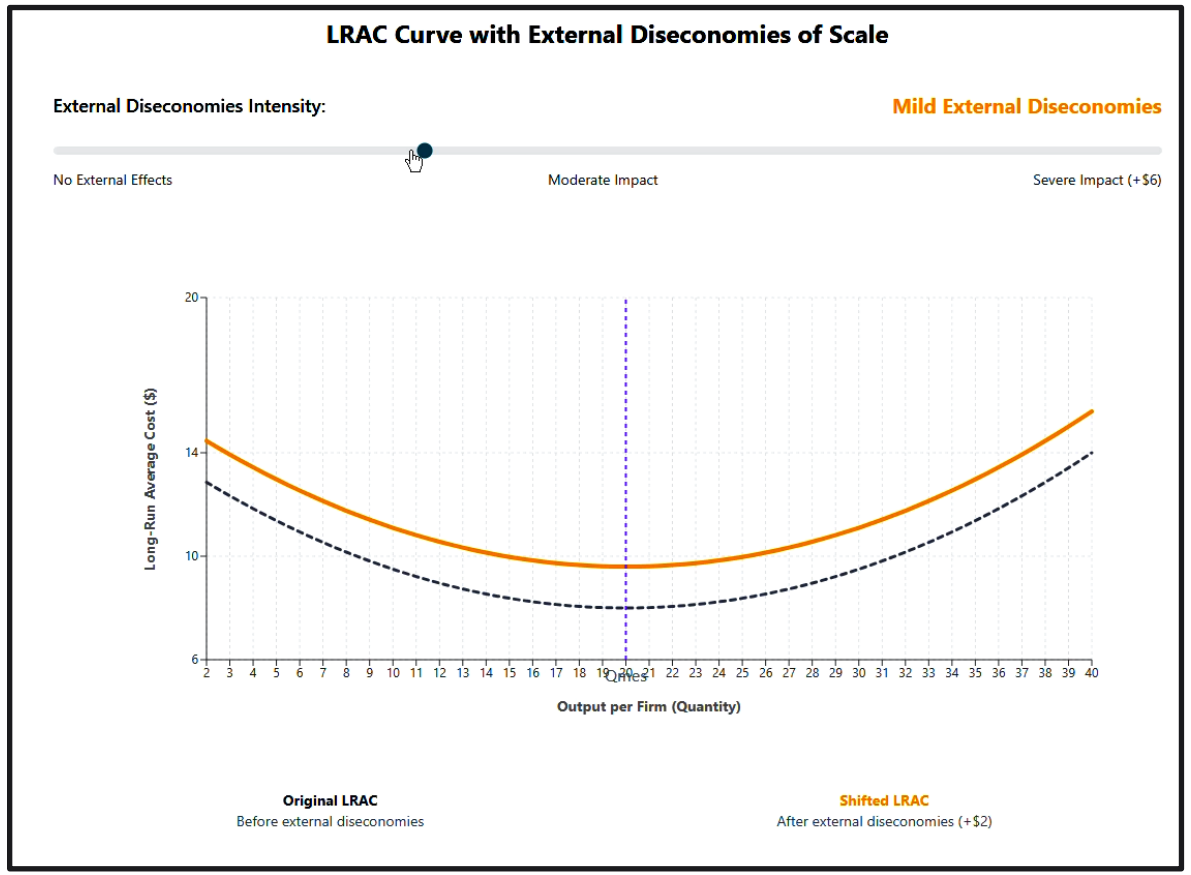
v2 · Latest

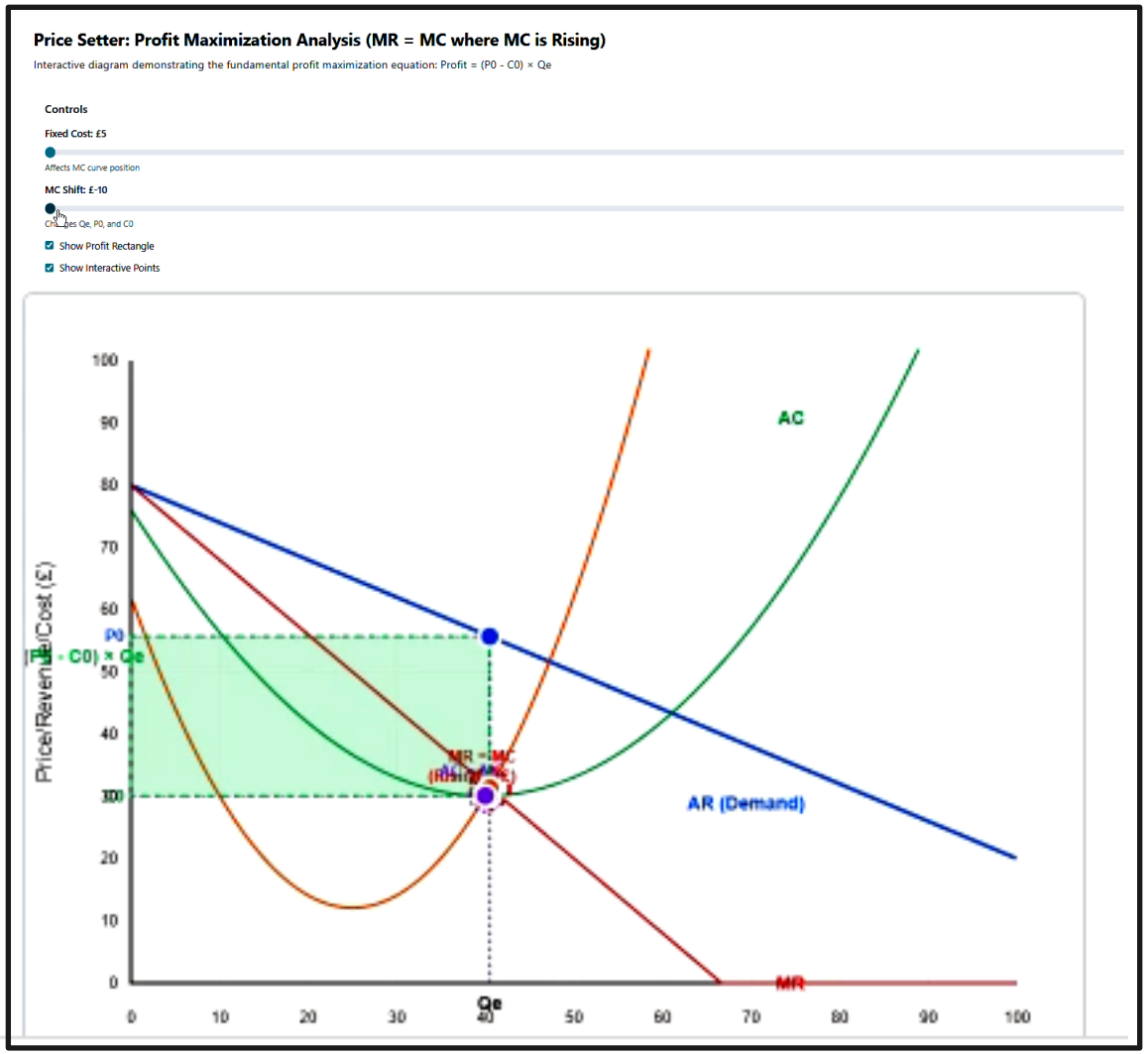
Copy

- Original LRAC Curve
- LRAC with External Economies (shifted down)
- LRAC with External Diseconomies (shifted up)
- Current Point (Q, C)
- QMES - Minimum Efficient Scale
- Internal Economies of Scale
- Internal Diseconomies of Scale

