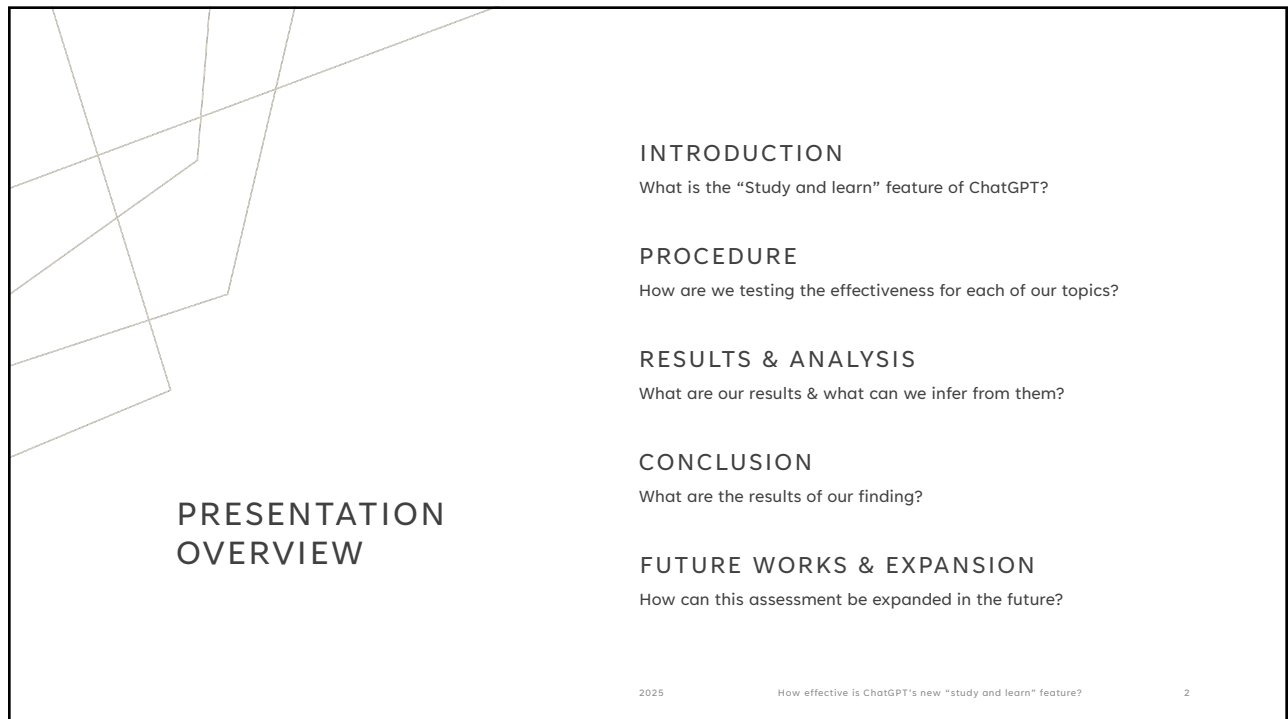


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INTRODUCTION

- The new “Study and Learn” feature of ChatGPT is aimed at helping students in their educational journey by guiding them step by step through the solution instead of immediately providing answers. According to ChatGPT’s website, “when students engage with study mode, they’re met with guiding questions that calibrate responses to their objective and skill level to help them build deeper understanding”.

Interactive prompts: Combines Socratic questioning, hints, and self-reflection prompts to guide understanding and promote active learning, instead of providing answers outright.

Scaffolded responses: Information is organized into easy-to-follow sections that highlight the key connections between topics, keeping information engaging with just the right amount of context and reducing overwhelm for complex topics.

Personalized support: Lessons are tailored to the right level for the user, based on questions that assess skill level and memory from previous chats.

Knowledge checks: Quizzes and open-ended questions, along with personalized feedback to track progress, support knowledge retention and the ability to apply that knowledge in new contexts.

Flexibility: Easily toggle study mode on and off during a conversation, giving you the flexibility to adapt to your learning goals in each conversation.

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How effective is ChatGPT’s new “study and learn” feature?

