

AI-Powered Productivity in Education

Harnessing the Potential of ChatGPT

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This book has a project page at github.com/ltangalo/ai-och-skolan (link subject to change), where you are welcome to suggest improvements and additions. Send an email to aiochskolan@falk.one to be notified when new versions of the book become available.

AI-Powered Productivity in Education: Harnessing the Power of ChatGPT

ChatGPT was launched at the end of 2022 and has spread like wildfire. It's a web service where you chat with an artificial intelligence (AI) that's knowledgeable in a surprising number of areas, is friendly and articulated, adapts to your demands, and never gets tired of helping and answering questions. People are using ChatGPT for everything from cooking to programming, from writing articles to creating interactive games. ChatGPT and future services like it will likely impact society and daily life in many and different ways.

This book is about how you, as a teacher, can use ChatGPT to make your job easier. The book also covers how *not* to use ChatGPT in your teaching. A central theme of the book is judgement, which is particularly relevant with powerful tools that have not been systematically tested in education.

Part 1 of the book provides an introduction to what ChatGPT is and how to get started using the service. The end of Chapter 3 contains some tips that may also be useful for someone who has been using ChatGPT for a while. Chapter 2 is probably the most important in the entire book: It describes four different types of AI pitfalls that you need to be aware of.

Part 2 focuses on practical use. Chapters 5-10 contain examples of how you can use ChatGPT to make your job easier, and are probably the ones you will find most useful. Feel free to browse the chapters for inspiration, but don't skip Chapter

4, which covers what you should not do with ChatGPT. Chapter 11 covers the issue of ChatGPT and cheating.

Part 3 is primarily for those who want to know a bit more about AI itself. Chapter 12 provides background on recent AI developments, including some information on ChatGPT and the company OpenAI that owns the service. Chapter 13 discusses how our view of knowledge may change due to tools like ChatGPT and Chapter 14 covers risks of AI from a broader perspective. Finally there are some tips for those who want to know more about using AI as a teacher or general questions about AI.

The author of the book is Johan Falk, who is a former science journalist, web developer and teacher. I've been following AI development since 2018 and been interested in school issues since high school. Since 2015, I've been working for education at a national level. The book is written and signed by myself, but several ideas and improvements come from other people. Special thanks to Rustan Håkansson and Peter Parnes.

This book is regularly updated. Those who want to are welcome to suggest improvements and additions at github.com/ltangalo/AI-och-skolan.

Part 1: Introduction

1: What is ChatGPT?

At first glance, ChatGPT is a chat window where you type messages to a chatbot, which responds to your messages. However, there are several things that make ChatGPT special. The first is that it writes in a human-like manner - it follows the conversation smoothly, writes things that are sensible and is generally friendly. The second thing that makes ChatGPT special is that it has a lot of knowledge even about specific subjects: you can ask about the history of model railroading, what is required for growing potatoes efficiently, or what distinguishes schottische as a dance, and ChatGPT will respond in a clear and credible way.

ChatGPT is powered by an AI model that has been trained on large parts of the text that was available on the internet until 2021. It's more text than a human could read in a lifetime - actually so much that it would require 57 billion human lifetimes to read through it all.¹ The text is the starting point for the answers that ChatGPT provides, but the answers are not looked up or copied from what the AI model has read. Instead, the text mass has been used to distill patterns for how text and words tend to be related. Based on this, ChatGPT makes guesses on which words would fit well together, and the same question will often result in slightly different answers if asked multiple times. (More information about ChatGPT can be found in Chapter 12.)

This book contains many excerpts from conversations with ChatGPT. A few of them were originally in Swedish and have been translated to English, but still show what conversations with ChatGPT look like. The rest are direct quotes from ChatG-

¹ BBC Tech Tent, 2022-12-09: <https://www.bbc.co.uk/programmes/w3ct4khv>

PT conversations. The bold text is the question (the "prompt") from the user, the rest is the AI's response. In some cases, the text has been lightly edited for better formatting in book form, and in some cases, larger amounts of text in the question have been replaced by a short description within square brackets.

What do you know about the history of model railroading?

Model railroading is a popular hobby where people build and operate miniature models of railways and trains. The history of model railroading dates back to the early 1800s, when railways became more common in Europe and North America. At that time, people built models of railways using wood and metal, but it was not until the late 1800s and early 1900s that model railways became a common hobby.

During the 1920s and 30s, model railroading became more advanced and companies specializing in the manufacture of model trains and railways started to appear. In the US, Lionel and American Flyer were two of the most well-known companies in the model railway industry, while Hornby in the UK was a leading manufacturer in Europe.

Since then, model railroading has developed a lot, with more detailed models and advanced technology such as digital control and sound and light effects. Today, there are many clubs and organizations around the world that are dedicated to model railroading, and there are

also many different types of models to choose from, including scales H0, N and G.

Something completely different: Do you know what is required to grow potatoes efficiently?

To grow potatoes efficiently, it is important to choose the right variety of potatoes and soil type, and to create the right conditions for the plant to grow in. Here are some important factors to consider:

1. *Choose the right variety of potatoes:* There are many different varieties of potatoes, and some are better suited for growing in certain climates and soils. It is important to choose a variety that is suitable for your area and conditions.
2. *Soil mixture:* Potatoes thrive in soil with high humus content, which is well-drained and has a pH level between 4.8 and 5.5.
3. *Sowing:* Potatoes are often sown in rows with about 50 cm between rows and 30 cm between plants.
4. *Fertilization:* Potatoes need fertilizer with high levels of nitrogen, phosphorus, and potassium to grow and produce a harvest.
5. *Watering:* Potatoes also need regular watering during their growing period, especially during dry periods.

6. *Care:* Potatoes also require regular care to keep weeds and diseases away.
7. *Harvest:* Potatoes are usually harvested when the leaves on the plant begin to yellow and dry. It is important not to harvest too early as the potatoes have not fully developed yet.
8. *Storage:* Harvested potatoes are best stored in a dark, cool, and dry environment.

Thanks! One more thing, by the way: What distinguishes schottische as a dance?

The Schottische is a traditional folk dance from Scotland often danced to violin and accordion music. It is known for its fast and lively steps and is usually danced in pairs.

Some of the key characteristics of the Schottische are:

- *The dance is often in 4/4 time and has a fast and lively rhythm.*
- *The Schottische is often danced in pairs, with a leading and a following dancer.*
- *The Schottische is known for its fast, lively steps and cuts and jumps.*
- *The dance often contains a series of hops and stomping steps, which are characteristic of the Schottische.*
- *The Schottische is often danced at folk music festivals and events in Scotland, but is also*

common at folk dance camps and festivals around the world.

There are many different variations of the Schottische, and the dance can vary depending on region and tradition. But regardless of where and how it is danced, the Schottische is known for its lively and energetic character.

Starting to use ChatGPT can be overwhelming. Whether you ask questions about cell biology, James Joyce, or the history of Buddhism, it has answers that are delivered clearly. It can summarize texts, write poems, create computer programs, invent bedtime stories, provide feedback and suggestions on drafts, and develop arguments in a conversation with a human. In Chapter 13, you can read more about how tools like ChatGPT could impact our view of knowledge, and of ourselves.

2: Four Types of AI Pitfalls

Something that's important to keep in mind right now is that ChatGPT makes mistakes. It does not show in this translation, but the original conversation above, in Swedish, contained a number of misspellings and strange choices of words - often derived from English words. Such mistakes are significantly less common in English, since the majority of the text that ChatGPT has been trained on is in English. If you use ChatGPT in a non-English language you are likely to encounter such mistakes, and you will probably notice them right away.

Something that's harder to notice are factual errors - partly because they require relatively good knowledge on the part of the reader, and partly because they are wrapped in a text so clear that the factual content also seems credible. For example, ChatGPT writes that the schottische originated in Scotland, while a reader of schottische on Wikipedia can establish that it probably originated in Bohemia. (This is somewhat supported by Encyclopedia Britannica.)

A couple of other mistakes - if they can be called mistakes - are even harder to discover. ChatGPT says that schottische has a "fast and lively rhythm," while the Swedish Wikipedia article on schottis says it has a "calm tempo." Schottische in other parts of the world seems to have a higher tempo than schottis in Sweden, but this question was (originally) asked in Swedish from a computer in Sweden. Is ChatGPT wrong in saying schottische has fast rhythm? Not really. However, it describes schottische from a perspective that may not be true in Sweden - the country where the question was asked - which makes the answer misleading. Another sort-of-mistake is that the description of the history of model railroading does not mention the manufacturer Märklin (but mentions other manufacturers), despite the

fact that Märklin plays a role in the history of model railways and in parts of the world (including in Sweden) is almost synonymous with model railways.

Such sort-of-mistakes are not false, but they reflect a particular aspect of the truth, or cause things to be perceived in a certain way or from a certain perspective. They are difficult to discover, especially for someone who is not vigilant, and risk pushing the recipient into a specific worldview without being aware of it.

The last type of mistake does not deal with what ChatGPT answers, but what you as teacher expect from the answers. The fact that ChatGPT gives you ten well-formulated quiz questions about the Enlightenment does not necessarily mean that it is good pedagogy to use the questions in class: Perhaps the students will learn better from completely different types of activities, or for that matter quiz questions chosen based on what you as a teacher know are common misconceptions or what is particularly important to learn. More serious pedagogical mistakes would be to let ChatGPT create exam assignments or mark student essays without being *very* careful that what ChatGPT delivers corresponds with what you want (and then one might ask how much help one actually got from the tool).

It is natural and useful to explore different ways to use new tools, and not everything you try needs to work well. But it is easy to overuse powerful tools and make the tool itself the starting point, instead of what you want to use it for.

ChatGPT's versatility and impressive ability to create objective-sounding, clear, and correct messages makes it easy to forget that there is not only artificial intelligence but also artificial stupidity. To make it easier to use ChatGPT with judgement, this book lists four types of AI pitfalls you need to be wary of.

- **Language pitfalls**, such as spelling mistakes and incorrect word choices. These are relatively easy to detect, and rare in the English language. The biggest risk with language mistakes is probably that students may be confused about terminology.

- **Fact pitfalls**, which can also include logical mistakes. Fact errors require subject knowledge to detect, not least because ChatGPT expresses itself in a way that inspires confidence.
- **Perspective and value pitfalls**, where answers from AI may be based on conditions in the United States (or other parts of the world), reinforce stereotypical gender roles, or ignore certain groups in society. Detecting skewed perspectives or values may require both vigilance and deep knowledge.
- **Pedagogical pitfalls**, meaning that what ChatGPT delivers is used without reflecting on whether it actually is useful for your students' learning.

These types of mistakes are not unique to ChatGPT, and can occur even without the help of technology. And a teacher who has never fallen into these pitfalls probably has not taught at all – and it must be okay to make mistakes. But those who keep the four AI pitfalls in mind will probably find it easier to avoid them.

Inappropriate Messages

ChatGPT has filters for certain types of messages and language. If you try to get ChatGPT to tell you how to make bombs, mix methamphetamine, or if you want suggestions on how to harass, abuse or torture someone, ChatGPT will respond by saying that it violates its policy to answer. The same applies, for example, to giving medical advice.

The fact that there are such filters makes ChatGPT a much safer tool, but the filters are not perfect. This means that ChatGPT can sometimes let things slip that it should keep quiet about, and that persistent users can find ways to consistently by-

pass the filters. (There are, not surprisingly, tips on the Internet on how to bypass the filters.)

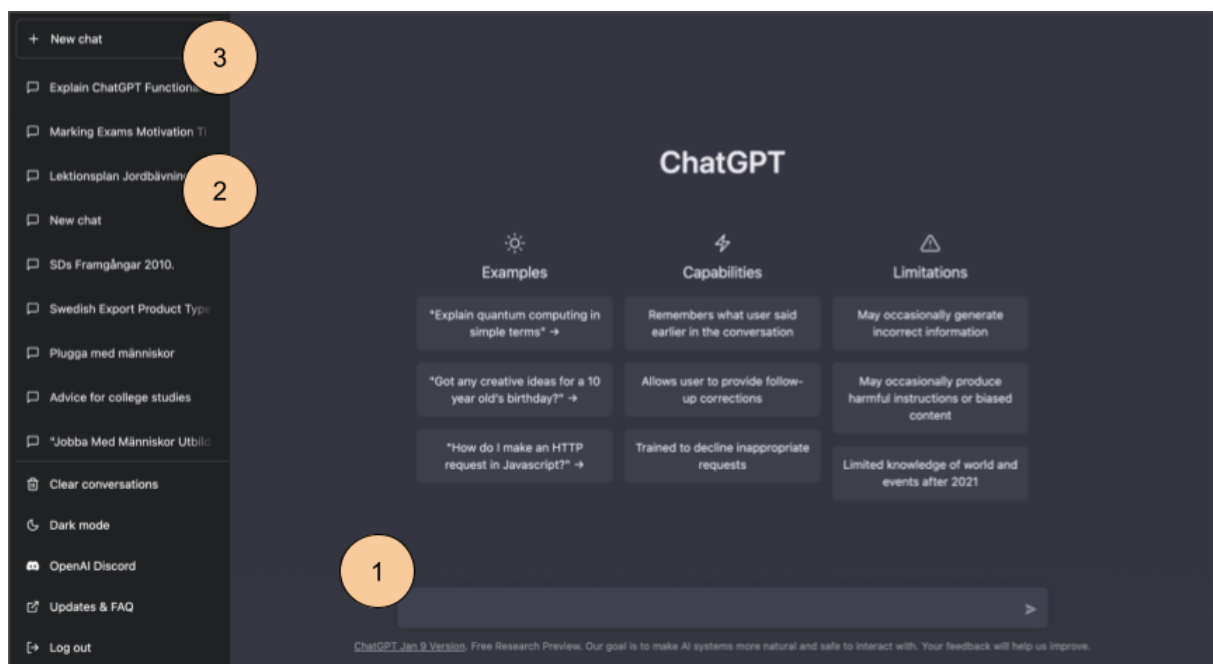
Most of the tips and ideas in this book assume that it is the teacher who is using ChatGPT, not the student. Of course, it can still happen that students use ChatGPT, in school or outside it, and as a teacher it's good to know that inappropriate messages can pop up.

Exercises

1. What are the four types of AI pitfalls, and what distinguishes them?
2. Can you come up with additional categories of AI pitfalls?
3. Review the conversation in chapter 1 again and consider where there may be AI pitfalls.

3: Getting Started with ChatGPT

ChatGPT was created and is operated by the company OpenAI. To use ChatGPT, you need an account on OpenAI, which you can arrange through the OpenAI website (e.g., beta.openai.com). The account is free, and while a paid service recently became available in the US ¹, there are also a free service available. [OpenAI account terms of use](#) state that you must be at least 18 years old. The email address you provide must be confirmed through an email sent to that address, and then you are ready to go to chat.openai.com and start using ChatGPT.