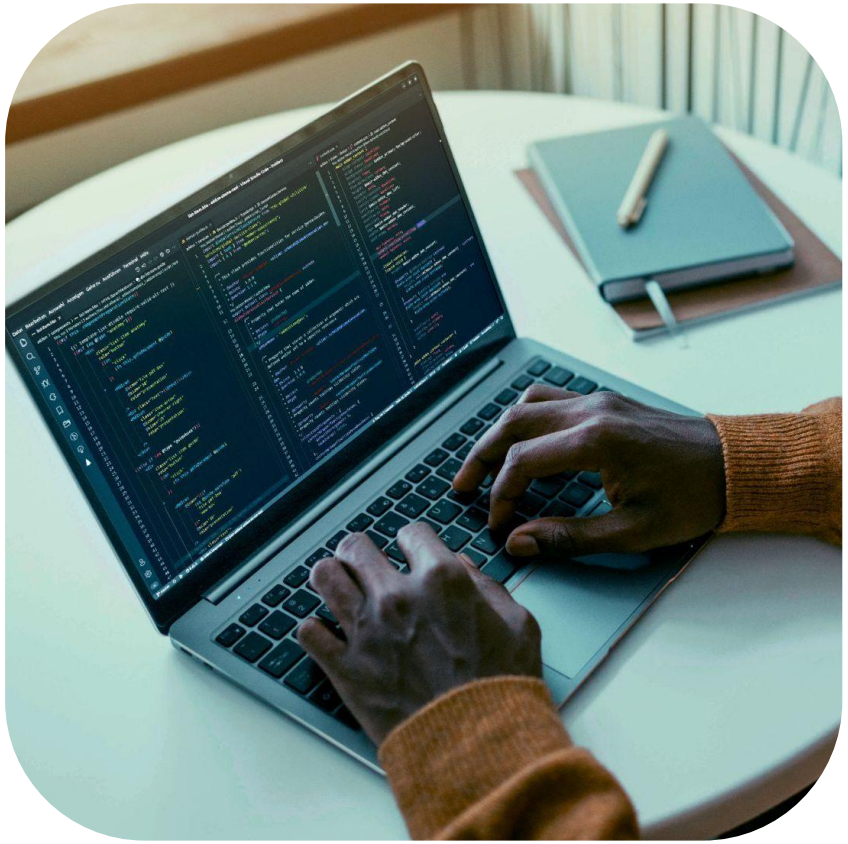


# Student artefacts (extracted)



# 03
# Outcomes

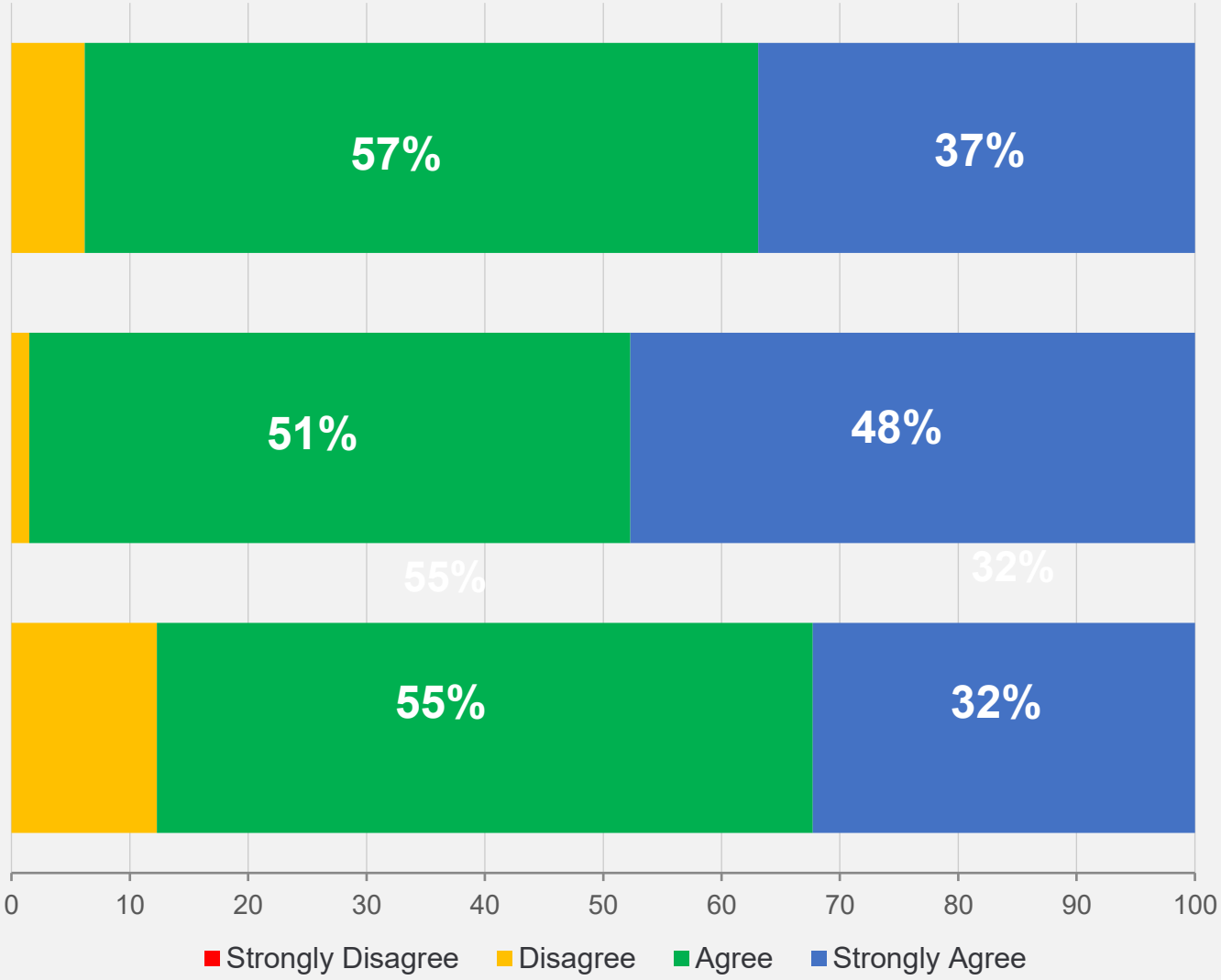


# Survey results (n = 65)

1. The activity made our group articulate our understanding of the relevant Economics concepts explicitly.

2. Our group tapped on our conceptual understanding to evaluate the accuracy of the interactive generated by Claude in each round.

3. Our group's understanding of economics concepts behind cost and revenue diagrams has deepened through this activity, more than through traditional methods (e.g. reading notes).