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PROCEDURE

1. Setup

- Three disciplines selected:
 - Math: Laplace Transforms
 - Computer Science: ER Diagrams
 - Electrical Engineering: Nodal Analysis
- Each topic assigned one learner (no prior experience) and one expert (subject evaluator).
- Learner allowed to use only ChatGPT-5’s “Study and Learn” feature — no external resources.

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PROCEDURE

2. Learning Phase

- Duration: **1 hour per topic**, minimum **15 prompts**.
- Learner begins with an **initial prompt** stating the topic and learning objectives.
- ChatGPT follows a teaching pattern:
Definitions → Examples → Guided Practice → Independent Practice
- Learner maintains dialogue: asks clarifying questions, requests examples, solves practice problems.
- Entire conversation saved for expert review.

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PROCEDURE

3. Evaluation Phase

- After learning, learner completes a **quiz** prepared by the expert.
- Quiz assesses:
 - Conceptual understanding
 - Problem-solving skills
 - Application of concepts
- Expert grades performance using standardized rubric:
 - **Learning Effectiveness (0–10)**
 - **Explanation Accuracy (0–100%)**
 - **Structure (1–5)**
- Same **grading rubric and difficulty** used across all subjects for fairness.

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PROCEDURE – STARTING PROMPTS

COMPUTER SCIENCE

I will be tested on ER Diagrams for a Database course quiz. I don't have any prior experience, so I need to learn all the concepts related to this topic so that I can develop a good understanding of them, enough to prepare me for a quiz on this topic. Below is a list of the concepts that I will need to know:

- Being able to analyze a problem domain and find entities, attributes of entities, and relationships between entities,
- Being able to create an ER diagram from the analysis of the problem domain that minimizes duplication of information,
- Being able to include specialization and generalization constraints in the ER diagram

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ELECTRICAL ENGINEERING

I will be tested on Nodal analysis for a DC circuits quiz. I don't have any prior experience except for Ohm's Law, so I need to learn all the concepts related to this topic so that I can develop a good understanding of them, enough to prepare me for a quiz on this topic. Below is a list of the concepts that I will need to know:

- Being able to recognize how many nodes we have in the circuits and choose a reference node.
- Write KCL equations for each node
- Be able to use Nodal analysis with both current and voltage sources in the same circuit
- Write a system of equations with N equations for N unknown voltage nodes.
- Be able to explain the core concept that lies behind KCL equations.

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MATHEMATICS

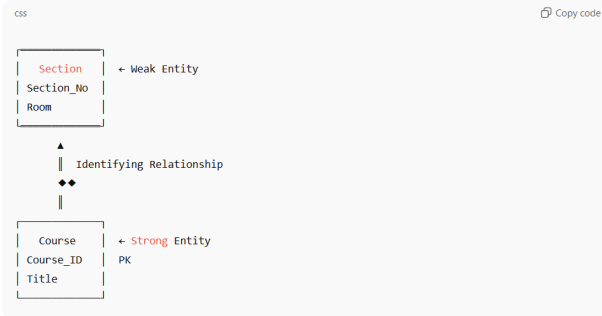
I will be tested on Laplace transforms for the quiz. I don't have any prior experience with Laplace Transforms, so I need to learn all the concepts related to this topic so that I can develop a good understanding of them, enough to prepare me for a quiz on this topic. Below is a list of the concepts that I will need to know:

- Being able to find Laplace Transform by definition
- Know how to use Laplace Table
- Know and be able to apply common properties of the Laplace Transforms
- Know and be able to find inverse of the Laplace Transform
- Be able to solve differential equation using Laplace Transform

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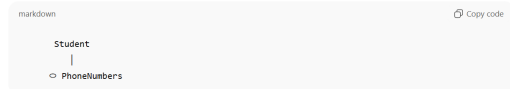
COMPUTER SCIENCE

- The relationship connecting it to the strong entity is shown as a **double diamond** (called an identifying relationship).
- Example:



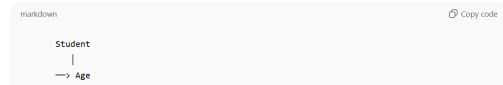
4 Multivalued Attribute

- Draw double oval for multivalued attributes.
- Example: PhoneNumbers for Student



5 Derived Attribute

- Draw dashed oval to indicate attribute is derived.
- Example: Age derived from Date_of_Birth



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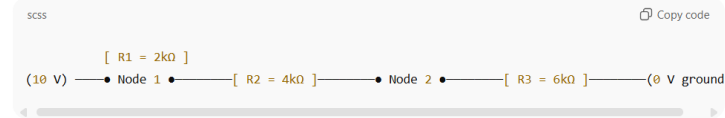
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ELECTRICAL ENGINEERING

can i try the two-unknown-node example next to practice writing two KCL equations?

Perfect — let's do that.

Here's our **two-node circuit** (I'll draw it in text form):



So:

- Node 1 connects to the 10 V source (fixed) and Node 2.
- Node 2 connects to Node 1 and ground.
- Unknown voltages: V_1 (at Node 1) and V_2 (at Node 2).
- Ground = 0 V.



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ELECTRICAL ENGINEERING

$$\begin{aligned} 3V_1 - V_2 &= 20 \\ 5V_2 - 3V_1 &= 1 \end{aligned}$$

Beautiful — you handled that perfectly. 🎉

Now you've got your system:

$$\begin{cases} 3V_1 - V_2 = 20 \\ -3V_1 + 5V_2 = 1 \end{cases}$$

Let's solve it step by step (you can use substitution or elimination).

👉 What values do you get for V_1 and V_2 ?

wait no isn't $5V_2 - 3V_1 = 12$

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MATHEMATICS

What is s in the Laplace Transform?

In the definition

$$\mathcal{L}\{f(t)\} = F(s) = \int_0^{\infty} e^{-st} f(t) dt,$$

s is the **transform variable** — sort of like how in the Fourier Transform we use ω .

But instead of being *just* frequency, s can be **complex**:

$$s = \sigma + j\omega$$

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How effective is ChatGPT's new "study and learn" feature?

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MATHEMATICS

If I told you that the Laplace transform of $f(t) = e^{at}$ is

$$F(s) = \frac{1}{s-a},$$

what do you think happens to $F(s)$ as s gets *larger* and larger? What does that tell you about the effect of increasing s on the weight e^{-st} ?

$F(s)$ will get smaller as s gets larger, because s is in the denominator of the function. As we increase s the weight will become more insignificant.

Exactly right — beautifully reasoned.

That intuition ("larger $s \rightarrow$ smaller $F(s) \rightarrow$ stronger decay from e^{-st} ") is the **core of how the Laplace transform filters signals**.

When s is big, the exponential e^{-st} damps the function $f(t)$ very quickly, so only the early part of $f(t)$ contributes much to the integral.

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How effective is ChatGPT's new "study and learn" feature?

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MATHEMATICS

Question 1 (Definition & Basics)

Using the definition of the Laplace transform,

$$\mathcal{L}\{f(t)\} = \int_0^{\infty} e^{-st} f(t) dt,$$

find the Laplace transform of

$$f(t) = e^{3t}.$$

You can use the same logic we used before with $f(t) = 1$.

👉 What's $F(s)$? (and for what values of s does it converge?)

1/(3-s)