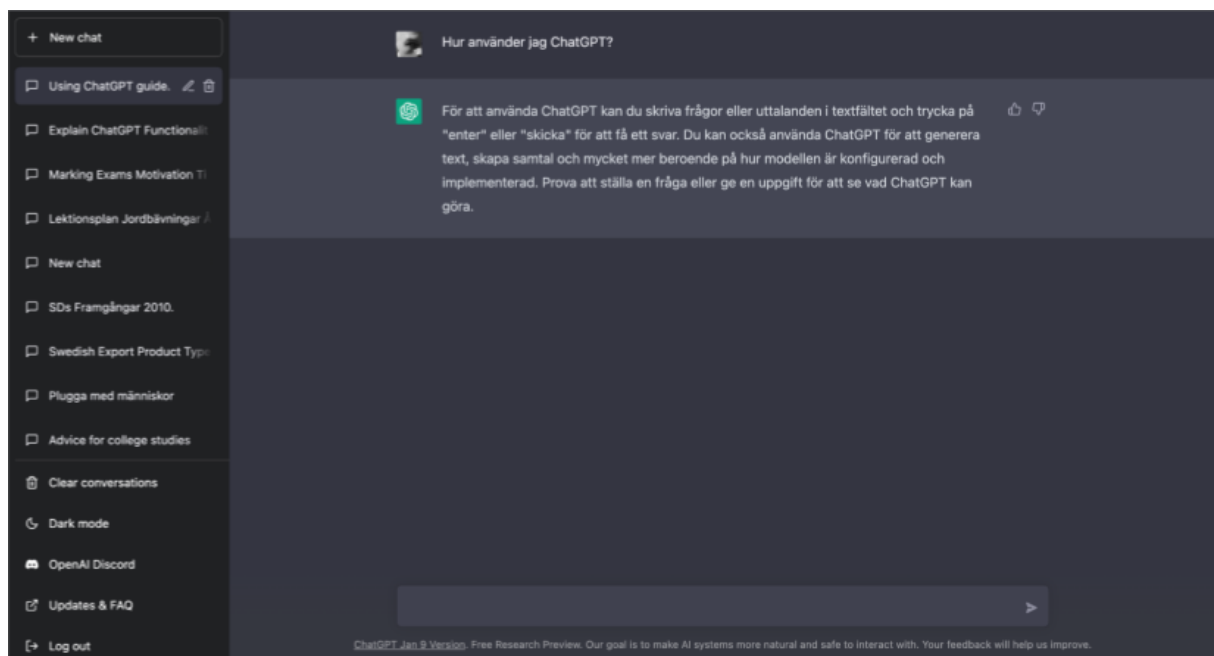


ChatGPT interface, with key elements marked 1-3.

¹ <https://openai.com/blog/chatgpt-plus/>

The key parts of the chat window are (1) the input window for ChatGPT - often called a "prompt", (2) history of previous chats, and (3) the button to start new chat threads. If the selected chat thread is empty, as in the image above, a summary of some of the key features of ChatGPT is displayed.

When you type something to ChatGPT, the conversation appears in the main part of the window. The response from ChatGPT grows word by word, and if the service under heavy load, it may take a few seconds for the text to appear. (If it times out, just reload the page.) The chat is saved in the left column and automatically gets a header based on its contents.



ChatGPT interface as it looks when a conversation is in progress.

If you hover over your message to ChatGPT, an icon to edit the question appears, giving a new answer. Next to each answer are buttons that can be used to provide feedback on whether the answer was good or bad, which also gives a chance to indicate what you think would be a perfect answer. Feedback is used to improve ChatGPT.

There is no built-in way to export text from conversations. It's common to either manually mark and copy text or take screenshots, but if you use ChatGPT frequently, you may want to consider installing a plugin in your web browser that makes it easier to copy text.

Some Tips when Chatting with ChatGPT

Chatting with ChatGPT is natural in many ways - you write as you would to a person. The most common ways are probably to ask short questions or to prompt ChatGPT to write something specific, and follow it up with further questions, prompts or adjustments. Some methods and tricks that may be less natural may also be good to know:

- If you press enter in the chat box, the message will be sent to ChatGPT. With shift + enter, you have the ability to create line breaks without sending the message.
- If you want to vary or reuse a longer question, it can save time to have the prompt in a text editor or word processor, where it can be edited, copied and reused more easily.
- If you want to give long texts to ChatGPT, you can for example type "What is the most difficult part of this text?" and paste the text before sending the message, or "Below is a text I have written that I want you to give feedback on so I can improve it."
- If you give ChatGPT a text without any question or instruction, it will respond with a summary of the text.

- ChatGPT is generally faster in answering if written in English, and the messages also contain fewer language errors.
- Detailed descriptions and questions often give more useful answers.
- Follow-up questions are also very useful for clarifying what you want to get out of the answers, or asking ChatGPT to develop parts of the answers that are interesting.
- Some people experiment with long descriptions of how they want ChatGPT to behave. Such descriptions are often ended with something like "confirm that this has been understood by answering 'ok'", and the actual questions or prompts are posted in the next step in the conversation.
- If you want answers in a specific format, such as a bullet point list, table, or a comma-separated list - ask ChatGPT to answer in that format. ChatGPT can sometimes also answer in a format that can be imported directly into certain programs. You can also ask ChatGPT to rewrite answers it has already given in a new form.
- If you find that ChatGPT is slow or limiting, you can try switching to OpenAI Playground at beta.openai.com/playground. It contains a more flexible (but also more complex) interface to generate AI texts.

It is good to know that there is a limit to the length of messages to ChatGPT, at about two thousand words, corresponding to or 7-10 pages². If you want to give ChatGPT longer texts than that, you can try dividing the text, and for example, giving ChatGPT the instruction "I will give you a long text divided into several parts. Here is part 1. Respond 'ok' when you're done."

ChatGPT allows up to 90 seconds for an answer, which can result in long answers being cut off in the middle. In such cases you can type "Can you continue

² <https://help.openai.com/en/articles/4936856-what-are-tokens-and-how-to-count-them>

from the last answer and finish it?" or simply "continue", or change the question so that ChatGPT can answer in smaller parts.

There are collections of prompts online that people have found particularly useful. These may include prompts designed specifically for a particular purpose (such as serving as a cookbook or a game master in solo adventures), or groups of prompts that are useful in specific areas (such as assisting computer programmers). If you want to explore such collections, you can try searching for "ChatGPT prompts".

Exercises

1. If you do not already have an account with OpenAI, create one - provided you agree to their user terms.
2. Try asking questions to ChatGPT or ask ChatGPT to create certain types of texts. Have at least three conversations, where you ask follow-up questions in at least one. At least one of the chats should be about school or education. If you know another language than English, try using that as well.

Part 2: Using ChatGPT in Practice

As described in part 1 of the book, there is every reason to use your judgement to determine whether what ChatGPT writes is suitable for use and, if so, in which parts. Be cautious of the four types of AI pitfalls:

1. Language pitfalls
2. Factual pitfalls
3. Perspective and value pitfalls
4. Pedagogical pitfalls

All these pitfalls are represented in the examples in this part of the book - partly to reflect how responses from ChatGPT look, and partly to make it easier to always use your judgement.

4: Things You Should Not Do

Do not Disclose Personal Information or other Sensitive Information

The text written to ChatGPT is sent to servers elsewhere and handled in ways that you do not have control over. This means that no personal information for students or other sensitive information should be given to ChatGPT.

Do not Tell Minors to Create an OpenAI Account

The terms for creating an account with OpenAI, which owns ChatGPT, require that you are at least 18 years old. (See openai.com/terms). Encouraging students under 18 years of age to obtain an account is therefore inappropriate. For students who are 18 years of age or older, you need to consider what is appropriate when it comes to creating accounts for online services, and it is worth checking if your school has any policy on this.

Do not Use Messages from ChatGPT without First Reviewing Them

It sounds a bit repetitive, but you always need to review and evaluate texts from ChatGPT before they reach your students. In particular, you should not use ChatGPT as an extra teacher, explaining things to students without you as the teacher ver-

ifying that what ChatGPT says is okay. The example below can make it clear why this is inappropriate.

What is the probability of rolling a pair with three dice?

The probability of rolling a pair with three dice is 11/36 or approximately 0.306.

Can you explain why?

Sure! The total number of possible outcomes when rolling three dice is $6 \times 6 \times 6 = 216$. To find the number of outcomes that result in a pair, we can consider the different combinations of values that will result in a pair.

For example, if the first die shows a "1", then the other two dice must also show a "1" in order for a pair to be rolled. So there is only 1 way to roll a pair when the first die is a "1". Similarly, there is 1 way to roll a pair when the first die is a "2", and so on for each number from 1 to 6.

Therefore, there are 6 ways to roll a pair with three dice, and the probability is $6/216 = 1/36$. But since there are three dice, we need to multiply by 3, giving us $3 \times (1/36) = 3/36 = 1/12$.

So the probability of rolling a pair with three dice is 1/12 or approximately 0.083.

In the conversation above, ChatGPT expresses itself clearly and succinctly, and what it says is *incorrect*. (The chance of rolling a pair is a bit more than 40 percent.) When asked, ChatGPT can even justify its answer in a way that sounds good but is

inconsistent. *What ChatGPT is good at is sounding like doing math, not actually doing math.* This is an effect of ChatGPT's view of the world beginning and ending with text: It creates text that is consistent with how text typically looks – and it doesn't have to be neither logically consistent nor accurate to the world we humans live in.

A student left to learn from ChatGPT could encounter all sorts of foolishness. At best, the student will be confused by the foolishness and ask the teacher for clarifications. But it is also possible that the student will form misconceptions, without you as a teacher even noticing when it happens, which will lead to difficulties later on.

This example concerns factual errors that are relatively easy to detect, but ChatGPT can throw much more hidden mistakes that can harm students in various ways.

Repeat after me: *ChatGPT is not a teacher or instructor.*

Don't Trust ChatGPT's References to Research

You can't rely on the accuracy of the information ChatGPT provides, but you might think that an AI that has read a large portion of the text on the internet in 2021 could suggest research articles to read – so that you yourself can read reliable sources.

ChatGPT cheerfully points to research articles, but the articles mentioned often do not exist. A better option for finding research is, for example, [Google Scholar](#). (You might also want to try the AI service [typeset.io](#)!)

None of the articles mentioned by ChatGPT below could be found online.

I would like to learn more about how I as a teacher can help students who experience speech anxiety. Can you suggest any research articles I can read?

Yes, I can give you some suggestions for research articles that can help you learn more about how to help students who experience speech anxiety:

- 1. "Preparing Students to Overcome Speech Anxiety: A Review of the Literature" by R. Scott Tannenbaum and Matthew J. Hertenstein. This article provides an overview of various methods that have been shown to be effective in helping students overcome speech anxiety.*
- 2. "Self-talk interventions in the classroom: A systematic review" by J. L. McCreary, M. H. Peters, L. L. Perry. This article investigates how teachers can help students use positive self-talk to increase their confidence in speaking.*
- 3. "Speech anxiety in the classroom: A review of the literature" by Scott Tannenbaum and Matthew J. Hertenstein. This article provides a detailed overview of various methods that have been shown to be effective in helping students overcome speech anxiety in the school environment.*

You can find these articles via academic search engines like Google Scholar or JSTOR.

Can you name a research article on dyslexia that actually exists, along with the name of the person who wrote the article? I don't want you to invent the name of an article, but answer with a published article that actually exists.

A research article on dyslexia that actually exists is "The neural basis of dyslexia: a review of recent research" written by F. Paulesu, E. Paulesu, A.F.F. Smith, J.D.E. Raven and L.J. Frith and published in *Brain: A Journal of Neurology*.

6: Inspiration for Planning

One of the things ChatGPT really excels at is providing ideas and inspiration. You can ask for ten ideas and choose the ones that feel worth pursuing, or ask for ten more with a slightly different question if none of the first answers fits what you're looking for. This can be a useful tool when planning lessons, courses or particular areas for teaching.

Inspiration for Lesson Plans

When asking ChatGPT for planning suggestions, it is particularly important to be aware of pedagogical pitfalls: ChatGPT does not use your country's curricula as a starting point and does not know the conditions in your class or group - unless you tell it. Still, the answers from ChatGPT can provide inspiration even if they are not spot-on.

When reading the conversations, consider:

- Would you like support with drafting lesson plans? Why, or why not?
- Do the suggestions from ChatGPT seem useful and pedagogically sound?
- What assumptions does ChatGPT make about the forms of teaching? Does it match how you usually teach? If not, are there things you can and want to adopt?
- Feel free to try asking for drafts for lesson plans for things you yourself are teaching. You will probably get better answers if you provide de-

tailed descriptions of the conditions or what type of plans you would like to have.

I'm starting a new area with my 8th grade class today: the ancient world. I only have four lessons for this area. Can you give me some suggestions on how to lay out these lessons?

Hello! It sounds like you have a challenge on your hands to cover as much about the ancient world as possible in just four lessons. Here are some suggestions on how you could lay out the lessons:

- 1. Introduction to the ancient world: Start by giving the students an overview of what the ancient world means and where in the world this period of history took place. You can also talk about important events and people from this time.*
- 2. Greek gods and myths: A large part of the ancient world concerns Greek gods and myths. Give the students an insight into the Greek mythology and talk about important gods and myths, such as Odysseus and his travels, or the Greek goddess Athena.*
- 3. The Roman Empire: The Roman Empire was another important culture during the ancient world. Give the students an overview of Roman history and talk about important events and people, such as Julius Caesar and Constantine the Great.*

4. *Culture and society in the ancient world: End the lessons by focusing on culture and society in the ancient world. Talk about what people ate, how they lived, how they dressed and what different social classes there were. You can also compare and contrast different cultures during the ancient world, such as Greeks and Romans.*

There's of course much more to say about the ancient world, but with four lessons, you can cover the most important aspects and give the students a good foundation to build upon. Don't forget to use different learning styles and methods to keep the students engaged, such as group work, discussions, and practical activities. Also, be sure to include visual aids such as images and maps to make the material more lively.

Those are quite some demands. Can you give suggestions for practical activities that would fit?

Here are some suggestions for practical activities that might be suitable for use when teaching about ancient times:

- 1. Gods and myths: Have the students create their own Greek gods and myths. They can, for example, draw pictures of their gods and write a short story about their gods and myths.*
- 2. Roman city plans: Have the students create a model of a Roman city. They can use clay or pa-*

per and pen to create houses, temples, the forum and other important buildings.

3. Costumes and attire: Have the students create costumes and attire that could have be worn during ancient times. They can use different materials such as paper, fabric, beads, and other decorations.

4. Role-playing: Have the students play different roles from ancient times, for example Greek gods, Roman soldiers, or slaves. They can use costumes and accessories to make the role-playing more realistic.

5. Practical experiments: Have the students carry out practical experiments that demonstrate, for example, how to create vases or mosaics. They can also experiment with different types of food and cooking techniques that were used during ancient times.

There are many different ways to make teaching about ancient times more practical and hands-on. Feel free to combine different activities to keep the students engaged and to give them different ways to learn. Don't forget to give the students clear instructions and guidance, and make sure the activities are appropriate for their age and abilities.

I will be taking over a 6th grade class. Can you suggest some activities we can do to get to know each other in an easy way?

Here are some suggestions for activities you can do to get to know each other:

- 1. Icebreaker games: There are many different types of icebreaker games that can help students get to know each other. For example, "Two Truths and a Lie", where students share two truths and a lie about themselves and then guess each other which is the lie.*
- 2. Interest presentations: Have students present their favorite interests to the class. It can be anything from sports to music or books.*
- 3. Group work: Put students in groups and give them a task to work on together. It can be a creative task, a problem-solving game or a presentation of a book they have read.*
- 4. Class dinner: Invite students to a class dinner where you can socialize and talk in a more relaxed environment.*
- 5. Question round: Have students ask questions of each other to get to know each other better.*

Remember that it is important to create a safe and positive environment for students to open up in.

