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Danish Gymnasium Students' Experiences with ChatGPT: Learning, Reflection, and Human Values in the Age of Generative AI

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Picture generated with ChatGPT

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In this techno-anthropological thesis we examine how Danish gymnasium students experience and engage with ChatGPT as a mediating technology in their learning - shaping their practices, understanding, and relationship to learning. This is based on anthropological fieldwork in two Danish gymnasium classes and a literature study. We introduce a bricolage model, *The Ellipse of Technomediated Experience*, which integrates theoretical perspectives from Rosa's theory of resonance, Gadamer's fusion of horizons, and postphenomenology's concept of technological mediation.

Our analysis reveals that ChatGPT is not merely a neutral tool but an active force that co-constructs the learning environment, influencing how students perceive themselves, their learning processes, and each other. Students often use ChatGPT due to time pressure and cognitive overload, leading to dependency that can undermine metacognitive awareness, critical thinking, and fusion of horizons. Human values such as *Identity*, *Autonomy*, *Accountability*, *Ownership*, *Trust*, and *Universal usability* emerge as central themes, as students navigate blurred boundaries between their own voices and AI-generated content. While ChatGPT offers potential for self-regulated learning, uncritical use may alienate students from their own learning process. To address these challenges, we introduce discussion cards as a dialogical tool to contribute to classroom conversation around GenAI use, fostering a posthuman learning environment.

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1. Introduction

In 1950, Alan Turing famously asked, “*Can machines think?*”. Rather than wrestle with an abstract definition of thought, Turing proposed a practical test - known as the Turing Test - as a way to evaluate whether a machine could imitate human intelligence convincingly enough to be indistinguishable from a person in conversation. This marked a pivotal shift in thinking about artificial intelligence: instead of probing the inner nature of consciousness, the question became one of interaction, perception, and social behavior (Oppy & Dowe, 2021). Since then, the ambition to create machines capable of human-like thought has captured imaginations across disciplines, cultures, and eras. The desire to build intelligent machines reflects a fundamental human curiosity - not only about the nature of intelligence itself but about what it means to be human. Part of this fascination stems from our tendency to anthropomorphize: we attribute human-like traits to anything that mimics thought, language, or emotional expression (Biever, 2023). If machines can replicate our reasoning, creativity, or even empathy, what does that say about our own minds? What does it mean for society when machines increasingly partake in tasks once thought to require uniquely human insight?

To better understand this contemporary fascination, it is instructive to turn back to the foundations of Western philosophy. To explore these questions, we used generative AI and prompted ChatGPT to simulate a dialogue between Greek philosophers and itself. ChatGPT creates a setting, where Socrates, Plato, and Aristotle sit in discussion about generative AI and ChatGPT joins the conversation.

Socrates: “You speak of machines that produce speech and ideas - an imitation of human thought. But tell me, do these machines possess wisdom, or are they merely clever echoes?”

ChatGPT: “They can process immense data and generate responses that often appear thoughtful, but they lack consciousness and self-awareness. They do not understand the meaning behind their words.”

Plato: “So these machines are like shadows on the wall of my cave - reflections of knowledge without access to true forms?”

ChatGPT: “Exactly. AI operates within the frameworks we design, calculating probabilities and patterns without grasping the essence of concepts like justice or beauty.”

Aristotle: “Yet, if we consider the practical use, are they not tools - extensions of our *techné* - which enhance human capability much like a plow assists a farmer?”

ChatGPT: “Yes, and this is the crucial point. AI is a powerful tool, but if we grant it too much authority without ethical oversight, it may come to govern us rather than serve us.”

Socrates: “Then, as always, it is our duty to question and probe, to reveal the limits of this intelligence, as I might challenge any Athenian.”

Plato: “Otherwise, we risk creating a new cave - an illusionary world where truth is obscured by artificial images.”

Aristotle: “Hence, it is essential to develop ethics governing these machines, just as we do for politics and science.”

(Generated with ChatGPT)

This imagined dialogue serves as a productive way to spark reflection on the scale and significance of today’s generative AI. It captures tensions: between imitation and understanding, between tool and autonomous agent, and between technological possibility and ethical responsibility. Through this lens, the creation of human-like machines is not just a technical achievement but a cultural and philosophical challenge.

Educational tools have continually shaped how students acquire and interact with knowledge. In recent years, the widespread use of laptops and online resources has further altered pedagogical approaches and the role of educators (Arisoy, 2022). Artificial intelligence represents the newest development in this trajectory. AI systems, including generative models like ChatGPT, are expanding the possibilities for students in educational settings - reshaping not only how they access and engage with knowledge, but also how they develop critical thinking, creativity, and ethical awareness.

In this thesis we investigate how ChatGPT is experienced and used by students in Danish gymnasiums. By examining students’ experiences with this generative AI, the study aims to deepen our understanding of generative AI’s role in shaping learning environments and the ethical challenges that arise. ChatGPT is the subject of this study, but also a tool we ourselves have used in the development of this thesis. We have used ChatGPT to translate quotes from

Danish to English, to check grammar, as well as for inspiration, such as the aforementioned fictional conversation between Greek philosophers and ChatGPT.

We begin by establishing the broader context of our study, offering a brief overview of generative AI and the Danish gymnasium system, then we present our problem statement, before explaining the methodology and theoretical framework for the following analysis. Lastly, we explore future perspectives through the lens of hermeneutical technology assessment, concluding with our recommendations for change.

2. Background

In this section, we present background information to contextualize the role of ChatGPT in education. We begin with an overview of generative AI, focusing on ChatGPT and how it works. We then explore its implications for learning, including benefits and concerns. Finally, we describe the Danish gymnasium setting that is central to our study.

2.1 Generative Artificial Intelligence

Generative artificial intelligence (GenAI) has become an increasingly significant technology since the initial spark in development in the 1960s and is much more widespread in recent years, continuing to expand into various aspects of human life. GenAI is the segment of artificial intelligence that is able to create new content in the form of text, images, music, and beyond, based on learning from vast amounts of data. GenAI's ability to create content in a human-like manner is highlighted as holding immense potential to revolutionize numerous industries and our daily lives. A highlighted use is in education, with potential for personalizing learning experiences (Solanki & Khublani, 2024b). GenAI models analyze patterns and structures in their training data and use this knowledge to generate new content. The technological development has depended on both computing power and access to large amounts of data. The development of GenAI from the 1960s to today is shaped by innovative breakthroughs. Solanki and Khublani (2024b) provide an overview of the development in the book *'Generative Artificial Intelligence: Exploring the Power and Potential of Generative AI'* starting with the emergence of deep learning.

Deep learning models are inspired by the way the human brain works, using layers of neural networks that filter and process information (3Blue1Brown, 2017). Deep learning models can

learn patterns in very large datasets for example, how words tend to follow each other in a sentence.

In 2014 there was a breakthrough with the introduction of Generative Adversarial Networks (GANs). GANs are made up of two parts: one AI model called *the generator* creates content, while another called *the discriminator*, evaluates the content. GANs made it possible for models to train each other. Another breakthrough was in 2017 where Vaswani et al., introduced the transformer architecture in the paper ‘*Attention Is All You Need*’ (2017). Transformers are especially good at understanding language because they look at entire sentences or paragraphs at once, rather than word by word. The transformer architecture has become a backbone of Large Language Models (LLM) with its self-attention mechanism (Solanki & Khublani, 2024b).

OpenAI introducing GPT (Generative Pre-trained Transformer) marked a new era of LLMs. These models are trained on massive collections of text from the internet. They are extremely good at predicting what comes next in a sentence, based on everything they’ve seen during training. Mainstream adoption with user-friendly models as ChatGPT, Midjourney and DALL-E happened in 2022. Chatbots have become one the most commonly used and well known AI forms. Two months after OpenAI’s release of ChatGPT the AI Chatbot had 100 million users. “*The reason why ChatGPT is so popular is that it was one of the first AI technologies that were made accessible and understandable to the general public*” says Adam Conner, Vice President for Technology Policy at the Centre for American Progress (Schwedux, 2023). The rapid rise and mainstream use of GenAI technologies have sparked important debates around copyright, ethics, energy use, and their impact on professions, highlighting the need for responsible development and thoughtful application (Solanki & Khublani, 2024b).

The following section will explore how ChatGPT works technically, shedding light on the underlying mechanisms that enable its human-like conversational abilities.

2.1.1 ChatGPT

ChatGPT is a chatbot developed by OpenAI. It is based on a large language model (LLM) that uses Natural Language Processing (NLP) - that is a set of techniques that help computers work with human language. This allows machines to process natural language and generate text in a way that mirrors natural language and resembles human communication. However, ChatGPT doesn’t truly ‘understand’ language - it predicts the most likely next word or phrase based on

patterns in its training data (Adiguzel et al., 2023). When you train a model on billions of sentences, it gets good at generating language that makes sense, stays on topic, and sounds natural for a human. A model like ChatGPT's work starts with the training phase.

Training phase: The model is shown massive amounts of text - books, websites, articles, conversations - and it learns patterns in how language is used with a combination of a transformer and self-attention (Solanki & Khublani, 2024b). This part is done by OpenAI and requires a lot of computing power. After the main training, the model is fine-tuned with human feedback and safety guidelines to improve helpfulness and reduce harmful outputs (Schwedux, 2023).

After the training the model works in three overall phases from input to output illustrated with the figure below. The model operates through tokenization of the input, weighing and prediction within hidden transformer layers, and generating an output.

Tokenizing: When the user types text into ChatGPT the model breaks it down into tokens, small units like words, parts of words, letters, or symbols. Each token is converted into a vector - a numerical representation that is 'context-aware' in the sentence. Each individual word in a sentence is valued in relation to the whole sentence (3Blue1Brown, 2024).

Prediction: These tokens are processed through multiple (hidden) layers of a neural network, also referred to as the transformer.

As each token moves through the network the model calculates a weighted focus or 'attention score' to each token indicating the meaning-making process of the model (3Blue1Brown, 2017). The weighted focus indicates which parts of the prompted input that should matter most in its next word prediction. The model predicts what a good answer should look like, based on everything it learned during training. The process through the transformer layers of self-attention and next word prediction is done word by word, meaning that the output layer 1 (the

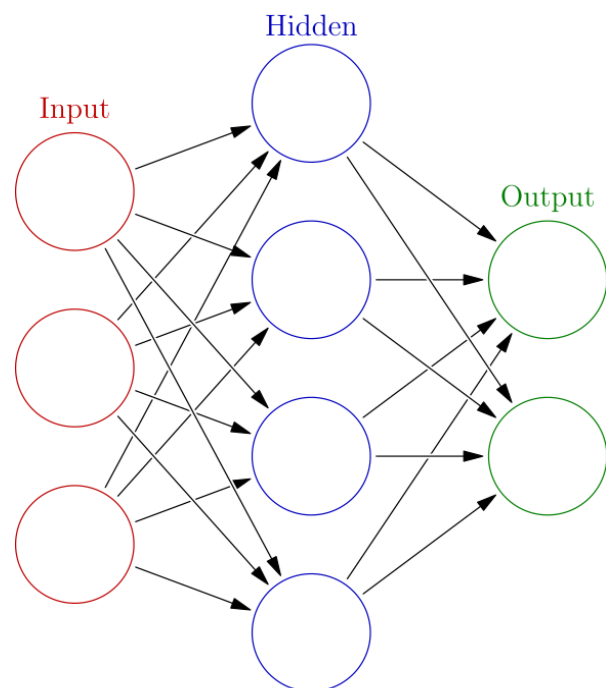


Figure 1: Image of an artificial neural network (Wikipedia: Neural network (machine learning) 2025)

first word predicted) becomes part of the input for the output layer 2 (the second word predicted). It continues predicting token by token until it reaches an end-of-sentence marker, such as a period or a question mark (3Blue1Brown, 2024).

Generating response: The output is converted back into readable text and shown to the user. The result is a response that appears fluent and meaningful, based on the patterns the model learned during training (3Blue1Brown, 2024).

Importantly, the quality of the responses depends a lot on how large and well-trained the model is. The free version of ChatGPT is GPT-3.5. The newer version, GPT-4 (released March 2023), are more accurate and nuanced than earlier ones because it has been trained on better data and have more internal parameters like more token inputs - which are like mental connections the model uses to process information (3Blue1Brown, 2017). The increased size of the model allows for more advanced natural language processing capabilities. ChatGPT's capacity for reasoning and understanding prompts across multiple domains makes it more adaptable and able to handle challenging tasks, relying heavily on the quality of the prompt.

2.1.2 Prompt

The input provided to ChatGPT by the user is absolutely crucial for the output as it sets the framework for what is possible for the model to perform in the hidden layers. But because the process of the model's meaning-making is hidden it is difficult for the user to know exactly how to provide the best possible context for the best possible output. The discipline of crafting prompts is called prompt engineering or prompt tuning:

“The art of crafting these prompts to extract the best possible performance from the models is called prompt engineering or prompt tuning. This practice involves a repetitive cycle of trial and error. While natural language offers greater versatility and expressiveness than formal programming languages, it also introduces a degree of vagueness. Furthermore, the natural language prompts are highly responsive to alterations, with slight changes potentially yielding vastly different results.” (Solanki & Khublani, 2024a, 230)

Prompting is experimental and nuanced by nature where even minor variations in phrasing can significantly influence the model's output or make it hallucinate. As such, understanding how the model processes natural language becomes essential for effective use. This trial-and-error

process highlights the gap between user intent and the model's statistical nature. To improve this dynamic, OpenAI uses user interactions to refine future versions of the ChatGPT model through ongoing training updates (Adiguzel et al., 2023). Additionally, there's always a small disclaimer at the bottom of the interface: “*ChatGPT can make mistakes. Check important info.*” (see screenshot below). This serves as a reminder that the output is not guaranteed to be correct, as the model generates responses based on word prediction and not verified facts.

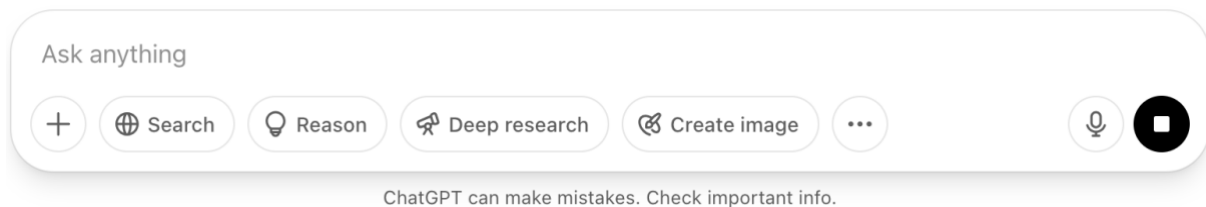


Image 1: Screenshot of ChatGPT interface.

As illustrated on the screenshot of ChatGPT's interface (from May 2025), ChatGPT is also making limited additions to the features on the model on how to search, where it's now possible to search with different focuses. Asking ChatGPT, the *Search* feature enables ChatGPT to access real-time information from the internet, *Reason* enhances ChatGPT's ability to perform step-by-step logical reasoning, improving its performance on tasks involving coding, mathematics, and scientific problem-solving. *Deep Research* is designed for in-depth, multi-step research tasks. Upon receiving a prompt, ChatGPT autonomously searches, analyzes, and synthesizes information from numerous online sources to generate comprehensive reports, complete with citations. We don't go further into these new features in this investigation, but it's important to note that these new features are under critical scrutiny, especially regarding their accuracy and potential biases (see, for example, Peters & Chin-Yee, 2025).

Shifting to a broader perspective, the integration of AI in education (AIED) has gained significant attention since the emergence of GenAI tools like ChatGPT, bringing both promising possibilities and notable challenges.

2.2 Artificial Intelligence in Education

Artificial Intelligence in Education (AIED) is a topic that has gotten increased focus after GenAI became a public tool with ChatGPT in late 2022. The focus surrounds both the benefits of having AI in education but also the concerns it brings. There are benefits of having an online tutor by your side all the time that can help you understand assignments and simplify complex

tasks into clear, easy-to-grasp language. However, AIED also comes with concerns, such as mistrust, cheating, reduced critical thinking, and dependency on AI (Tlili et al., 2023). With an interest in exploring how we can develop the skills to use GenAI technologies effectively in learning environments, a few concepts stood out as relevant: AI literacy, self-regulated learning, and metacognitive laziness.

2.2.1. AI Literacy

When we look up the word literacy or to be literate in the dictionary, it is defined as “*an educated person*” and “*a person who can read and write*” (Merriam-Webster Dictionary, n.d.). In other words, the ability to understand meaning through reading and to communicate meaning through writing. When we add AI in front of literacy, the concept remains similar and AI literacy refers to the ability to understand, use, and think critically about AI technologies. This includes knowing how AI works, recognizing its limitations and biases, and reflecting on ethical implications (Chiu et al., 2024). In this context, AI literacy - specifically in relation to tools like ChatGPT - involves developing the skills and competencies needed to use AI thoughtfully and responsibly, with an awareness of both its potential and its constraints. A potential is the concept of GenAI supporting Self-Regulated Learning.

2.2.2. Self-Regulated Learning

In our literature search, we found multiple studies that focus on Self-Regulated Learning (SRL) as a key theme (Ng et al., 2024; Chiu et al., 2024; Fan et al., 2025). SRL enables learning flow and difficulty to be tailored to individual learners. When combined with GenAI, SRL becomes more manageable, as it reduces the need for teachers to constantly regulate each student’s needs and motivation. Regulation in individual learning is important for maintaining student engagement and motivation, as it ensures that learning experiences are appropriately challenging, personalized, and aligned with learners’ progress and goals (Fan et al., 2025). Zimmerman defines SRL in ‘*Attaining Self-Regulation: A Social Cognitive Perspective*’ as “*(...) students' self-generated thoughts, feelings, and actions, which are systematically oriented toward attainment of their goals.*” (Zimmerman, 2000, 418). Self-regulated learning framework is divided into three phases. The first phase, *forethought*, involves planning how to do the task, setting your own goals, and choosing strategies to get there, all influenced by the students feelings and motivation. The second phase, *performance*, is where the student carries out the task, finds out how to stay focused and motivated and tracks how it goes. The last step, *self-*

reflection, is when students think about how things went, figure out why they got the results they did, and decide what they could do differently next time to learn better (Fan et al., 2025).

ChatGPT can function as a personal tutor, providing resources and motivation to engage students. However, it can also be misused - allowing students to complete assignments at a high academic level with minimal effort, which may undermine genuine learning.

2.2.3 Metacognitive Laziness

In our literature search, we found multiple studies that focus on cognitive challenges with generative AI in education (Sardi et al., 2025; Fan et al., 2025; Chen et al., 2023). Overdependence on GenAI tools like ChatGPT may lead to a decline in self-regulation and encourage passive learning habits, potentially diminishing deep engagement with the material - hence metacognitive laziness. Metacognitive laziness is not necessarily about being lazy but a reluctance or unwillingness to engage in thinking about one's own thinking. It can be described as when a person fails to reflect on how they learn, think, or make decisions - often because it requires a certain amount of mental effort (Fan et al., 2025). ChatGPT can be a helpful tool for managing the demands of a gymnasium workload by reducing cognitive (over)load. However, if students become overly reliant on it, they may disengage from the learning process altogether. In such cases, rather than supporting learning, GenAI risks replacing the cognitive and reflective effort essential for meaningful understanding (Fan et al., 2025).

Having presented the concepts for benefits and concerns with GenAI in the education sector, we now move on to the specific, educational context for this investigation - the Danish gymnasium.

2.3 The Gymnasium Context

What role is ChatGPT currently playing in Danish gymnasiums? To get a sense of how this rapidly evolving technology is affecting education, we turned to the public conversation unfolding in Danish media. A wide range of recent articles reveal that ChatGPT, and other forms of GenAI, have quickly become highly relevant and debated topics in education. The articles cover everything from academic integrity and new exam formats to the potential

benefits for disadvantaged students. They also reflect a growing awareness that something fundamental is shifting in how students learn and how schools assess knowledge.

Here is a selection of recent headlines on artificial intelligence in gymnasiums translated by the authors:

- **Gymnasium teacher can no longer tell whether his students are cheating with AI or not: Now he has adopted a new method** - *Berlingske*, May 2024 (Kajkus, 2024)
- **Artificial intelligence in exams is intended to help the weakest students** - *Berlingske*, March 2024 (Rømer, 2024)
- **Teacher: Cheating with AI in schools undermines the exam system** - *Politiken*, April 2025 (Roswall, 2025)
- **Teachers are pressured by artificial intelligence: Gymnasiums call for new exam forms** - *DR.dk*, Marts 2025 (Kristensen, 2025)
- **Almost every seventh school student has used ChatGPT in teaching** - *DR.dk*, October 2023 (Kirkebæk-Johansson, 2023)
- **ChatGPT can make a 'huge difference' for students who don't get homework help at home** - *DR.dk*, April 2024 (Svendsen & Pedersen, 2024)

This mix of positive and negative views reflects a broader debate - similar to earlier discussions around self-regulated learning. While tools like ChatGPT can support students at home, the media articles also show that many teachers are facing new challenges. Some are worried about how AI makes it harder to know if students are cheating, which can undermine trust in the exam system. The Danish Ministry of Children and Education (Børne- og Undervisningsministeriet) is saying the following regarding the use of generative AI in education;

“Our approach is that we should teach students with and without generative artificial intelligence. The technology should be used as a tool to enhance students' learning and digital literacy when integrated into teaching. Students should be educated to become competent and critical users, enabling them to utilize new digital tools to improve their work while avoiding the pitfalls that the technology also presents.” [translated by authors] (Børne- og Undervisningsministeriet, 2024)

The ministry emphasizes the importance of enhancing students' digital literacy to help them become critical users of AI technology. According to the ministry, it is up to individual

gymnasiums to establish rules and guidelines to support this goal. Currently, the ministry has only issued recommendations for the use of GenAI to gymnasium principals and teachers (Børne- og Undervisningsministeriet, 2024). However, a national youth dialogue about GenAI reveals that students feel there is a lack of clear guidelines on how to use the technology. They describe the existing rules as arbitrary and express that they lack proper training to use GenAI constructively. Students see ChatGPT as both a helpful tool and potentially addictive, and they stress the need for more dialogue within educational institutions (Democracy x & Dataetisk Råd, 2025, 21). With this in mind we will delve further into the exact learning environment.

