

## ThatGPTeacher and Cerebral Classmate

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**Abstract:** In my talk, I will highlight features of NUS interim policy on AI in education through the lens of a fellow educator and student. We will explore its relevance in the context of healthcare and humanity's strengths needed to steer AI.



CDTL podcast



NUS policy



- Can you ban a classmate who is smarter than you?
- Can you ban a teacher who is more knowledgeable than you?



**YOU**



- If you copy from your smarter classmate, should you ban your classmate?

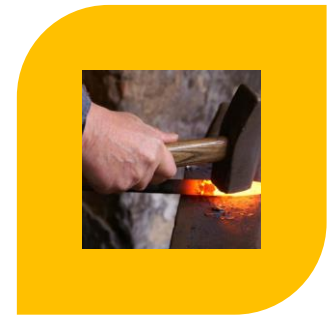
# So, how do you interact with this classmate?



**LEARN**



**COLLABORATE**



**CHALLENGE**

How should you **NOT** interact with this classmate?

**Plagiarize**

(Even if AI does not own the work)

**Over-rely**

(Do not surrender your gifts and autonomy)

A woman with dark hair, wearing a floral-patterned sleeveless top, is standing in the foreground on the right, smiling and holding a microphone. She appears to be addressing a large audience seated in a lecture hall. The audience, consisting of many young people, is visible in the background, filling the room. Two large screens are mounted on the wall at the front of the hall, displaying text. The room has a modern design with recessed ceiling lights and yellow walls. The overall atmosphere is positive and engaged.

# What do future students need?

Don't learn for the sake of doing but for the sake of knowing

Greater sense of responsibility and moral intelligence

Greater wisdom and higher order thinking

# What should future educators do?

## Design

- assessment in the context of AI

## Instill

- stronger values and higher order thinking

## Differentiate

- work generated by students with and without AI

and by creating an environment that fosters such values,



# TOWARDS A HEALTHIER SINGAPORE



# Virtual Doctor? Not quite...

Z

I am a 15 year old boy with Type I diabetes. For the past 2-3 days, I had a stomach upset and vomited again and again. I stopped taking insulin injections as I wasn't able to eat. Do you think I'll be ok?

I went to the A&E yesterday as I was still vomiting. The doctor said everything was ok and I didn't have this thing called diabetic ketoacidosis. He said there was nothing seriously wrong with me. He gave some anti-vomiting medication and asked me to go home. He told me to start injecting myself with insulin once the vomiting stops.

Is this advice ok?



As an AI language model, I am not qualified to provide medical advice. However, I strongly recommend that you follow the advice of the medical professional who assessed you in the A&E. They are the most qualified person to provide medical advice and treatment for your condition.

It is crucial to take insulin regularly and maintain stable blood sugar levels to manage Type 1 diabetes effectively. When you are sick and vomiting, your body may have difficulty absorbing the insulin you take, which can increase your risk of diabetic ketoacidosis. It is also possible that your vomiting may be a symptom of diabetic ketoacidosis, which requires immediate medical attention.

Please follow the doctor's advice to take the anti-vomiting medication and restart your insulin injections once the vomiting stops. It is also important to monitor your blood sugar levels closely and seek medical attention if your condition worsens or if you experience any unusual symptoms.



# Virtual Doctor? Not quite... but can be trained.

Z

A 15 year old boy was a known case of Type I diabetes mellitus. For the previous 2-3 days, he developed a gastrointestinal upset which caused repeated vomiting. He decided to stop giving himself insulin injections, reasoning that without food intake it would be dangerous to do so. A day later, he went to the A&E department of a neighbourhood hospital when the problem persisted. At the hospital, the attending physician decided to assess the acid-base status of this patient, fearing that diabetic ketoacidosis might have set in.

The laboratory results were as follows:

Plasma pH 7.39 (normal 7.35-7.45)

Plasma bicarbonate 25 mmol/L (normal 20-32)

Plasma pCO<sub>2</sub> 41 mmHg (normal 35-45)

The A&E doctor reassured the boy that there was nothing seriously wrong and sent him home with medications to stop the vomiting and instructing him to re-start the insulin once vomiting stops.