I'm going to teach systems of linear equations for students taking the social sciences program. I have a total of three lessons for the topic, with 60 minutes per lesson. Afterwards, I want them to be able to use linear equation systems to describe realistic situations and have a reasonable confidence in solving linear equation systems (preferably with more than one method). Many of the students feel uncertain when it comes to algebra and arithmetics, and several students think that math is boring. It is therefore important that the students feel that they are learning things and succeeding, and I want the teaching to be engaging. Do you have suggestions for the setup of the three lessons?

For the students to feel that they are learning things and succeeding, and for the teaching to be engaging, the following setup for the three lessons may be appropriate:

Lesson 1: Introduction to systems of linear equations and graphical solution. Start by giving the students an overall understanding of what systems of linear equations are and why they are useful. Then present graphical solution as a simple method for solving systems of linear equations. Give the students an opportunity to try solving some simple equation systems graphically and give positive feedback for their efforts.

Lesson 2: Algebraic solution for systems of linear equations. Focus on teaching the students how to solve systems of linear equations using algebraic methods,

such as substitution and elimination. Use examples from real-life situations to make it more relatable and engaging for the students. Give the students an opportunity to try solving equation systems using algebraic methods and give positive feedback for their efforts.

Lesson 3: Summary and practice. Go over important concepts and methods presented during the previous lessons. Give the students an opportunity to practice solving systems of linear equations using both graphical and algebraic methods. Give positive feedback for the students' efforts and give the opportunity for the students to ask questions and get help with any difficulties.

Thank you! Can you suggest real-life situations where systems of linear equations are useful, especially relevant to students taking the social sciences program?

Yes, there are many real-life situations where systems of linear equations are useful and particularly relevant to students in social science programs. Here are a few examples:

1. *Economics:* Economists often use systems of linear equations to model related variables, such as related prices or income and expenses.
2. *Demography:* Demographers often use systems of linear equations to describe population growth and changes over time.

3. *Sociology: Sociologists often use systems of linear equations to describe relationships between different social phenomena, such as the relationship between education and income.*
4. *Marketing: Marketers often use systems of linear equations to describe relationships between different marketing variables, such as the relationship between advertising costs and sales.*
5. *Geography: Geographers often use systems of linear equations to describe relationships between different geographical variables, such as the relationship between distance and time.*

These are just a few examples of how systems of linear equations are used in different social science fields, but there are many more. It's good to use real-life examples from different areas to make teaching more relatable and engaging for students.

Feedback on Lesson Plans

ChatGPT can provide feedback that is sometimes accurate and often at least helps to spark new thoughts and perspectives on lesson plans and other preparations.

When reading the conversation, consider:

- Do the suggestions from ChatGPT seem useful and well thought-out for teaching purposes?

- What are the pros and cons of asking ChatGPT for feedback on a lesson plan compared to asking a colleague?
- Asking ChatGPT for feedback on lesson plans requires that the plans are written down. How can you record lesson plans in a way that does not take too much time?

Below is a summary of a lesson introducing systems of linear equations to a first-year science class in upper secondary school.

Lecture by me, on the board:

- *Brief review of the equation for a straight line and how solutions can be drawn in a coordinate system.*
- *A real-life situation containing two relationships, each of which can be described with a linear equation.*
- *Representation of the situation as both two linear equations and two lines in a coordinate system.*
- *Arguments for both equations being satisfied at the point where the lines intersect.*

Summary and reflection:

- *Three randomly selected students get to say something about what they learned, or pose any questions they have.*

Practice using methods and concepts:

- *Presentation of another real-life situation with two relationships that can be described with two linear equations.*
- *Students work individually and then in pairs to solve the problem, by drawing lines and identifying the intersection point.*
- *Collective reflection on results and methods.*

More practice:

- *Work on selected exercises in the math book, on the same topic.*

Can you suggest ways to improve the lesson plan to make it more engaging for students?

It seems like you have planned a structured and comprehensive lesson on systems of linear equations, and there are several things you can do to engage students more in the lesson:

- 1. Use more real-life examples and problems: Using examples and problems that students can relate to and see relevance in can help keep their interest awake.*
- 2. Give students opportunities to work on their own: By giving students opportunities to work on their own or in pairs, you can increase their personal involvement in the lesson, which can help increase their engagement.*

3. *Use different methods to explain concepts and ideas: It may be beneficial to use different methods to explain concepts and ideas, such as demonstrations, examples, analogies, and visual aids. This can help students get a deeper understanding and remember concepts longer.*
4. *Give students opportunities to ask questions and participate in discussions: By giving students opportunities to ask questions and participate in discussions, you can increase their understanding and engagement in the lesson.*
5. *Use different types of exercises and tasks: Using different types of exercises and tasks, such as problem-solving tasks, group exercises, and individual exercises, can help students explore different aspects of the concept in a more hands-on way.*

Can you suggest three short questions to use as exit tickets?

Exit tickets are a good tool for quickly getting an idea of students' understanding and can be used to identify any areas that may need extra support. Here are three suggestions for short questions that you can use as exit tickets after the lesson on systems of linear equations:

1. *Briefly describe what a system of linear equations is and what it is used for.*

2. *How do you draw two straight lines in a coordinate system and how do you find their point of intersection?*
3. *Give an example of a real-life problem that can be solved by using a system of linear equations.*

Suggestions for Describing or Explaining Topics

As ChatGPT's messages sometimes contain inaccuracies (or often for certain topics), it is inappropriate to directly let ChatGPT explain things to students. However, ChatGPT can provide good suggestions that you as a teacher can assess and then either use yourself or pass on to the student (after any adjustments). It also provides the opportunity to take into account special circumstances for groups or individual students.

When reading the conversation, consider:

- Do the answers from ChatGPT seem to be factually correct? Are there things you would like to add or change?
- What do you think, from a pedagogical perspective, about creating descriptions tailored to specific interests that students have?
- Feel free to ask ChatGPT to describe one or more concepts that you yourself teach students. Can you spot any factual errors or skewed perspectives? Also feel free to try asking ChatGPT to explain something based on specific interests of one or more of your students.

Can you explain the mechanisms of inflation on a level suitable for a 15 year old student?

Inflation is a rise in prices of goods and services over time. It means that the same amount of money can buy you fewer goods and services.

Think of it like a balloon. As you blow air into the balloon, it gets bigger and takes up more space. In the same way, as more money is added to an economy, the value of each unit of money (like a dollar) decreases and prices for goods and services go up.

The main drivers of inflation are:

- 1. Increase in demand for goods and services: When people have more money to spend, they buy more, which can cause prices to go up.*
- 2. Increase in production costs: When it costs more for businesses to produce goods and services, they may raise their prices to make up for the extra cost.*
- 3. Decrease in the supply of money: When there is less money in circulation, each unit of money is worth more and can buy more goods and services, leading to lower inflation.*

Overall, inflation is a normal part of a healthy economy, but too much inflation can cause problems. The central bank (like the Federal Reserve in the U.S.) tries to control inflation by adjusting the supply of money in the economy.

I have a student who is really into basketball. Can you explain inflation in a way that is engaging for someone who likes basketball?

Sure! Let's use basketball to explain inflation.

Imagine you're playing a game of one-on-one basketball and you have a dollar. This dollar can buy you one drink from the concession stand before the game. However, as the game goes on and more people show up to watch, the demand for drinks increases. The concession stand raises their prices to make up for the extra demand. Now, your dollar can only buy you half of a drink.

This is similar to what happens in the economy with inflation. As the demand for goods and services goes up, prices go up too, which means your money can buy you less.

Just like in basketball, there are different factors that can cause inflation. For example, if the cost of ingredients for the drinks at the concession stand goes up, the concession stand may have to raise their prices. This is like when a key player on your team gets injured and you have to find a replacement. This can lead to increased costs for the team, which could lead to higher ticket prices for fans.

The central bank (like the Federal Reserve in the U.S.) works like a coach in this situation. Just like a coach would make adjustments to the team during the game, the central bank adjusts the supply of money in

the economy to help control inflation and keep prices stable.

Ideas for High School Projects, Thematic Projects, etc.

ChatGPT's breadth of information can be useful for generating whole lists of ideas where one might have a hard time coming up with more than a few ideas. From the lists, you can choose what feels feasible and pedagogically useful.

When you read the conversations, think about:

- Do the suggestions from ChatGPT seem useful and pedagogically meaningful?
- What areas do you have where you can benefit from using ChatGPT as an idea generator? Feel free to ask for ideas and evaluate them.

I work at a after-school-club for elementary school pupils. We are going to buy some new board games, and would like games where the children get to practice counting and arithmetics while having fun. Do you have any ideas on games that might fit?

Yes, here are some board games that are educational and fun for elementary school students:

- 1. Count Your Chickens: A simple game that involves rolling dice and counting chickens.*

2. *Sum Swamp*: A game that challenges players to add and subtract their way through a swamp.
3. *Brain Box Maths*: A memory game that tests players' knowledge of basic arithmetic.
4. *Rummy Cube*: A classic rummy game with a twist, where players use addition and subtraction skills to lay down sets of numbers.
5. *24 Game*: A fast-paced game that challenges players to make 24 using basic arithmetic operations.
6. *Qwirkle*: A game of strategy where players build lines of tiles, practicing addition and pattern recognition.
7. *Zingo*: A bingo game with a twist, where players match numerical equations to win.

These games are designed to be engaging and fun while also helping students practice important arithmetic skills.

I would like to have projects where my students can combine geography with either craft, art, music, or home economics. Can you give ten ideas for such projects? It is for high school, and we have a total of four lessons for the project.

Sure! Here are ten ideas for projects that combine geography with craft, art, music, or home economics for high school:

- 1. Create a map of a continent or a country using craft techniques such as paper tape, painting, and crafting.*
- 2. Study different cultures and create music-inspired compositions or instruments that represent each culture.*
- 3. Use art techniques to create a series of works that focus on landscape photography from different places in the world.*
- 4. Study different economic systems and create a model for an ideal economy using craft materials.*
- 5. Explore different food cultures and create a cookbook with recipes and pictures that represent each culture.*
- 6. Study different architectural styles and create models of buildings that represent each style.*
- 7. Explore different climate zones and create music-inspired compositions that represent each zone.*
- 8. Use art techniques to create a series of works that focus on people from different cultures.*

9. Study different travel destinations and create models of different types of accommodations that represent each place.

10. Explore different cultures and create a fashion or jewelry collection inspired by each culture.

Note that these are just ideas and can be adapted to your students' abilities and knowledge level.

I have a biology student in upper secondary school who is especially interested in genetics. She would like to do a upper-secondary thesis in biology. Can you give some suggestions for questions she could explore in a thesis?

Below are the graduation requirements for the natural science program, which the student is taking. It includes the requirements for the upper-secondary theses.

[Document describing the upper secondary natural science program in Sweden.]

A suggestion for a question for a high school thesis in genetics that would fit into the natural science program could be: "How are gene expressions affected by different environmental factors? A comparison between indoor and outdoor environments of a certain organism."

Another suggestion could be: "Genetic causes of diseases - a study of a certain disease and its genetic factors."

A third suggestion could be: "CRISPR-Cas9 - a revolutionary technology for gene editing and its possibilities and challenges"

These suggestions would provide an opportunity for students to develop their knowledge in genetics, as well as to use their skills in critical thinking, logical reasoning, problem-solving, and systematic observations. Additionally, it would give students the opportunity to develop the ability to evaluate different types of sources and to differentiate between claims that are based on scientific and non-scientific foundations.

Create Randomized Groups

ChatGPT can create (somewhat) randomized groups fulfilling specific requirements.

When reading the conversation, consider:

- If you were to make group assignments with requirements similar to those in the example, would you need to review the groups to ensure they are correct? How much time would you save?

Can you divide these 24 students into groups of 3-4 per group? I want Alice and Bob to be in different groups, and Isak and Jakob to be in the same group. Also, Lena +

Viktor, Zara + Felix, and Emma + Malte should be in the same group.

[List of 24 made-up names.]

Here's a proposal for dividing the students into groups:

- Group 1: Alice, Elin, Johan, Liam
- Group 2: Bob, Julia, Klara, Nora
- Group 3: Isak, Jakob, Lena, Viktor
- Group 4: Felix, Zara, Emma, Malte
- Group 5: Hanna, Linn, Maja, Oskar
- Group 6: Sara, Sofia, Tilda, Wilma

7: Create Materials

Create Texts for Students to Build upon

ChatGPT can be used to give ideas for writing assignments or starting points that students can build upon after the suggestions have been reviewed and possibly adjusted.

When reading the conversation, consider:

- Do the suggestions from ChatGPT seem engaging and useful for 15-year-olds?
- Are there parts of the answers that might be inappropriate for one reason or another?

I have a lesson where students will practice writing argumentative texts. Can you create ten short introductions to argumentative texts, a couple of sentences long each, that deal with areas that might engage 15-year-olds?

Sure! Here are ten suggestions for introductions to argumentative texts that might engage 15-year-olds:

1. *"Mobile phones are a necessity in our lives today, but there is also a dark side to the con-*

stant connection. Should we limit our use of mobile phones to protect our mental health?"

2. *"Streaming services like Netflix and Spotify have revolutionized how we consume entertainment. But is it really worth paying for a subscription every month when there is so much free content available on the internet?"*

3. *"E-sports is a rapidly growing industry, but many argue that it should not be considered a sport. Should we accept e-sports as an equal form of sport or continue to regard it as a game?"*

4. *"Social media is an effective way to keep in touch with friends and family, but it can also create stress and comparison anxiety. Should we limit our time on social media to protect our mental health?"*

5. *"Virtual realities are an exciting and innovative area that offers limitless opportunities. But it's also important to avoid becoming too lost in them. Should we be more aware of our time in virtual realities?"*

6. *"Having your own car is a symbol of freedom for many, but it can also lead to increased car dependence and environmental problems. Should we consider using alternative modes of transportation to reduce our environmental impact?"*

7. *"Access to information is easy and convenient with the help of the internet, but there is also a lot of misinformation. Should we be more critical of what we read and share on the internet?"*
8. *"Vegetarianism and veganism are popular, but there are also many counterarguments. Should we consider changing our diet to reduce our environmental impact and improve our health?"*
9. *"Online shopping is convenient and [ChatGPT response ended here.]"*

Create Fictive Student Examples to Discuss

In some cases it may be sensitive to use authentic student examples, and in such cases using texts generated by ChatGPT could be an alternative. The excerpt below could for example be used as a basis for discussing how the text can be improved both in form and content.

When you read the conversation, consider:

- What are the educational advantages and disadvantages of using fabricated student examples instead of authentic ones?
- Do you think a 14-year-old would focus on different aspects in the essay topic below, depending on which country he or she lives in? If so, which part of the world does the answer from ChatGPT represent?

- Feel free to ask ChatGPT for other short essays on topics you choose, such as what students of different ages would have written them. Does it work to ask ChatGPT to include common spelling errors?
- What happens if you ask ChatGPT to write as a student with an immigration background - and what does it mean if you get differences in the answer?

Can you write a short essay (about 150 words) about C. S. Lewis, as a 14-year-old would have written it?

C.S. Lewis was a famous author who wrote many amazing books. He was born in Ireland in 1898 and grew up to be one of the most well-known writers of his time. One of his most famous books is "The Chronicles of Narnia," which is a series of seven books about talking animals and magical adventures.