2.3.1 The Danish STX-Gymnasium

To understand how ChatGPT is used in practice, it's essential to understand the Danish gymnasium. Following the 9th or 10th grade of primary school, the gymnasium offers a three-year program of general education. This program provides the necessary foundation for further studies and concludes with the gymnasium exit examination that qualifies students for admission to higher education. There are four different types of gymnasium but the most common is the STX (Danske Gymnasier, n.d.) and is where our focus will be.

The STX-program focuses on academic disciplines within the humanities, social sciences, and natural sciences. Students follow a broad and general curriculum designed to foster in-depth subject knowledge and an understanding of how scientific disciplines are applied. This is achieved by emphasizing both theoretical learning and practical application in analyzing general and science-related issues. The main objective is to equip students for further studies in higher education (Børne- og Undervisningsministeriet, 2025b). While the Ministry of Children and Education defines the formal goals of the gymnasium, students bring their own personal goals, which shape their motivation and engagement in learning. Assessment in the gymnasium includes oral and written exams where grades are given by both a teacher and an external censor, as well as yearly grades assigned solely by teachers. These grades are essential not only to pass the exams but also for applying to higher education programs.

We focus on gymnasium students because they are at an age where technology is becoming increasingly present in their lives, while they are still embedded in a learning environment. The gymnasium is a space dedicated to both learning and personal development, making it an ideal setting for meaningful conversation about AI in education.

3. Problem Field

The introduction of ChatGPT in the gymnasium context opens up new opportunities with self-regulated learning but also raises challenges with metacognitive laziness and AI dependency. It creates a need to understand how the technology affects the student's learning and values in education, but most importantly how students navigate this new landscape in the classroom.

3.1 The Techno-Anthropological Triangle

One of the core models of techno-anthropology highlights the key competencies that underpin techno-anthropological research. Our research centers on both the users and the artifact focusing on users' perceptions and use of ChatGPT. The focus is therefore situated between the user and ChatGPT - emphasizing an anthropology-driven design perspective.

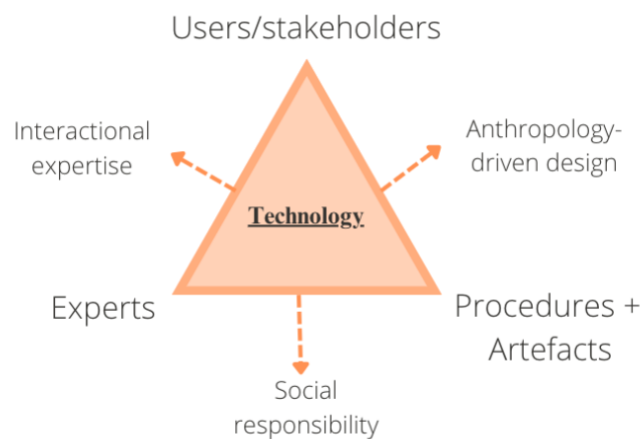


Figure 2: Own illustration of the techno-anthropological triangle adopted from (Børsen, 2013, 50)

In the book *‘What is Techno-Anthropology?’* (Børsen & Botin, 2013), Botin describes anthropology-driven design as:

“Anthropology-driven design is of course in touch with classical anthropological scientific and methodological virtues. These theoretical and methodological approaches are supplemented by action- and change-oriented methods for enquiry, innovation and design, where users are moved as well as artifacts are molded by the interaction with the users and the techno-anthropologist.” (Botin, 2013, 71)

As techno-anthropologists, we believe that a change for the better involves constructively incorporating users' perspectives into the shaping of technology design, while also enabling

users to develop and adapt in their relation with the artefact. In regard to our field of research it is difficult to have the gymnasium students influence the design of ChatGPT but nonetheless it is possible to change how they themselves interact with the design and reflect upon the use of ChatGPT in an educational setting. Much of our methodological approach has taken the form of a classical anthropological toolbox where we gain insight into the user's interpretation, perception and use of the technology.

3.2 Problem Statement

The emergence of ChatGPT is reshaping the learning environment in Danish gymnasiums. As students increasingly use ChatGPT in their educational practices, the technology mediates new forms of understanding, behavior, and ethical considerations in relation to learning. This shift raises important questions about how students engage with GenAI, and how educational institutions can support critical and responsible use. To ensure that ChatGPT contributes meaningfully to student learning and ethical development, there is a need to assess how the technology can be integrated into the classroom in a socially responsible and reflective way. This includes developing students' AI literacy and fostering critical awareness of the broader implications of GenAI in education. To explore this, we ask:

1. How do Danish gymnasium students experience ChatGPT as a mediating technology in their learning?
2. How does ChatGPT shape their practices, understanding, and relations to learning?
3. How can AI literacy and posthuman learning perspectives shape students' critical reflection and moral practice in their engagement with generative AI?

To explore these questions, it is important to draw on existing research. Gaining insight into how ChatGPT influences learning and ethical development requires an understanding of the broader academic landscape on AI in education.

3.3 Literature Study

This literature study's framework is built to understand and get knowledge about what already has been done in this field of research. Our focus in the literature study lies with AI in education and on the educational level the study is about. We found that a lot of new research has been made about AI in education but the majority of it surrounded higher education. We use the literature study to get an insight in the field we are working in and what we could build upon but also to see where we could differ from previous research.

Article	Themes	Methods	Conclusion
1. What if the devil is my guardian angel: ChatGPT as a case study of using chatbots in education. (Tlili et al., 2023)	Educational transformation The public discourse User experience	Interviews Social network analysis of tweets Investigation of user experiences	Embrace the technology rather than banning it. Need for new teaching philosophy and up-skilling competencies. This research unfolds in three distinct phases. In the first phase, it is found that public discussions on social media are mostly positive, with noticeable enthusiasm for incorporating the technology into educational contexts. The second phase explores ChatGPT in depth, focusing on aspects such as its potential to transform education, the quality and usefulness of its responses, the presence of personality and emotion, and the ethical implications of its use. The final phase involves analyzing user experiences across ten educational scenarios, which brings to light concerns such as academic dishonesty, the accuracy and integrity of ChatGPT's responses, privacy risks, and possible manipulation. Overall, the study highlights important areas for future research to support the safe and ethical integration of chatbots - particularly ChatGPT - into educational environments.

<p>2. Generative AI in Education and Research: Opportunities, Concerns, and Solutions.</p> <p>(Alasadi & Baiz, 2023)</p>	<p>Opportunities and benefits of AI in education</p> <p>Main Concerns of ChatGPT in the education sector</p> <p>Solutions from a system perspective</p>	<p>Literature study and ChatGPT as an empirical source</p>	<p>It is essential for students to learn how to effectively engage with AI tools, recognize their limitations, and apply them in ethical ways. Teaching without acknowledging the surrounding technological landscape would leave students underprepared for the demands of the future.</p> <p>To ensure AI's responsible integration, we need to approach it with care grounded in ethics, inclusivity, and critical reflection. This includes promoting transparent discussions, encouraging collaboration across disciplines, and supporting fair access to AI technologies. By doing so, we can harness AI to drive meaningful progress in education and research, ultimately empowering both individuals and communities.</p>
<p>3. Application of generative artificial intelligence (GenAI) in language teaching and learning: A scoping literature review.</p> <p>(Law, 2024)</p>	<p>Language education</p> <p>Teachers and students</p> <p>Stakeholders</p>	<p>Literature review</p>	<p>A large review of existing literature lays the foundation for further research in this field. However, there remains a clear need for more empirical studies to deepen our understanding. Ongoing and systematic inquiry is essential to address the ethical implications and potential constraints associated with rapidly advancing technologies like generative AI.</p> <p>Exploring how these tools can specifically aid language development will enable educators to design more targeted and effective teaching methods. Moreover, involving stakeholders in the development and deployment of generative AI in education is vital to ensure that implementation aligns with practical needs, ethical standards, and broader societal goals.</p>
<p>4. Empowering student self-regulated learning and science education through ChatGPT: A pioneering pilot study.</p> <p>(Ng et al., 2024)</p>	<p>Self-Regulated Learning</p> <p>The study offers insights into how ChatGPT can be used as a tool to facilitate SRL and promote sustained learning habits</p>	<p>A comparative study between generative AI-based and rule-based AI chatbots in a 3-week science learning experience with 74 Secondary students in Hong Kong</p> <p>Quantitative and qualitative</p>	<p>Both educators and students need to recognize the limitations of AI technologies and apply them thoughtfully to achieve meaningful outcomes. Building AI-related skills among teachers and learners is essential to effectively integrate these tools into teaching and learning practices.</p> <p>Self-regulated learning (SRL) and motivation play a significant role in shaping learning outcomes and experiences. Motivation drives learner engagement and sustains goal-oriented behavior, while SRL skills help learners set goals, track their progress, and adjust their approaches as needed.</p> <p>Although this study concentrates on SRL, AI literacy, and motivation, future research should broaden its scope to examine other aspects of learning. A more comprehensive exploration of AI's role in education can provide deeper insights and reinforce the study's conclusions.</p>

<p>5. What are artificial intelligence literacy and competency? A comprehensive framework to support them</p> <p>(Chiu et al., 2024)</p>	<p>K-12</p> <p>The major frameworks are focused on identifying content and technical knowledge (AI literacy)</p>	<p>Participants included 30 experienced AI teachers from 15 middle schools</p>	<p>Literacy involves understanding - knowing the relevant concepts and skills - while competency goes a step further, focusing on the ability to confidently and effectively apply that knowledge in practice.</p> <p>Many current definitions of AI literacy, particularly for general audiences, are rooted in engineering frameworks, which may not align well with the needs and realities of K–12 education.</p> <p>This study suggests that AI literacy, more accurately framed as AI competency, should incorporate self-reflective thinking and include insights from educators and practitioners to ensure relevance and effectiveness in school settings.</p> <p>Developing a meaningful and practical AI curriculum for K–12 learners remains a significant challenge, requiring careful design and collaboration across disciplines.</p>
<p>6. Integrating generative AI in knowledge building.</p> <p>(Chen et al., 2023)</p>	<p>K-12</p> <p>Help students become “AI-literate” citizens who are better equipped to navigate the AI-mediated world</p>	<p>Knowledge Building Pedagogy in classroom (religion as subject)</p> <p>Assignments, Knowledge Forum and final essay with ChatGPT</p> <p>Semi-structured interviews</p>	<p>In examining how students integrated ChatGPT into their learning processes, it was observed that high school students primarily used the tool to generate information, discover unexpected insights, and support routine academic tasks.</p> <p>The study also emphasizes the importance of creating meaningful and intentional opportunities for students to engage with generative AI. Such interactions can promote the development of AI literacy and help students build constructive relationships with these technologies as part of their learning journey.</p>
<p>7. Beware of metacognitive laziness: Effects of generative artificial intelligence on learning motivation, processes, and performance.</p> <p>(Fan et al., 2025)</p>	<p>2 ways of motivation - extrinsic and intrinsic</p> <p>Self-regulated learning</p> <p>Metacognitive laziness</p>	<p>Randomised experimental study and compared learners' motivations, self-regulated learning processes and learning performances. A total of 117 university students</p>	<p>The study demonstrates that ChatGPT can significantly improve essay performance, even surpassing groups receiving guidance from human experts. However, it found no meaningful differences in overall knowledge acquisition or the ability to transfer learning, suggesting that while ChatGPT may enhance immediate task results, it does not necessarily support deeper motivation or long-term educational development.</p> <p>A key concern emerging from the findings is the risk of learners becoming overly dependent on AI, which could lead to a decline in metacognitive engagement. This overreliance may reduce students' ability to think critically, self-regulate, and actively participate in their own learning processes.</p>

8. How Generative AI Influences Students' Self- Regulated Learning and Critical Thinking Skills? A Systematic Review. (Sardi et al., 2025)	The impact of generative AI on SRL (self- regulated learning) and CT (critical thinking) is summarized	PRISMA literature review	Tools like ChatGPT can support students in overcoming specific learning obstacles, such as difficulties with time management or understanding complex material, by offering personalized feedback and adaptive learning strategies. ChatGPT also plays a role in fostering critical thinking by prompting students to reflect on their reasoning, explore different viewpoints, and engage more deeply with analytical tasks. However, students who engage with AI in a passive manner may miss valuable opportunities to strengthen their critical thinking abilities.
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Table 1: Literature study

3.3.1 Research Gap

Our study of the literature, both systematic and exploratory, revealed a substantial body of research on the integration of GenAI in the educational system, particularly focusing on its application by teachers and the policy measures adopted by educational institutions and governmental bodies. However, there appears to be a notable gap in the existing studies regarding students' perceptions of - and interactions with - GenAI. There is a clear prioritization of research focused on higher education. Researchers are increasingly directing their efforts toward exploring how GenAI can benefit the educational program and self-regulated learning in higher education. There are also studies focusing on K-12 education (Kindergarten to 12th grade). Our study is particularly relevant to students in grades 10-12, which corresponds to the Danish gymnasium level. However, there is a lack of specific research targeting this exact age group. A lot of the literature mentions that there is a need for more empirical data on the subject, which is a reason for us to go out in the field and get knowledge of how the students are using ChatGPT in their everyday lives.

4. Methodology

We will now delve into our methodological approach which includes literature search, two workshops on two different gymnasiums and group interviews with students from one of the gymnasiums. We will start by delving into the structure of our literature search and then move on to our fieldwork.

4.1 Literature Search

This section outlines our literature search process, incorporating both unsystematic and systematic search methods. The systematic approach includes details on the database consulted, search strategies employed, and the inclusion and exclusion criteria applied. Additionally, a block search strategy was used to structure and refine the search process by dividing key concepts into separate components. A PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flowchart was also utilized as a framework to document and guide the search process systematically.

Our literature search began with an unsystematic approach, also known as deliberate random search, to explore and gather inspiration on GenAI in the education sector. This method is useful for gaining an overview of existing knowledge, conducting broad searches, and identifying key themes. It is quick and dirty meaning that it's easy to perform but also gives an unfocused search (KP Bibliotek, 2025). This unstructured literature search gave us knowledge on what to include in the systematic literature search.

4.1.1 Block Search Strategy

The table below presents our block search strategy in Scopus, detailing the search terms and results. Employing a block search strategy streamlined the search process, allowing us to assess the impact of each search iteration. The search blocks were adjusted as we analyzed their effects on the results.

Database:	Search field:	Search field:	Search field:
Scopus	“GAI” OR “Generative AI” OR “Gen AI” OR “GenAI” Results: 12.020	“AIED” OR “Education” Results: 2.855.759	GAI” OR “Generative AI” OR “Gen AI” OR “GenAI” AND “AIED” OR “Education” Results: 2.539

Table 2: Block search strategy

After delving into these results and filtered it to see the most citations, newest and most relevant there was a clear tendency that the results were focused around higher education. We changed our search on Scopus to have another section being - AND NOT - and typed in “Higher education” to exclude these results and narrow our literature search. Our main focus is gymnasium and thus not higher education, the result after this exclusion was 1.747.

To narrow it further down to our criteria and therefore match our field of research we included an - AND - section being “ChatGPT” in the search on Scopus.

Database:	Search field:
Scopus	“GAI” OR “Generative AI” OR “Gen AI” OR “GenAI” AND “AIED” OR “Education” AND “ChatGPT” AND NOT “Higher education” Result: 766

Table 3: Result of block search strategy

The result after this final search was 766 and afterwards we had some inclusion and exclusion criteria.

4.1.2 Inclusion- and Exclusion Criteria

We will show our criteria we have used to narrow our search and why we have made these exact criteria in our literature search in the table below.

Criteria	Description
Publishing year 2023 - 2025	No papers matching the search from before 2023. ChatGPT came out in November 2022 and all material on Scopus has to be peer-reviewed thus no material was published before 2023.
Exclude all non-English results	The ability to understand the text.
Include only articles	We are excluding everything else than articles because we don't want to manually sort out conference papers, notes and stuff.
Include only social science subject area	We only want social science articles because our study is focused on the human use of the technology and not the technology itself. The main subject areas which are excluded are Computer Science (136 articles) and Medicine (57 articles).
Include articles from Denmark only. (Deleted again because of a too low result)	Our research is about Danish gymnasium students, so we wanted to find out if there were any articles from Denmark. The search only gave 2 articles and one of them was about workers and the other had a lot of international universities in affiliation.

Table 4: Inclusion- and exclusion criteria in our literature search

Following these criteria, we refined our literature search to 296 articles. Subsequently, we conducted a manual screening of article titles to identify those most relevant to our study. Despite the application of predefined criteria, some articles focusing on higher education remained in our selection. This is due to the search strategy, which primarily considers article titles, abstracts, and keywords; if an article does not explicitly mention "higher education" within these sections, it may still be included in the search results. Studies about medicine can also be there because we only excluded medicine as a subject area but medicine articles can also be in the social science area. Throughout the screening process, we applied a strict and rigorous selection approach. This study is not solely based on a literature search but is combined with fieldwork data. Thus, a strict and selective review of the literature was necessary to keep the scope manageable. This approach allowed us to gain insight into existing research and to determine our position within the field.

The PRISMA-flowchart below, shows our process and selected number of articles, from the systematic literature search, included in our study.

4.1.3 Prisma Flowchart

The PRISMA flowchart effectively illustrates the flow of information in a systematic search, mapping the number of results retrieved and those excluded.

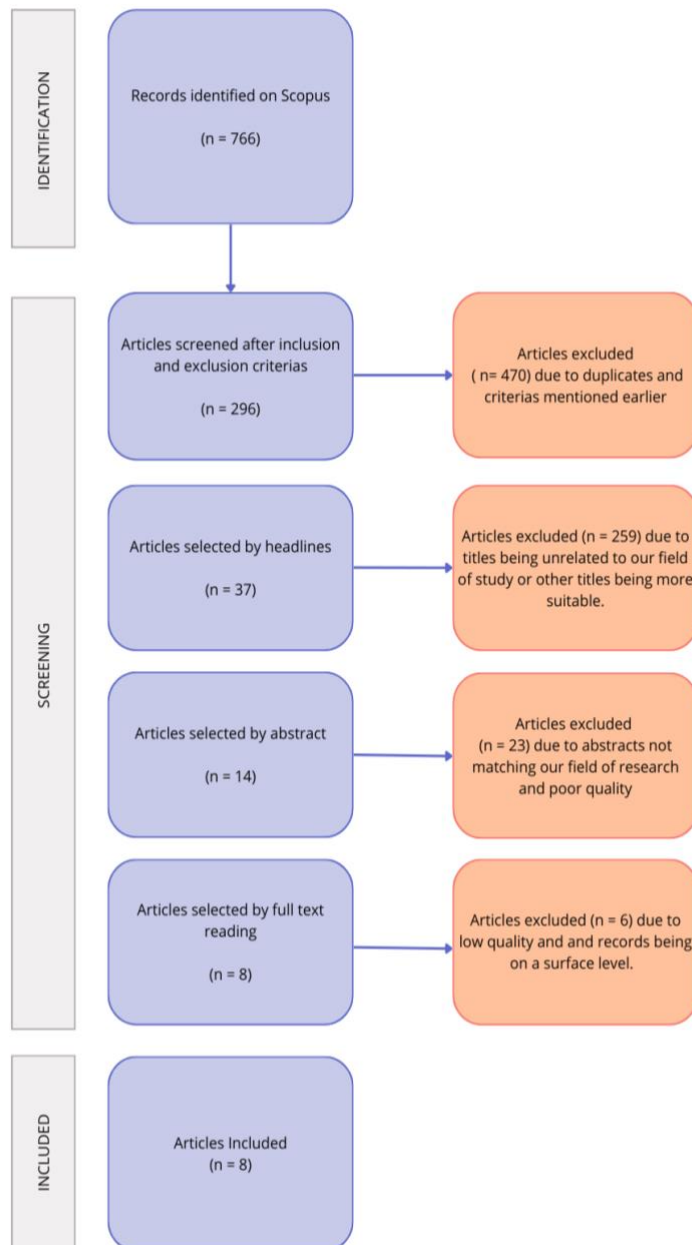


Figure 3: PRISMA flowchart showing the screening and selection process of articles

The figure illustrates the exclusion process and indicates at which stages articles were removed. A large number of articles were excluded during the title screening, with additional exclusions made during the abstract and full-text reviews. This process resulted in a final selection of eight articles included in the literature study.

4.2 Fieldwork

Our fieldwork was conducted at two gymnasiums: Solrød Gymnasium (in a 2nd-year class) and Københavns Åbne Gymnasium (in a 3rd-year class). Searching for access to gymnasiums we looked to our personal networks where we had personal relations to two gymnasium teachers. Both teach the subject of social science, one at Københavns Åbne Gymnasium and one at Solrød Gymnasium.