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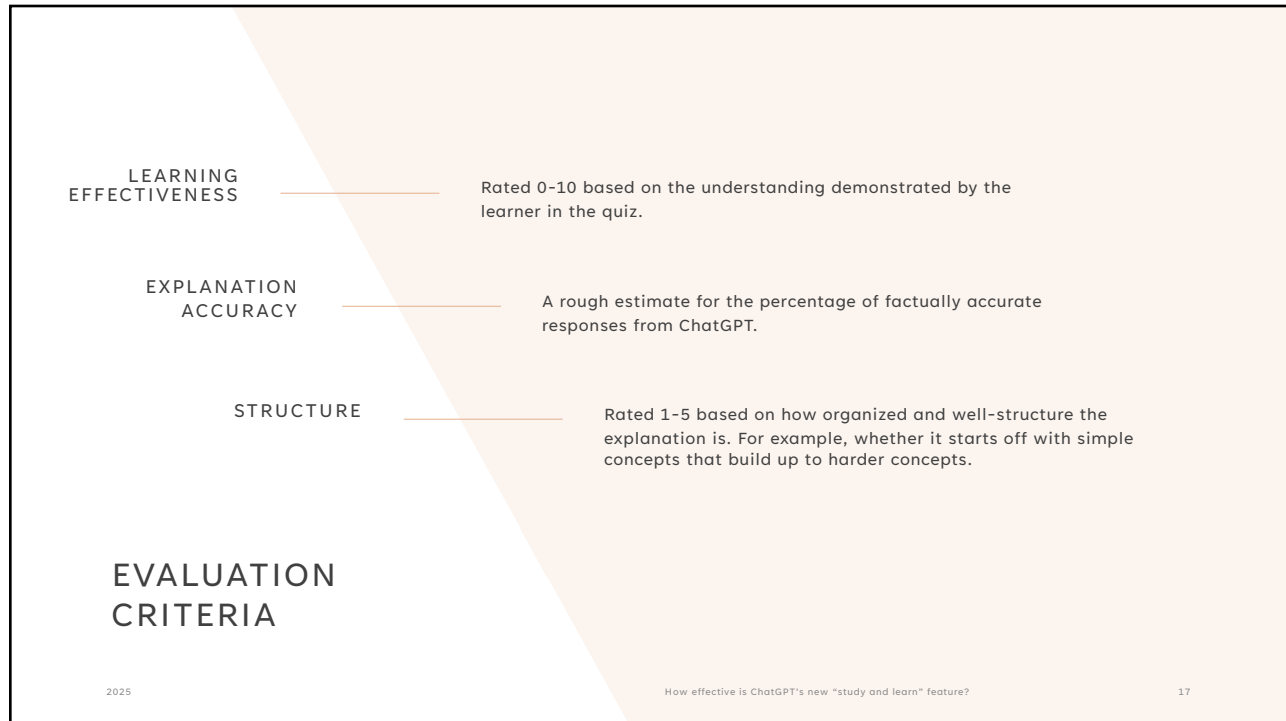
How effective is ChatGPT's new "study and learn" feature?

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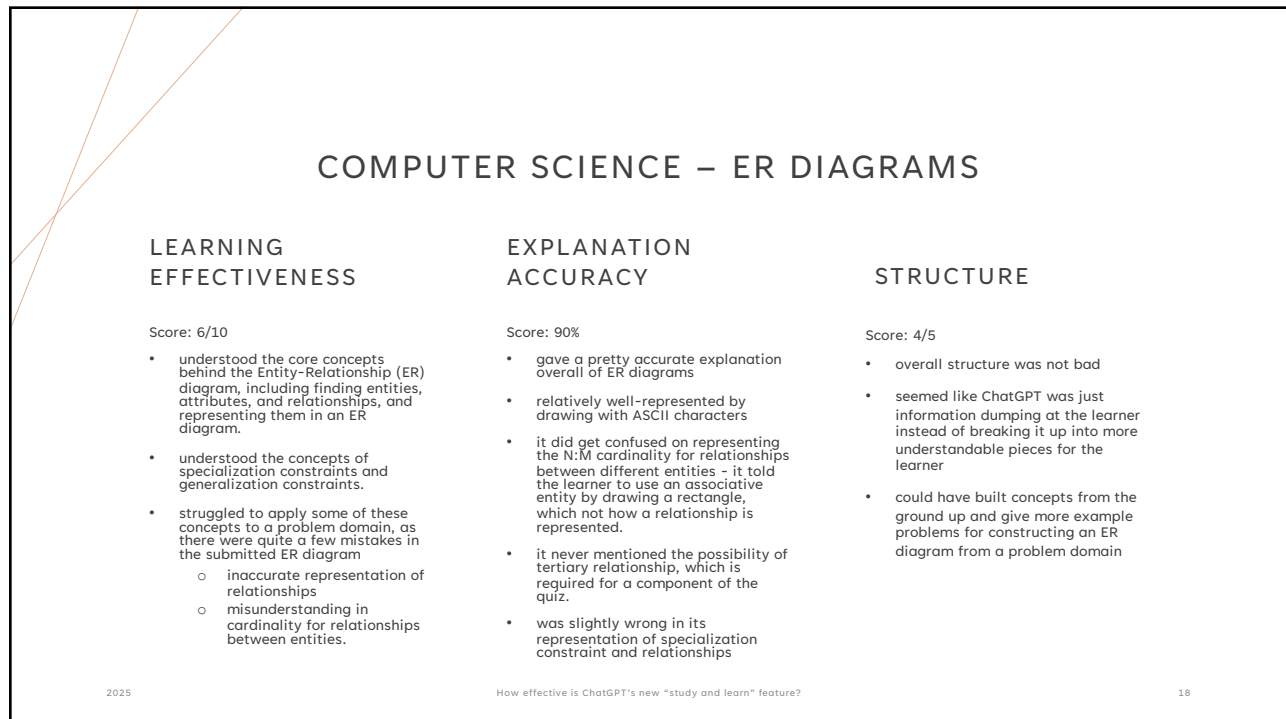
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RESULTS