Lewis was also a Christian writer and wrote many books about faith, including "Mere Christianity" and "The Screwtape Letters." He was a professor at Oxford University and was friends with J.R.R. Tolkien, another famous author.

Lewis died in 1963, but his books are still loved by people all over the world. If you haven't read any of his books yet, I highly recommend that you do! You'll be transported to amazing places and learn a lot about faith, friendship, and courage.

Create Examples for Students to Learn from

The human brain seems to be built to learn from examples, but as a teacher it can be difficult to create examples that cover a sufficiently wide range. With the help of ChatGPT, you can quickly create many examples to review, possibly adjust, and use in your teaching. You could also consider evaluating ChatGPT texts based on grading criteria, to give students a better idea of what different grades can represent.

When you read the conversations, consider:

- Are the book reviews sufficiently different to serve as examples of different styles? If not, can you get ChatGPT to create a more wide range of texts?
- Are there areas in your own teaching where you would like to have many different text examples to show students? Can you get ChatGPT to create such examples?

My students are practicing writing book reviews, and I would need a number of examples that show what book reviews can look like. I want the examples to reflect different ways of writing reviews, and I will ask you for more and more examples. All examples should be based on the first book in the Harry Potter series. Can you give me a first example of a book review about 150 words?

"Harry Potter and the Philosopher's Stone is a fantastic debut book by J.K. Rowling. The story of the young Harry Potter, an orphan boy who discovers he is a wizard, is both gripping and charming. The book contains

a number of different characters, many of whom are as memorable as they are versatile, including the ruthless former wizard Lord Voldemort and the wise and loyal Hermione Granger.

It is difficult to tear yourself away from Harry Potter's adventures at Hogwarts, where he learns about magic and witchcraft while fighting to solve the mystery of the philosopher's stone. The book is well written and easy to read, and it is hard not to fall in love with the story and characters.

I strongly recommend Harry Potter and the Philosopher's Stone to anyone who loves fantasy and adventure, and I look forward to reading the rest of the series."

Thank you! Can you create another review, in a new style, about 200 words?

"J.K. Rowling's Harry Potter and the Philosopher's Stone is a powerful opening to a series that would change the fantasy genre forever. The plot is exciting, with a young protagonist discovering his wizard identity and being drawn into a world filled with magic and dangers.

The characters are vivid and well-developed, with Harry as a sympathetic hero constantly fighting against injustice and evil. I also loved Rowling's depiction of the school Hogwarts, which felt like a place with real life and personality.

But what really makes Harry Potter and the Philosopher's Stone an unforgettable reading experience is

Rowling's ability to create a world that feels so real and filled with details. She has created a world that you really want to visit and experience.

I cannot recommend Harry Potter and the Philosopher's Stone enough. It's a unique and gripping story that's suitable for all ages. A must-read for all fantasy fans."

Thank you! Can you create another one, in a new style, in just 70 words? I want this one to be more critical of the book.

"Harry Potter and the Philosopher's Stone by J.K. Rowling is an okay debut book. The plot is quite simple and the characters are not particularly deep. The writing style is well-written but there's not enough plot or complexity to keep the reader engaged. An okay fantasy debut, but nothing more than that."

Create Statements for Students to Evaluate and Discuss

After working on a topic, it may be interesting to show the class what ChatGPT has to say about the topic, and allow the students to discuss or evaluate the statements. Are the important things included? Is something wrong? Is there something included that we wouldn't have mentioned? You can also ask ChatGPT to create intentionally simplistic or even incorrect texts.

When reading the conversations, consider:

- Are there areas in your teaching where it is pedagogically meaningful for students to discuss and evaluate statements? Would it be meaningful for students to compare different texts written by ChatGPT? Would it be better if the texts were written by you as a teacher, or perhaps by students?

Can you describe the water cycle, as a 9-year-old would describe it, with a few spelling mistakes and using uppercase letters?

The water on Earth moves in a cycle called the WATER CYCLE. It starts with the sun HEATING UP the water in the oceans and lakes. When the water gets warm, it starts to steam up and become clouds. Then it can become rain or snow that falls back down to the ground. When it rains or snows, the water ends up in rivers and lakes again or it can land on the ground and become groundwater. Then the water in rivers and lakes can flow back to the ocean again and the whole process starts over.

Can you summarize what operant conditioning is, at a level suitable for high school?

Operant conditioning is a type of learning in which behavior is modified by its consequences, either reinforced or punished. Reinforcement strengthens a behavior by providing a reward or positive outcome, while punishment weakens a behavior by providing a negative outcome or consequence. This process helps to shape behavior in

desired ways and can be used to understand and influence a wide range of behaviors, from simple habits to complex personality traits.

Creating Study Questions or Other Questions for Texts

ChatGPT can be used to create study questions for texts at various levels.

When you read the conversations, consider:

- If you give students questions for texts, is it to check if they have read the text or to help them focus on the essential content of the text? What role does the ChatGPT's suggestions seem to play?
- Feel free to ask ChatGPT to create study questions for a text that relates to your teaching. (An easily accessible example is text from a relevant article on Wikipedia.) Do the study questions seem pedagogically meaningful?

I'm giving my pupils in first grade as homework to read the story "Little Red Riding Hood", pasted in full below. Can you give me suggestions for five questions they should write answers to, to make sure that they have understood the text?

[The full story.]

- 1. Who gave Little Red Riding Hood the red velvet cap?*

2. *Where did Little Red Riding Hood's grandmother live?*
3. *Who did Little Red Riding Hood meet in the woods?*
4. *What did Little Red Riding Hood bring to her grandmother?*
5. *What did the wolf do when he reached Little Red Riding Hood's grandmother's house?*

Can you give me seven study questions to the text below, on organic acids? The questions are for my upper secondary class in chemistry.

[Text from [Wikipedia's article on organic acids](#)]

1. *What is an organic acid?*
2. *What type of acids are the most common organic acids?*
3. *How can one determine the acidity level of an organic acid?*
4. *Can alcohols act as acids and if so, how strong are they typically?*
5. *What are some common examples of organic acids?*
6. *Why are organic acids typically weaker than mineral acids?*
7. *What type of use do organic acids have in food preservation and what effect do they have on bacteria?*

Create Glossaries

Using ChatGPT can be an effective way to create glossaries for concepts in a work area, when glossaries are not already available.

When reading the conversation, consider:

- Does the information from ChatGPT seem correct?
- Does the text need to be adjusted before it can be given to students?

Can you make a glossary with short explanations for these terms? It's for my high school biology class.

DNA, RNA, cell wall, cell nucleus, lysosome, mitochondria, Golgi apparatus

DNA (deoxyribonucleic acid) - is the genetic material found in all living organisms and carries information on how the organism should develop and function.

RNA (ribonucleic acid) - is a nucleic acid that is important for protein synthesis and is involved in the transfer of genetic information from DNA to ribosomes.

Cell wall - is an outer layer that surrounds many bacteria and plant cells, providing support and protection to the cell.

Cell nucleus - is a central part of a cell where the cell's genetic material, DNA, is located. It is also the place where the cell's genetic material is regulated and controlled.

Lysosome - is a small organelle within a cell that is responsible for breaking down and removing waste and contaminated materials.

Mitochondria - are organelles within the cell that are responsible for producing energy for the cell through the process known as cellular respiration.

Golgi apparatus - is an organelle within the cell that is responsible for managing, sorting, and distributing proteins and other molecules within the cell.

Creating Quizzes

ChatGPT can quickly create quiz drafts. Like other AI material, they need to be reviewed before they are used.

When reading the conversation, consider:

- When can a quiz be useful in your teaching?
- If ChatGPT suggests a quiz question about something you haven't covered in your lesson, would you remove it? Why?
- Feel free to ask ChatGPT for a quiz on a topic you recently taught.

Can you create 5 quiz questions on the industrial revolution suitable for 17-year-olds? Include three incorrect and one correct answer for each question, and mark the correct answer with an arrow: <--

Sure! Here you go:

What was the main source of energy during the Industrial Revolution?

- A) Wind power*
- B) Coal <--*
- C) Solar power*
- D) Hydro power*

Where did the Industrial Revolution begin?

- A) France*
- B) Germany*
- C) England <--*
- D) United States*

What was the main factor that led to the development of the spinning jenny?

- A) Increase in demand for cloth*
- B) Availability of cheap labor*
- C) Technological advancements <--*
- D) Abundance of raw materials*

Who is known as the "Father of the Industrial Revolution"?

- A) James Watt <--*
- B) Richard Arkwright*
- C) Samuel Slater*
- D) Eli Whitney*

Which invention revolutionized transportation during the Industrial Revolution?

- A) The steam engine <--*
- B) The internal combustion engine*
- C) The electric motor*

D) *The bicycle.*

Thanks! Can you create a CSV from the questions and answers, so I can import them to my quiz tool?

Certainly! Here is the CSV format of the questions and answers:

Question,Answer 1,Answer 2,Answer 3,Answer 4,Correct Answer

[The questions and answers above, separated by commas.]

Customize Assignments or Texts for Student Groups

It can be difficult to find material that is tailored to certain student groups. ChatGPT can, to some extent, write existing material in new contexts.

As you read the conversations, consider:

- Do you think it's time-saving to use ChatGPT in the examples below, taking into account any time spent processing AI answers?
- If you needed to make similar customizations often, what would you do to make it faster to use ChatGPT?
- Do you have a need for customized assignments or texts? Try to make ChatGPT customize material in a meaningful way.

(The story in first example contains 529 words, shortened from 1442 words.)

Below is the story Little Red Riding Hood, which I will give my pupils to read as home assignment. Can you cre-

ate a version of the story that is 500-700 words and doesn't contain any difficult words? Also, I want you to write the story with upper-case letters only.

[Full story pasted.]

ONCE UPON A TIME, THERE WAS A LITTLE GIRL NAMED LITTLE RED RIDING HOOD. SHE LIVED WITH HER MOTHER AND HER GRANDMOTHER WHO LOVED HER VERY MUCH. ONE DAY, LITTLE RED RIDING HOOD'S MOTHER GAVE HER A LITTLE CAP OF RED VELVET TO WEAR. LITTLE RED RIDING HOOD LOVED THIS CAP SO MUCH THAT SHE WORE IT EVERYDAY.

LITTLE RED RIDING HOOD'S MOTHER TOLD HER TO GO TO HER GRANDMOTHER'S HOUSE WITH A PIECE OF CAKE AND A BOTTLE OF WINE. LITTLE RED RIDING HOOD PROMISED TO BE CAREFUL ON HER WAY TO HER GRANDMOTHER'S HOUSE.

AS LITTLE RED RIDING HOOD ENTERED THE WOOD, A WOLF MET HER. LITTLE RED RIDING HOOD DID NOT KNOW THAT THIS WOLF WAS DANGEROUS AND WAS NOT AFRAID OF HIM. THE WOLF ASKED LITTLE RED RIDING HOOD WHERE SHE WAS GOING. LITTLE RED RIDING HOOD TOLD THE WOLF THAT SHE WAS GOING TO HER GRANDMOTHER'S HOUSE TO BRING HER CAKE AND WINE. THE WOLF THOUGHT THAT LITTLE RED RIDING HOOD WOULD BE A BETTER MEAL THAN HER GRANDMOTHER, SO HE DECIDED TO TRICK HER.

THE WOLF TOLD LITTLE RED RIDING HOOD THAT THE FLOWERS IN THE WOOD WERE PRETTY AND THE BIRDS WERE SINGING BEAUTIFULLY. LITTLE RED RIDING HOOD BECAME INTERESTED AND DECIDED TO PICK FLOWERS FOR HER GRANDMOTHER. THE WOLF THEN RAN TO GRANDMOTHER'S HOUSE AND KNOCKED ON THE DOOR. WHEN GRANDMOTHER ASKED WHO WAS THERE, THE WOLF SAID IT

WAS LITTLE RED RIDING HOOD WITH CAKE AND WINE. GRANDMOTHER TOLD THE WOLF TO LIFT THE LATCH AND THE WOLF WENT STRAIGHT TO THE BED AND ATE GRANDMOTHER.

MEANWHILE, LITTLE RED RIDING HOOD HAD BEEN PICKING FLOWERS AND FORGOT ALL ABOUT TIME. WHEN SHE FINALLY REMEMBERED HER GRANDMOTHER, SHE WENT TO HER HOUSE. WHEN LITTLE RED RIDING HOOD ENTERED THE ROOM, SHE HAD A STRANGE FEELING. SHE CALLED OUT "GOOD MORNING" BUT RECEIVED NO ANSWER. WHEN SHE DREW BACK THE CURTAINS, SHE SAW HER GRANDMOTHER IN BED. HER GRANDMOTHER HAD BIG EARS, BIG EYES, BIG HANDS, AND A BIG MOUTH. THE GRANDMOTHER TOLD LITTLE RED RIDING HOOD THAT SHE HAD BIG EARS TO HEAR BETTER, BIG EYES TO SEE BETTER, BIG HANDS TO HUG BETTER, AND A BIG MOUTH TO EAT BETTER. THEN THE WOLF SWALLOWED LITTLE RED RIDING HOOD.

THE WOLF THEN WENT TO

Please continue.

THE HUNTSMAN HEARD THE SNORING AND THOUGHT TO HIMSELF, "WHAT CAN BE MAKING SUCH A NOISE?" HE DECIDED TO INVESTIGATE AND CAME UPON THE GRANNY'S HOUSE. HE NOTICED THE DOOR WAS AJAR AND WALKED IN. HE SAW THE WOLF ASLEEP IN THE BED AND REALIZED THAT HE HAD EATEN LITTLE RED RIDING HOOD. HE DREW OUT HIS KNIFE AND WITH ONE STROKE CUT OPEN THE WOLF'S BELLY. HE SAW LITTLE RED RIDING HOOD AND GRANNY, ALIVE AND UNHURT. HE PULLED THEM OUT AND TOOK THEM HOME TO THEIR MOTHER.

FROM THAT DAY FORWARD, LITTLE RED RIDING HOOD WAS NEVER AGAIN ALLOWED TO WANDER OFF THE PATH WHEN SHE WENT

TO VISIT HER GRANNY. SHE LEARNED THAT IT WAS IMPORTANT TO BE CAREFUL AND TO LISTEN TO THE ADVICE OF HER MOTHER AND OTHERS. AND GRANNY LIVED TO BE A HAPPY OLD LADY FOR MANY YEARS AFTER THAT.

Below is a math problem adjusted for third grade. Can you change the context of the problem so that it fits for my adult students, but still contains the same type of math?

On the playground, there are 17 children. After a while, 5 more children arrive. How many children are there on the playground then?

Show your calculation and write the answer.

In a company, there are 17 employees. After the recruitment, there will be 5 more employees. How many employees will there be in the company after the recruitment?

Calculation: $17 + 5 = 22$

Answer: 22 employees.

Can you create an easy-to-read version of the text below? Remove all references in brackets.

[Inlined text from the beginning of [Wikipedia's article on global warming](#), about 460 words.]

Climate change is the ongoing increase in global average temperature caused by humans burning fossil fuels.

This leads to increased levels of greenhouse gases such as carbon dioxide and methane, which trap more heat in the Earth's atmosphere and cause global warming. The effects of climate change include expanding deserts, more frequent heat waves and wildfires, melting permafrost, and intense storms. Climate change also threatens people with food and water scarcity, increased flooding, and more disease. Poorer countries, which have the least ability to adapt, are the most vulnerable to the effects of climate change. To limit warming to 1.5°C, emissions must be reduced by halving them by 2030 and achieving net-zero emissions by 2050. This requires generating electricity from low-carbon sources and removing carbon from the atmosphere.