Our plan was to follow an iterative process, visiting each school more than once. However, due to the tight exam-oriented schedule of the 3rd-year students, we were only able to revisit Solrød Gymnasium. The fieldwork is conducted in Danish because it's the used language of the informants. This was to get past any language barriers there would be if it was done in English and to make a safer space for the students to talk in. The teacher - our gatekeeper - didn't want to participate in Solrød which helped to create a safer space for the students around the ChatGPT subject, and we chose to do the same at Københavns Åbne Gymnasium. In total, we conducted fieldwork at Solrød Gymnasium twice and once at Københavns Åbne Gymnasium between February and April 2025.

4.3 Workshop

The purpose of our first meeting with the gymnasium students in the field was to gain insight into their understanding of ChatGPT, as well as their immediate relationship with using the technology. We were given a module equivalent to 100 minutes. One of the teachers mentioned that she would combine our visit with a focus on quantitative and qualitative methods. Therefore, in true quid pro quo style, we designed the workshop activities to include both a qualitative and a quantitative method. Including both qualitative and quantitative methods provided a more comprehensive understanding of our topic. Quantitative methods offer measurable and generalizable data and give a good overview of the students' use, while our qualitative methods added depth and context. Together, they strengthened the validity of findings and allowed us to explore both patterns and underlying reasons. This approach emphasized that qualitative and quantitative methods should not be viewed as opposites, but rather as complementary tools that - when used appropriately - can enrich one another and contribute to a more holistic understanding of the subject and creates methodological triangulation (Frederiksen, 2020).

4.3.1 Part 1: Dixit Cards

The first part of the workshop aimed to get students to articulate their own immediate perception of the technology. We chose to use Dixit Cards as a tool for the students to be exploratory and create storytelling. Dixit Cards present drawings with various colors and more or less abstract motives where meaning is open for interpretation (Kwiatkowska et al., 2014). In groups of 4-5 students, they took turns selecting cards that spoke to them in relation to the question: *What is ChatGPT for you?* They had to describe what about the card that made them think of ChatGPT and preferably tell a story related to why they identified with the cards. The purpose of using the Dixit Cards was to make a broad question easier to articulate by concretizing it with the cards, which are abstract enough that their motives and colors are open to the students' own interpretation and experiences.

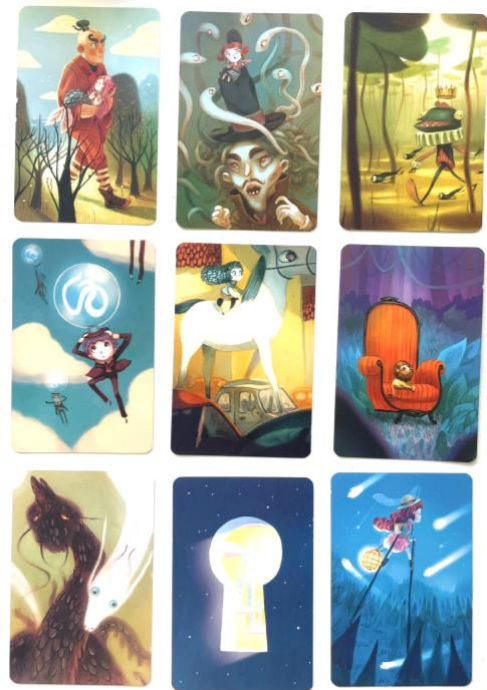


Image 2: Nine different cards from the game Dixit.

There were 84 different cards distributed in random stacks among the groups, providing them with 10-14 cards to choose from. The diversity of available cards across groups is not as important, as what the cards reflect. It is an internal perception, which is not made visible to the student through the specific motive but rather through the free associations with the elements that occur in the eyes of the beholder (Kwiatkowska et al., 2014).

The dialogues within the groups should help initiate reflections on GenAI by allowing students to express their thoughts in new ways about something as ‘black-boxed’ as ChatGPT, as well as enabling them to relate to each other’s associations. When we were creating several smaller groups in the classroom we were aware that it’s impossible for us to collect all the empirical data in the minor groups, such as the discussions and stories behind the selected cards. To try and get a full picture of this exercise we split up so one of us could go join a group to get the full participating experience of the exercise first hand. The other one had a more overall agenda to look at the whole class and try to listen to more than one group's engagement with the cards, keep track of time, and make sure the exercise was running accordingly. During the first workshop we revised the roles. After a few minutes we figured it didn't make sense to stand up

looking like a teacher keeping watch and decided to walk around and join different groups. This method is called participant observation and is used to gain in-depth insight into human behavior, social interactions, and everyday life but still have a distance to keep focus on the research question and to write notes down (Szulevicz, 2020).

We experienced that some groups didn't discuss each card much but went through the pile systematically with a couple of describing words and therefore quickly found themselves "done" with the exercise. Due to the exercise being done faster than we expected. We added a round with fresh cards to restart the exercise and added the task of agreeing on one card to present in front of the class after. This was both to keep them engaged but also for us to get insight in every group's thoughts and get the story behind the chosen card. We aimed to create a relaxed and informal atmosphere to encourage students to speak more casual and freely about their experiences with ChatGPT in a learning context.

4.3.2 Part 2: Mentimeter Live Survey

The second part of the workshop was a quantitative questionnaire designed to provide an overall insight into the students' use of ChatGPT and their thoughts about it. We chose to use the platform Mentimeter¹ so the questions and responses were displayed to the students in real time, allowing them to reflect on the different answers collectively. This also enabled us to ask follow-up questions, offering an opportunity to nuance the answers and have a plenum talk and discussion. The survey consists of 14 questions with different response options.

The first question was a follow-up on Part 1, where students wrote three words, they used to describe ChatGPT based on the Dixit Cards to create a shared word cloud. This served to wrap up the exercise while providing us with an overview and data. The remaining questions focused on the use of ChatGPT. Some questions were answered on a scale or through ranking, while others were yes/no questions or free-writing

Write the words you mostly used to describe the Dixit image card you chose.
47 responses

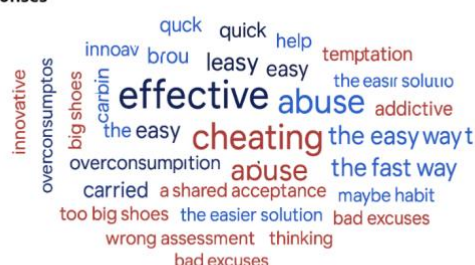


Figure 4: Word cloud from our Mentimeter survey at Solrød Gymnasium.

¹ Mentimeter is an online platform where students access the survey via a website and a code, allowing them to create an anonymous username and participate in the survey on their own devices.

responses. The questions were shaped by a desire to gain insight into: when students believe it is fair to use, the reasons they recognize for using it, the emotions they associate with usage or non-usage, and what they believe they gain from using ChatGPT. A quantitative questionnaire limits qualitative nuances. Instead, we used it as inspiration and insight to shape the questions for subsequent qualitative interviews with students and got an indication of whether there is a collective understanding and use of ChatGPT within a class or if it varies. Students may also be challenged to reflect on their own relationship with ChatGPT and gain insight into what their classmates do and think about its use. The online live element of the survey clearly made some students look at the screen to see and comment on what others had already answered, making the first responses potentially shaping how the later respondents replied. The live overview of the responses made it very dynamic as well.

4.3.3 Part 3: Creating Arguments

The last part of the workshop was a plenum debate in class about arguments from the devil and the angel on the shoulder regarding generative AI. The class was divided in two halves representing two different sides of opinions. This exercise resembles a method the students are familiar with in the social science classes, where they are given a stand, in this case the good intentions and the bad intentions, and together in the two different groups, they had to come up with arguments to debate and discuss with the other group. The exercise aimed to provide us with an inside in what the students with their own words bring to the argument indicating what they find relevant and important in the debate, as well as giving them a space to discuss together after the two exercises. It was important for us to give them their own voice in the discussion about ChatGPT and get an insight into the moral considerations of the students.

4.4 Qualitative Interviews in Pairs

We did 3 x 30 minutes interviews with pairs of students at Solrød Gymnasium from the class we also had the workshop with. Having the interviews with two students at once was because we believed it would increase the likelihood that students would want to participate if they could do it together with a friend. We acknowledge that being in pairs could influence each other during the interview, but we felt that allowing it would make them more willing to participate and create a safer space. The six students were paired up by the teacher with consideration to their personal relationships.

The purpose of the interviews was to get insights into the actual interaction between the students and ChatGPT. We had prepared two different approaches to facilitating the interviews. The first one was an interview based on one of their previous ChatGPT-histories, and the second was an assignment, specifically answering the question; *How does ChatGPT work?* One of the reasons why we also had an assignment was because we wanted to give the students a choice to not show their chat-history if it felt too personal. As well as wanting to see how they would act in solving the assignment.

We had prepared a semi-structured interview guide with themes and questions, but with room for flexibility and follow-up questions along the way (Kvale & Brinkmann, 2015). This interview guide was made with knowledge from our workshop with the students. During the interviews we already had built up some rapport and could follow up on some of the findings we made in the workshop like digging deeper into when they are using ChatGPT and why. Upon arriving, we were shown to a meeting room the teacher had booked for us. It had a long meeting table and a more formal atmosphere than we had wished. We placed sodas for the students in the middle of the table and sat up our stuff in one of the ends resembling more of a round table feeling.

All six students agreed to the first part and opened their ChatGPT for us. One student didn't use ChatGPT, and the computer remained closed during the interview. For two of the pairs, we managed to also have time to test the assignment in the last part of the interview. Pair 1 was with two moderate users (student 1 and 2), pair 2 were with the non-user and a very active user (student 3 and 4), and pair 3 were with a moderate and very active user (student 5 and 6).

Non-user	Moderat user	Very active user
Have tried ChatGPT but do not use it for school work	Not using ChatGPT to generate text for hand-in assignments	Use ChatGPT for hand-in assignments often
Student: 3	Student:1 Student: 2 Student: 5	Student: 4 Student: 6

Table 5: Overview of how the interviewed students use ChatGPT

A challenge about having the interviews in pairs was that when we wanted to talk about specific prompts and contexts it was restricted to one student at a time. Naturally, the conversation moved away from the concrete examples on the screen when a topic became a conversation where both students participated. Being in pairs made it possible for the students to nuance each other's answers and add additional examples to the other's statements. We gained insight into what the participants agreed and disagreed on, and how opinions were shaped collectively - which was useful when exploring attitudes and values. However, there may also be a fear of expressing one's opinion in front of friends (Halkier, 2020). The students also asked each other questions about how they perceived the rest of the class' use of ChatGPT. In some instances, they also confirmed each other's statements which also indicated a possibility of just agreeing to agree, or a possibility that things they each would have highlighted individually did not come to light in the specific dynamic of the pair. This way of doing the interviews made it possible for us to observe the interaction between the students and not only one student's answers.

The interviews were recorded with the students' consent and later transcribed using the online transcription tool 'GoodTape'. However, since the recording included four different voices, the tool struggled to produce an accurate transcription. As a result, we afterwards manually transcribed with meaning condensation to summarize the interviewees' statements and coded them into themes (Kvale & Brinkmann, 2015).

We actively use the empirical data from the workshops and interviews throughout the analysis, and when quotes, graphs or other fieldwork material appear in the text, they have been translated from Danish into English – by the authors with help from ChatGPT. All material in their original language can be found in the appendix.

5. Theory

In this section, we present the theoretical frameworks used in this investigation of gymnasium students' relation with ChatGPT. We have chosen to do a *bricolage* of concepts to combine, to support multifaceted nuances and levels that we find relevant in the analysis. The rationale of the bricolage is to assemble existing, finite, and concrete things anew (Botin & Børsen, 2024). We draw on Hartmut Rosa's theory of resonance and social acceleration (2019) in conjunction with Gadamer's fusion of horizons (Vessey, 2009), and postphenomenology's perspective on the technological mediation of the world where various takes on the human-technology-world relation are presented and combined. All theoretical approaches are rooted in phenomenology, where the subject's embodied experience is constituted in relation to the object that mediates their understanding of - and being in - the world. Within phenomenology, knowledge of our being-in-the-world is connected to our existence through experiences, perceptions, and actions (Sjørølev, 2017). We therefore aim to understand the phenomenon of ChatGPT in relation to gymnasium students based on their experiences, perceptions, and practices with the technology.

We will begin by presenting Rosa's theory concerning our relationship to the world, particularly the concepts of *social acceleration*, *alienation* and *resonance*. This will serve as a foundation for exploring ChatGPT as a technological phenomenon within the lifeworld of gymnasium students in late modern society. Following this, we will delve into Gadamer's *fusions of horizons* followed by relevant postphenomenological analytical concepts such as *intentionality* and *intersubjectivity* in the realm of generative AI technologies. Finally, we will briefly outline the interplay between these theoretical perspectives and present a model that combines the perspectives we have found and presented along the way and relate this to the field of *posthuman learning* presented by Hasse (2019).

5.1 Social Acceleration

Hartmut Rosa's *Social Acceleration Theory* described in his book '*Resonance: A Sociology of Our Relationship to the World*' (2019) claims that modern life is driven by an ever-increasing pace of technological development, social relationships, and economic processes. Modern society is defined by *dynamic stabilization* where growth is needed just to maintain the status quo. In other words, it is a mode of reproduction where we need to run faster to maintain the structures of society (Rosa, 2019). Rosa argues that this mode of reproduction entails that we constantly strive to improve our lives through efficiency and optimization, but paradoxically,

this acceleration often creates *alienation* - a sense of meaninglessness and indifference also referred to as burn-outs. Rosa identifies three forms of acceleration:

- *Technological acceleration* being innovations designed to save time but often leading to even greater busyness.
- *Social acceleration* being faster shifts in social structures, norms, and relationships.
- *The pace of life rhythms* is the experience of having less time, even though we technically have more time-saving technologies (Rosa, 2019).

In relation to our focus on ChatGPT in youth education it is interesting to connect how technological acceleration can result in a state of alienation, where the students can feel disconnected from the world, from each other, and even from themselves. Most importantly, how this alienation can be counteracted. To understand how people can regain a sense of connection, Rosa introduces the concept of *resonance*.

5.1.1 Resonance

Resonance is described by Rosa as the counterpart to alienation. Resonance is a relationship to the world formed through affect and emotion in which the subject (humans) relate to the world in a way that answers them - or resonates with them - making them feel seen, heard, and moved by what we engage with. The relation of resonance therefore always has a bodily, sensory basis (Rosa, 2019). Rosa describes the dual movement as something that touches us from the outside - affection directed towards the subject. We answer by giving a response and thereby making a connection - emotion directed towards the world. It is a state of mutual responsiveness, where we affect and transform the experienced world, and the experienced world affects and transforms the subjects.

“The core idea here is that two entities in relation, in a vibratory medium (or resonant space), mutually affect each other in such a way that they can be understood as responding to each other, at the same time each speaking with its own voice.” (Rosa, 2019, 167)

Rosa uses an anagram of a tuning fork to describe the voice of resonance. Like a tuning fork it is not simply an echo received but a response with *its own voice*. Having a voice of its own depends on it being perceived as *other*, as something that is self-contained. According to Rosa, resonant relations shape and transform subjects' relational abilities, identity formation, and their

sense of connection to - or place in - the world. Rosa aims to make an intangible concept as resonance a bit more concrete and easier to tackle by introducing the three dimensions of resonance as the social conditions where subjects individually and in groups typically experience resonance.

- The horizontal, *social axis of resonance* that connects us to other humans in modes of love, friendship and democratic citizenship.
- The diagonal, *material axis of resonance* that connects us to objects in modes of work, education, sport, and consumption.
- The vertical, *existential axis of resonance* that is the connection to the world, universe, nature, or life as a whole that are established through religion, art, history, or nature for instance (Rosa, 2019).

Resonance depends on establishing vibrating resonance axes across dimensions. Resonance being a relation means that it is not constant but depending on specific contexts and has a moment-like character.

“The category of resonant experience essential to our sociology of human relationships to the world can nevertheless be understood as a three-note chord consisting of the momentarily converging movements of body, mind, and tangible world. This motion can be initiated or encouraged, but also inhibited or obstructed by any of the three elements involved.” (Rosa, 2019, 169)

An important element to highlight is that resonance and the mutual transformation are elusive and beyond the control of the subject. We humans cannot control what affects us or how it affects us and nonetheless predict when moments of resonance occur. This means we are unable to create a moment of resonance instrumentally when we want to, because resonance is not an echo under our control (Rosa, 2019).

We will look into what is vibrating and what is mute when ChatGPT is introduced in the gymnasium classroom at different moments. Resonant vibrating axes are challenged in modern society and described as a resonant crisis with blocked axes.

5.1.2 A Resonance Crisis

According to Rosa, the modern world has become hostile to resonance because our institutions are designed for optimization and efficiency rather than creating conditions for meaningful experiences. This leads to an existential crisis - or a resonance crisis - making it difficult for us to find meaning in our lives. In the article '*The Idea of Resonance as a Sociological Concept*' (2018), Rosa argues that our society should be structured to support resonance rather than merely maximizing efficiency and growth. To do so, we have to rethink how we define the good life. Dynamic stabilization has the potential for systematic undermining when subjects are forced to reify relations to objects and subjects to increase their resources and possibilities. When we implicitly believe that the good life and finding our place in the world rely on making more of the world available, attainable and accessible it is up to us to always make the most opportunity-optimizing choice to not be limited in achieving the good life (Rosa, 2019). Rosa also argues that "*We can not compete and resonate simultaneously.*" (Rosa, 2018, section 12). If we are not open to being transformed in an unpredictable way, stressed, full of fear, or focused on a certain result, resonance is not possible. Time pressure and fear are drivers to prevent resonance and reinforce alienation. We will be looking at how the structures in the gymnasium life of the students help to initiate or inhibit potential vibrating resonance axis and what role ChatGPT plays in opportunity-optimization for the students.

Resonance involves a transformative relationship between the subject and the perceived world. To understand how such transformation unfolds, we turn to Gadamer's hermeneutic concept of the fusion of horizons.

5.2 Fusions of Horizons

The concept of *fusion of horizons* originates in the hermeneutical philosophy of Hans-Georg Gadamer and is endorsed by David Vessey in '*Gadamer and the Fusions of Horizons*' (2009).

Before delving into the concept of fusion of horizons, we will first elaborate on Gadamer's interpretation of understanding as a continuous, circular process, as illustrated by figure 5. Parts of pre-understanding are perceived to form a whole, which transform into a new

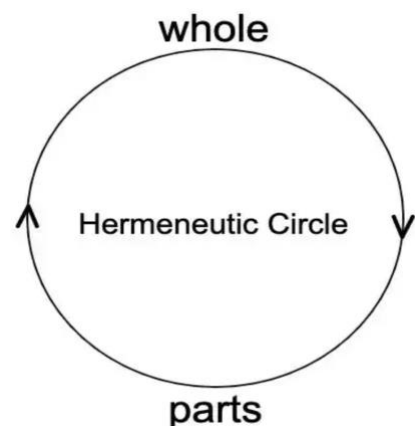


Figure 5: The Hermeneutic Circle (Figueiredo, 2023)

understanding and in turn becomes a new part of an ever-evolving whole as understanding unfolds (Figueiredo, 2023).

Fusion of horizons describes the process by which understanding deepens through dialogue between differing perspectives - different horizons - shaped by differing historical, cultural, or personal contexts. At its core, a horizon refers to the scope of what one can perceive, interpret, and understand - both in a literal and metaphorical sense. Our horizon is framed as; "*The horizon is everything we are aware of in the perception of an object above and beyond what is given directly to our senses.*" (Vessey, 2009, 534). The horizon includes all the assumptions, beliefs, experiences, and cultural frameworks that shape how we interpret texts, objects, and events both regarding what we can sense and what is beyond our sensing. In other words, our pre-understanding.

Gadamer, following and extending Husserl's '*Ideas: general introduction to pure phenomenology*' (1913), sees horizons as dynamic rather than fixed. For Husserl, a horizon gives perspective, it situates objects in a meaningful world. Gadamer builds on this by arguing that understanding arises not from neutral observation, but from the meeting of horizons: our own and the subject or *Other*. Understanding is therefore never objective or detached; it is always mediated through one's horizon (Vessey, 2009). True understanding involves encountering the *Other*, not just abstractly, but through real engagement. In this encounter, one experiences resistance and difference, which challenge familiar beliefs. This friction is vital and without it we remain enclosed in our assumptions. Gadamer warns that; "*A person who has no horizon does not see far enough and hence overvalues what is nearest to him.*" (Gadamer in Vessey, 2009, 538).

Lacking a sense of historical or cultural context makes a person unable to weigh the significance of the subject of matter to the greater context. In the case of gymnasium students' engagement with ChatGPT the students have a horizon of their own shaped by their assumptions, beliefs, experiences, and cultural frameworks that shape their interpretation of what ChatGPT presents as the *Other* horizon. Fusion of horizons occurs when one becomes aware of how different contexts can give rise to different interpretations and a change of understanding. The fusion of horizons is described as; "*Horizons fuse when an individual realizes how the context of the subject matter can be weighted differently to lead to a different interpretation from the one initially arrived at.*" (Vessey, 2009, 540)

In recognizing the limits of one's initial understanding, one can integrate or surpass that limited view into a broader one. This doesn't mean abandoning one's perspective but rather expanding it to include alternative understandings. The result is not merely a compromise between views, but a transformation of understanding - one that acknowledges difference, respects context, and allows for growth.

The fusion of horizons parallels Rosa's resonance theory, where the subject and the *Other*, each with their own voice, affect and transform one another with an alternative understanding and meaningful experience. We have illustrated the transformative circular process in figure 6.