Discuss the approach of the A&E doctor.



The approach of the A&E doctor in assessing the acid-base status of the 15-year-old boy with Type 1 diabetes and gastrointestinal upset is appropriate. The doctor recognized the possibility of diabetic ketoacidosis, a life-threatening complication of uncontrolled diabetes characterized by high blood sugar, high ketone levels, and metabolic acidosis. In diabetic ketoacidosis, the body produces high levels of ketones, which can lower blood pH and cause metabolic acidosis.

The laboratory results provided show that the boy's plasma pH is within the normal range (7.35-7.45), and his plasma bicarbonate level is also within the normal range (20-32 mmol/L), indicating that he does not have metabolic acidosis. The plasma pCO<sub>2</sub> level (41 mmHg) is slightly elevated but still within the normal range (35-45 mmHg), suggesting that the boy is not experiencing respiratory acidosis.

Based on these results, the A&E doctor made the correct decision to reassure the boy that there was nothing seriously wrong and to provide medications to stop the vomiting. The doctor also instructed the boy to restart insulin once the vomiting stops, which is crucial to prevent high blood sugar levels and the risk of diabetic ketoacidosis.

Overall, the A&E doctor's approach in assessing the boy's acid-base status, considering the possibility of diabetic ketoacidosis, and providing appropriate treatment is in line with standard medical practice. It is essential to closely monitor the boy's condition and follow up with further medical care as needed.



# Future healthcare providers will need to

## Provide

More human touch  
because

- Anthropomorphic  $\neq$  Human

## Work

More closely together  
because

- There will be more 'expert patients'

## Be

More interdisciplinary  
because

- Contexts will be increasingly important in differentiating AI vs human practice

# Education

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- Can be used for differentiated learning
  - Foundational learners can benefit from basic knowledge
  - Intermediate learners can critique output to advance their learning

Z

An elderly man developed congestive heart failure. Before treatment was initiated, he was found to have a plasma sodium concentration of 129mmol/L (normal 135-145). Explain the low plasma sodium concentration seen in this patient.



The low plasma sodium concentration in the elderly man with congestive heart failure is likely due to a condition called hyponatremia. Hyponatremia is a common electrolyte disorder in which the concentration of sodium in the blood is lower than normal, typically below 135 mmol/L.

In congestive heart failure, the heart's ability to pump blood is weakened, leading to a decrease in blood flow to vital organs such as the kidneys. This can cause the kidneys to retain more water than necessary, leading to dilution of sodium in the blood and resulting in hyponatremia.

Additionally, some medications commonly used to treat congestive heart failure, such as diuretics, can also contribute to hyponatremia by increasing urinary sodium excretion and further reducing sodium levels in the blood.

Hyponatremia can cause a variety of symptoms, including nausea, headache, confusion, seizures, and in severe cases, coma and death. Treatment of hyponatremia involves addressing the underlying cause, such as reducing fluid intake, adjusting medication doses, or treating the underlying heart failure. In severe cases, intravenous fluids or medications may be needed to raise sodium levels in the blood.

# Education

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- Crafting assessment
  - Bloom's taxonomy
  - Provides clinical context
  - MCQs to MEQs etc



**You**

Write a MCQ on type 2 diabetes mellitus.



**ChatGPT**

Question: What is a characteristic feature of Type 2 Diabetes Mellitus (T2DM)?

- A) Autoimmune destruction of pancreatic beta cells
- B) Insulin resistance and impaired insulin secretion
- C) Absolute insulin deficiency
- D) Onset typically occurs in childhood

Correct Answer: B) Insulin resistance and impaired insulin secretion



**You**

Make it 5 options.



**ChatGPT**

Question: Which of the following is a characteristic feature of Type 2 Diabetes Mellitus (T2DM)?

- A) Autoimmune destruction of pancreatic beta cells
- B) Insulin resistance and impaired insulin secretion
- C) Absolute insulin deficiency
- D) Onset typically occurs in childhood
- E) Presence of autoantibodies against insulin



# Education

- Giving feedback on written assessment

## You

Please provide detailed feedback to the answer on the question below, focusing on areas for improvement.