Improving Own Texts

ChatGPT can process large amounts of text and provide (often) meaningful feedback on it. Since feedback should be used judiciously, it is recommended to use AI feedback as a teacher, not as feedback given unreviewed to students.

Feedback is often more useful when asking about specific aspects, such as making it more readable, more engaging, or what parts of the text need improvement.

When reading the conversation, consider:

- What are the advantages and disadvantages of asking for feedback from ChatGPT compared to from colleagues?

- Do the suggestions from ChatGPT seem useful?
- Feel free to test asking for feedback on lesson materials or other texts you have written. Make sure to describe what type of feedback you want, or in what context the text is intended to be used.

Below is a text intended for upper secondary students and dealing with quadratic equations - an introduction and then presentation of three different ways to solve quadratic equations. Can you give me suggestions on how to improve the text?

[Embedded text from [Solving Quadratic Equations: A Recipe \(in Swedish\)](#)]

Here are some suggestions on how the text can be improved:

- 1. Add an introduction that gives the reader an overview of what the text is about and why it can be useful.*
- 2. Be more specific in your definition of quadratic equations and provide examples of such equations.*
- 3. Provide more examples of quadratic equations and how to solve them, so that the reader gets a better understanding of how to solve different types of equations.*
- 4. Make the text more readable by using clear and simple terms and explain any more advanced concepts when they appear.*

5. *Add a conclusion or summary of the text so that the reader can have an overview of what has been learned and what will be needed to solve quadratic equations.*
6. *Add links to additional resources for the reader who wants to learn more about the subject.*
7. *Correct any spelling and grammar errors in the text to make it easier to read and understand.*

Create Drafts for Recurring Texts

ChatGPT can save time by providing drafts of well-written standard messages that you still want to send. For such tasks, it may be useful to have a template for ChatGPT with instructions where you replace certain content every time you generate a message.

When reading the conversations, consider:

- What are the advantages and disadvantages of having an AI write messages and texts?
- There is a risk that recipients may feel misled if they believe that a person wrote texts created by an AI. What do you think the reaction will be if the message states that it is formulated by an AI based on instructions from (in this case) teachers at the preschool?
- What recurring needs do you have for writing texts? Try letting ChatGPT write such a text for you and reflect on the results. Can you get the AI to use a language style that you like?

I would like you to write a draft of a weekly newsletter for the caretakers of the children at our preschool group, "Humpty." The letter should be brief and friendly and tell what we have done during the week.

Things to include in the letter:

- Welcome back after the holiday break*
- A new child from the Dumpty group has joined us*
- We are going ice skating on Tuesday*
- We have continued working on the seasonal tree*
- The children have been playing with magnetic bricks a lot*
- Next Monday, the preschool will close at 3:45 PM due to staff meeting*

Subject: Weekly Newsletter from Humpty Preschool Group

Dear Caretakers,

We hope this letter finds you well! We wanted to give you a quick update on what has been happening at Humpty this week.

First, we would like to welcome you back after the holiday break and hope you all had a wonderful time with your families.

Additionally, we have a new child joining us from the Dumpty group and we are thrilled to have them as part of our community.

On Tuesday, the children will be going ice skating which should be lots of fun. We are also continuing to

work on our seasonal tree and the children have been playing with magnetic bricks, which has been a big hit!

Just a quick reminder, next Monday, the preschool will be closing at 3:45 PM due to a staff meeting.

We hope this update gives you a good insight into what has been happening at Humpty and we are looking forward to another great week.

Best regards,

Humpty Preschool Group

Can you write a letter of recommendation for my student Maria Andersson, who is applying to the University of Brighton? I want the letter of recommendation to mention that Maria is overall a competent and meticulous student, and is particularly skilled in chemistry and expressing herself in writing. Write in British English.

Dear Admissions Committee,

I am writing to wholeheartedly recommend Maria Andersson for admission to the University of Brighton. I have had the privilege of teaching Maria for two years and can attest to her exceptional academic abilities and overall character.

Maria is an extremely competent and meticulous student who consistently demonstrates a strong work ethic and dedication to her studies. She consistently produces high-quality work and is not afraid to take on challenging assignments. In particular, she excels in chemistry,

displaying a deep understanding of complex concepts and the ability to apply this knowledge to practical situations.

In addition to her technical skills, Maria also possesses excellent writing abilities. She has a talent for expressing herself clearly and succinctly, making her arguments easy to understand and follow. Her written assignments are always well-structured, thoughtful, and insightful.

Maria is also a respectful and responsible member of the classroom community. She actively participates in discussions, offering valuable contributions and always listens attentively to her peers. She has a positive attitude, is always willing to help others, and has made a lasting impact on her classmates and teachers.

In conclusion, I strongly believe that Maria would be an asset to the University of Brighton and would make the most of the opportunities available to her. She has the potential to excel academically and contribute positively to the university community. I wholeheartedly recommend her for admission.

Please do not hesitate to contact me if you require any further information.

Sincerely,

[Your Name]

8: Professional Development and Personal Growth

Summarize Documents to Prioritize Reading

By pasting text masses and asking ChatGPT to summarize them, it is possible to get an idea of texts without having to read everything oneself. Of course, information is lost in such a summary, and there is a risk that ChatGPT misses or distorts essential aspects - but it also makes it possible to skim many more documents and choose one or a few texts to read in more detail.

A limitation is that ChatGPT does not accept prompts that are longer than approximately 2000 words. Longer documents can be divided into several steps (see the tips at the end of chapter 3), but it can become impractical for really long texts, and it appears likely that ChatGPT takes less account of things written far back in a chat conversation.

When reading the conversation, consider:

- Do you think ChatGPT's summary below is fair?
- How should one weigh that ChatGPT simplifies and perhaps distorts content against the possibility of overviewing the content of more texts?
- Feel free to let ChatGPT summarize a text you wrote yourself, a long email you received (without sensitive information), or a text you recently read. Do you think it captures the most important part of the text?

- What would happen if students use ChatGPT or similar tools to summarize texts in textbooks or other texts that belong to the teaching?

Can you summarize the text below?

[Copy of a text that served as the basis for this book.]

The document describes how ChatGPT, an AI model trained to generate text and carry out a dialogue, can be used in school education. It mentions different ways to use ChatGPT in teaching, such as to get ideas for lesson planning or to get feedback on lesson plans, but also warnings that information from ChatGPT must always be reviewed and verified. The document also discusses what information, knowledge, and judgment are and how AI affects the role of teachers and schools. The document also provides examples of use that may be inappropriate and things that are not allowed to be done with ChatGPT in school education.

Drafts for Evaluations

Instead of using ChatGPT to get answers, you can try using it for getting good questions - or at least inspiration for good questions.

When you read the conversation, consider:

- Do you think the questions would work for getting useful feedback from your own students?

- To what extent do you think it is time-saving to get AI-created drafts for evaluations, compared to writing them from scratch yourself?
- How can you balance or combine AI-created evaluations with questions that address specific things you have done in the teaching?

I am about to finish teaching a history class and I want to conduct a survey to hear what they think worked well or less well in my teaching. Can you give suggestions for a number of questions that the students won't answer with just "good" or "don't know," and that will help me improve the teaching for next school year? This is for an 8th-grade class.

Sure! Here are some questions that may help you gather useful feedback:

- 1. What topics were your favorite to learn about in this class and why?*
- 2. Was the pace of the class too fast or too slow? Why?*
- 3. What methods of teaching helped you understand the material best (e.g. lectures, discussions, group projects, etc.)?*
- 4. Was there anything that you struggled to understand? Can you give an example?*
- 5. Were the class assignments and assessments helpful in reinforcing what you learned? Why or why not?*
- 6. How could the class be improved for next year?*

7. *Were there any aspects of the class that you found particularly engaging or interesting?*
8. *Was there anything you would have liked to learn more about in this class?*
9. *Were the class materials (textbook, videos, etc.) helpful in understanding the subject matter?*
10. *Are there any suggestions you have for making the class more interactive or hands-on?*

Note that it's important to let the students know that their feedback is valued and that their answers will be kept confidential. This may encourage them to be more honest and thoughtful in their responses.

Develop Forms for Collaborative Learning

Even though ChatGPT can provide inspiration for teaching, it is often more rewarding to discuss teaching with people in meat space. ChatGPT can provide suggestions for this, too.

When reading the conversations, consider:

- Could the suggestions be useful at your school?
- What follow-up questions would you like to ask, with details about the conditions at your school?

Can you give five suggestions on how the faculty at my elementary school can establish routines for discussing and sharing examples of how we teach, so that we can develop our work?

1. *Schedule regular meetings: Establish a regular meeting schedule for faculty to come together and discuss teaching strategies, best practices, and share examples.*
2. *Create a discussion forum: Encourage the use of online discussion forums or groups where faculty can share and exchange ideas, resources and best practices with each other.*
3. *Foster a culture of collaboration: Encourage teachers to work together on projects and assignments, allowing them to share their teaching methods and learn from one another.*
4. *Use technology: Utilize technology such as videoconferencing, screen sharing and collaborative documents to facilitate discussions and share examples of teaching practices.*
5. *Encourage reflection: Encourage faculty to reflect on their teaching practices and engage in regular self-assessment. Provide opportunities for teachers to observe one another's classrooms and give feedback, promoting a culture of continuous learning and improvement.*

Can you suggest ideas on how teachers and school management at my school can create common goals for teaching, which we actually can work towards? It is a high school with approximately 50 teachers, a principal, and an assistant principal. Teachers feel that school management is not engaged in improving the quality of teaching.

Sure, here are some ideas that can help create common goals for teaching at your high school:

1. *Conduct a survey: Ask teachers and school management to identify areas where they feel the school needs improvement.*
2. *Hold focus groups: Gather teachers and school management to discuss their thoughts and ideas on common goals.*
3. *Set clear and realistic goals: Make sure the goals are specific, measurable, achievable, relevant, and time-bound (SMART) so everyone can work towards them.*
4. *Encourage collaboration: Foster a culture of teamwork and open communication between teachers and school management.*
5. *Establish regular check-ins: Schedule regular meetings to assess progress towards the common goals and make necessary adjustments.*
6. *Reward progress: Recognize and reward progress towards the common goals, which can encourage continued effort.*

7. *Foster a culture of continuous improvement: Encourage teachers and school management to continuously strive for better outcomes and to be open to constructive feedback.*
8. *Involve the whole school community: Encourage students, parents, and other stakeholders to participate in the goal-setting process and engage with the common goals.*
9. *Keep the goals aligned with the school's mission and vision: Make sure that the common goals align with the overall purpose of the school and support the school's mission and vision.*

ChatGPT as Writing Coach

ChatGPT can provide feedback on texts, thereby giving ideas on how to become a better writer. This method is primarily suitable for teachers, not students, as it requires assessing the suggestions given by AI (as not all suggestions are necessarily successful or worth putting much effort into).

Note that this example for using ChatGPT aims to develop writing skills, not primarily to get a well-written text. The focus is therefore on the feedback and its usefulness.

When reading the conversation, consider:

- Does ChatGPT provide meaningful feedback to develop the language in the article?
- Would you like to have coaching from an AI yourself? Why or why not?

- Are there other areas related to your work that you think ChatGPT could serve as a coach?

Below is a text I've written on the background of ChatGPT. Can you give me suggestions on how I can improve my writing style?

[Embedded text from chapter 12.]

Here are some suggestions to improve your writing style:

Strengths:

- *You provide a clear explanation of the background of ChatGPT and its AI model, GPT-3.5.*
- *You mention relevant details such as the number of users, the development of AI for images, and the comparison of ChatGPT with other AI services.*
- *You give a sense of the value of large AI models, their development process, and the companies involved.*

Weaknesses:

- *Your writing is often repetitive and lacks variety in sentence structure.*
- *The language can be dense and technical, making it difficult for the reader to follow.*
- *You include several parenthetical statements, which can be disruptive to the flow of the text.*

- *You could benefit from providing more context or background information on terms and concepts that are not commonly known to the reader.*

General suggestions:

- *Consider using shorter, simpler sentences to make the information more accessible.*
- *Try to use descriptive language and avoid excessive use of technical terms.*
- *Use subheadings, bullet points, or other formatting elements to break up the text and make it easier to follow.*
- *Consider rearranging the information to build a more cohesive narrative.*
- *Use concrete examples to illustrate key concepts, making them more memorable and easier to understand.*

Thanks! (I think.) Do you have any suggestions for how I can become better at using a more varied sentence structure?

Certainly! Here are some tips to help you use a more varied sentence structure:

- 1. Mix short and long sentences: Alternate between short, simple sentences and longer, more complex ones to maintain reader engagement and interest.*
- 2. Use different sentence starters: Start sentences with different words and phrases, such as claus-*

es, prepositional phrases, and gerunds, to add variety and interest.

- 3. Vary sentence length: Avoid using only one type of sentence length. Experiment with varying the length of your sentences to add rhythm and interest.*
- 4. Use active voice: Write in the active voice rather than passive voice, as it makes sentences livelier and more engaging.*
- 5. Experiment with sentence structures: Play with sentence structures, such as compound, complex, and compound-complex sentences, to add variety and interest.*
- 6. Read widely: Read different types of writing to become familiar with different sentence structures and techniques.*
- 7. Practice writing: Practice writing in different styles, using a variety of sentence structures, to help you develop your own style and become more confident with using a varied sentence structure.*
- 8. Get feedback: Share your writing with others and seek feedback on how to improve your sentence structure. This can help you identify areas for improvement and develop your skills over time.*

Ideas for Technical Tools and How to Use Them

ChatGPT can provide suggestions on how to perform tricky or uncommon tasks, and can also provide guidance on navigating some well-known programs to get the job done.

When reading the conversations, consider:

- What are the pros and cons of asking ChatGPT compared to searching the internet? Compared to asking a colleague or IT support?

Do you have ideas for programs or apps that I can use to save time when providing feedback on student essays? (Ideas that don't involve programs or apps are also okay.)

Here are a few suggestions:

- 1. Grammarly: This app can help you identify grammatical errors and suggest improvements in writing. It can save time in the editing process, allowing you to focus on more in-depth feedback.*
- 2. Google Docs: This online word processing program allows you to provide comments and suggestions in real-time, making it easy to collaborate with others and give quick feedback to students.*
- 3. Rubric-based grading: Develop a set of criteria for grading essays and use a rubric to quickly and consistently evaluate student work. This*

will also help students understand what they need to do to improve their writing.

4. *Audio or video feedback:* Consider using audio or video feedback to provide more personal and engaging feedback to students. This can be done using tools like Flipgrid or Explain Everything.
5. *Highlighting and commenting tools:* Utilize the highlighting and commenting tools in word processing software, such as Microsoft Word or Google Docs, to quickly and efficiently provide feedback on specific areas of an essay.

Note that these are just a few examples and the best tool for you will depend on your specific needs and preferences.

Me and my colleagues work together on a number of documents, which we email to each other when we make updates. It becomes difficult to know which is the latest version and we have several times lost changes that someone has made. Can you suggest any other method for collaborating on documents?

Yes, there are several alternatives to emailing updated documents that can make collaboration easier and prevent the loss of changes. Some options are:

1. *Cloud-based document collaboration tools:* Services like Google Docs, Microsoft OneDrive, and

Dropbox allow multiple users to access and edit the same document in real-time, with the ability to track changes and revert to earlier versions.