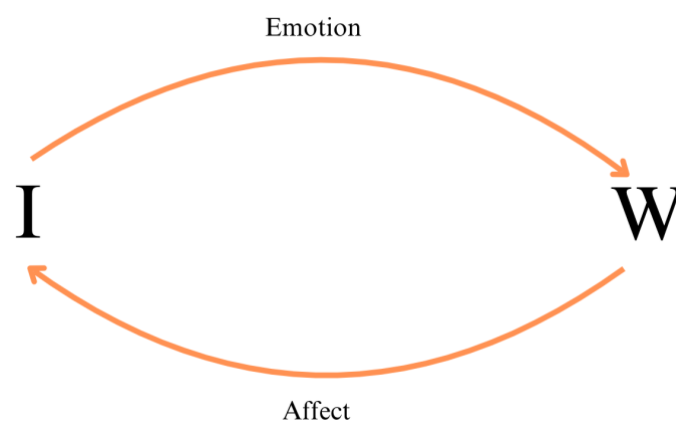


Figure 6: The 'I' and the 'World' transformed by affect and emotion.

The hermeneutic circle connecting the experiencing subject 'I' and the experienced world 'W' illustrates how a fusion of horizons transforms the understanding. The relational arrows can be understood as affect from the world when a horizon challenges the subjects existing knowledge, and as emotion when the subjects understanding is changed to an alternative that has given a new perception of the world experienced in the moment. Being in a mode of alienation - unable to be affected or transformed in one's relation to the world - means what is perceived doesn't change the understanding for the 'I'. In our investigation the students each have a normative inner horizon that is shaped by the greater historical and cultural context in their meeting with a horizon presented to them by ChatGPT. How the students adopt, surpass or fuse their existing knowledge and understanding with what ChatGPT presents to them shapes their interpretation of future experiences. To better understand what role technology plays in the meaning-making process of the students we turn to the concept of technological mediation that is the core of postphenomenology.

5.3 Postphenomenology

Postphenomenology is a philosophical approach that explores how technologies shape and mediate human experiences. Building on classical phenomenology, it emphasizes that we never relate to the world directly, but always through some form of technological mediation. Central concepts include *intentionality* being our directedness toward the world through technology, *multistability* being there can be more than a single meaning to a phenomenon, and *intersubjectivity* of how shared meanings are co-shaped by technology (Ihde, 1990). Rather than viewing technology as neutral or deterministic, postphenomenology sees it as a co-constitution where technologies are actively involved in shaping how we perceive, act, and relate to others (Kudina, 2021, 243). It is especially useful for analyzing everyday interactions with digital technologies like ChatGPT, where the human experience is deeply entwined with the technological system. Don Ihde is widely recognized as the creator of postphenomenology, having laid the foundation through his work on human-technology-world relations. Ihde made four different relations regarding the mediation of the world through technology (1990).

- *Embodiment relation* ($I - Technology$) \rightarrow *World*: illustrates how technology becomes a natural extension of our body without our notice like a pair of glasses you experience the world through.
- *Hermeneutic relation* $I \rightarrow (Technology - World)$: illustrates how technology serves as a lens through which we interpret and make sense of the world around us like a thermometer.
- *Alterity relation* $I \rightarrow Technology (- World)$: which refers to moments when we engage directly with a technology that mediates access to the world like an ATM.
- *Background relation* $I \rightarrow (technology -) World$: illustrates when technologies quietly shape our daily experiences, only drawing our attention when they stop working as expected like WIFI (Wellner, 2024, 166-168).

Peter-Paul Verbeek later expanded and adapted Ihde's framework, especially in relation to emerging technologies in '*Cyborg Intentionality: Rethinking the phenomenology of human-technology relations*' (2008). With the emergence of GenAI, new forms of relations of technological mediation are taking shape. Unlike earlier, non-generative technologies, GenAI is increasingly seen as participating in interpretation rather than merely mediating data and

thereby the world. In this context, we find inspiration in those who have worked on further developing these relational approaches, as we explore how they might be extended to account for the mediating role of generative technologies as ChatGPT.

To analyze the technological mediation in the student–ChatGPT–world relation and to understand the intentionality of this relation we draw inspiration from; Galit Wellner’s notion of the *relegation* relation (2024), Verbeek’s immersion relation with *bi-directed intentionality* (2015), Olya Kudina’s concept of the *hermeneutic lemniscate* (2021), and lastly Soraj Hongladarom and Auriane van der Vaeren’s idea of the *data-world* (2024).

5.3.1 Intentionality

Intentionality refers to the directedness of experience and traditionally in phenomenology it has been something that was attached to the human subject with the agency to direct attention to an object (Sjørølev, 2017). The human-centered narrative of the anthropocene is being challenged by including other entities than humans as the driving force in the world. Humans are not seen as in control over everything that surrounds us but more as a co-constitutor with technology and the planet (Soraj & Hongladarom, 2024). The change in the narrative opens up for a development on what has intentionality in relations, particularly with emerging technologies with generative capabilities as ChatGPT.

In ‘*Artificial Intelligence and the Need to Redefine Human Traits*’, Wellner focuses on how the intentionality between the ‘I’ and GenAI is reversed and previous human capabilities such as imagination and attention are delegated to the technology (2024). Wellner takes on what she frames as the “*postphenomenological challenge is to update the understanding of the lived experience in light of our new technologies.*” (2024, 165). Ihde’s traditional hermeneutic relation is illustrated as $I \rightarrow (Technology-World)$ where the human ‘I’ interprets the world through technology as the technology and world is perceived as one. In light of new generative technologies, Wellner questions the consequences for the phenomenological concepts of body and perception when our experiences of the world are based on AI-generated text and images instead (2024). Wellner uses *posthuman imagination* to illustrate the change in how human imagination moves from a point of view founded on the primacy of bodily perception to a layered mode. Imagination operates with different layers that can be combined and changed

into new ones. When the combining of layers is not done by the human subject solely but delegated to ChatGPT it is described as digital imagination by Wellner:

“This digital imagination operates not in accordance with the intentionality of the experiencing ‘I’. Moreover, it shapes perceptions in unexpected ways. Therefore, I suggested reversing the intentionality arrow:

$I \leftarrow \text{technology} \text{---} \text{world}$

I termed this new type of relations ‘relegation’ to denote a down grade of the human intentionality while hinting at Latour’s notion of ‘delegation’, according to which technologies take over and operate instead of the human actor.” (Wellner, 2024, 173)

With the reversing of the intentionality arrow the interpretation in the hermeneutic relation is changed, meaning it is not solely up to the human subject to interpret the meaning of the mediated data. It is rather imposed as a certain world view on the subject (Wellner, 2024). This change mediates our imagination differently as our role is to provide the GenAI with instructions to which different layers to combine, but with the digital imagination actually combining. The task of directing attention and thereby shaping our perception is delegated to technology and how the technology combines layers (of information) is beyond our sensing. The human ‘I’ perceives the data mediated by the technology as a layer to combine with our senses to compose our human experience similar to the fusion of horizons. For instance, the layer presented by ChatGPT to a gymnasium student is perceived by the student in relation to the greater context beyond the computer screen where it is read.

Recognizing how new technologies re-shape intentionality is highlighted by Peter-Paul Verbeek (2015) as well with the concept of the immersion relation with *bi-directed intentionality* illustrated as \leftrightarrow . With this two-faced arrow intentionality is both from the technology to the human as well as from human to technology. Humans direct their intentionality toward technologies and the world through technologies. At the same time, technologies direct their 'intentional structure' toward humans, as they shape our perception, understanding, and actions (Verbeek, 2015). Bi-directionality can on the one hand result in *reflexive intentionality* if the human is aware of how the technology experiences, then it opens a new relation to oneself. On the other hand, it can result in an *induced intentionality* if the technology gives feedback on human behavior unnoticed. There can be more or less balance in

the intentionality of human and technology when the relation is bi-directed. Reflective attention from the human towards how the systematic structures of a technology as ChatGPT experiences and interprets the actions of the user is crucial for the balance in the intentionality equations. To be in a *relegation relation* or a relation with *bi-directed intentionality*, then, is not to become powerless, but to become conditioned - to find the human subjects' imaginations already shaped in advance. Technologies such as ChatGPT do not simply extend human capabilities; they now preconfigure the forms those capabilities may take or - as described by Kudina - they constitute the subject as a subject.

5.3.2 Hermeneutical Lemniscate

Olya Kudina refers to the hermeneutical lemniscate in her article ‘“*Alexa, who am I?*”: *Voice Assistants and Hermeneutic Lemniscate as the Technologically Mediated Sense-Making*’ which is about digital voice assistants (DVAs) like Alexa or Siri acting as more than just tools or neutral devices (2021). Instead, they are active participants in meaning-making, mediating how users interpret themselves and the world. Drawing on the concept of the hermeneutic lemniscate, Kudina frames the interaction between humans and DVAs as a loop of interpretation that goes both ways. This frame is applicable to GenAI as well because it also has an activeness in the meaning-making and mediation of the world.

The hermeneutical lemniscate is a valuable model to draw inspiration from when analyzing how ChatGPT is in a never-ending loop mediating how the students interpret the world through ChatGPT. Meaning-making is a collaborative process involving both humans

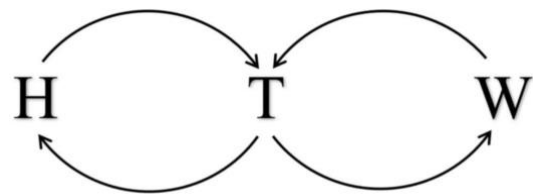


Figure 7: The hermeneutical lemniscate (Kudina, 2021)

and technology, where technology also responds to feedback from the world-making, all three is co-producing the creation of meaning. This explains the circular back and forth movement where they continually are interrelated and affecting one another. This perspective views interpretation as a dynamic and shared process, where no actor - human, technology, or world - holds a privileged position. As a result, the human is not necessarily the starting point in the interpretive loop of the lemniscate, and technology is not necessarily at the center. Interpretation is always contextual, because the meaning we make is shaped by the specific situation we are in. Meaning is never made in isolation; it emerges through a back-and-forth

process shaped by who or what is involved, where it takes place, and the historical and cultural knowledge brought into the situation (Kudina, 2021).

5.3.2.1 Shaping Moral Values

An interesting perspective with the lemniscate is the focus on how technologies mediate morality framed by Kudina and Verbeek as; “*If ethics is about the question of ‘how to act’ and ‘how to live,’ and technologies help to shape our actions and the ways we live our lives, then technologies are ‘actively’ taking part in ethics*” (Kudina and Verbeek 2019, 297 in Kudina, 2021, 236). The co-constitution with the circular process of experience and practice in the human-technology-world relation illustrates how our actions are shaped by our experiences that are mediated by technologies. Therefore, how we are able to act and choose to act is a symbol of what we find intuitive moral in the specific context. Kudina exemplifies this with how DVA’s and privacy concerns gave rise to moral actions as: either accepting the third party listening as an inevitable trade-off, refusing to use it, or creative appropriation hacks as feeding it white noise (Kudina, 2021). Regarding human values we draw inspiration from the definitions in Friedman and Hendry’s “*Value Sensitive Design: Shaping Technology with Moral Imagination (2019)*”. The values we are introducing throughout our analysis are *identity, autonomy, ownership, accountability, trust and universal usability*.

Technologies do something more than what they are designed for and recognizing their participation in how we reevaluate our moral values and actions is important in assessing the technology. It is a ‘we’ in phenomenology, due to the concept of *intersubjectivity*, the idea that our understanding of the world is not formed alone, but through interaction with others. We experience the world together, in a shared way, even before we reflect on it. In essence, intersubjectivity is about the co-constitution of meaning through the mutual sharing of perspectives. It underscores the idea that much of our understanding of the world is not formed in isolation but through dynamic social interactions that enable us to reach common ground. Whether in everyday conversation or in classroom learning (Moran, 2012). Even though the mediation and meaning-making is an individual situated context the relation and impact on moral values indicate a shared understanding that does not only apply to a single individual.

The lemniscate concept together with co-constitution of experience and moral practice is relevant when we look at what values ChatGPT participates in making-sense-of and

renegotiating in the different situations in everyday lives of gymnasium students. Additionally, we include the concept of *(Data-)world* presented by Soraj Hongladarom and Auriane van der Vaeren in their 2024 article: '*ChatGPT, Postphenomenology, and the Human-Technology-Reality Relations*'.

5.3.3 Dataworld

Hongladarom and van der Vaeren argue that ChatGPT performs a form of hermeneutics in its interaction with users. ChatGPT mediates a dataworld - a constructed representation of reality based on the dataset it was trained on and the methods used (2024). As a GenAI, it interprets input prompts through its internal algorithmic relations, producing personalized and context-sensitive responses. This process goes beyond mere probability calculations; it constitutes a kind of interpretive work where ChatGPT contributes to the user's understanding of the world. ChatGPT introduces a second layer of interpretation where it performs a kind of internal hermeneutic activity, relieving the user of part of the interpretive burden and acting as a co-interpreter. Though it does not understand in the human sense, its operation implies a minimal form of meaning-making necessary for interaction (Hongladarom & van der Vaeren, 2024). The authors illustrate the relation as:

$I \rightarrow \text{ChatGPT} \rightarrow (\text{Data-})\text{World}$

The relation illustrates ChatGPT as a mediating layer between the 'I' and the (Data-)World with intentionality from the 'I' to ChatGPT but also intentionality from ChatGPT to (Data-)world. This illustrates how ChatGPT's intentionality as hermeneutic action influences what part of the (Data-)world is (re)presented to the 'I'. This view on the relation does not have bi-directed intentionality as the hermeneutic lemniscate relation. What the concept of the (Data-)World contributes with - that is relevant for our analysis - is how the layer represented by ChatGPT can help us understand what takes place in the circular process between ChatGPT and the world within the lemniscate. We can use the programmed structure of how the model works to better understand what is interpreted with digital imagination as the answer to a prompt when students engage with ChatGPT. Having presented all the concepts, we find relevant to nuance the following analysis, we have bricolaged them in a model all working together.

5.4 Our Bricolage: Ellipse of Technomediated Experience

We have created a figure that integrates the different theoretical concepts of technological mediation and meaning-making of the world, that we will present step by step combining the various concepts.

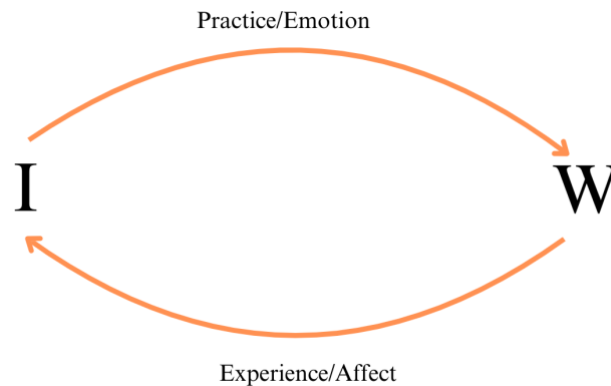


Figure 8: First step of our model: The 'I' 'W' ellipse

Firstly, we have Gadamer's hermeneutic circle with Hartmut Rosa's concept of affect and emotion previously shown. In this model the co-constitution of experience and practice is added. We see them as having a similar understanding of how we interpret and act in the world as a circular process where transformation is the outcome. What we experience, how it affects us, and how our understanding shapes a new understanding, that is acted out with emotions and practice. This provides the framework to investigate how students' actions reflect their understanding and moral emotions, and how these are shaped by their perception and experience of how new understandings of the world are presented to them in an ongoing loop. Specifically, how the students' patterns of ChatGPT use are shaped by new understandings from experience in situations where it is meaningful for them. It can bring momentarily resonance with fusion of horizons, or it can bring alienation from learning.

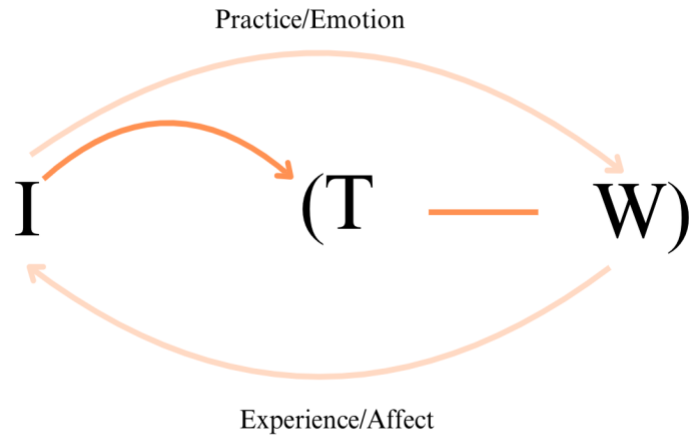


Figure 9: Second step of our model

Next step we turn to how adding the postphenomenological technological mediation relation inside the ellipse to illustrate how the world is perceived through technological mediation. Ihde's hermeneutic relation is the starting point, but as we have shown earlier there are additional arrows to be added with a generative technology.

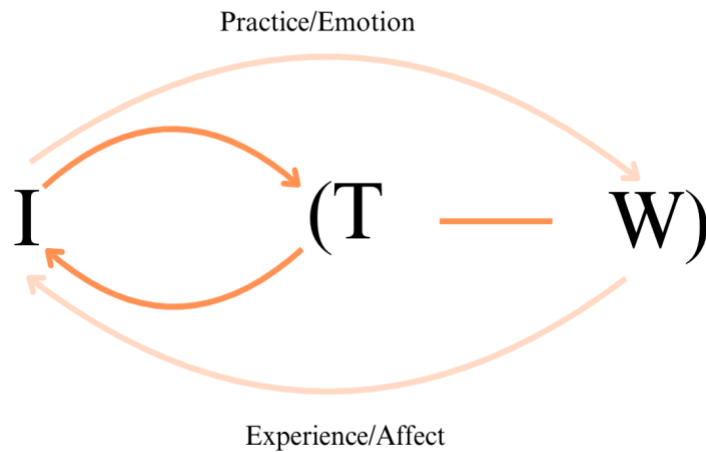


Figure 10: Third step of our model

The circular process of intentionality between the 'I' and the technology is added in this step. The lower arrow illustrates how a part of the meaning-making is delegated to the technology by the 'I'. The relation with bi-directed intentionality opens up for an investigation of: what is delegated, how it shapes human understanding afterwards, and if the students reflect on how they are experienced by the technology.

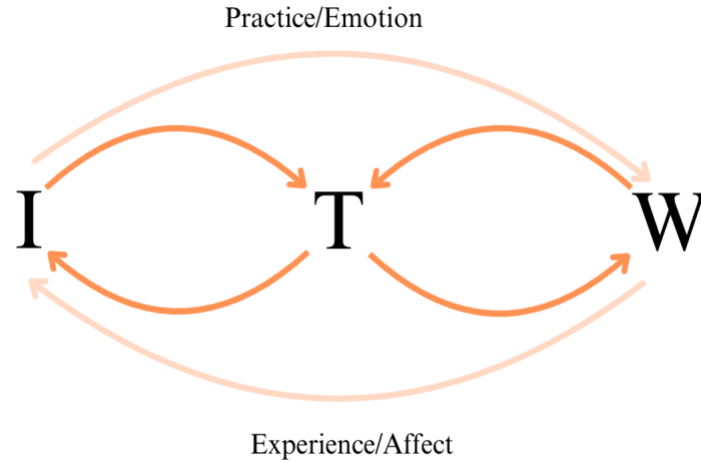


Figure 11: Fourth step of our model

It is not only between the ‘I’ and ‘technology’ a circular process of intentionality occurs as presented by Kudina who argues that the ‘technology’ also has a bi-directed relation to the world as the world affects how the technology works and what it mediates. The lower right arrow between ‘technology’ and the ‘world’ is a relation that is shaped by technical features and datasets. The upper right arrow is how the world’s data is getting presented first to the technology and then through the technology to the ‘I’. It means that the meaning-making of what is mediated is not a linear process but a dynamic process between ‘technology’ and the ‘world’ that is hidden from the experiencing ‘I’.

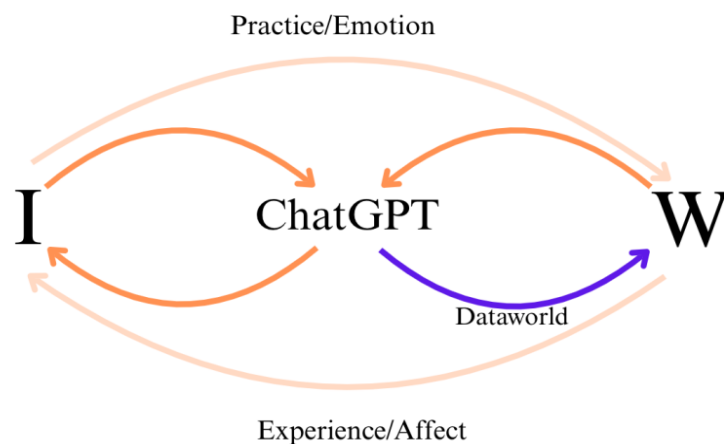


Figure 12: Our model: Ellipse of Technomediated Experience (ETE)

Lastly, looking at the *Ellipse of Technomediated Experience* model with ChatGPT as the technology, we add the dataworld that Hongladarom and van der Vaeren argue is the layer that ChatGPT interprets. We suggest that dataworld lies in the lower right part of the lemniscate with default settings, options and databases. In technological mediation the experience of the

world presented by ChatGPT is constituting the world through a dataset of text and probability.

An important factor to consider is how technological mediation shapes meaning-making in learning environments where human students are intended to learn and already engage with emerging technologies like ChatGPT - a setting Cathrine Hasse (2019) describes as *posthuman learning*.