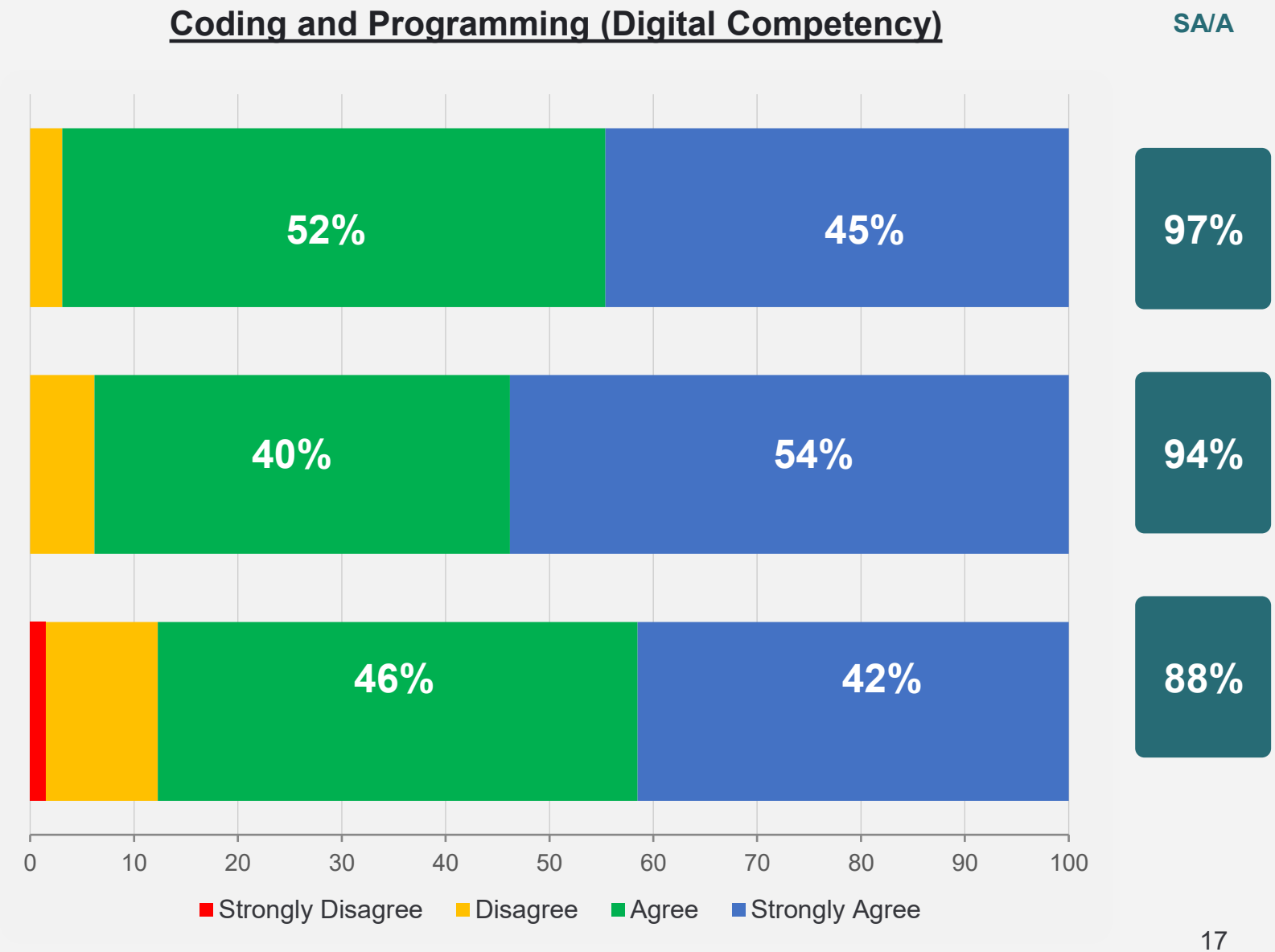


# Survey results (n = 65)

4. Our group learnt to write prompts based on conceptual understanding to generate an interactive diagram as best as possible.