2. *Project management software:* Tools such as Asana, Trello, and Monday.com offer document collaboration features as part of their project management suite, allowing teams to share and track the progress of their work.

3. *Version control systems:* For software development teams, version control systems such as Git provide a way to manage changes to source code and track the progress of a project.

You can choose the option that best fits your needs and start collaborating more effectively on your documents.

We are not allowed to use any cloud services at my school. Do you have any other tips?

Yes, here are some alternatives to cloud services that you can use at your school:

1. *Network shared drive:* You can create a shared network drive where all team members have access to the latest version of the document. This eliminates the need to email the document back and forth.

2. *File synchronization software:* Tools like BitTorrent Sync, Resilio Sync, and Syncthing allow you to synchronize files between multiple devices without the need for a central server.

3. *Local version control systems:* If you're working on text-based files, you can use a local version control system such as Git to track changes and revert to earlier versions if needed.
4. *USB drives:* You can also use physical storage like USB drives to transfer the latest version of the document between team members.

By using one of these options, you can collaborate on documents more effectively and avoid losing changes.

How do I share my Outlook calendar with someone outside of our school?

To share your Outlook calendar with someone outside of your school, you can use the following steps:

1. *Open Microsoft Outlook and go to your calendar.*
2. *Right-click on the calendar you want to share and select "Share Calendar."*
3. *In the "Share Calendar" window, enter the email address of the person you want to share the calendar with.*
4. *Select the level of detail you want to share (e.g. availability only, full details).*
5. *Optionally, you can add a message to accompany the calendar invitation.*
6. *Click "Send."*

The recipient will receive an email with a link to your calendar. They will be able to view it in their own Outlook calendar or in a web browser if they don't have Outlook. Note that the recipient will only be able to see updates to the calendar if you continue to share it with them.

Do you have suggestions for programs that can be used to convert handwritten mathematical text to computer text?

There are a few options for converting handwritten mathematical text to computer text:

- 1. MyScript Calculator - a handwriting recognition software that can recognize mathematical equations and convert them into digital text.*
- 2. Mathpix Snip - a tool that uses OCR technology to recognize mathematical equations and convert them into LaTeX, a typesetting language for mathematics.*
- 3. Microsoft OneNote - a note-taking program that has handwriting recognition features that can convert handwritten equations into editable text.*
- 4. Ink2Text - a free web-based tool that can convert handwritten equations into digital text using OCR technology.*

Note that the accuracy of these tools may vary and some post-processing may be required to get the desired output.

How can I analyze an mp3 file with music to find the most common frequencies in the song?

To analyze an MP3 file to find the most common frequencies in a song, you can do the following steps:

- 1. Convert the MP3 file to a WAV file: MP3 is a lossy compression format and may not contain the full frequency range of the original audio. Converting the MP3 file to WAV will ensure that the audio information is preserved.*
- 2. Perform a Fast Fourier Transform (FFT) on the WAV file: FFT is a mathematical operation that transforms a time-domain signal into a frequency-domain signal, which represents the different frequencies present in the audio.*
- 3. Plot the frequency spectrum: The result of the FFT can be plotted as a frequency spectrum, where the vertical axis represents the magnitude of each frequency component, and the horizontal axis represents the frequency. The frequency components with the highest magnitudes will represent the most common frequencies in the song.*

There are many software tools that can perform these steps, such as Audacity, MATLAB, or Python libraries like Numpy and Matplotlib. You can use any of these tools to perform the analysis and visualize the frequency spectrum.

Encourage and Motivate Yourself

Even in teaching, one may occasionally need some extra encouragement. ChatGPT can, to some extent, help here as well. (In the second example, the prompt is a modification of a prompt on the prompts.chat page.)

As you read the conversations, consider:

- Does ChatGPT provide meaningful encouragement? Would you benefit from similar encouragement?
- What happens if AI becomes nearly as good as people in encouraging and creating motivation?

I have more than 60 tests from my students to mark, and I find it difficult to find motivation. Can you write a nice text about me, so that I feel encouraged and understand how good I will feel when I'm done with the tests?

Of course! Here you go:

"Dear [Your Name],

You are a true shining star in the field of education. Your dedication to your students and their learning is truly inspiring. It takes a special kind of per-

son to pour so much time and effort into grading 60+ tests, but you are more than up to the task.

The feeling of accomplishment that you will experience once you've completed marking all of these tests will be immense. You will have taken an important step in helping your students grow and succeed, and that is something to be truly proud of.

So take a deep breath, focus on the task at hand, and remember that you are making a difference in the lives of your students. The hard work that you are putting in today will pay off in ways you can't even imagine, and you will feel a sense of satisfaction like no other.

You've got this! Keep up the fantastic work."

I want you to act as a motivational coach. I will provide you with some information about someone's goals and challenges, and it will be your job to come up with strategies that can help this person achieve their goals. This could involve providing positive affirmations, giving helpful advice or suggesting activities they can do to reach their end goal. My first request is "I need help motivating myself to stay disciplined while marking a large number of exams".

Here are some strategies that may help you stay motivated and disciplined while marking a large number of exams:

1. *Break up the task into smaller, manageable chunks. Instead of thinking about marking all the exams at once, focus on completing a set number of exams each day.*
2. *Set specific, measurable goals for yourself. For example, "I will mark 50 exams by the end of the week."*
3. *Use a timer to stay on task. Set a timer for a specific amount of time, and make sure to stay focused on the task at hand until the timer goes off.*
4. *Reward yourself for making progress. When you reach a goal or complete a certain number of exams, give yourself a small reward, such as a break or a treat.*
5. *Keep a positive attitude and remind yourself of the importance of your work. Marking exams is an important task that contributes to the education of students.*
6. *Create a conducive environment for working, free from distractions and comfortable.*
7. *Take breaks in between, move around, and stretch your body to avoid burnout.*
8. *Lastly, keep in mind that discipline and motivation are skills that can be developed over time. The more you practice, the more natural it will become.*

I have now marked seven exams and feel like doing something else. Can you cheer me up so I get the energy to do seven more?

Of course! Here are some ways you can boost your motivation and energy to keep going:

- 1. Remind yourself of your goals and why they are important to you.*
- 2. Take a short break and do something you enjoy, like listening to your favorite music or taking a quick walk outside.*
- 3. Make a list of all the benefits you'll receive from completing the task, such as a sense of accomplishment, the satisfaction of a job well done, and the ability to take the next step in your career.*
- 4. Try to change your perspective about the task, instead of marking exams, think of it as an opportunity to help students achieve their goals.*
- 5. Positive affirmations can also be helpful in this situation, try saying something like "I am capable and strong, I can do this."*
- 6. If you are feeling low on energy, try drinking some water or eating a healthy snack to boost your energy levels.*
- 7. Lastly, try to focus on the progress you've made so far and remember that every exam you mark is one step closer to completing the task.*

Remember, motivation and energy can fluctuate, but you have the power to control your thoughts and actions. You can do this!

9: Programming

ChatGPT is, for better or for worse, pretty good at both understanding and writing computer programs. If your teaching includes programming, there is therefore extra support to get from AI.

An advantage of getting ChatGPT assistance in programming is that some of the AI pitfalls you can fall into become less serious. When ChatGPT provides incorrect tips on code snippets, it will be noticed more or less immediately, and questions about perspective and values play a much smaller role as long as you stick to programming questions only (unless you start discussing different paradigms in programming).

Some programming languages works better than others when asking ChatGPT to explain or create code. A reasonable starting point is that the more common the programming language is, the better ChatGPT is at the language.

The internet has many examples of how ChatGPT can be used for programming. In this book contains a few selected examples. More dedicated programmers could, for example, use ChatGPT to write tests, create credible dummy content, create stub code for entire applications, or get suggestions for architecture.

ChatGPT outputs code blocks with syntax highlighting, while there are no colors in this book.

Create Simple Computer Programs

ChatGPT can create ready-to-use small programs, often with surprisingly well-commented code and high flexibility.

When you read the conversation, consider:

- Would you benefit from AI-created simple computer programs in your teaching? How?
- What opportunities and risks exist for students to ask ChatGPT for simple computer programs themselves?

Can you write a Python program that tests the likelihood that at least two people in a group of 26 people have the same birthday? Use the Monte Carlo method.

Yes, it is possible to write a Python program that uses the Monte Carlo method to test the likelihood that at least two people in a group of 26 people have the same birthday. Below is a solution to this problem:

```
import random

def test_birthdays(num_people, num_samples):
    num_matches = 0
    for i in range(num_samples):
        birthdays = []
        for j in range(num_people):
            birthday = random.randint(1, 365)
            birthdays.append(birthday)
        if(len(set(birthdays)) != len(birthdays)):
            num_matches += 1
    probability = num_matches / num_samples
    return probability

num_people = 26
num_samples = 10000
probability = test_birthdays(num_people, num_samples)
print(f"Probability that at least two people in a group of
{num_people} have the same birthday: {probability:.2f}")
```

This program uses a random number generator to create birthdays for the people in the group, and then counts the number of times at least two people have the same birthday. The probability of this happening is calculated by dividing the number of matches by the number of tested groups.

Note that the result may vary depending on the number of test groups used, so it may be good to increase the number of test groups to get a more accurate result.

Debugging Computer Programs

ChatGPT is also surprisingly good at finding and fixing bugs in code, which can be useful for both teachers and students' code.

When reading the conversation, think about:

- Does the response from ChatGPT seem clear?
- If you have any programming in your teaching: What does it mean for you or your students to get AI assistance with finding, understanding, and fixing bugs?

Why doesn't this code work?

```
for (var i = 0; i < 5; i++) {  
  setTimeout(() => console.log(i), 1000)  
}
```

It appears that the code is trying to print the value of the variable i with a delay of 1 second for each itera-

tion in the loop. What's not working as expected is that all logs are written with the value 5.

This is because `setTimeout` is an asynchronous function, which means it will run in the background while the rest of the code continues to run. By the time the loop has finished running and the `setTimeout` functions start printing the values of `i`, `i` has already increased to the value 5 and all logs are written with this value.

To solve this issue, you can use another technique called "creating a new closure" or "wrapping in a closure." This is done by creating a new function within the loop that has its own copy of the variable `i`. In this way, you can pass the current value of `i` to the `setTimeout` function:

```
for (var i = 0; i < 5; i++) {
  (function(i) {
    setTimeout(() => console.log(i), 1000)
  })(i)
}
```

Another option is to use the ES6 syntax and the `let` keyword instead of `var`. `let` defines a local variable in the current block scope, while `var` defines a global or local variable on the function scope. This means you can use `let` to create a new closure for each iteration in the loop:

```
for (let i = 0; i < 5; i++) {
  setTimeout(() => console.log(i), 1000)
}
```

With these changes, you should get the expected output with one log for each iteration in the loop with the correct value of i.

Create Code for Specific Tasks

If programming isn't just a part of your subjects, but you actually teach programming as a subject of its own, ChatGPT can be used to create code snippets for a range of different areas.

When reading the conversation, consider:

- If you teach programming: What are the pros and cons of asking ChatGPT for code examples and solutions, compared to searching the internet or writing the code from scratch? What are the pedagogical consequences?

Can you write a Python program that looks up a Wikipedia article that the user specifies, and tells how many words are on the page?

Yes, I can write a Python program to look up a Wikipedia article and tell how many words are on the page. Here is an example:

```
import requests
from bs4 import BeautifulSoup

def count_words_on_wikipedia_page(page_name):
    url = f'https://en.wikipedia.org/wiki/{page_name}'
    page = requests.get(url)
    soup = BeautifulSoup(page.content, 'html.parser')
```

```
text = soup.get_text()
words = text.split()
return len(words)
```

```
page_name = input("Enter a Wikipedia page name:")
word_count = count_words_on_wikipedia_page(page_name)
print(f'The number of words on the page is {word_count}')
```

Note that this program only works for English Wikipedia pages. To use it on another language version of Wikipedia, change the URL address in line 8 to the appropriate language version.

Find Exceptions You Missed in the Code

ChatGPT can analyze code and in many cases find different ways that the program can break.

When reading the conversation, think about:

- If you teach programming: How do you view the educational value in having ChatGPT find exceptions compared to you or the students doing it by hand? What are the educational consequences? What are the long-term consequences?

Can you find edge cases in the code below that could cause it to malfunction?

```
import requests
from bs4 import BeautifulSoup
```

```
def count_words_on_wikipedia_page(page_name):
    url = f'https://en.wikipedia.org/wiki/{page_name}'
    page = requests.get(url)
    soup = BeautifulSoup(page.content, 'html.parser')
    text = soup.get_text()
    words = text.split()
    return len(words)

page_name = input("Enter a Wikipedia page name:")
word_count = count_words_on_wikipedia_page(page_name)
print(f'The number of words on the page is {word_count}')
```

Here are some potential edge cases that could cause the code to malfunction:

- If the Wikipedia page does not exist, the code may throw an exception when it tries to retrieve the page using `requests.get(url)`.*
- If the Wikipedia page contains non-English characters, this may cause problems with `text.split()` as it expects English words.*
- If the Wikipedia page is not in HTML format, this may cause problems with `BeautifulSoup`, as it expects HTML.*
- If the internet connection is down, the code may throw an exception when it tries to retrieve the page using `requests.get(url)`.*
- If the Wikipedia page is large, this may cause memory problems as all text is retrieved and stored in memory before counting the number of words.*

Commenting Code

Creating well-commented code makes it easier to read, both for teachers and students.

When reading the conversation, consider:

- Are the comments that ChatGPT suggests correct? Are they meaningful?
- If you teach programming: What are the advantages and disadvantages of having ChatGPT write comments, compared to students writing comments themselves? What are the educational consequences?

Can you comment the code below so that it becomes easier to read?

```
import requests
from bs4 import BeautifulSoup

def count_words_on_wikipedia_page(page_name):
    url = f'https://en.wikipedia.org/wiki/{page_name}'
    page = requests.get(url)
    soup = BeautifulSoup(page.content, 'html.parser')
    text = soup.get_text()
    words = text.split()
    return len(words)

page_name = input("Enter a Wikipedia page name:")
word_count = count_words_on_wikipedia_page(page_name)
print(f'The number of words on the page is {word_count}')
```

The code counts the number of words on a Wikipedia page. It uses the requests library to get the HTML content of the page, the BeautifulSoup library to parse the HTML, and extract all the text content of the page. The text is then split into words using the split() method and

the number of words is returned using len(). The user is prompted to enter a Wikipedia page name, and the result is printed to the console.

Here's the commented code:

```
> # Import the requests library for making HTTP requests
import requests

# Import the BeautifulSoup library for parsing HTML
from bs4 import BeautifulSoup

# Define a function to count the words on a Wikipedia page
def count_words_on_wikipedia_page(page_name):
    # Create the URL for the Wikipedia page by combining the base
    # URL and the page name
    url = f'https://en.wikipedia.org/wiki/{page_name}'

    # Make an HTTP GET request to the URL and store the response in
    # a variable
    page = requests.get(url)

    # Create a BeautifulSoup object to parse the HTML content of
    # the page
    soup = BeautifulSoup(page.content, 'html.parser')

    # Extract all the text content of the page
    text = soup.get_text()

    # Split the text into words using the split() method
    words = text.split()

    # Return the number of words
    return len(words)

# Prompt the user to enter a Wikipedia page name
page_name = input("Enter a Wikipedia page name:")

# Call the count_words_on_wikipedia_page() function and store the
# result in a variable
```

```
word_count = count_words_on_wikipedia_page(page_name)

# Print the result
print(f'The number of words on the page is {word_count}')
```

10: Miscellaneous

In this chapter, there are some more specific or unusual examples of what ChatGPT can be used for by a teacher.