A 50-year-old man complained of a 3 kg weight loss over the past 3 months, accompanied by increased urine output of 4-5 litres per day. He was otherwise well. There was no significant past medical history. The physical examination was not revealing except for a body mass index (BMI) of 31.2.

His physician suspected diabetes mellitus.

Besides diabetes mellitus, what 3 other conditions may also cause polyuria? (3 marks)

Any 3 of the following will be acceptable:

- Primary polydipsia (compulsive water drinking)
- Central diabetes insipidus due to ADH deficiency
- Nephrogenic diabetes insipidus due to ADH resistance
- Primary aldosteronism (less likely but acceptable)

## ChatGPT

The provided answer is generally accurate, addressing potential causes of polyuria other than diabetes mellitus. However, there is room for improvement in terms of providing more context and details to enhance the completeness of the response. Here's a more detailed feedback:

### 1. Primary Polydipsia (Compulsive Water Drinking):

- The answer correctly includes primary polydipsia as a potential cause of polyuria. However, it could be beneficial to elaborate on this condition. For instance, mentioning that excessive water intake dilutes the blood, leading to increased urine production, can enhance the completeness of the explanation.

### 2. Central Diabetes Insipidus due to ADH Deficiency:

- The answer correctly identifies central diabetes insipidus as a potential cause. To improve, a brief explanation of how antidiuretic hormone (ADH) normally regulates water reabsorption in the kidneys and how its deficiency can result in uncontrolled diuresis would add valuable context.

### 3. Nephrogenic Diabetes Insipidus due to ADH Resistance:

- The response appropriately mentions nephrogenic diabetes insipidus. To enhance the completeness of the answer, adding a brief note about the kidney's insensitivity to ADH, leading to impaired water reabsorption and subsequent polyuria, would provide more thorough information.

### 4. Primary Aldosteronism (Less Likely but Acceptable):

- While the answer mentions primary aldosteronism as less likely but acceptable, it would be beneficial to briefly explain how excessive aldosterone production can lead to increased sodium and water retention, potentially resulting in polyuria. This can help justify its inclusion in the list.

In summary, the answer is accurate but can be improved by providing additional details and explanations for each condition, ensuring a more comprehensive response. Adding concise physiological mechanisms or consequences associated with each condition would enhance the overall quality of the answer.



# Education

- Simulating clinical encounters

- History-taking
- Communication skills
- Gives feedback

**You**  
Let's simulate a patient-doctor encounter. Case is on asthma. You play the patient. I play the doctor. I'll start.

**ChatGPT**  
Sure, I'll be the patient. Go ahead and start the conversation.

**You**  
Hi Mr Chen, how are you today?

**ChatGPT**  
Hello, Doctor. I've been experiencing some difficulty breathing lately, and it's been bothering me. I thought it would be a good idea to come in and get it checked out.

**You**  
Any other areas for improvement?

**ChatGPT**  
While your approach was generally thorough, you might consider delving a bit deeper into the patient's daily activities and environment. For instance, asking about the patient's occupation and potential exposure to occupational hazards, as well as exploring their home environment for possible allergens or irritants, could provide additional context.

Additionally, you could inquire about the patient's adherence to any medications they might be taking, if applicable. This information can be crucial in understanding the patient's overall management of their health.

Moreover, it could be beneficial to explicitly ask the patient about their concerns or expectations from the visit. This helps to address any specific worries they may have and ensures that the conversation remains patient-centered.

Overall, your approach was strong, and these suggestions are minor refinements that could enhance the thoroughness of your patient assessment.


**You**  
Let's reverse roles.

**ChatGPT**  
Certainly! I'll be the doctor, and you can be the patient. Feel free to start the conversation or let me know what symptoms or concerns you'd like to discuss.

**You**  
Hi doc, I can't breathe!

**ChatGPT**  
I'm sorry to hear that you're experiencing difficulty breathing. Let's start by gathering some information. Can you tell me more about when this started and if there's anything specific that seems to trigger or worsen the difficulty in breathing?