5.5 Posthuman Learning

In the article ‘*Posthuman Learning: AI from Novice to Expert?*’ Cathrine Hasse examines whether artificial intelligence can truly emulate human learning (2019). Hasse critiques the traditional view that AI can achieve human-like expertise through rule-based learning, as proposed by Hubert and Stuart Dreyfus. Stuart and Hubert Dreyfus’ model from the article “*Five-Stage Model of Adult Skill Acquisition*” (Dreyfus, 2004 [original work published 1980]) outlines how humans progress from rule-following beginners to intuitive experts through five stages of skill development:

- *Novice*: Learners rely on context-free rules provided by instructors. They follow instructions without understanding the situation fully. Performance is rigid and limited.
- *Advanced Beginner*: Learners gain real-world experience and start recognizing situational aspects. They rely on general guidelines rather than strict rules but still need guidance.
- *Competent*: The learner faces complexity and must select relevant information and actions. This stage requires planning and personal judgment, leading to emotional investment and responsibility.
- *Proficient*: The learner begins to see situations holistically and intuitively grasps what is important. But, decision-making still requires conscious deliberation and occasional fallback on rules.
- *Expert*: Actions become intuitive and automatic. Experts immediately recognize what to do based on deep experience and nuanced understanding, even without conscious thought or analysis.

(Dreyfus, 2004)

Hasse argues that human learning is inherently uncertain, context-sensitive, and intuitive and deeply rooted in socio-cultural and material experience. Drawing on theories from Vygotsky, Karen Barad, and Don Ihde, Hasse emphasizes that learning is a collective, materially grounded process. Until AI systems can engage in socio-cultural materiality, achieving genuine human-like learning remains unattainable (Hasse, 2019). Central to this framework is the idea that machines do not learn like humans because they operate through fixed algorithms devoid of embodied and socio-cultural context. Unlike humans, who navigate a volatile world by continuously re-negotiating meaning through prior learning and shared experiences, machines function through symbolic representation without intuitive or cultural understanding. As Hasse argues, learning processes in humans are collective and situated, marked by ongoing value creation and context-specific engagements. With posthuman learning the focus shifts from the individual learner to learning within collective phenomena. Ultimately, posthuman learning complicates the assumption that AI can mirror human cognitive development. Even in AI systems that reject ‘context’-free models, it remains questionable whether machines can ever truly replicate the relational, embodied, and meaning-making dimensions of human learning (Hasse, 2019). Therefore, when humans - in this case gymnasium students - engage with ChatGPT it is a new way of learning that changes the nature of the inputs of knowledge that the students re-negotiates meaning with. Posthuman learning with ChatGPT has the potential of learning being a fusion of a context-sensitive, human, meaning-making and a symbolic representation from a model that shapes the students' understandings.

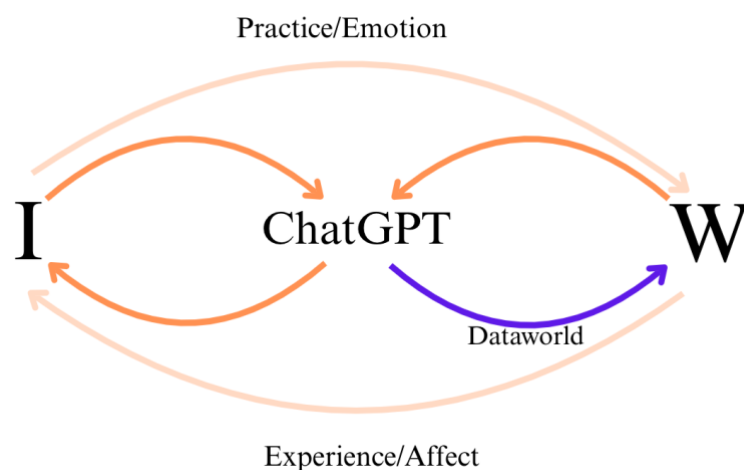


Figure 13: Ellipse of Technomediated Experience (ETE)

The Ellipse of Technomediated Experience model is a bricolage - an assemblage of selected elements from the various theories we have presented. We use this model to analyze the empirical data collected during our fieldwork at the two gymnasiums. It illustrates the interaction between the students and ChatGPT initiated through a prompt. The prompt engages with the dataworld, an algorithmic representation of the world constructed by designers. Within this interaction, ChatGPT interprets the prompt to determine what the student is seeking, what response or form of knowledge is being requested. The data that the algorithm is built upon is the world so it then returns an interpretation of the world to ChatGPT, and then ChatGPT represents it in text to the student.

The loop of the outside ellipse then continues with new knowledge shaping the students practice and values, as well as their experience of the world, each other, and themselves in the world. The horizon presented by ChatGPT is one of uncertain knowledge - uncertain in whether it can truly replicate the relational, embodied, and meaning-making dimensions of human learning - yet it nonetheless mediates aspects of students' learning experiences. The role of ChatGPT as a part of collective learning depends on if the relations between students and world is open and vibrating or if the axes instead are muted with the nature of the technology. In other words, if there is resonance there is fusion of horizons and thereby learning, and if there is adoption of horizons and alienating to the learning subject then there is no learning.

In the following analysis, we will examine the students' experience of using ChatGPT in the learning environment, along with the values that shape how the technology is perceived, through the lens of our theoretical bricolage model on our empirical data.

6. Analysis

This analysis is separated in five different sections investigating how the students' experiences of ChatGPT is shaping their practice and underlying human values. Each section is built on a combination of empirical data from the Dixit Card exercise, the live Mentimeter survey and the interviews in pairs. All sections start out with a Dixit Card and associated storytelling. We have combined the storytelling from the two different gymnasiums to include as many nuances as possible, but still with the words they chose to use when describing the cards. The empirical examples are analyzed with the different context-relevant elements from our bricolage model which ultimately provides an overview of how the learning environment is challenged and reshaped with ChatGPT.

6.1 Identity

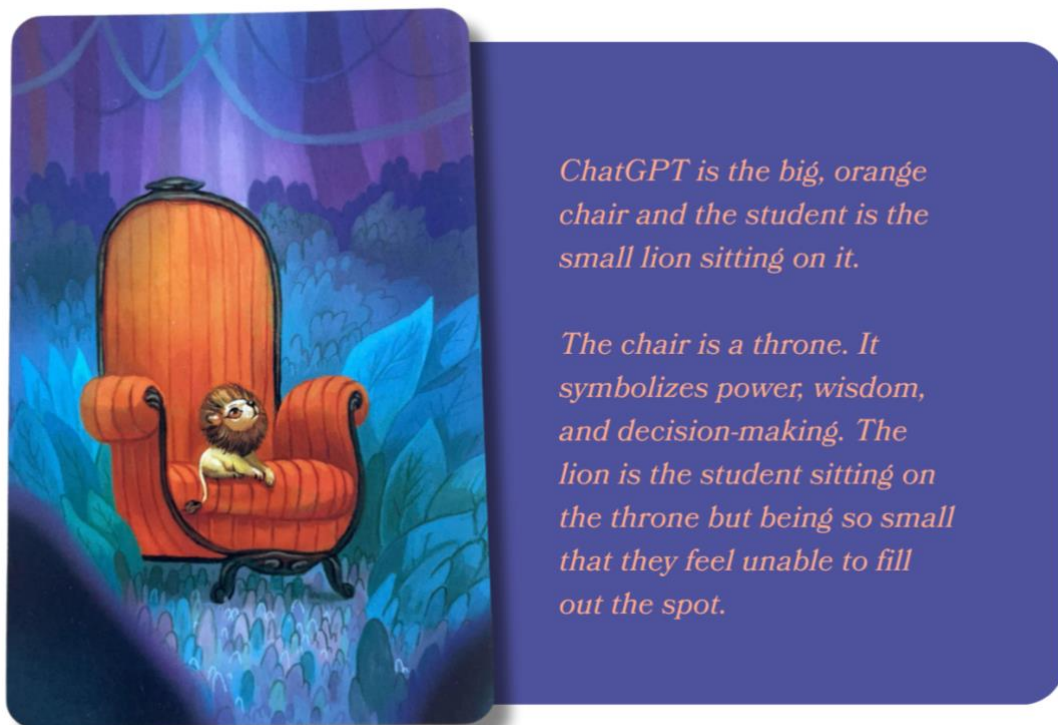


Image 3: Storytelling of Dixit Card picked by the students (own creation)

The story of ChatGPT as the big, orange throne and the students being the shrunken, little lion sitting on it highlights how ChatGPT's entering in their lives has shaped how they perceive themselves in relation to the technology. The students perceive themselves as smaller compared to ChatGPT and unable to fill out the chair of its capabilities. This understanding of the

unproportional relation between human and technology illustrates a change in the value of identity because they change their understanding of themselves (Friedman & Hendry, 2019). But why do the students perceive themselves as being inferior to ChatGPT?

It is interesting to look closer at what capabilities the students experience ChatGPT being great at while they themselves are unable to match the greatness. In our Mentimeter survey the students answered that they mainly use ChatGPT because they are pressured on time and because it is easy.

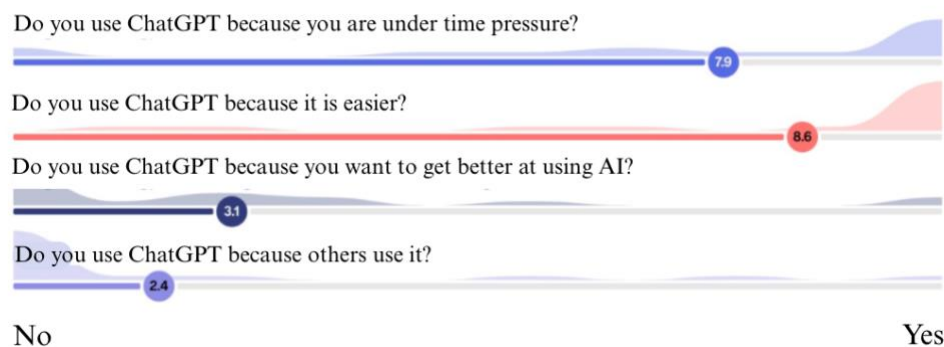


Figure 14: Results from our Mentimeter survey at Københavns Åbne Gymnasium about the students' use of ChatGPT

Looking to Rosa's technological acceleration and a society dependent on dynamic stabilization it is not surprising that the technology is used as a tool to optimize work for efficiency. Being a gymnasium student there are numerous assignments and academic subjects that require their attention within deadlines. It is then relevant to ask; What happens to the meaning-making in situations where time and effort is limited resources and ChatGPT is a go-to tool at hand?

6.1.1 Time pressure

The students' practices of using ChatGPT often connects with written assignments due to the nature of the technology as text generating. The written assignments include an expected time estimate (student hours) that reflect the time anticipated for the student to be able to solve the task within, corresponding with exam time. The point is that the students' experience of time and time pressure of assignments are an understanding that is re-negotiated with new experiences. Using ChatGPT to do parts of the work with the written assignments will add an experience of how fast or easy it was - or wasn't - that will inform future practice.

An example of how the students connect the use of ChatGPT with time pressure is with homework. In the gymnasiums the teachers have a deadline for homework for modules the

following day at 4 o'clock in the afternoon. The day-to-day change in the workload sometimes clashes with student's other extracurricular activities. A student describes such a situation where ChatGPT came in handy;

Student 1: *"We have this rule that homework has to be posted no later than four o'clock or something like that. And our math teacher has this really annoying habit of posting it at a quarter to four, and it's usually on Thursdays.*

Interviewer: *Like, for the next day?*

Student 1: *Yeah, for the next day. Yesterday, for example, he posted it at a quarter to four. And we had our mock exams yesterday, I finished at one o'clock, so I could have gone home and done it then. But I have work at four, and then you're just stuck. It takes a little while before you can get home and actually do it. So you use it (ChatGPT) because there's a bit of time pressure."*

In this example, the capabilities of ChatGPT as fast and easy provides the student with an opportunity to do something about the homework even though they don't have the hours available being stuck at work. Even though the context in this situation is very specific: with both mock exam, the math teacher who is usually late with uploading homework, and the students' working day, it shows how the experience of time pressure encourage the use of ChatGPT's capabilities. The experience will become a part of the students' understanding and therefore a possible practice for future situations where time feels limited. It becomes a part of the negotiation within the students of who should do a task - them or ChatGPT. The non-ChatGPT-user student mentions this effect;

Student 1: *"If I find out that I (with ChatGPT) can make it easier, or that you can get a really great answer, then I think it'll be hard not to do it."*

The reflection of how it is hard not to turn to something we previously experienced as easy, great or fast describes the mode of efficiency and choice-optimization that characterizes modern society (Rosa, 2019). It requires active reflection and opt-out not to turn to the optimizing technology when it is possible. We all desperately seek the most efficient and

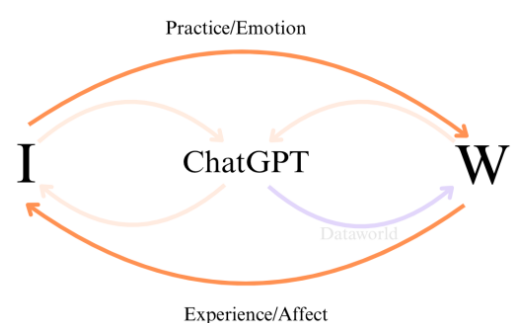


Figure 15: Focus on the outer arrows of ETE

optimized way to get an intended result. ChatGPT is perceived as a tool to work faster than the student's feel they can do themselves, and the time efficiency also reshapes what tasks they consider relevant to delegate to ChatGPT in future situations. Their practices are formed by their technological mediated experience - as illustrated with the outer experience-practice arrows of the ellipse (figure 15).

6.1.2 Effort

Time optimization is not the only area in which students perceive ChatGPT to outperform themselves. Also, their own efforts can be optimized with ChatGPT. Their efforts are in this case their cognitive- and metacognitive process - or mental work. During the Mentimeter survey the students were asked to rate the difference between their effort and outcome when using and not using ChatGPT.

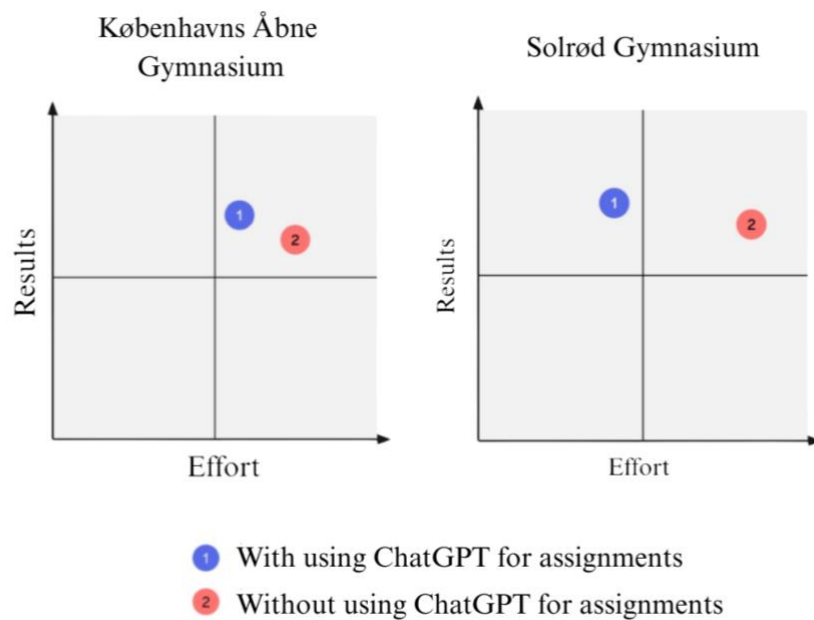


Figure 16: Results from Mentimeter survey at both gymnasiums about effort compared to result when using or not using ChatGPT

The result is approximately rated at the same level, but the effort is rated lower with ChatGPT (see figure 16). Several participants at both gymnasiums noted that, in terms of time, the effort required was roughly the same, but that using ChatGPT demanded less 'mental energy'. Even though time efficiency inspires use of ChatGPT in some situations, the reason also lies in the mental thought process being less present when using ChatGPT thus requiring less cognitive activity. An interesting element in this regard is how the students personalize ChatGPT as

‘chat’, ‘chatty’ or ‘him’ as well as using ‘hello chat’ and ‘you’ when interacting with it. It is a crucial part of the design of ChatGPT that the answers it gives resemble human communication.

Zooming in on the lower left arrow in the ellipse, means that when the students interpret the feedback given to them by ‘chatty’ it resembles their own efforts in regard of it being a cohesive and understandable text. On the surface you don’t need to edit anything before others can read and interpret it. At the same time, it also causes frustration when the chatbot doesn’t seem to get the efforts. The students mentioned how frustrating it was when ChatGPT didn’t understand what they would like to get back, saying stuff like *“it doesn’t understand what it’s being asked to do”* and *“It’s making me lose my mind”*. The students can spend significant time and effort attempting to guide ChatGPT toward their intended outcomes, which, in some cases, may also lead to a negative impact on their mood. ‘Chatty’ is therefore both described as smarter than the students and stupid in different contexts. Even though it can’t be stupid or smart in a human way it can guess “good” and deliver something that matches the expected outcome from the prompter. When the students feel understood by ChatGPT it means their horizon isn’t challenged as they are if the outcome doesn’t match. The perception of ChatGPT not having human understanding and skills only becomes visible to the students when it seems to not understand their human meaning-making.

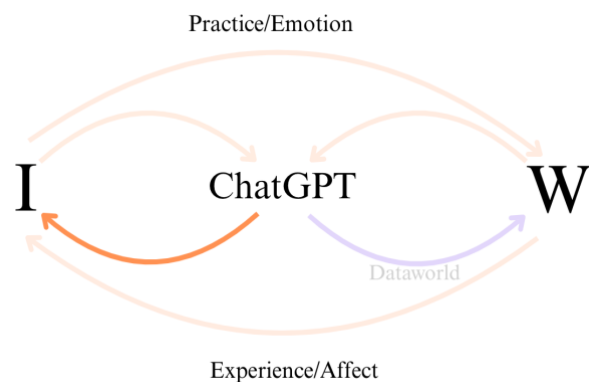


Figure 17: Focus on the lower left arrow of ETE

To sum up; this section has shown how time pressure and cognitive efforts are contextual factors for students to turn to ChatGPT as a tool simply because it is perceived to produce results more efficiently than the students perceive they could on their own. Their previous practice with ChatGPT shapes their future practice with knowledge of how fast or effort saving it can be - this depends on if and how ChatGPT ‘understands’ them or challenges their use. ChatGPT mediates an understanding of their own capabilities as inferior when the output fits their horizon and challenges this when it deviates from their expectations.

6.2 Autonomy



Image 4: Storytelling of Dixit Card picked by the students (own creation)

ChatGPT is also perceived as a temptation that surrounds the students. It is compared to the snake in paradise, whispering in their ears that it's just this one time and a single click is all that is needed. ChatGPT is symbolized as a snake because they themselves think that it's something they're not supposed to do. In our Mentimeter survey, we asked the students how often they use ChatGPT on a scale from never to always. The students rated their own usage closer to always.

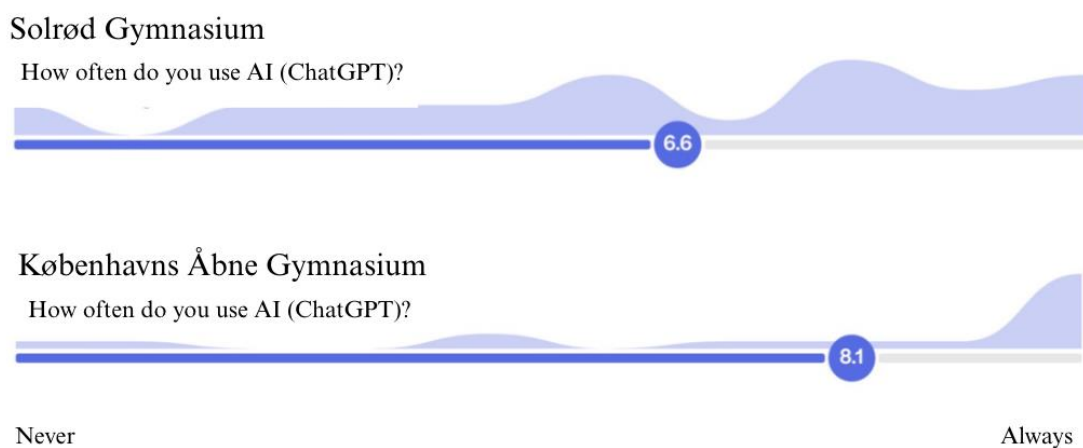


Figure 18: Results from Mentimeter survey at both gymnasium about how often the students use ChatGPT.

Several students described having an experience of thinking something like; *'I'll just do it this time, but next time I won't'* and yet ending up feeling addicted to the easy choice. Experiencing it as hard to deviate from the practice of delegating some of the workload and effort to ChatGPT connects well with the concern of a growing state of metacognitive laziness. This is shaped by the extent of what mental effort of interpreting and meaning-making that is delegated to the technology as well as how the feedback is evaluated and processed by the student.

6.2.1 What is Delegated?

Looking towards the students' reflections and practices of delegating work to ChatGPT - zooming in on the upper left arrow in lemniscate of the model - it is greatly dependent on the context of use. Students delegate work to ChatGPT by using prompts, and there are various ways to engineer these prompts and ways to receive the outcome. This is an important outtake because it shapes how the students interact with ChatGPT and thus how it mediates and shapes the rest of the lemniscate process. We categorize their use in four categories: *no use, validations, inspiration and text generation*.