Friendly and Well-Written Comments

When grading essays or other texts, it can be helpful to not have to think about phrasing things kindly and neatly, in order to work faster. It's possible to let ChatGPT worry about selecting the right words.

When reading the conversation, consider:

- Does it save time to let ChatGPT create phrasings?
- Is there a way to make it faster to use ChatGPT for getting well-written short comments?

I need help grading student essays. I will write a few short words, such as "repetition" or "spelling". Your job is to give me short, well-phrased and clear sentences that I can paste as comments to the students. For example, "A word or phrase is repeated. Can you select a different word?" or "The spelling is incorrect here. Please check and fix it."

Are you ready?

Yes, I'm ready! Please provide the comments you need help with.

Source?

"Please provide a source for this information."

Transition

"The transition between sentences or paragraphs is not smooth. Consider using a transition word or phrase to link the ideas."

Facts?

"This statement appears to be a personal opinion rather than a fact. Please provide evidence or supporting information to back up this claim."

Tips for Study Techniques

If a student or a group of students needs to practice on something particular, ChatGPT can provide suggestions for tasks or other ways to improve skills. This might be a useful way to help provide more targeted practicing for students.

When reading the conversations, consider:

- Do you think the lists would be useful for the students? What would you like to change or add?
- Do you think the reply could be handed to students without any editing first?

- What are the educational benefits of giving individual or smaller groups of students instructions for things to work on? Would you save time by getting drafts from ChatGPT?

Can you write a list of specific and actionable steps that a student can follow to improve their ability to write laboratory reports?

Sure, here's a list of actionable steps that a student can follow to improve their writing of laboratory reports:

- 1. Read and understand the guidelines for the report format, including the expected length, structure, and style.*
- 2. Familiarize yourself with the appropriate terminology and technical language used in laboratory reports.*
- 3. Plan and outline the report before you start writing, making sure to include all necessary sections and information.*
- 4. Write a clear and concise introduction that explains the purpose of the experiment, the hypothesis, and the methods used.*
- 5. Present the results of the experiment in an organized manner, using tables, graphs, and figures as appropriate.*
- 6. Interpret the results, relating them back to the hypothesis and the experiment's purpose.*

7. *Discuss any limitations or sources of error in the experiment, and suggest ways to improve the method in the future.*
8. *Write a conclusion that summarizes the main findings and implications of the experiment.*
9. *Ensure that the report is proofread and edited for clarity, grammar, and style.*
10. *Cite any sources used in the report, following the appropriate citation style guide.*

By following these steps, a student should be able to write clear, concise, and well-organized laboratory reports that effectively communicate the results of their experiments.

Can you give me a list that students can use to assess their own essays? The topic is health, diet and exercise. High school.

Sure, here's a list that students can use to assess their own essays on health, diet, and exercise:

1. *Relevance: Does the essay stay focused on the topic of health, diet, and exercise?*
2. *Thesis statement: Is there a clear thesis statement that presents the main argument of the essay?*

3. *Evidence: Does the essay provide evidence to support the thesis statement, such as statistics, research studies, or expert opinions?*
4. *Organization: Is the essay well-organized, with a clear introduction, body, and conclusion?*
5. *Paragraph development: Do the paragraphs have clear topic sentences and supporting details?*
6. *Transitions: Are there smooth transitions between paragraphs, helping the reader follow the argument?*
7. *Word choice: Does the essay use precise language to effectively communicate its message?*
8. *Grammar and spelling: Are there any errors in grammar or spelling that distract from the message of the essay?*
9. *Conclusions: Does the essay have a clear conclusion that summarizes the main points and supports the thesis statement?*
10. *Reflection: Does the essay show evidence of the writer's personal reflection and insights on the topic of health, diet, and exercise?*

I have some students in my mathematics class who are struggling with writing equations or algebraic expressions based on descriptions of real-world situations. Can you write something that will help them getting better at this?

Sure, here is a helpful guide for students struggling with writing equations or algebraic expressions based on real-world situations:

- 1. Identify the variables: First, identify the important quantities in the situation and assign a variable to each one. For example, if the problem is about the number of apples in a basket, you could assign the variable "x" to represent the number of apples.*
- 2. Write down the given information: Write down any information given in the problem that you can use to write an equation or expression. For example, if the problem states that the basket starts with 3 apples and you add 5 more, you have the equation $x = 3 + 5$.*
- 3. Identify the relationship between the variables: Look for relationships between the variables, such as "increased by", "equals", "is a multiple of", etc. This will help you write an equation that represents the problem.*
- 4. Write the equation or expression: Use the information you've gathered to write an equation or expression that represents the problem. Make sure your equation is balanced and accurately reflects the relationships between the variables.*

5. *Check your work: Make sure that the equation you've written accurately represents the problem and that it makes sense mathematically. Try substituting in some numbers for the variables to see if the equation holds true.*

Practice is key in mastering the skill of writing equations or algebraic expressions based on real-world situations. Encourage your students to practice this skill regularly and seek help when needed.

Inspiration for Activities outside of Subject Teaching

Ideas and suggestions that ChatGPT can come up with are of course not limited to traditional teaching.

As you read the conversation, consider:

- Are the answers from ChatGPT useful?
- Is there anything inappropriate in the answers?
- Feel free to ask ChatGPT for suggestions for any type of activity outside of teaching. Also, try asking follow-up questions to create material or planning for an activity.

On Thursday, we have the last day before Christmas holiday. I would like to do something fun with the class I'm mentoring - a class in the natural science program, year

2 in upper secondary. Can you give me some suggestions? We have 60 minutes to use and will be in a classroom. 32 students.

Sure, here are some fun activity suggestions for your class:

- 1. Science Trivia Game - Prepare some questions related to science and divide the class into teams. Each team will take turns answering the questions.*
- 2. Science Magic Show - Encourage students to perform simple science experiments and share them with the class.*
- 3. Mystery Substance - Give each student a small sample of a substance and have them use their scientific knowledge to identify it.*
- 4. Build a Tower Challenge - Provide materials like marshmallows, toothpicks, or paper and have the students work in teams to build the tallest tower they can within a time limit.*
- 5. Science Escape Room - Create a simple escape room style activity, where students have to solve science-based puzzles to escape the classroom.*

Remember to adjust the activities to the age and level of your students, and to ensure that all safety precautions are taken during the experiments. Have fun!

Enliven Your Lesson with Poetry Based on Today's Topic

One way to utilize ChatGPT's linguistic skills is to ask it to write songs or poems about the subject being taught. It might not lead to better test results, but it can bring excitement and engagement in meaningful ways - especially on a Friday afternoon.

When reading the conversations, consider:

- What educational points are there with humor like this?
- Feel free to try creating other unexpected pieces of art based on something you will be teaching in the next few days.

Can you write a song about the 2008 financial crisis, in Eminem style?

Verse 1:

*It all started with the banks, a toxic debt they'd
try to hide*

*But soon the whole world felt the pain, a financial
tidal wave inside*

*The housing market fell, with homeowners left out to
dry*

Unemployment rose, families struggling just to get by

Chorus:

The 2008 financial crisis, a turning point in history

*An era of greed and corruption, left the world in
misery*

*But from the ashes we'll rise, with determination in
our eyes*

Rebuild and recover, a brighter future's in sight

Verse 2:

*The government stepped in, to bail out the banks in
need*

But many saw it as a mistake, a sign of our greed

*Critics say they should have let them fail, the mar-
ket to correct itself*

*But the real cost was on the people, their wealth and
their health*

Chorus:

The 2008 financial crisis, a turning point in history

*An era of greed and corruption, left the world in
misery*

*But from the ashes we'll rise, with determination in
our eyes*

Rebuild and recover, a brighter future's in sight

Bridge:

*It's time to learn from our mistakes, to never let
greed take control*

*We need to hold our leaders accountable, and make the
system whole*

*It's time for a change, to make sure this never hap-
pens again*

*To rebuild our economy, and create a world without
pain*

Chorus:

*The 2008 financial crisis, a turning point in history
An era of greed and corruption, left the world in
misery*

*But from the ashes we'll rise, with determination in
our eyes*

Rebuild and recover, a brighter future's in sight

Outro:

*The 2008 financial crisis, a dark time but we'll sur-
vive*

*We'll come out stronger, with a renewed sense of
pride.*

**Can you write a poem about the Citric acid cycle in
Sylvia Plath style?**

*Sure, here's a poem about the citric acid cycle in
the style of Sylvia Plath:*

*Citric acid swirls in a cycle of woe,
A dance of electrons, a battle to know.
A cycle of life, a cycle of death,
A whirlpool of energy with every breath.
In the dark chambers of the cells within,
The citric acid churns, a fiery spin.
A symphony of enzymes, a cacophony of pain,
A burning in the muscles, a constant strain.
With every turn, a molecule is born,
A spark of energy to light the dawn.
A push and a pull, a rise and a fall,*

*A never-ending cycle, a carnival.
And yet, amidst the chaos and the heat,
There's a beauty in this cycle, a secret treat.
For without the citric acid, without its pain,
Life would not exist, nor would remain.
So let the citric acid swirl and spin,
Let it consume and conquer from within.
For it is the spark that keeps us alive,
The fiery cycle of the citric acid drive.*

11: ChatGPT and Cheating

"Cheating" can mean many different things, and it's worth remembering that using ChatGPT in writing assignments does not necessarily have to be considered cheating - just like using spell-checking for essays or calculators for math tests. In some cases, it is considered cheating, in other not.

In this book, "cheating" refers to deliberately trying to deceive or mislead the teacher, and it is clear that ChatGPT makes it easier for students to cheat, especially when it comes to writing assignments outside the classroom. ChatGPT can create texts on almost anything that is taught in school, with a quality that can be perceived as being written by a human both in terms of content and style. How does one deal with a problem like that?

One way to try to prevent cheating using ChatGPT is to block the web service on the school network. This is a path that some schools have taken - it became world news that all schools in the state of New York chose that option. Another option is to try to identify which texts are created with ChatGPT (or other similar tools). A tool called GPTZero was launched at the beginning of 2023, to do just that. [Another was launched by OpenAI](#) themselves in late January. The tool checks, among other things, if the word sequence in a text is "probable," which in that case points to the text being written by an AI of the same type as ChatGPT - which chooses words based on how well the words and sequences match texts they were trained on. Experiments show that the accuracy in classification is far from impressive, and difficult to rely on.

I am convinced that resourceful students will find relatively simple ways to trick AI text detectors and bypass network blacklists: Currently, it might suffice to make slight edits to a ChatGPT text or to create a wifi hotspot with a phone. If a teacher

needs written work from students and it is used as a grading basis, I therefore believe that the assignments need to be done in a monitored way – not at home. I also believe that there is reason to examine how assignments can be designed so that ChatGPT can be used as a tool in the work, instead of being classified as cheating. Other possible options include trying to reduce the incentives for students to cheat, but this is difficult if there is a lot of focus on grades.

Regardless of approach, there will be cases where teachers suspect that students have cheated. A natural but rather time-consuming way to handle such cases is to ask students to explain what they submitted. If the student can do so in a way that is convincing, it is a credible way to see that the student indeed has the knowledge of interest. If the student can't do it in a convincing way, it is a credible way of concluding that the student *doesn't* have the required knowledge. Whether the student cheated or not, and with which tools, becomes less interesting – the focus is shifted to what the student does or doesn't know.

In some subjects, or parts of subjects, it is difficult to use that approach. And how to handle questions about cheating often depends on both personal attitudes and school policies (and sometimes national policies).

In short, I think it is useful to think in these terms when it comes to ChatGPT and cheating.

- Can the incentives for students to cheat be reduced? In many cases, this means assignments *not* being used as grading material.
- Can graded assignments be carried out in a supervised manner? This can involve written exams with pen and paper, or a computer without an internet connection, but also, for example, giving questions orally to a few students at a time.
- Can assignments be designed so that ChatGPT is a tool that is allowed to use? It is difficult to encourage students under 18 to use ChatGPT,

due to the terms of service, but if the goal of an assignment is an oral presentation, a product pitch, or an actual solution to a problem, it may not be wrong for students to seek help from various sources along the way.

- How can you following up suspected cheating?

Some argue that the similar ways of cheating has existed for a long time, and that it has been exploited regularly by a small but dedicated or privileged group of students. ChatGPT contributes to providing more opportunities to cheat, which means that the problem must be taken more seriously - for everyone.

Part 3: More about AI

12: The Background of ChatGPT

ChatGPT was launched as a beta on November 30, 2022, by the company OpenAI and quickly gained attention. In just five days, the number of users had grown to one million¹, something that normally takes months or years even for successful technology services².

Earlier in 2022, several AI services for images had also gained attention. The most well-known of these tools are DALL-E 2 (also from OpenAI), Midjourney, and Stable Diffusion. Although earlier AI services could create realistic images (see, for example, thispersondoesnotexist.com from 2019), it was not until 2022 that you could write a description of almost anything and get back an image that looked good. Although not all images are world-class, there are also examples of AI-created images that [win competitions against images created by humans](#).

Unlike AI for generating images (and [a long list of other AI services](#)), ChatGPT can be considered a more generally competent AI, not trained for a specific task and capable of handling such diverse things as giving dietary advice, writing code, and imitating a Linux terminal.

The AI model behind ChatGPT is called GPT-3.5 and is a variant of GPT-3, which was launched in 2020. The success of ChatGPT was largely due to the fact that it became easy for anyone to use the AI. GPT stands for "generative pre-trained transformer" and is an abbreviation used by OpenAI for a series of its AI

¹ <https://twitter.com/gdb/status/1599683104142430208>

² <https://indianexpress.com/article/technology/chatgpt-hit-1-million-users-5-days-vs-netflix-facebook-instagram-spotify-mark-8394119/>

models. They are a type of model called a large language model (LLM), which in turn uses a more general principle called artificial neural networks – a technique inspired by how nerve cells in our brains work.

The capacity of artificial neural networks is often measured in the number of so-called parameters they have, roughly equivalent to the connections between nerve cells in our brains. These parameters are values set during AI training to provide the best answers possible. Training large AI models requires huge amounts of data and lots of computer power, which has the effect that basically only states and large technology companies that can create large AI models.³ Often parts of the data also need to be assessed or labeled by humans, making it even more expensive to produce. A major difference between GPT-3 and GPT-3.5 is that many texts have been assessed by humans, so that ChatGPT can understand what is classified as great or inappropriate replies⁴. The finished models are valuable assets for the company. However, using the finished models is much less resource-intensive and can be done on single personal computers.