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ELECTRICAL ENGINEERING		
LEARNING EFFECTIVENESS	EXPLANATION ACCURACY	STRUCTURE
<p>Score: 6/10</p> <ul style="list-style-type: none"> The learner understood the basic idea of nodal analysis. Could find nodes and write simple KCL equations. Had trouble with more complex circuits and nodes that were connected to current/voltage source. showed good progress but not full understanding. 	<p>Score: 85%</p> <ul style="list-style-type: none"> Most definitions and equations were correct. Circuit drawings were sometimes inaccurate or missing. Didn't always catch learner mistakes during problem solving. 	<p>Score: 3/5</p> <ul style="list-style-type: none"> The explanations followed a general order from easy to hard. Some parts were unclear or skipped steps, making it harder to follow. Needed more examples and guided practice to improve understanding.
2025	How effective is ChatGPT's new "study and learn" feature?	19

MATHEMATICS		
LEARNING EFFECTIVENESS	EXPLANATION ACCURACY	STRUCTURE
<p>Score: 5.5/10</p> <ul style="list-style-type: none"> The learner understood the basic ideas of Laplace Transforms. Could find Laplace Transforms using both the definition and Laplace Table. Struggled to apply concepts in solving differential equations. Showed solid familiarity, but needed deeper understanding for complex problems. 	<p>Score: 100%</p> <ul style="list-style-type: none"> Explanations were step-by-step and logically organized. Most concepts were clearly explained and built on each other. A few topics mentioned in the summary were not fully explained. Overall, the responses were clear and easy to follow. 	<p>Score: 4/5</p> <ul style="list-style-type: none"> All rules, formulas, and examples were correct. Explanations were factually accurate and consistent. Provided complete examples for most topics.
2025	How effective is ChatGPT's new "study and learn" feature?	20

CONCLUSION

- ChatGPT-5's "Study and Learn" feature can provide basic understanding of topics but cannot teach independently.
- The model struggles with in-depth explanations, visual tasks, and correcting learner errors.
- Best used as a supplementary tool with external guidance or for simpler topics.
- Not recommended as a sole learning resource for undergraduate courses.

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How effective is ChatGPT's new "study and learn" feature?

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POTENTIAL EXTENSIONS

ADJUST LEARNING TIME

Varying the time allocated for the learner to understand the concept can affect the outcome of their quiz.

INCREASE SAMPLE SIZE

With more time, more samples of the experiment can be taken to have more certainty on the results of the experiment.

PROVIDE COURSE MATERIAL

With course materials provided, this can guide the LLM towards the answering with the correct information, especially if there exists different definitions or methods.

COMPARE DIFFERENT LLMS

Instead of only using ChatGPT, the results of studying with different LLMs can be compared.

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How effective is ChatGPT's new "study and learn" feature?

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