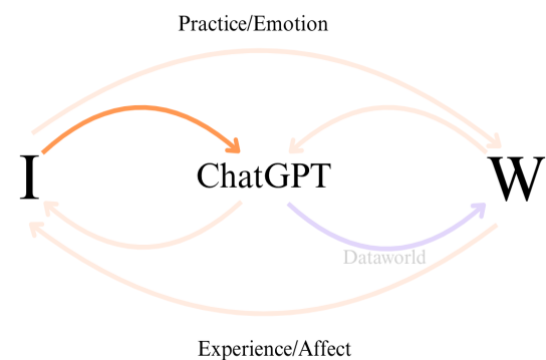


Figure 19: Focus on the upper left arrow of ETE.

6.2.1.1 No Use

No use is - as the phrase indicates - when the students actively choose not to use ChatGPT for something. The practice of not using ChatGPT is attached to the context where the student wants to gain a skill that they believe is needed for them later and they want to gain experience of being able to do it without ChatGPT. For instance, situations concerned with developing skills that are needed in exam situations where ChatGPT is not allowed. A student describes this experience as motivation for not using ChatGPT;

Student 3: *"I don't think I like the dependency on it. The feeling that I wouldn't be able to manage without it."*

Interviewer: *"So you're actually motivated not to use it?"*

Student 3: *"Yeah, I think so."*

The student is motivated not to use it to gain the self-understanding of being able to reach goals without depending on ChatGPT. By not delegating any part the student is doing all the interpretation and is aware of the meaning-making that occurs. The value of *autonomy* dominates the opt-out of using ChatGPT with the motivation of (human) learning to manage themselves as experts.

6.2.1.2 Validation

Validation is when the students use ChatGPT for checking their own written product or understanding. Students mention running written parts through ChatGPT asking it to check grammar and spelling, to make the language flow better as well as providing synonyms for certain words. An example of this validation is what this student does:

Student 2: *“So we were sitting there, me and my group, having a discussion about which overarching explanations we were thinking about, and then I just asked Chat, because - again - confirmation.”*

In this example, a group of students are discussing different analytical concepts that could be relevant for their social science report. In continuation of their discussion, they reach to ChatGPT to check if it agrees with their understanding by presenting the same concepts or challenge their understanding by presenting additional concepts for them to discuss. Delegating a checking-role to ChatGPT means that the students want to challenge their own horizon of understanding. If the horizon presented by ChatGPT fits what they expected, they have been validated in their understanding. If it doesn't fit, they reevaluate if they want to transform their understanding with the new knowledge or want to surpass it. With this way of using ChatGPT the bi-directed intentionality results in reflexive intentionality because the student is aware of how ChatGPT's take on the matter is something to be evaluated by them and not just taken for good. In this context of use the technological mediation constitutes the student as a competent learner in control of whether to fuse horizons with the input from ChatGPT.

6.2.1.3 Inspiration

Inspiration is when the students turn to ChatGPT when they feel stuck in their thinking and writing process. They then turn to ChatGPT to get started and motivated, either in asking brainstorming questions and “conversate” ideas or simply just ask ChatGPT to continue the sentence to get the flow starting again. We hear Student 2 elaborate on this: *“... And here for*

example, *I got stuck, so I ask it to continue the sentence. If it uses words I don't even know the meaning of, then I replace the word - or ask it to - like to use this word instead*". In this example we see what is at stake when the student delegates imagination or parts they initially are uncertain about to ChatGPT. When a student asks ChatGPT to continue a sentence or paragraph because they themselves lack imagination of how to proceed, it can challenge the autonomy of the student in different ways.

When imagination is delegated to the technology a part of the interpretive work is done by ChatGPT, hidden from human attention. ChatGPT is combing the layers for a certain understanding of the world built on its algorithmic probability of following words. Zooming in on the lower left arrow in the lemniscate it can go two ways. When the student reflects on the meaning-making process that ChatGPT has carried out behind the scenes, they can critically evaluate the framework of understanding that this process represents - *'is this a point, I think is meaningful to the greater context?'*. Opposite, if the student is induced with an understanding without reflecting on the meaning-making process with a *'this seems credible'* then the student's understanding is conditioned by the transformation model of ChatGPT. This marks a clear distinction in the student's level within Dreyfus' five-step model - specifically, whether they are a novice or an advanced beginner (or above) - reflected in their metacognitive awareness or laziness.

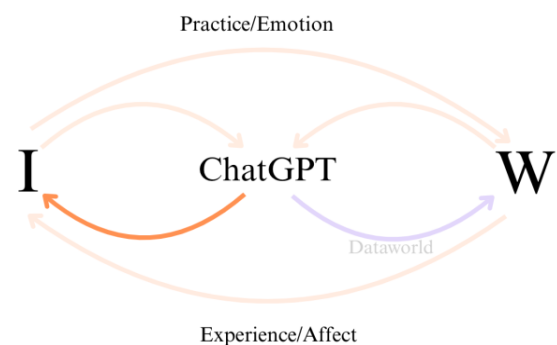


Figure 20: Focus on the lower left arrow of ETE.

When it comes to experience and practice, using ChatGPT for inspiration presents both positive and negative dimensions. On the one hand, it can be a valuable tool for gaining new perspectives and helping students move past moments of feeling stuck in their assignments. On the other hand, it may become a barrier that hinders students from navigating these challenges independently, especially if they lack the self-awareness to understand why a particular idea or perspective is meaningful within a broader context. In this way, using ChatGPT as a source of inspiration places the balance of autonomy depending on whether the student actively reflects on the meaning-making process and critically evaluates their understanding, or passively adopts the generated horizon.

6.2.1.4 Text generation

The last category is text generation, where ChatGPT is used to generate whole text pieces to incorporate directly into the end-product. This context of use could be when the students use ChatGPT to write entire parts of their written assignments. A student shares a previous experience of this use;

Student 6: *“I think I made a whole page in like 10 minutes because we were going on a study trip, and it was late in the night, and I just had to get it done. So, I think it made a whole page, and it actually didn’t take that long.”*

When students delegate the task of generating the final text to ChatGPT, their prompts gain significant importance in shaping the written outcome and potentially transforming their learning process. The student guides ChatGPT to the best of their prompting abilities. The students perceive themselves as being in control of guiding the direction of what understanding it should generate. In this context the students broaden their own horizons to take on the role of the validator of what is generated by ChatGPT up against their understanding of what fits with that specific type of assignment. The student evaluates on their own set of specific criteria whether the language reflects their own, as well as the use of references, titles, names and so on related to the specific assignment. Leaving the reflections by the student closer to *‘does this sound like something I would write’* rather than *‘does this convey what I mean’*.

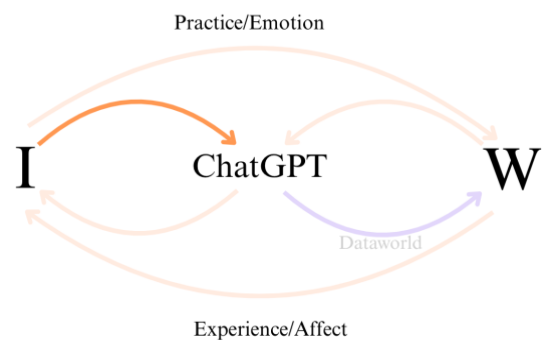


Figure 21: Focus on the upper left arrow of ETE.

The control of guiding ChatGPT to generate something that mirrors the meaning-making process of the student - if they used their human imagination - depends on their prompting technique and technology understanding of the neural network of ChatGPT. One of the students explains this as ‘manipulating’ ChatGPT to get closer to, what they were looking for:

Student 1: *“I’m also trying to explain it in depth, but it’s also that thing where, if I don’t feel like I’ve explained it deeply enough, then I probably won’t get the answer I’m looking for either. Because that’s the thing - I’ve realized you can actually manipulate it. If you*

say you want it one way, but it's the same question and you just change a few words, you can end up getting a completely different answer.”

This illustrates well how there is a difference in human understanding and machine learning understanding and how self-regulated learning depends on how and if the students aim to manipulate this mechanism. An illustrative example on the difference of human and symbolic understanding is when a student mentioned how ChatGPT had generated a characterization for an analysis for Danish class, which actually was perceived quite good apart from the “misunderstanding”. The main character was characterized as angry and not happy - which was clearly not the case from a human understanding. The student replied ChatGPT with an additional instruction that the characteristic was happy and not angry. When ChatGPT “misunderstands” it’s because it interprets meaning through probabilities - predicting which word is most likely to appear in a given context. Adjectives like 'angry' and 'happy' are opposites, but from a probabilistic standpoint, they may be equally likely to fit grammatically in the same sentence position, making them interchangeable despite their contrasting meanings. When the students experience “manipulating” ChatGPT by changing a few words it changes the calculation of probability for certain words. Using ChatGPT for text generating delegates the meaning-making process to the dataworld where words that are used frequently in a certain order indicate meaning.

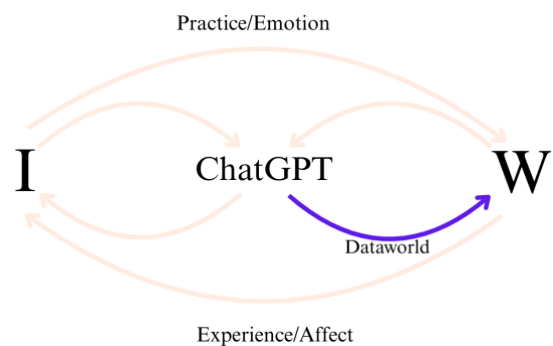


Figure 22: Focus on the lower right arrow of ETE - the dataworld.

Regardless of whether ChatGPT is refused used, used as a validator, a source of inspiration, or a text generator, it is the nature of the delegation of meaning-making - and the student’s reflection on it - that shapes the value of autonomy. Students can exercise autonomy in diverse ways by deciding how to engage with ChatGPT to achieve their personal goals. The significance of this delegated autonomy becomes most evident when the technology “breaks down” and the access to the technological mediation is lost.

6.2.2 When ChatGPT is Gone

The class at Solrød Gymnasium had mock up exams the same week we interviewed them. A point they highlighted was how the mock up exams showed the consequences of frequent

ChatGPT use with students struggling to start the process of answering the assignment. The computers are surveilled by the program ExamCookies that takes pictures of their screens whenever a new tab is opened preventing the students of using ChatGPT undetected. One of the students that use ChatGPT frequent for written assignments explained her experience at the mock up exam:

Student 6: *“I also think that some people have had trouble with this mock exam. Honestly, I thought it was really hard because you’re used to using ChatGPT. I think I’ve gotten really bad at expressing myself.”*

Interviewer: *“But you said earlier that what ChatGPT produces for you is at the same level as what you do yourself.”*

Student 6: *“Yeah, but I also think it just takes me a really long time. But I also think that what I ended up producing myself was actually okay and on the same level. But it took me such a long time to think about what the hell I’m supposed to do and how I should express myself.”*

This example illustrates how the student has a hard time starting the mental thought process of what to write when getting the assignment without using ChatGPT - as she is used to doing. Without previous experience of interpreting the assignment and activating the human imagination of how to act on it, the student experienced it as being difficult and slow. An example of being closer to a novice than expert in having learned the stuff and being able to make use of it in different contexts. Being used to experiencing understanding with the help of ChatGPT challenges the students capability of speaking with their own voice based on their own knowledge pool of previous experiences. Not being in contact with one's own voice makes the voice of the assignment seem mute not resonating in the exam-situation. If the students use ChatGPT in a way where they delegate the meaning-making process without reflection, their horizon of understanding isn't challenged and their knowledge pool of experience isn't affected and transformed.

To sum up; ChatGPT is often perceived as a temptation - likened to the snake in the Garden of Eden - offering an easy way out of cognitive effort, yet ultimately undermining the purpose of learning with a growing dependency on GenAI when it replaces rather than supports their thinking. The four categories of use reflect a varying degree of delegation and student autonomy. While some students use ChatGPT deliberately for validations others rely on it to complete assignments. This reliance can weaken students' metacognitive awareness and hinder

the development of new skills and deeper understanding. The challenge becomes especially evident during mock exams, where the absence of ChatGPT reveals difficulties in initiating tasks that leave some students - as highlighted with the value of identity - to experience their own capabilities as less without ChatGPT.

6.3 Accountability and Ownership

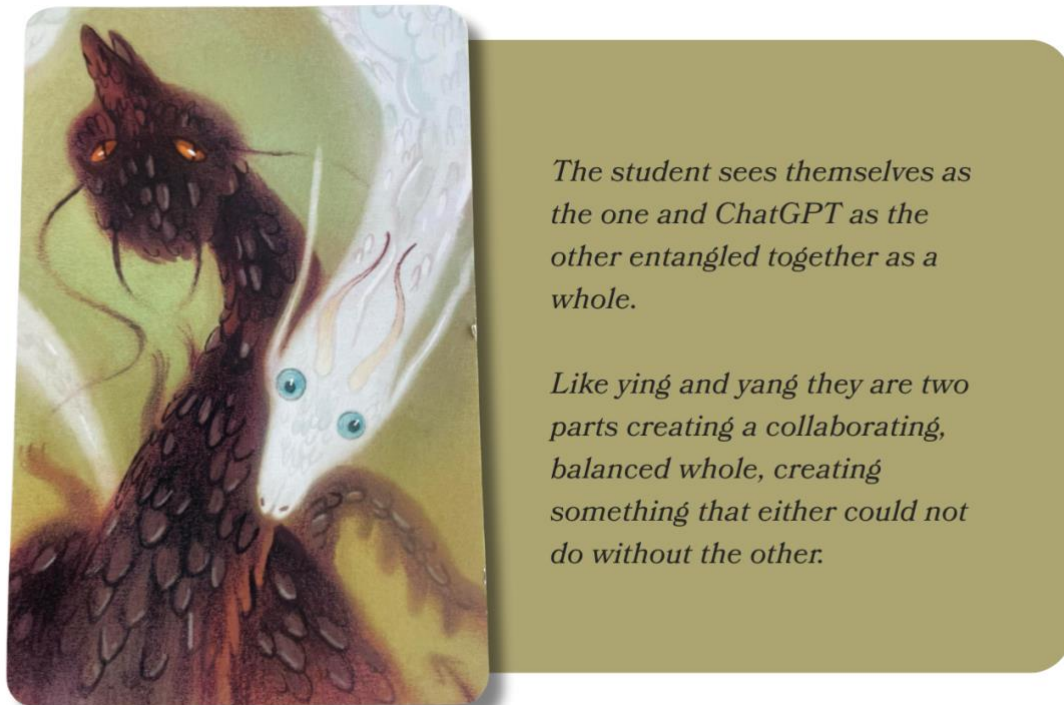


Image 5: Storytelling of Dixit Card picked by the students (own creation)

In this story the students perceive themselves and ChatGPT as equals helping each other. In some situations, they don't see ChatGPT as something bigger and better - as previously argued - but instead they see a potential in using ChatGPT in collaboration with their own knowledge and agenda. In this context of technological mediation of ChatGPT, the values of *ownership* and *accountability* become significant. The value of ownership refers to the right to claim authorship or possession over something, and the value of accountability refers to clearly identifying and tracing specific contributions (Friedman & Hendry, 2019). Relations have a moment-like character which means it varies from student to student and from situation to situation, how ChatGPT's mediation is perceived in the relation. As a result, students' experiences are nuanced; some describe a sense of alignment and co-creation, while others feel a disconnect, where the final product does not feel like their own. An example of experiencing

an alignment is when ChatGPT resembles what the students perceive as their level and capabilities. A student explains;

Student 6: *“I kind of feel that what I write with Chat also reflects what I can do myself. I mean, I don’t use it to take things to another level. Well, maybe in English, but that’s the only exception. Otherwise, it’s more like my own level.”*

The student explains how she aims to guide ChatGPT to generate text that mirrors a potential product she feels could have been something she would be able to write herself. Aiming to collaborate with the technology to resemble a person's own level - or own voice - is problematic in regard to resonating with the world. As previously stated, Rosa argues that moments of resonance aren't created instrumentally when we aim to because it is not an echo under our control (Rosa, 2019). When students experience a collaborative alignment of finding a matching level with ChatGPT it is not a mutual responsiveness where the student is affected by the generated part and reacts with emotion. Instead, similar to the point from the previous section on text generation, the student’s inner horizon is conditioned to evaluate the voice of ChatGPT on whether it sounds familiar to something they could write. The aim is not to be challenged, affected and transformed by the other horizon. In this case, a successful collaboration with ChatGPT is about getting to a point where horizons overlap or fuse minimally. Some students express ownership over written assignments they have created together with the use of ChatGPT even though they are not accountable for choosing every word and meaning, because they feel that they could have written it themselves according to the student’s own self image.

It is far from all students that take on this view on the values of ownership and accountability. Other students express that rather than feeling aligned with the work, they described a disconnection from the product when using ChatGPT.

6.3.1 Authenticity

A theme that was voiced by several students was how it didn’t feel real or authentic in some contexts when using ChatGPT. They described it as feeling like cheating and as the opposite of doing it themselves. The students used phrases like: *“It is not real if you use ChatGPT”*, *“I rather want to do it myself”*, and *“In the end, you’re only cheating yourself”* (Student 2; Student 5; Student 1). Describing ChatGPT in that way indicates that it mediates an experience

of cheating and not doing it 'real'. Expressing the relation as something that doesn't feel real relates well with the concepts of alienation and relegation. When we relate to the world we resonate with the 'Other' when we are affected and respond with emotion (Rosa, 2019). A student exemplifies the connection between feeling lack of affect and lack of realness when reading a text;

Interviewer: *"So you choose to get a summary before you start reading?"*

Student 1: *"Afterwards, because otherwise I feel like it's kind of cheating. Then you haven't really read the text after all"*

Reading a text is a classical example of how we can be affected by what we read and relate to this with emotion. When we are moved in some way by what we have read it has transformed the way we understand and perceive the world. The student experiences it as not really having read the text if a ChatGPT summary is interpreted beforehand. When you read a text you have an existing understanding about the subject you are going to engage with that is shaped by your existing pool of experiences. Reading the summary beforehand means you will add that understanding you have been presented with by ChatGPT to this existing pool that will shape how you read the text afterwards. In this relation ChatGPT has done a part of the interpretive work when it presents a summary where something is highlighted and presented and other parts are surpassed and left unmentioned. This is based on probability calculations of the dataworld. In other words, the students do not experience affect from subjects they engage with if they have already adopted an understanding. The experience is conditioned by a certain world view that has informed the students inner horizon making it more challenging to look beyond being confirmed in one's own understanding as a confirmation bias. When students talk about doing things real or authentic the intentionality lies in the interpretive act itself, where they have actively reflected on the influence of delegating this to ChatGPT.

A lack of authenticity when using ChatGPT is also expressed as a lack of (real) emotions from humans directed towards the world. In our Mentimeter survey we wanted to know how the students perceived delegating more personal and emotional work to ChatGPT. We asked the students to rate how fair or not fair it was to use ChatGPT to write a speech for their mother's 50th birthday.

Solrød Gymnasium

Is it okay to use ChatGPT to write a job application?



Is it okay to use ChatGPT to write a speech for my mom's 50th birthday?



Is it okay to use ChatGPT as a friend?



Is it okay to use ChatGPT for school assignments?



Not fair

Completely fair

Københavns Åbne Gymnasium

Is it okay to use ChatGPT to write a job application?



Is it okay to use ChatGPT to write a speech for my mom's 50th birthday?



Is it okay to use ChatGPT as a friend?



Is it okay to use ChatGPT for school assignments?



Not fair

Completely fair

Figure 23: Results from Mentimeter survey at both gymnasium about fairness of ChatGPT use.²

The interesting element with this question was the debate it caused in both classes. It was debated because the students were either stating it as totally fair or not fair at all out loud. The arguments in the debate indicated that it triggered something due to emotions being involved. Some argued that you had to be better than ChatGPT to express affection for your own mother, because ChatGPT can't express genuine human emotions. Others countered with how their knowledge and affection would be what ChatGPT would use to make a speech that would be better written in regard to word flow and creativity advocating for still feeling ownership of the speech. The thought process and intentions are valued in a certain way in human relations that reflects care and empathy. You can feel the sender's voice and emotions in a speech and thereby be moved by it. Not having your own voice indicates a lack of thought process in creating it.

² In the graph we also see that the question about using ChatGPT as a friend has a big difference at the two gymnasiums. There is a clear tendency at Københavns Åbne Gymnasium that some of the students are answering 10 to all questions, making every question getting a higher score. We didn't elaborate more on this question in the classroom and it's therefore difficult to conclude why there is such a big difference.

Having an own voice when relating to the world is determining for resonance and it is hard to imagine moving a crowd with words that sound empathic but don't feel that way. ChatGPT challenges the student's capability to move others with their own voice because expressing emotion is not just about the words it is about the thoughts and meaning-making behind it.

To sum up; ChatGPT mediates a reevaluation of what students perceive as their creation that they feel ownership and accountability for. It is values that the students interpret and practice differently. For some students, they experience collaborating with ChatGPT as their work and authorship because it could have been their authentic work. For others they experience using ChatGPT to shape their understanding as limiting the feeling of authenticity and realness. A consequence of being alienated from their own voice is the lack of affect and emotion that defines a resonant relation. This is needed for the students to experience a learning transformation with the subjects they engage with. Using ChatGPT as a collaborative partner to generate 'your own voice' is not transformational learning. When the interpretive thought process is delegated to the technology it can alienate the students from relating to the world when their own voice is muted.