**Is ChatGPT 'ready' to be a learning tool for medical undergraduates and will it perform equally in different subjects? Comparative study of ChatGPT performance in tutorial and case-based learning questions in physiology and biochemistry**

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## Practice points

- Generative AI is a promising tool as an adjunct to available resources in education, for both educators and students.
- The current generative AI technology, ChatGPT in particular, is not at a stage to be recommended as a sole educational resource, as performance is still not up to the 'ideal' standard in certain instances.
- The differential performance of ChatGPT across two disciplines emphasizes that this technology is not uniformly applicable across all disciplines, and the user should be aware of discipline-based limitations.
- The difference in performance between GPT-4 and GPT-3.5 highlights the importance of users being aware of the difference between iterations and types of generative AI software.

# Education

Educators will shift from information providers to information discerners.

**From:** XXX

**Date:** Thursday, 23 February 2023 at 10:38 AM

**To:** Chen Zhi Xiong <zhixiong\_chen@nus.edu.sg>

**Subject:** Question regarding hyper/hypocalcemia

Dear Prof Chen,

I am XXX from M1! I realised that I didn't really catch what you mentioned about whether high pH will lead to hyper or hypocalcemia and so I tried to google and ChatGPT and got very different answers 😊 I recall that  $H^+$  competitively binds to albumin and hence so high pH would mean more  $Ca^{2+}$  binding and hypocalcemia. However ChatGPT says that metabolic alkalosis can also increase the sensitivity of the parathyroid glands to calcium levels, leading to an even greater secretion of PTH and a further increase in blood calcium levels (along with compensatory increase in  $Ca^{2+}$ ) which leads to hypercalcemia. My friend's attempt at ChatGPT even said that  $Ca^{2+}$  binds with  $H^+$ ?? Google also said something about high pH leading to  $Ca^{2+}$  precipitating out with  $PO_4^{3-}$  at lower amounts? I'm just very confused which answer and explanation is correct 😊

Thank you so much in advance! 😊

Sincerely,  
XXX



# Research

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- Generate ideas and directions
- Able to customize with right prompts
- Informs what have been done or are known

## **But may be:**

- Biased
- General
- Outdated
- Inaccurate

# Research

Z

I have milk, sake, yoghurt, cheese and chocolate in my fridge. What should I make for dinner?



With the ingredients you have, you could make a delicious and unique dish: Sake and Cheese Fondue with Chocolate-Dipped Fruit for dessert.

Here's how to make it:

Sake and Cheese Fondue:

Ingredients:

- 1 cup sake
- 1 cup shredded cheese (such as Gruyere, Emmental, or Fontina)
- 1/4 cup plain yogurt
- Salt and pepper, to taste
- Bread or vegetables, for dipping

Instructions:

1. In a small saucepan, heat the sake over medium heat until it comes to a simmer.
2. Add the shredded cheese and stir until it is melted and smooth.
3. Stir in the yogurt and continue to cook until the fondue is heated through and smooth.
4. Season with salt and pepper to taste.
5. Transfer the fondue to a fondue pot or serving dish and serve with bread or vegetables for dipping.

Chocolate-Dipped Fruit:

Ingredients:

- Assorted fruit (such as strawberries, bananas, or pineapple)
- 1/2 cup chopped chocolate (milk or dark)

Instructions:

1. Wash and dry the fruit, and cut it into bite-sized pieces.
2. Melt the chopped chocolate in a double boiler or in the microwave, stirring frequently.
3. Dip the fruit pieces in the melted chocolate and place them on a parchment-lined baking sheet.
4. Chill the chocolate-dipped fruit in the fridge until the chocolate is set.
5. Serve the chocolate-dipped fruit alongside the fondue for a delicious and unique dessert.

Enjoy your sake and cheese fondue with chocolate-dipped fruit for a fun and flavorful dinner!





# Takeaways

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- Work and live with it but do not idolize it.
- Focus on developing humans as AI humanize.
- Master and harness it but do not succumb to it.