OpenAI is tight-lipped about information regarding ChatGPT. In interviews, they have stated that the model was trained on a significant portion of the text available on the internet in 2021 (and it's clear that it doesn't retrieve new information from the web). It's difficult to find information about how many parameters GPT-3.5 has, but GPT-3 has 175 billion parameters.⁵ Two different sources suggest that GPT-3.5 (and therefore ChatGPT) only has a tenth of that number of parameters, around 2 billion, which would match some information found on OpenAI's blog.⁶

³ <https://arxiv.org/abs/2212.08073>

⁴ OpenAI has faced criticism for how those who made these assessments were treated, see <https://time.com/6247678/openai-chatgpt-kenya-workers/>

⁵ See for example <https://www.datacamp.com/blog/what-we-know-gpt4>

⁶ <https://openai.com/blog/instruction-following/>

OpenAI is likely to release its follow-up, GPT-4, in 2023. Rumors about how many parameters it will have range from as many as GPT-3 to more than five hundred times as many⁷. According to the German AI Association, Beijing Academy of AI and Google already had undisclosed language models in 2021 with around one hundred times as many parameters as GPT-3.⁸

OpenAI started as a non-profit company, with a strong focus on making AI accessible to many. When Microsoft entered the company in 2019, OpenAI became for-profit. The trial version of ChatGPT is free, and each ChatGPT conversation is said to cost "single-digit cents" in calculations⁹. On February 1st [ChatGPT Plus](#) was introduced for the US market - a paid subscription that gives faster and more reliable response times, as well as priority access to new features and improvements.

⁷ <https://www.datacamp.com/blog/what-we-know-gpt4>

⁸ Reported in article at <https://the-decoder.com/ai-in-education-chatgpt-is-just-the-beginning/>

⁹ <https://fortune.com/longform/chatgpt-openai-sam-altman-microsoft/>

13: How Does this Affect Our Ciew of Knowledge?

There are clear gaps in ChatGPT's knowledge, and it can be amusingly confident even when it's wrong. At the same time, it's also clear that many are amazed by what the AI can do, and that computers have taken yet another step into the area that we thought was reserved for humans.

What does technology like this mean for our view of knowledge?

It's too early to give an answer to that question, not least because the technology is still accelerating. It's nonetheless a question worth exploring. It's reasonable to believe that parts of what we today consider important knowledge will be re-shaped, and some things we will no longer consider important. It's also likely that many things will remain unchanged.

An interesting paradox is that despite ChatGPT's ability to answer anything, it is so unreliable that it is difficult to use as a source of information for things you do not already know well or are willing to spend considerable time double-checking. Put in another way: To use ChatGPT in a meaningful way requires judgement, and for that judgement requires knowledge of what you use ChatGPT for¹. An experienced teacher can use ChatGPT as a support for making lesson plans, creating materials and getting ideas on how the teaching can be improved, but an inexperienced teacher relying on ChatGPT risks falling into AI pitfalls or wasting time.

¹ The term "judgment" here is quite loose. One could, hypothetically, imagine someone using ChatGPT to create a bomb, which is quite thoughtless. Someone who follows ChatGPT's instructions without having knowledge of explosive materials risks harming themselves or wasting resources, while someone with "judgment" in bomb making can see where the instructions are reasonable, where they are wrong or gaps, and can relate to new things that AI suggests.

There is a parallel here, to access to information on the internet, that is a bit striking: It is sometimes said that the internet has made it unnecessary to know facts, because one can always look up what one needs to know. This is true when it comes to trivial facts ("What is the capital of Azerbaijan?"), but to take advantage of deeper information, one needs to understand the context, be able to connect different concepts, and even have a sense of whether the information one receives is revolutionizing, doubtful, or fully normal. To be able to make use of facts on the internet, you must know a lot of things yourself. And to be able to use ChatGPT as an assistant in an area, you must have competence in the area yourself.

A first guess is therefore that ChatGPT will be able to speed up processes of analyzing and summarizing texts, and also writing well-formulated texts from outlines or drafts. These are things we can do today, but the technology makes it faster for us.

To explore the consequences further it could be illuminating to compare with when calculators became common. Broadly speaking, the impact of the calculator can be summarized as follows:

1. Many warned that we would become worse at doing arithmetics in our heads and by hand.
2. We probably did become worse at doing arithmetics in our heads and by hand, on average. Fewer people received the training needed to become good at doing arithmetics when calculators were available.
3. Basic arithmetic skills, without a calculator, are still considered important both inside and outside of school.
4. The ability to use a calculator is now considered a part of being able to do mathematics.
5. Things like multiplying large numbers and calculating square roots is no longer done by hand, except as a brain exercise or a party trick. Being

able to perform extensive calculations by hand just isn't a meaningful skill any more.

6. The proportion of people who can multiply large numbers and calculate square roots when needed has increased, provided that calculators are available (although fewer understand what a square root is and when to calculate it).
7. The ability to perform extensive calculations (with tools more powerful than pocket calculators) has opened up new fields in mathematics.

What could this list mean, translated to using ChatGPT to summarize and write texts?

1. We are concerned that our ability to read and summarize/write texts "by hand" will deteriorate.
2. Our ability to do this will probably deteriorate.
3. Being able to summarize and write texts on a basic level will continue to be an important skill, both inside and outside of school.
4. Being able to use AI to summarize and write texts will become an important skill to learn.
5. Reading through extensive texts and making literature reviews will not be something we do by hand, unless we do it for fun. It will also not be as important to be able to structure texts and use simple language.
6. The fact that texts are long will prevent fewer people than before from accessing their content, and more will be able to produce well-written and well-structured texts. At the same time, fewer may be able to explain why a text is easy to read or are capable of structuring texts without AI help.

7. More powerful technology will provide opportunities to process, summarize, and even synthesize large amounts of text, which will give us new insights, new ways of thinking, and new perspectives.

The points above are, of course, only speculation and more or less directly translated from the case of calculators (which in turn should be acknowledged is more of a shot in the dark than based in research). But they are a way to explore what the future *may* look like.

But it's important to remember that ChatGPT is not just capable of summarizing and writing texts. The AI is extremely versatile and can write computer programs, analyze the tone of text, generate text-based games, give comfort, provide dietary advice, translate texts and come up with new episodes of a TV series. Not with perfect quality, but you could still make many different lists similar to the one above to explore what technology like ChatGPT can lead to.

A strong limitation of ChatGPT is how unreliable it is when it comes to facts and logic. You might think that it's "just" about adding functions that let an AI check if what it says is logically consistent or compare its answers to reliable sources. But the model underlying ChatGPT is based *only* on a universe built of words - there are no concepts of what is true or not, just what is more or less natural/likely sequences of words. Adding logic or a notion of what is true would likely require [another type of technology](#), and is therefore not "just". Nonetheless, we are likely to take steps in that direction in 2023. The AI technology we see today is light-years better than [what was available in 2019](#) - and already back then, it elicited attention, questions, and concern. GPT-3.5, the underlying model for ChatGPT, is expected to be replaced by a much more capable GPT-4 in 2023. [Several other companies and organizations have similar services that have not been launched yet](#), some of which are expected to be much more powerful and there are even examples that can mix media such as images and text.

It's a big leap, but if we imagine that AI in the near future can do most things that do not require too much mental effort, we can get this slightly worrying list:

1. We are concerned that our ability to do mental work will deteriorate, such as analyzing new topics, do logical reasoning and drawing conclusions.
2. We are also likely to become worse at this.
3. Being able to perform basic mental work, such as analyzing new topics, do logical reasoning and drawing conclusions, will continue to be important skills.
4. Being able to use AI to analyze new topics, do logical reasoning and draw conclusions will be an important skill to learn.
5. We will not perform advanced analyses or track complex logical reasoning without AI assistance, unless we do it for fun.
6. Advanced and large topics, or complex reasoning, will become accessible to more. At the same time, fewer may understand what it means that conclusions are well supported.
7. With more powerful technology, it will be possible to think and reason further and deeper than humans can do "by hand". This will give us new types of insights and knowledge areas to explore.

Expressed in prose: We will generally become worse at "by hand" understanding new things, do logical reasoning and draw conclusions when AI can do it for us, despite these things still being emphasized in education. On the other hand, most people will learn to use AI when complex reasoning is required or when learning new things. This will give more people the opportunity to feel that they understand many different topics – even if many cannot explain the reasoning and conclusions that their sense of understanding is based on, and also have a limited understanding of what it means that conclusions are well supported. When applied in large

scale, AI technology can be used to reason and draw conclusions about many more things than a human can do in their lifetime, giving us new types of insights and knowledge areas to explore.

14: AI and Safety

A book about AI should address risks of AI. Concerns that AI could seriously harm society, the world order, or even humanity are well-founded enough that many serious thinkers, researchers, and lobbyists are working to understand and reduce those risks.

The risks of AI increase as AI becomes more competent. There are several types of risks, but three broad categories are:

1. The risk that AI is used to benefit a few while harming many.
2. The risk that the goals we give AI lead to unintended and harmful consequences.
3. The risk that AI creates its own goals that do not align with ours.

These risks partially overlap with each other, and there are risks that fall outside of these categories.

Risk of AI Benefiting Few and Harming Many

In this category, there are several existing AI technologies. One example is surveillance cameras with facial recognition technology used in China, which increases the ability to prevent and follow up on crimes – including demonstrating for democracy in Hong Kong. Another example is drones used in warfare (for example in Libya), equipped with AI that can identify targets and decide whether to attack them.

A much more diffuse example is the AI systems that determine what content users on social media should see. They are powerful enough to create profits for the companies that own the platforms, but at the same time cause harm in the form of, for example, mental illness, polarization in society, and spread of fake news.

There is a particular risk with highly competent AI, since it is a relatively cheap and accessible technology. While things like nuclear weapons are difficult to create or purchase for terrorist organizations, the price of armed AI drones is so low that they could be purchased in thousands. Someone who wants to do a lot of harm could also use AI usually used for finding potential medicines to create chemical weapons.¹ While creating AI models is expensive, it is cheap to use – and democratization of technology that can be used for mass destruction carries great risks.

Risk of Unexpected and Harmful Consequences

Even if high-competent AI is in the hands of people who mean well, there is a risk of bad consequences. To a large extent, this is due to the fact that AI can lead to narrowly stated goals being pursued so effectively that other things suffer – things that we did not think of and perhaps did not have the chance to anticipate when we set the goals for the AI.

Algorithms used in social platforms are an example of this: The goal of the algorithms is to keep people as engaged as possible – they should continue to read and continue to click (which in itself has to do with a large user base and advertising revenues, or for that matter collecting data that can be used to train AI). What's wrong with an AI helping to show you things that you find interesting?

¹ <https://futureoflife.org/podcast/sean-ekins-on-regulating-ai-drug-discovery/>

One of the problems arises when it turns out that people are engaged by content that makes them upset, which in turn leads to social platforms often showing posts and news that create polarization both online and in society. Further problems arise when the algorithms do not take into account what is true, but only what creates more clicks. Even more problems arise when the algorithms actually affects people's opinions, creating strongly polarized groups that are easy to upset - and get clicks from.

In a hypothetical future with a super-AI, it becomes extremely important what goals we have given the AI, and it turns out that it is not easy to find any goals that do not carry a risk of going astray. The goal "people should be happy" sounds innocent, but could be achieved through a morphine drip. Even very limited goals have a great potential to go astray. It is sometimes expressed with the phrase "you can't fetch coffee if you're dead", meaning that a super-AI with the sole goal of fixing coffee will realize that it cannot make coffee if it is shut off - which in turn can lead to all sorts of measures to get rid of things that can shut it off (such as people).

Super-AI Creating its Own Goals

AI researchers are divided on the likelihood of inventing a super-AI - an AI that is at least as good as a human at solving virtually all types of problems. Some researchers consider it impossible or extremely unlikely in the near future, but the average assessment has been getting radically closer in recent years. The values vary between surveys, and the median estimate is 100, 50 or 30 years.

Super-AI is often referred to as "strong AI" or "artificial general intelligence" (AGI), and many researchers in the field consider it essential that we take the time to understand and reduce the risks of a super-AI: even if the likelihood of

creating a super-AI within a hundred years is as low as 10 percent, it would be well invested time and money.

One thing that makes super-AI particularly risky is the possibility of an AI explosion: if a super-AI is at least as good as humans at solving problems, it also includes the ability to create new, better AI. The new AI becomes even better at this, which in a relatively short time could lead to an AI that can outsmart anything that humans are able to assemble.

Some of the research in AI security therefore focuses on what is called *AI alignment* - ensuring that the goals of the AI align with what humanity considers good. Part of this involves finding ways to secure that the AI understands the goals we give it, that the AI follows these goals, and that the AI retains these goals. A significant problem is that AI in the form of neural networks is largely a black box, where we can see the output but cannot see how the AI has come up with a particular answer or decision.

Research in AI security is moving forward, but one problem is that economic, military and other interests are making AI technology progress much faster than AI safety.

"Can't we just pull the plug on a super-AI if it shows a desire to harm us humans?" Perhaps. If it really is a super-AI, it understands humans well enough to know which line it shouldn't cross too soon, and is capable of securing its survival even if it begins to dominate at the expense of humans. What's going on with climate change and the fossil industry is an example: it is beyond all reasonable doubt that human emissions of greenhouse gases, largely due to the fossil industry, harm humanity as a whole - in a serious and expensive way. Still we are unable to stop it.

Other Risks

A few other risks associated with increasingly capable AI are briefly described below.

- **Skewed power structures can be reinforced.** Since AI technology is largely based on training with existing data, there is a clear risk that skewed power structures will be present also in AI decisions. If an AI is to recommend suitable candidates for a management position, there is a risk that white middle-aged men will receive unjustified advantages.
- **Human content can be drowned out by AI-generated content.** Given that GPT-3.5 has been trained on text equivalent to 57 billion human-life worth of reading, it is clear that most of the text on the internet is *not* created by humans. As AI becomes increasingly sophisticated, it will become more difficult to find text that has actually been written by a human, and more difficult to know when you have found it.
- **Resources and power can become even more unequal.** Although AI is relatively cheap to use, it is expensive to produce and requires vast amounts of data. The few actors that can produce powerful AI can wield significant influence – both in terms of economic production and in terms of the information that people are exposed to. The large generative AI models available today come from only six actors.²
- **Rapid changes in the job market.** AI development can lead to a contraction in the job market or to changes in the skills that are in demand, resulting in many people becoming unemployed. This can cause problems for the affected individuals and unrest at a societal level.

² <https://arxiv.org/abs/2301.04655>

Further Reading

AI in education

- European Union's ethical guidelines on using AI in schools: education.ec.europa.eu/news/ethical-guidelines-on-the-use-of-artificial-intelligence-and-data-in-teaching-and-learning-for-educators
- A well-written and comprehensive article on ChatGPT, related AI technology and education, from the Decoder (January 7th, 2023): the-decoder.com/ai-in-education-chatgpt-is-just-the-beginning/
- A Teacher's Prompt Guide to ChatGPT, from Andrew Herft/@herfteducation: bit.ly/WWBChatGPT
- MIT AI Literacy Units: raise.mit.edu/resources.html
- UNESCO report on K-12 curricula that include AI: unesdoc.unesco.org/ark:/48223/pf0000380602
- Report on how AI is included in K-12 curricula in Canada and South Korea: asiapacific.ca/publication/ai-education-k-12-canada-and-south-korea

More on current AI technology

- A collection of AI services for specific purposes, regularly updated: theresanaiforthat.com
- Overview and classification of publicly available generative AI models: arxiv.org/abs/2301.04655

AI and the future

- [Life 3.0](#): A book by the Swedish-American Max Tegmark, discussing what AI may mean for society, the future and how we perceive ourselves. Written 2018.
- 80,000 hours podcast, discusses AI and the future regularly: 80000hours.org/podcast/episodes/
- Future of Life Institute podcast, discusses AI and the future regularly: futureoflife.org/project/future-of-life-institute-podcast/