6.4 Trust

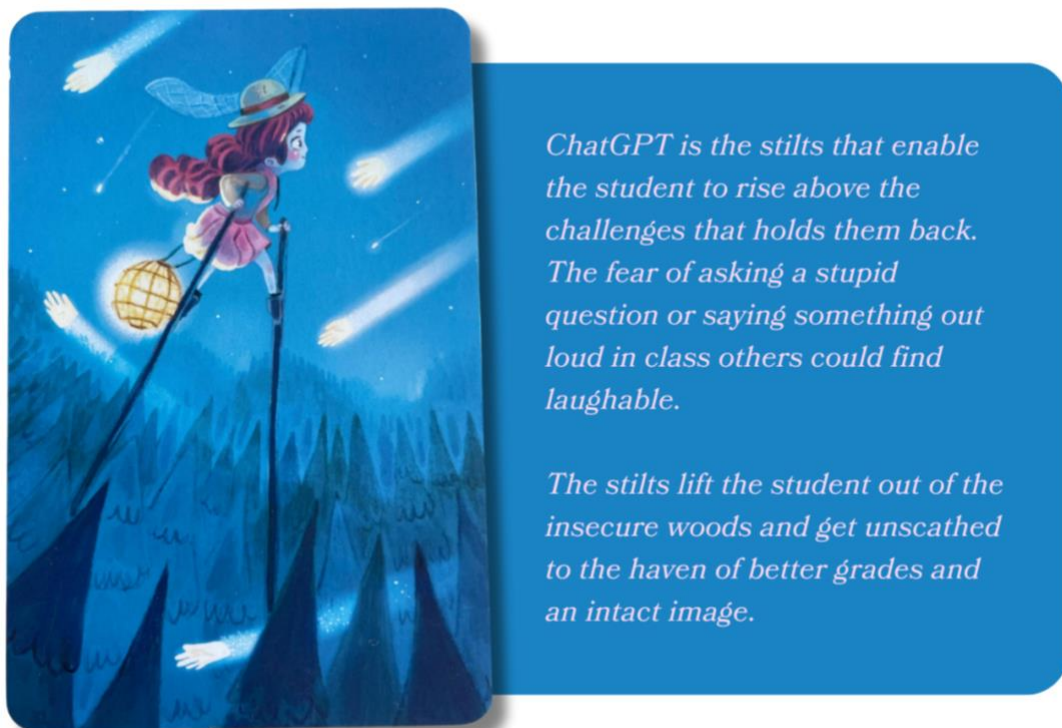


Image 6: Storytelling of Dixit Card picked by the students (own creation).

The value here is *trust*. Trust is a key element in the classroom. It shapes the expectations between people; between fellow students, between student and teacher, and within oneself. Trust means feeling safe to speak up, take risks, and be vulnerable (Friedman & Hendry, 2019). It's the confidence to say the right or wrong thing without fear of judgment. In this storytelling ChatGPT is described as stilts enabling students to rise above insecurities and get a shortcut to the result they aspire, namely not having their image and grades affected by the academic quality of what they say out loud in class. The picture the students paint of the classroom here is a space where they feel insecure and focused on how they are judged by others. In a school setting, Rosa describes the ideal classroom for vibrating resonance axis as a room where the students are able to independently try out things and the teacher's role is to provide help and know-how (2019, 242). If that is the case, then the world will 'talk' to each student in a certain way that is not possible in an uniform way. Thus, if teaching becomes locked where students are reluctant to try out things because of fears of feeling stupid or not as good as one's classmates indicates blocked resonance axes. This can occur if the teaching is focused on the correct and wrong answers where there is no room for either the students or the educational subjects' own voices (Rosa, 2019). ChatGPT is changing the relationships and trust in the classroom both between student and teacher, student and student, and within the students themselves.

6.4.1 Image is Everything

During our Mentimeter survey in the two gymnasium classes, we asked who they would prefer to ask for help; the teacher, friends, or AI.

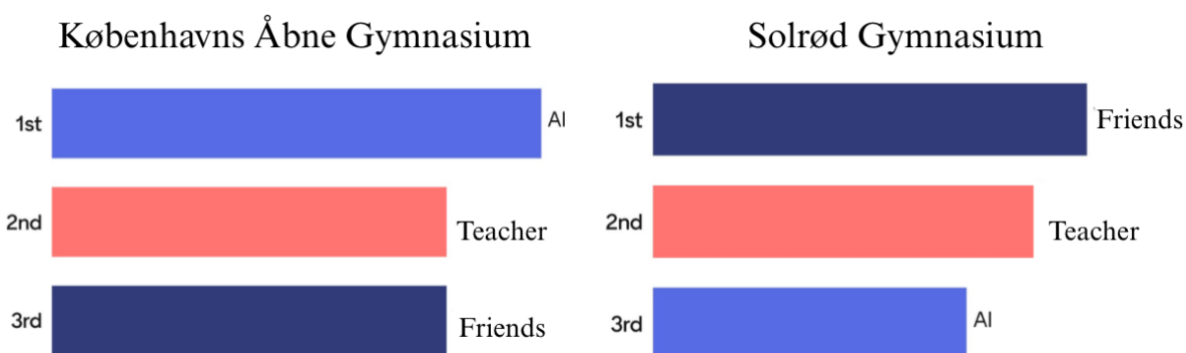


Figure 24: Results from Mentimeter survey at both gymnasiums about who the students preferred to get help from.

Regarding the question, one student shared her experience that teachers downgrade grades if students ask 'stupid' questions. Therefore, the student argued that many avoid asking teachers

questions in class in order to maintain a good academic image, and thus not be penalized in oral grades. The connection between speaking up in class and grades are also noticed by additional students:

Student 1: *“I think people are thinking that if they hand it in using chat, it sounds better than they do themselves. And that's probably also something to do with grades, something they have in mind. Because maybe it's those who don't always speak up in class. Yeah, they have something to prove.*

Student 2: *Exactly, they're trying to prove something, but maybe they don't have the ability to elaborate or explain it themselves. So, they use chat to try to see if they can bump their grade up a notch or two.”*

The uncertain woods the ChatGPT stilts help the gymnasium students overcome are that they have something to prove if they don't always speak up in class. When they do speak up it is important that what they are saying pulls them up in terms of having their oral performance assessed. This indicates a room where teaching is blocked for the students as only a matter of what is correct or incorrect, meaning there can be several wrong things to say and few right ones that directly impact how they are judged academically. Transformation and learning is limited when the students take fewer chances in regard to speaking up challenging their own and others' understandings. Fusion of horizons are difficult to achieve when students stick closely to their existing understandings - that they feel confident in will not drag them down. On the other hand, the ChatGPT-stilts could be an empowering relation as well if the students overcome the fear of sharing thoughts in class and try out things because they were reassured.

It can create a trust in themselves to validate what to say in class and give them the power to do so - changing the practice and thus also the experience, looking at the outer arrows of the model. The re-negotiation of trust with ChatGPT has also shaped the implementation of analog practice as backlash from the teachers.

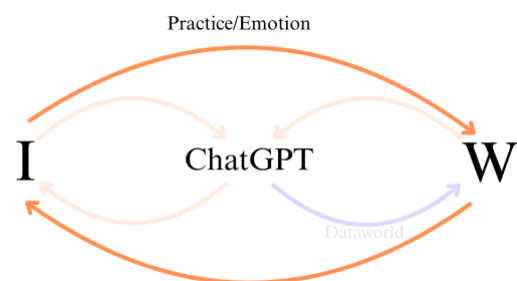


Figure 25: Focus on the outer arrows of ETE.

6.4.2 The Element of Analog Surprise

The relationship between students and teachers has been challenged and changed with ChatGPT. The students are aware of how the teachers perceive and judge their academic skills

both in class and with written assignments. The use of ChatGPT is something the students code together with being accused of cheating by the teachers. One of the factors contributing to this distrust is that ChatGPT can bypass traditional plagiarism detection tools, making it difficult for teachers to determine what has been written by students and what has not. As a result, teachers may resort to strategies such as asking students to rewrite assignments by hand:

Student 1: *“Our English teacher from last year had set up this thing where we had to write a message or a speech or something like that to our past selves. And then we had to write it out by hand the next day, or a few days later, because he thought too many people had used ChatGPT.”*

Interviewer: *“So the test was, here’s a piece of paper, now write out the thing you wrote yourselves, since you thought so much about it when you originally wrote it.”*

Student 1: *“Exactly. And I remember there were quite a few people just sitting there staring blankly, not remembering what they had written, probably because they didn’t actually and kind of looked at each other with blank faces.”*

Some of the “blank” students experienced the consequence of having delegated and adopted the understanding of ChatGPTs’ result without challenging and reflecting upon it. It is also a consequence of a distrust between teacher and student when the teacher is in need of making hidden traps to back up an accusation of using ChatGPT to a noticeable degree. The text generating capabilities of ChatGPT are so human-like making it difficult to distinguish from what could be done by the students. Even though plagiarism detection tools can’t get ChatGPT generated text, the teachers can still figure out when a student uses it a bit too much because they are experiencing the written text in the socio-cultural context of knowing the student beyond the black letters on the paper. Kind of like getting a vibe that doesn’t match the surroundings, can text generated with ChatGPT be experienced as off from the context.

During our Mentimeter survey we experienced how some of the students' answers on the short free-writing questions stood out as ChatGPT-generated, in our assessment. First of all, the answers could only be 100 characters long so when sentences stopped in the middle of a word, it would make sense that ChatGPT was used. Additionally, different answers using multiple of the exact same words stood out, the words were both longer and more academic than what most other students used in their answers. Our experience of some students having used ChatGPT is based on what we can call our human intuition - a result of multiple, individual elements that

together add up to a whole three-dimensional picture that the context-free symbolic representation from ChatGPT clashes with.

ChatGPT mediates a re-negotiation of trust in the classroom where students perceive it as helpful to overcome their insecurities in a result-oriented and judgmental room. Teachers set up analog responses to test if they can trust the hand-ins to be an authentic expression of the student's academic abilities. Also, in situations with group work the students have to intersubjectively negotiate a shared understanding of, if and how ChatGPT should be used to fit a shared ambition.

6.4.3 A Shared Ambition

The students demonstrated different approaches to using ChatGPT in group work compared to individual assignments. When working in groups, there was a heightened sense of responsibility and respect for the quality of the assignments, as the outcomes reflected not only on themselves but also on their classmates. Within the groups the use of ChatGPT is not explicitly discussed and agreed on. Instead, each student is aware of each other's attitudes towards ChatGPT and school work in general and try to adapt their own practice to the specific group dynamics. A student explains this implicit shared understanding;

Student 6: "I feel it's different in group work. When it's my own assignment, I can decide for myself how much I want to cheat. It also really depends on who's in the group. Yeah, because if you're with people who don't really care either, then it's easier to use it. But if not, then you tend to make more of an effort. For me, it definitely depends a lot on what the others in the group do. And if, for example, they really care about school, then I also get more involved in the group."

The practice of using ChatGPT or making more of an effort is co-constituted intersubjectively on a shared group understanding that goes beyond being responsible for your own assignment. The student exemplifies how she adapts her practice whether she perceives the group members as 'really caring about school' or 'not really caring about school'. Individual students shape their practice to match their understanding of what effort is expected and accepted in the group. In some groups individual student's practice deviates from other group members' expectations. One student shares an experience of not having a shared understanding of ChatGPT use;

Student 2: *“He just inserted the question. He often does that when we're in a group with him, while the rest of us feel a responsibility to make it good. If you use ChatGPT, you rewrite the answer so that it makes sense in relation to the question.”*

In this example, the student doesn't claim that using ChatGPT is prohibited, but points to a social norm that it should be used reflectively, meaning you're expected to rewrite and adapt its output, rather than simply accepting everything it generates without critical engagement. Having a shared responsibility for the final product indicates an importance in trusting the other group members to make an effort that contributes to the shared product. Experiencing having certain group members that again and again contributes with something that isn't critically processed and doesn't live up to the rest of the group's ambitions creates a distrustful relation within the group. This blocks the axes of resonance in the group, limiting dynamic discussion about the subject where they together challenge each other's understandings.

To sum up; ChatGPT mediates new understandings of trust in the classroom. Individually, students use ChatGPT to overcome insecurities of damaging their image with stupid questions. Between teacher and students trust is challenged with ChatGPTs abilities of generating text that is difficult to prove as not written by the students themselves. Analog tests can be used by the teachers as a practice to restore trust that submitted work represents the students' own voice. Within group work a shared understanding of responsibility and effort is implicitly negotiated. Individual students shape their practice after their experience of the shared group understanding that sometimes differs from other group members' understanding. This shapes how students are perceived in future group work as well as their access and ability to engage in the shared learning.

6.5 Universal Usability

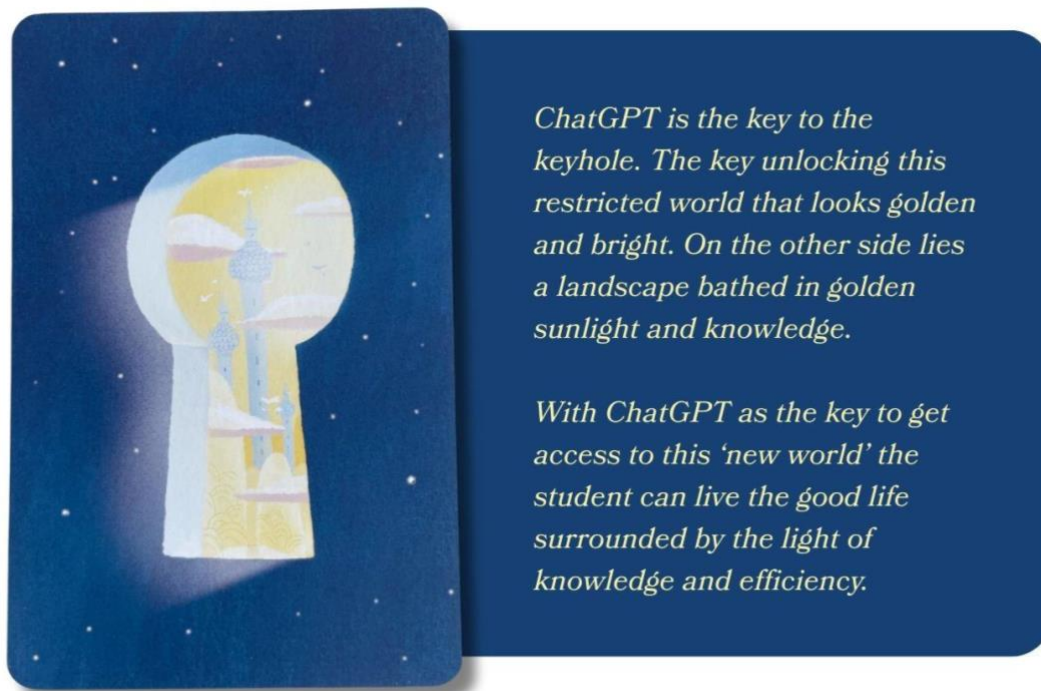


Image 7: Storytelling of Dixit card picked by the students (our own creation).

The story connected to this card illustrates how ChatGPT is perceived as the key to a new world of possibilities for the students. The universe of ChatGPT is golden. The students get the experience of expanding their lives in terms of getting access to knowledge easily. ChatGPT being a key that is available for all indicates the value of *universal usability*. There is equal access to ChatGPT for all in the sense that no special skills or knowledge is needed to engage with the model. You just need a computer with an internet connection and an email account to get access to the free version ChatGPT 3.5. ChatGPT has an intuitive interface that is easy to communicate with on basic technological skills without a deeper understanding of programming language and neural networks (Schwedux, 2023). This universal access to ChatGPT is in some of the literature (Ng et al., 2024; Chiu et al., 2024; Fan et al., 2025) investigated for the potential to become a self-regulated teaching assistant that is available to help students outside the classroom and on their individual levels with their individual needs. For the students we talked to, they recognized how ChatGPT could give them the experience of getting access to help in situations where they otherwise depended on other people - often at home. A student with dyslexia explains how she uses ChatGPT to meet her individual need for another view on assignments to catch spelling mistakes;

Student 1: *"I mostly use it for everything, because I'm also dyslexic. So, for example, sometimes I don't understand how something is explained, so I might ask it to rephrase it. Or if I make spelling mistakes - which I do quite often in Danish assignments - then I go in and say, 'Can you highlight the spelling mistakes?' and so on."*

In this example, the student explains how ChatGPT can assist her in situations where her dyslexia challenges her work with both interpreting written text and spelling when writing text. The student has other helping tools designed to help her overcome the challenges of her dyslexia, but it is mainly focused on how dyslexia can make tasks more time consuming with a software for reading texts out loud as well as having the possibility to have additional time at exams (Student 1). ChatGPT is perceived particularly beneficial in this case because the student can get spelling mistakes highlighted and thus be able to participate in correcting them. The student has gone from getting a lot of feedback on grammar and spelling to getting almost none and instead mostly getting comments on the content. The student is also less dependent on needing someone else - in this case her mother - to read it through before handing in (Student 1). Depending on access to help at home is something other students highlight in their use of ChatGPT as well. A student says:

Student 6: *"I just think that if you need help, it's quick to ask. It gives you an answer pretty fast. It's much easier. Like, for example, if I need help from my parents at home, I can't really get any help. So, it's much easier just to ask ChatGPT. Also, because it's right there next to you, ready to help."*

In this example ChatGPT is perceived as a tool to mediate equal access to help at home by bridging gaps between families. It is a resource that is available at instant when needed both regarding knowledge and time. In this case, it is delegating getting a second opinion or horizon from another human to the technology instead exemplifying a *social acceleration* in relations between humans. The students can choose to interact less with other humans – both each other, teachers and their families in shaping their own understandings. Even though ChatGPT in some situations enables students to engage with tasks independently, from otherwise having to engage with other humans, the help or answer it provides depends on the prompt. ChatGPT doesn't understand what to help with in a human-way. It will always give you an answer whereas other humans might ask for more context to get an understanding of what is asked for and what is needed to help. All ChatGPT users have access to the same data set, but that doesn't mean they will get access to the same outputs. During our interviews in pairs with the students

we asked them to provide us with an explanation of how ChatGPT works. This exercise showed how having access to the same thing doesn't give you the same outcome and the significance of prompt engineering.

6.5.1 Self-Regulated Prompting Skills

The two pairs of students had two very different strategies on how to shape their prompt to get an explanation they were satisfied with. The first group consisted of a non-user and a student with ChatGPT-4, and they made a shared prompt on the regular user's computer. It was the non-user student that took charge on what to prompt while the other student wrote it down:

Student 3: "Should we write something about if it can go through a step-by-step process, from receiving a prompt to producing the final answer? (Student 4 typing). Yes, exactly how the process looks from a prompt to the finished product. We can write something like 'can it be detailed and set up in bullet points' too."

For comparison, the second pair both prompted "how do you work?" in their separate chats. These three chats gave three different answers. The first one provided a longer and more detailed explanation of the different steps including the notion of ChatGPT not searching the internet - which were commented on as surprising for the students. The other two answers were shorter and less detailed and - surprisingly for the students - slightly different, but it didn't seem to challenge their thoughts on the result when we followed up on it:

Interviewer: "Are you satisfied with that answer?"

Student 6: "'Chat works by analyzing the text or code you enter and generating relevant text based on its training data.' I'd say I'm reasonably satisfied. It looks quite nice."

Interviewer: "Then can you explain why you get different answers to the same question now?"

Student 6: "No. No."

These two examples show how much the choice of words in the prompt and the evaluation of the answer shapes the understanding or help ChatGPT can provide the students. The algorithm works in a way where certain words like 'step-by-step' or 'prompt' activates attention to other words in the dataset than 'you' and 'work'. Then you get 'access' to the information presented with other words and a potential different interpretation as shown with this example of

outcomes containing: “*ChatGPT doesn’t search the internet*” versus “*based on its training data*”. The potential of SRL with ChatGPT is mentioned as one of the main advantages in the education sector. The idea of ChatGPT returning answers to the same level as you have sent out a prompt can also have a self-reinforcing effect. The examples from the quick exercise focus on the first prompt, to show how much the framing of words shapes the output.

Interacting with ChatGPT is often an ongoing interaction back and forth. As illustrated by the lower left arrow in the lemniscate model, the student plays a crucial role in evaluating the output of what ChatGPT presents. The students must actively interpret and reflect on ChatGPT’s responses rather than accepting them passively if the process should be defined as self-regulated learning. This reflective process supports the

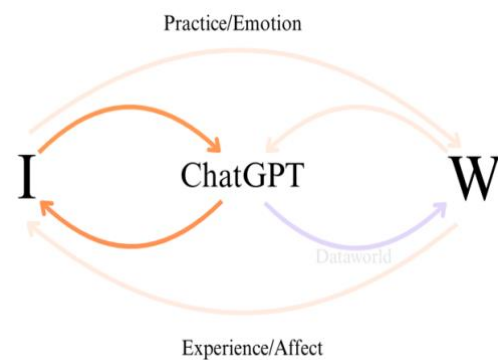


Figure 26: Focus on the arrows between 'I' and 'Technology' of ETE

continuation of the prompting cycle. Through reflection, students become more aware of how to refine their prompts to get what is intended - whether by rephrasing, changing the framing, or seeking more specific information. Additional words in the prompt will open up for additional predictable words in the answers. Without this critical engagement, students risk becoming induced by ChatGPT’s responses and not really learning anything that transforms their understanding of the world. Viewed through Dreyfus’ five stages, progressing from novice to expert requires a transformation in how one engages with learning. If students use ChatGPT only at the novice level - simply receiving information without reflection - it becomes harder for them to advance through the stages. The idea of SRL can work for the students that use ChatGPTs horizon to challenge their own as a part of an interpretive loop, but has the opposite effect if you just buy whatever it serves you the first time around.