5. Our group made use of the given rounds to improve the accuracy of the interactive diagram.

6. The activity increased our group's confidence in using AI tools to create digital artefacts, such as interactives.



# Survey results (n = 65)

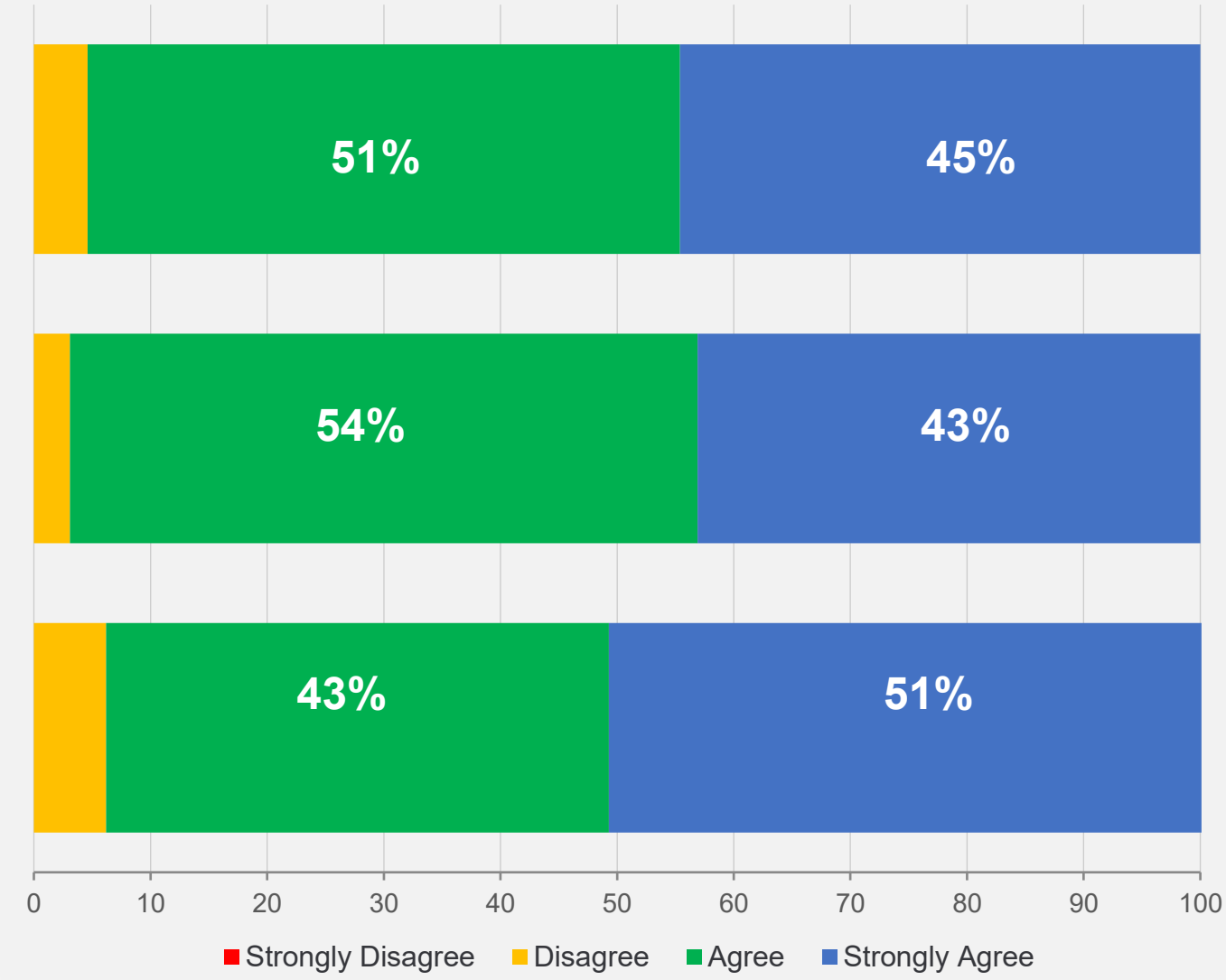
