

## WHAT IS THE IMPACT OF CHATGPT ON FACILITATING KNOWLEDGE PROVISION AND CREATION? EXAMPLES AND CRITICALITIES IN CLASSROOM EDUCATION

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**Abstract:** ChatGPT, the generative Artificial Intelligence-based chatbot features generating cohesive and human-like responses to user inputs. The presented study reviews some applications from the field and reflects on experiences from the classroom to enrich our understanding of ChatGPT's capabilities across subject domains, how it can be used in educational settings, and issues raised by facilitators. The findings of this review suggest that ChatGPT's use and effects varies across subject domains and didactic settings. Although ChatGPT has the potential to serve as an assistant for knowledge provision and a virtual tutor for learners, there are substantial challenges associated with its use. They include assignments and assessments and affect educational designs and institutional anchoring.

*Keywords: scientific paper; ChatGPT; generative AI; knowledge generation; instructional facilitation; learning support.*

**Resumo:** ChatGPT, o *chatbot* generativo baseado em Inteligência Artificial, gera respostas coesas e semelhantes às humanas às entradas do usuário. O estudo apresentado analisa algumas aplicações do campo e reflete sobre as experiências da sala de aula para enriquecer nossa compreensão dos recursos do ChatGPT em vários domínios de assunto, como ele pode ser usado em ambientes educacionais e questões levantadas pelos facilitadores. As descobertas desta revisão sugerem que o uso e os efeitos do ChatGPT variam entre domínios de assunto e configurações didáticas. Embora o ChatGPT tenha o potencial de servir como um assistente para o fornecimento de conhecimento e um tutor virtual para os alunos, existem desafios substanciais associados ao seu uso. Eles incluem atribuições e avaliações e afetam projetos educacionais e ancoragem institucional.

*Palavras-chave: artigo científico; ChatGPT; IA generativa; geração de conhecimento; facilitação instrucional; suporte à aprendizagem.*

**Resumen:** ChatGPT, el *chatbot* generativo basado en inteligencia artificial, genera respuestas cohesivas y similares a las humanas a las entradas de los usuarios. El estudio presentado revisa algunas aplicaciones del campo y reflexiona sobre las experiencias del aula para enriquecer nuestra comprensión de las capacidades de ChatGPT en todos los dominios de las materias, cómo se puede usar en entornos educativos y los problemas planteados por los facilitadores. Los hallazgos de esta revisión sugieren que el uso y los efectos de ChatGPT varían según los dominios temáticos y los entornos didácticos. Aunque ChatGPT tiene el potencial de servir

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como un asistente para la provisión de conocimientos y un tutor virtual para los estudiantes, existen importantes desafíos asociados con su uso. Incluyen asignaciones y evaluaciones y afectan los diseños educativos y el anclaje institucional. texto do autor.

*Palabras clave: artículo científico; ChatGPT; IA generativa; generación de conocimiento; facilitación de instrucción; apoyo al aprendizaje.*

## 1 INTRODUCTION

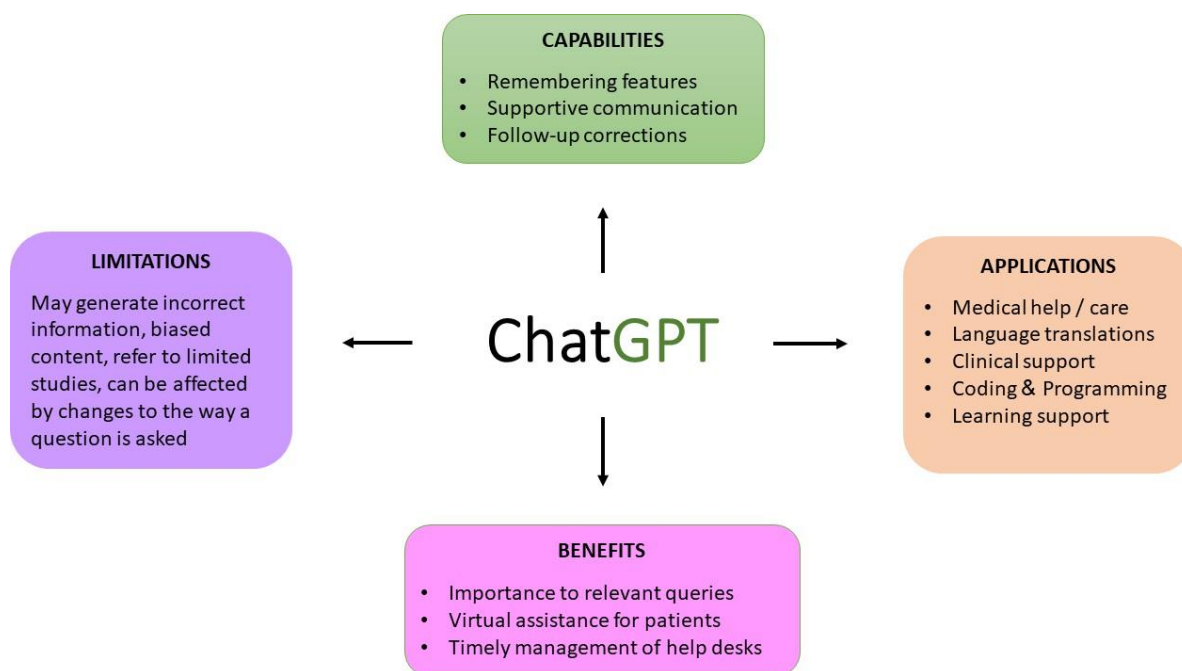
Recently, AI technology science has taken a leap forward by releasing generative language modeling software: ChatGPT (<https://chat.openai.com>). In its latest version backed by GPT-4 it tends to influence knowledge generation and assessments, ranging from scientific contributions (Manohar et al., 2023) to education (Baidoo-Anu et al., 2023, Rudolf et al., 2023) and other societally relevant sectors such as public health (Biswas, 2023) – see also Figure 1. According to the study by Haleem et al. (2022) it can be helpful for a variety of tasks,