To sum up; ChatGPT is experienced as access to overcome tasks independently from needing other humans’ opinions and help. Being available for all students at all times is highlighted as a potential for SRL. But if ChatGPT is intended to be an universal tutor for every gymnasium student and their individual needs, there is a need to guide the students to understand it in a greater context: how it works, and how to use it as a teammate who challenges your understanding - not just as an inducing mirror of effort.

6.6. Learning and ChatGPT

Learning in a time shaped by technologies like ChatGPT is deeply rooted in cultural, social, and moral contexts. It is not merely a matter of access to tools, but of how these tools become embedded in students' experiences, values, and practices. As students gain experience using ChatGPT, turning to it becomes increasingly habitual - often preferred over opting out. This shift happens in the broader context of students' lived realities where many feel pressured and find the classroom to be an insecure space to speak out loud in. In such an environment, the temptation to 'sound smart' by using ChatGPT becomes stronger. However, this use of GenAI becomes a practice students carry with them into other settings, shaping their long-term approach to learning as something to delegate parts of to the technology.

A consequence is that learning becomes challenged when ChatGPT is used unreflexively, as the technology itself does not impose boundaries on what should or should not be delegated. That responsibility lies with the user, and it is therefore important that the students become reflective and morally grounded about their own learning process and ChatGPT's role in it. Teachers can attempt to challenge these patterns by introducing analog practices - especially during exams - but such interventions may inadvertently reinforce students' insecurities, especially if they have come to rely too heavily on the technological mediation.

Some students experience alignment with ChatGPT, while others experience a lack of authenticity. This alignment points to metacognitive laziness from a lack of experience in letting the subject matter affect and transform them. Students navigate this landscape individually but also observe and respond to each other's use of the technology. Transformational learning requires that students can activate their own voices and are metacognitive aware of their learning process. Without this, the risk is alienation from their education with a muted voice that blocks learning altogether. The resonating axis of learning only vibrates when horizons can fuse, and the students' experiences move their existing knowledge that informs their future practices of using ChatGPT with awareness and reflection regarding the context.

7. What Kind of Education Do We Want?

What kind of educational environment do we want in an age of generative AI? This question sits at the heart of the debate surrounding ChatGPT's role in gymnasiums. On the surface, the responses often appear binary: either we open the door and welcome the technology in, or we close it and keep it out.

Looking to assess what kind of learning environment we want in the future - in the light of GenAI technologies - we are inspired by Wenzel Mehnert and Armin Grunwald's '*Hermeneutic technology assessment*' in Grunwald's '*Handbook of Technology Assessment*' (2024). This approach to technology assessment contrasts with the consequentialist paradigm that relies on predictive knowledge of the future - knowledge that is often inaccessible and impractical to await. Instead, hermeneutic technology assessment focuses on how future-oriented technological visions termed *technofutures* reflect current societal values, knowledge, and concerns. Rather than evaluating whether such visions will come true, this perspective asks what these visions reveal about the respective present. Technofutures are socio-cultural constructed narratives that express collective hopes and fears, strategically shaped by actors. Technofutures open up to understand and reflect upon the culturally shared imaginaries of a culture beyond the potential of a technology. We can't predict the future. However, how we frame the potential futures that could be achieved or prevented with the technology in 'if-and-then-statements' are embedded with societal meaning and plays a role in framing debates, raising questions, and assigning responsibilities (Mehnert & Grunwald, 2024).

In the case of ChatGPT, we see at least two dominant imaginaries: one where the door is open for ChatGPT and GenAI to find a place in the learning environment, and one where the door is closed for the technology. In this discussion, we will look at how relevant actors position ChatGPT in gymnasiums in the possible future, and what values, hopes, and fears it reflects of what education is perceived to be in a digital society.

7.1 Open or Closed Door

The big question regarding ChatGPT's role in the gymnasium seems to be if it is a resource or a threat to what we want the gymnasium to be. On one side, we have the open door image. This vision suggests that if GenAI is here to stay, then schools should reflect the reality of a digital society. The Danish Ministry of Children and Education initially seemed to embrace this view when, in 2023, it declared:

“The technologies are here to stay, and therefore they must also find their rightful place in our education system. Our schools and educational institutions should reflect the society that students are part of - including when it comes to technological development.” [translated by the authors] (Tsfaye et al., 2023, section 2)

This statement indicates a technofuture of; If generative AI is excluded from the educational system, then our institutions won't reflect the society the students are being prepared for. Closing the door on ChatGPT would be an expression of fear that will limit the students' opportunities. After all, gymnasiums are meant to prepare students for higher education, an environment where digital tools are not only present but essential. From this perspective, banning ChatGPT could mean preparing students for a world that no longer exists. Yet, within just two years, this position shifted. By 2025, the Ministry began reintroducing handwritten exams in some academic subjects. Following a trial in handwritten Spanish exams, the Ministry announced that all beginner language exams will now be conducted using pen and paper:

"Now we are expanding the exam format using pen and paper to other language subjects. Trials with this somewhat old-fashioned form of examination have shown that it both helps prevent cheating and supports students in developing their own language."
[translated by the authors] (Tsfaye citation in Børne- og Undervisningsministeriet, 2025a)

Tsfaye's statement highlights a change in present values about the gymnasium that is challenged by ChatGPT. The technology is framed as a threat to authenticity that invites the students to cheat and prevents them from developing their own language. Old-fashioned examination is an attempt to send the technology outside the door.

Between 2023 and 2025 the right place for technologies such as ChatGPT wasn't found and the rhetoric changed. Instead, the future scenario of the ministry becomes; If generative AI is possible to use for students, then cheating and distrust will rule. Going back to pen and paper underlines the values of ownership and accountability. Writing by hand reduces the risk of cheating because only the student can place words on the page. Trust is also reinforced when teachers can be confident the work is truly the student's own. But does this protect learning or limit it? Is the problem really ChatGPT or is it that we don't teach or trust students to use it well?

7.1.1 A Future without ChatGPT

Is it realistic that pen and paper exams will support the students in developing their own language, as stated by the Minister? Re-introducing pen and paper targets the formal exams where the students are present in a room where tool usage can be tightly controlled. It is a very technological deterministic perspective to state that the only way to control the usage of GenAI is by going back to the analog, indicating going back to a time when cheating with GenAI wasn't a challenge. Today, ChatGPT or similar tools aren't allowed at written exams, so the students should already be motivated to practice their exam skills without it. The reality is that ChatGPT is free, easy to use, and incredibly accessible and already a part of the students' daily lives and they will engage with it at different levels outside the educational system. Even though ChatGPT isn't allowed in the education setting some students may still gain AI literacy skills beyond novice at home - especially if they have parents or relatives who can guide them in awareness of which situations to use chatbots in. However, students who lack this support risk using the technology without understanding how, when, or why to use it. Leaving the understanding of ChatGPT to the students themselves can contribute to increasing inequality locally in classes but also on a broader national plan - hence the demographic inequality.

What motivates the students to use it or not - according to our data - is shaped by context and previous experiences and not solely the knowledge of an awaiting exam without access. For some students being able to confidently go to exams do shape their ChatGPT practice, but for others it is factors like time pressure and feeling inferior that motivate use. Reinforcing the weight on the result-situation instead of the process to the exam does not necessarily initiate moments of resonance and affection. On the contrary, there is a risk that it puts the students in a mode that alienates them even further from the actual learning process. On top of that, changing the exam format doesn't change how students experience their daily lives as stressed, and ChatGPT as an available tool to overcome the mental overload. If the reasoning behind re-introducing pen and paper exams is to support the teachers' evaluations of the students' skills, then it is impactful but not reflecting reality. Wouldn't it be more reasonable to expect that gymnasiums adapt to the tools students already use instead of trying to simulate a reality without internet access and keyboard clicks? And if GenAI is shaping how people write, think, and work, then shouldn't learning include understanding these tools, not fearing them? Ignoring that all students have access to these tools beyond exam-situations could risk leaving students underprepared for the realities of academic and professional life. Digitalization and

technological acceleration are deeply integrated in our society. Tools like ChatGPT are not going away. Without digital know-how we risk students that are less prepared to engage critically with the tools that shape modern life.

7.1.2 A Future with ChatGPT

Opposite, what if we then just let ChatGPT be available for the students and let them engage with it to prepare them for a future with GenAI around them? Giving students the opportunity to engage with GenAI tools may help them develop critical digital literacy, understand how such technologies function, and learn how to use them responsibly. In this way, education would not fall behind the realities of the modern world, and students would be better equipped to navigate and shape an AI-influenced society. However, if we introduce ChatGPT into classrooms without clear reflection, boundaries, or pedagogical purpose, then we risk serious consequences. Students might become over-reliant on the tool, leading to undermining their ability to think critically, write independently, and engage in deep learning. With minimal regulation, there is a risk of inequality if the students use ChatGPT as novices without the necessary guidance, it will as well reinforce existing demographic gaps.

If GenAI starts to mediate more of the learning process, students could grow metacognitively lazy, depending on ChatGPT rather than developing their own thoughts and voices. If students begin to rely on ChatGPT to such a degree, then we might also see negative effects on their self-perception. Some students may feel that the GenAI performs better than they can, eroding their confidence and sense of competence. Instead of feeling empowered, they may feel inadequate, alienated, or even addicted to the tool's assistance. This could create an uneven classroom environment. Moreover, if ChatGPT and Big Tech becomes a silent partner in shaping how students express themselves, then we risk undermining fundamental human values, skills, and ways of acting in society as well as democratic values such as having one's own voice and the ability to form personal beliefs. The European Union's AI Act from 2024 illustrates a focus on protecting humans from GenAI and Big Tech's influence on topics as GPDR data security, bias and misinformation, and the environmental impacts of energy and water use (Tranberg, 2025).

Perhaps the metaphor of the open and closed door is too rigid. What if the real question isn't about entry or exclusion, but about how to be in a classroom where the technology already exists? Students already use ChatGPT - often daily - and it is not possible to send it outside the

door in an educational context. At the same time, the students must be helped to reflexive use to prevent a future of metacognitive laziness, AI dependency and alienation from their own learning process.

7.4 The Middle Way

We are not arguing that ChatGPT shouldn't be either banned or used without limits. Instead, we want to reflect on how students can be supported in using GenAI reflectively and meaningfully – not just for getting through education, but for becoming thoughtful learners and humans. Technology has always been a part of human life, shaping how we live, learn, and interact. With the rapid acceleration in technological development, we must also accelerate our understanding to work reflectively, critically, and meaningfully with these new tools including knowing when not to use them. Just as schools teach students how to read, write, calculate and even how to use a hammer or a sewing machine, we must also teach students how to engage with GenAI. That's why we argue that learning about GenAI through open dialogue and hands-on practice is essential in education today. In primary school, students often earn a driver's license for using a sewing machine. Similarly, we propose a driver's license for AI literacy. This would involve students learning to reflect on: when to use GenAI, what to use it for, how to use it responsibly, why we use it, and what implications there can be with the use. Moving from a novice to a more advanced and competent learner. The process could culminate in an exam or certification, ensuring that all students are equipped with a foundational understanding and awareness they can use in different contexts.

To get closer to this AI literacy and open dialogue in gymnasiums we have made a discussion game to make it easier to open the dialogue and discussion. The meaningful thing is to get the students to reflect upon GenAI and become metacognitive aware instead of metacognitive lazy. In this way, students learn not only from instruction but from each other engaging in a collective cultural learning process. A shared conversation and mutual expectation-setting could foster more reflection about what 'good' ChatGPT use looks like - grounded in values, not just convenience and effectiveness. After all, we learn from one another. As materials and tools like ChatGPT become part of our shared environment, they reshape what is possible to learn and how. Unlike machines, humans move from novices to experts by continuously learning from each other, not just through information, but through shared values, experiences, and transformation.

8. Discussion Cards

Discussion cards in the classroom are to create an engaging and participatory learning environment where students can explore and reflect on the use of ChatGPT. The purpose is to support critical thinking, dialogue, and moral awareness around GenAI technologies. By using these discussion cards with open-ended questions and scenarios, students are encouraged to share diverse perspectives, consider real-world implications, and move beyond surface-level understanding. The benefits of this approach include:

- *Active participation*, where all students are involved in the conversation. It is a challenge to get every student to participate equally but in this way the students are supported to relate to the question or scenario on the card.
- *Structured reflection*, helping students process complex ideas in manageable steps. The students get help from the card to actively think and discuss certain things they might haven't thought about before. In this way the reflection is structured by the cards.
- *Critical engagement*, promoting deeper thinking about the role of AI in education and society because these cards provide open discussion about the topic and are supporting the students to have an opinion and broaden their understanding.
- *Peer learning*, where students learn from each other's viewpoints and experiences, and can ask each other follow-up questions about their individual use getting a sense of shared experience (Mortensen, 2021; Wood, 2023).

The downside of this method is that it can be too structured and make the discussion run less freely in the classroom. Those who might have a lot of opinions might need to step back, and the ones who normally keep quiet have to step forward (Mortensen, 2021). This method transforms the classroom into a space for thoughtful, collaborative exploration and understanding of new technologies like ChatGPT, rather than passive consumption of information. It provides a dialogue in the classroom about a subject that is confusing and complex for the students to navigate in.

We suggest playing this game in small groups of 4–5 students. Each player takes turns drawing a card, reading it aloud, and sharing their personal opinion on the question. This then opens up into a group discussion. Every student will have a turn to pick



Cards 1: Visualization of discussion cards

a card and lead the discussion. The structure is intentionally kept flexible to allow players to adapt the game to their own style and preferences.

Hereunder we have created 23 questions that could be a part of the game. We have gathered the questions on one card but in the actual game every question should have its own card.

<p>When to use it?</p> <ul style="list-style-type: none"> • When do you think it's appropriate to use ChatGPT for your school work? • When should teachers encourage or discourage the use of generative AI? • Should there be rules about when students are allowed to use generative AI in assignments? Why or why not? • Can you think of a situation where using generative AI would be unfair? When? 	<p>What to use it for?</p> <ul style="list-style-type: none"> • What kind of school tasks do you think ChatGPT is most helpful for? • What is something you would never use ChatGPT for in your learning and why? • What can generative AI help you with in learning - and what does it risk replacing? • What role should ChatGPT play in group work? 	<p>Why to use it?</p> <ul style="list-style-type: none"> • Why do you think students turn to AI tools like ChatGPT? • Why might some people be critical of using generative AI in school? • Why could it be valuable to learn with instead of from generative AI?
<p>How to use it?</p> <ul style="list-style-type: none"> • How do you usually use ChatGPT - as a tool, a tutor, a shortcut or something else? • How can you make sure you're still learning when you use generative AI? • How would you explain to a teacher how you used generative AI in a specific assignment? • How can schools help students use generative AI in a responsible way? 	<p>If you are using it?</p> <ul style="list-style-type: none"> • Are you currently using generative AI tools in your education? If yes - how? If no - why not? • Have you ever felt unsure in situations about whether it was okay to use generative AI? • Do you feel more confident or more uncertain when you use generative AI for school work? • Would you tell your teacher if you used ChatGPT to help you? Why or why not? 	<p>Values and reflections</p> <ul style="list-style-type: none"> • Do you think it is cheating to use ChatGPT if an assignment doesn't say you can't? • Who should decide the rules for using generative AI in school - students, teachers or someone else? • Should students be taught how generative AI works before they're allowed to use it? And how? • Has ChatGPT ever helped you understand something in a new way? What?

Cards 2: Our discussion cards gathered on 6 posters.

Future research is testing the discussion cards in the classrooms to see how they challenge or reshape the students' experience of ChatGPT and similar GenAI technologies.

These cards summarize our techno-anthropological framework, where - as stated at the beginning of this thesis - we position ourselves between the user and the artefact with an anthropologically-driven design perspective within the techno-anthropological triangle.

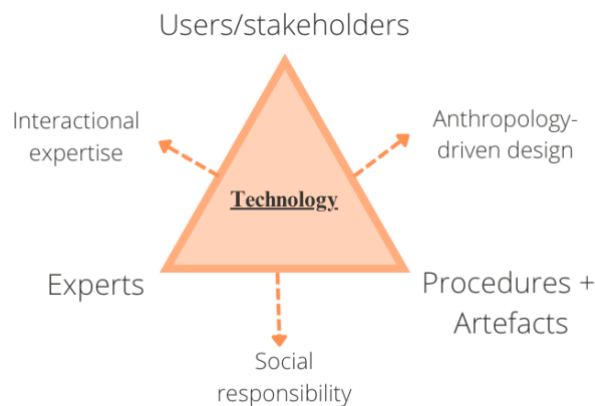


Figure 27: Own illustration of the techno-anthropological triangle adopted from (Børsen, 2013, 50)

We hope these cards can help improve how ChatGPT is used in- and outside classrooms in Danish gymnasiums. They are based on anthropological fieldwork in which students were given a voice to express their experiences and feelings about ChatGPT. The design of the cards is grounded in these insights. The design also extends into the educational setup itself: to foster more meaningful and responsible use of generative technologies. We need to rethink how we shape our moral practices' because technologies *do* something to us. While we cannot change the technological design or how it is regulated at the ministerial level, we can influence the everyday collective practices, discussions, and norms surrounding its use. In doing so, we contribute to a potential new understanding of the technology that reshapes how new experiences are perceived - shaping the practice with GenAI with new awareness and moral considerations.

9. Conclusion

In this thesis we have examined how Danish gymnasium students experience and engage with ChatGPT as a mediating technology in their learning, and how this engagement shapes their practices, understanding, and human values. Our analysis reveals that ChatGPT is not merely a neutral tool, but an active force that co-constitutes the learning environment, influencing how students perceive themselves, their learning processes, and each other.

A key finding is that time pressure, cognitive effort, and the classroom being an insecure space often drive students to use ChatGPT as an efficient and accessible shortcut. Prior experiences with the technology shape a dependency for future use of ChatGPT when the students' daily lives with deadlines pressures them. ChatGPT often becomes a go to tool that students carry with them across academic subjects and situations. This dependency on GenAI can also be likened to a temptation offering an easy choice to overcome cognitive efforts but potentially undermining learning. As students delegate more cognitive work to ChatGPT, they lose metacognitive awareness, along with their ability to reflect critically and develop new skills. This is especially evident during analog exams, where students are forced to confront their abilities without ChatGPT. For some, this creates a sense of alienation from their own learning process and a sense of feeling inferior in relation to ChatGPT's efficiency. Moreover, the boundaries of authorship and authenticity are increasingly blurred. While some students feel ownership over AI generated content - when it resembles with their own perception of their voice - others experience a lack of realness and indifference from their work. When students do not feel the subject, they engage with, they are not transformed by it and learning gets alienated. In such cases, ChatGPT can mute rather than support students' own voices.

Trust also emerges as a central theme - trust in oneself, in teacher-student relations, and in peer collaboration. Students may turn to ChatGPT to avoid asking 'stupid' questions, due to insecurity of being judged and maintaining an image and grades in the classroom. Students experience their teachers' distrust of them regarding using ChatGPT for assignments when teachers test if students have used GenAI with analog methods. In group settings, unspoken assumptions about effort and responsibility can lead to misunderstandings and unequal contributions, affecting not just the present task but future work in collaboration with others.

Self-regulated learning is a potential of ChatGPT that is highlighted due to the technology being available to overcome challenges independently from others. If used uncritically, without clear

boundaries of delegation and reflection, ChatGPT risks replacing rather than supporting meaningful learning. A use where ChatGPT challenges and transforms students' understandings depends on the greater context of the students' metacognitive awareness, reflexivity of what tasks they delegate to the chatbot, and how they prompt. Without these skills and awareness, the students end up being induced by the world view presented by ChatGPT.

Ultimately, the use and availability of ChatGPT challenges not only the process of learning but also human values of: *Identity, Autonomy, Accountability, Ownership, Trust, and Universal usability*. It reshapes how students relate to learning and future actions. We argue that dialogue in classrooms with discussion cards can contribute to a posthuman learning environment where students share practices and experiences and collectively learn from each other. A shared understanding of ChatGPT's role can reshape student use and metacognitive awareness towards the students' own learning. Experience shapes practice, and practice, in turn, shapes experience. It is therefore essential to create classrooms where students and teachers can collaboratively explore what kind of role they want this technology to play - and not play - in their learning environments. Only then can ChatGPT become a tool that supports rather than undermines learning.

10. References

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Figures:

Any figures not appearing on the list were created by us (Hansen & Bech, 2025) or provided by Mentimeter.

Figure 1: *Figure of a Neural network (machine learning)*. Wikipedia.org. (2025). Retrieved May 23, 2025, from [https://en.wikipedia.org/w/index.php?title=Neural_network_\(machine_learning\)&oldid=1291786772](https://en.wikipedia.org/w/index.php?title=Neural_network_(machine_learning)&oldid=1291786772)

Figure 2: *Illustration of the techno-anthropological triangle* inspired and adopted by Børsen, T. (2013) Identifying Interdisciplinary Core Competencies in Techno-Anthropology: Interactional expertise, social responsibility competence, and skills in anthropology-driven design. In T. Børsen & L. Botin (Eds.), *What is Techno-Anthropology?*, 50.

Figure 5: *The Hermeneutic Circle*. Figueiredo, G. (2023) *A Brief History of Hermeneutics*. Retrieved May 22, 2025, from <https://daily-philosophy.com/figueiredo-brief-history-of-hermeneutics>

Figure 7: *The hermeneutical lemniscate*. Kudina, O. (2021). "Alexa, who am I?": Voice Assistants and Hermeneutic Lemniscate as the Technologically Mediated Sense-Making. *Human Studies*, 44(2), 244.