**Adaptive Thinking (21st Century Competencies)**

**SA/A**

7. The activity encouraged our group to be strategic given limited rounds of prompting. — 96%

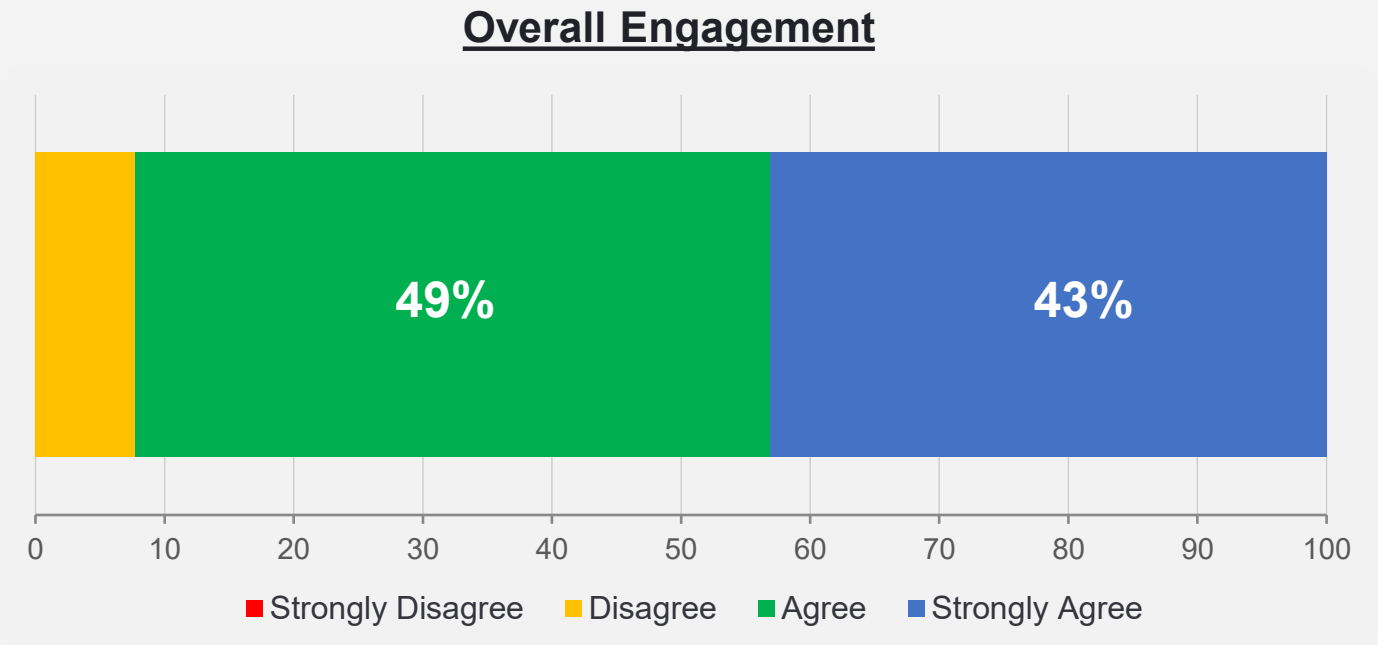
8. Given what Claude has generated, our group was prepared to try different approaches of prompting. — 97%

9. Our group reflected on our mistakes. — 94%



# Survey results (n = 65)

10. On the whole, our group found this activity engaging.




SA/A

92%

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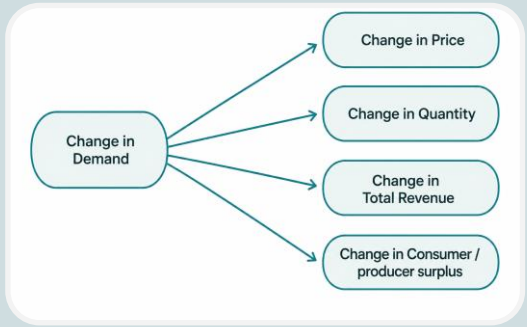
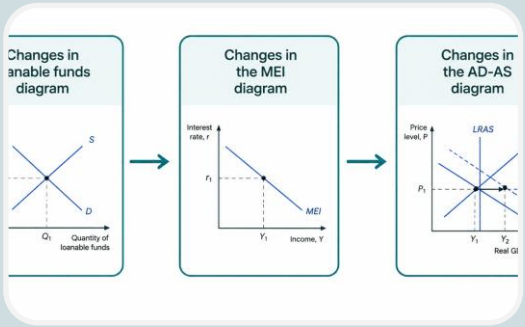
# Further use of vibe coding

The value of vibe coding is in modelling dynamic change within economic systems which is particularly useful in four contexts.



Multi-dimensional comparative statics

Multi-step transmission mechanisms

Temporal dynamics

Decision-making and scenario testing

# 04

# Hands-on Activity

# Design considerations

Before you begin building, think deliberately about what you want to achieve and why it matters.

1. **Identify the Opportunity**
- What is a challenge, need or opportunity in your educational or professional context?
- Where could an interactive digital solution make a meaningful difference?

2. **Clarify the Value**
- What specific difficulty, limitation or unmet need are you trying to address?
- How would your solution improve the experience (e.g. enabling exploration, simplifying processes, supporting decision-making, enhancing engagement)?

3. **Decide on the Form of the Solution**
- What type of interactive tool would best address your identified need? (e.g. interactive visualisation, simulation, decision-support tool, quiz, game, resource navigator)

Only when you have clarity on these should you move into vibe coding.

# Instructions

**Suggested platforms**

- Claude for ease of rendering and deployment but you can use any LLM you are comfortable with

**Prompting**

- Intentional prompting rather than rapid iterative prompting

# Thank you!

Do you have any questions?