including creating code, recommending meals, and enhancing the quality of life for older people and those with impairments:

- The ability to utilize ChatGPT to complete assignments is available since every paper the bot creates is unique.
- ChatGPT can react to a broad range of cues, almost nothing beyond its capabilities.
- The goal of the conversation GPT is to understand a simple statement.
- It provides us with guidance and assistance on right and wrong in the age of smartphones and computers.
- It acts as a humanoid when we need to inquire about a different module since it will research to get the answers.
- The foundation model will significantly alter how software is developed and used across the technology sector, driven by platforms like the Role of ChatGPT.

In their analysis the authors refer to role of ChatGPT can play in education indicating its capability to explain words and sentences related to learner needs, as well as the changing role of facilitators providing ‘just the basics of a subject while providing students a forum to ask questions and clear up any confusion’ (ibid.). Finally, they mention ChatGPT’s adaptability when searching to ‘the individual requirements and tastes of the user’ (ibid.). The opportunity to improve the user experience in digital learning processes has also been recognized by Zhai (2022) which has led to the expectation of benefits even for self-directed learning: ‘Educators and students may more effectively use these technologies to help and enhance their own learning and development by being aware of how Chat GPT can support the independence and independent study of autodidactic learners.’ (Firat 2023).

Figure 1 – ChatGPT contributions from various angles.



Adopted from Haleem et al., (2022)

However, recent studies, e.g., Lu (2023), reveal substantial challenges when using ChatGPT in the classroom for knowledge provision and generation. These challenges were associated with incorrect information provision, and bypassing plagiarism detectors. Following the call for action to rethink assessment methods and institutional policies in educational institutions (ibid) we aim to structure the findings so far, including the facilitator and learner activities in preparing and completing learning (support) processes.

Section 2 provides some foundations of Large Language Models. Section 3 reviews classroom experiences exemplifying ChatGPT applications for preparation, operation, and assessment. Section 4 structures the findings along a pragmatic framework from institutional knowledge provision and production and exemplifies its application by providing experiences from the field we are working in. Section 5 contains the discussion of our findings, and section 6 concludes the paper.

## 2 LARGE LANGUAGE MODELS – SOME FOUNDATIONS

Large Language Models (LLMs) like ChatGPT are based on deep learning architectures. Typically, such architectures comprise multiple layers of interconnected neurons, so called neural networks. These layers of a neural network can be categorized into three main types:

- **Input Layer:** This is the first layer that receives the raw input data, which could be images, text, audio, or other types of data.

- **Hidden Layers:** These intermediate layers process and transform the input data through a series of mathematical operations. The number of hidden layers and the number of neurons in each layer can vary depending on the specific architecture and task.
- **Output Layer:** The final layer produces the desired output or prediction, which could be a classification label, a numerical value, or a sequence of data.

The neural network needs to be trained. The training phase of a classical deep learning architecture typically involves the following key steps:

- **Initialization:** Initially, the neural network's weights are randomly initialized or set to small values. These weights are the parameters that the network learns during training.
- **Forward Pass:** During training, input data is fed forward through the network. Each layer performs a linear transformation followed by a non-linear activation function. This process continues through the hidden layers until the output layer produces predictions.
- **Loss Calculation:** The predictions made by the network are compared to the actual target values (ground truth) using a loss or cost function. This function quantifies the difference between the predicted and actual values.
- **Backpropagation:** The gradient of the loss function with respect to the network's weights is computed using a technique called backpropagation. This gradient information is used to update the weights in a way that reduces the loss.
- **Gradient Descent:** Optimization algorithms like stochastic gradient descent (SGD) or its variants are employed to adjust the network's weights iteratively. The goal is to minimize the loss function, which effectively tunes the network's parameters to improve its performance on the training data.
- **Epochs:** Training typically occurs over multiple iterations called epochs. In each epoch, the entire training dataset is passed through the network, and the weights are updated. This process continues until the loss converges or reaches a predefined stopping criterion.
- **Validation and Testing:** After training, the model's performance is evaluated on separate validation and testing datasets to assess its generalization capabilities. The model should perform well on data it has not received in the course of training.

Basic technological foundations of LLMs are:

- **Transformer Architecture:** LLMs are typically built on the Transformer architecture, which is well-suited for handling sequential data, making it effective for natural

language processing tasks.

- **Attention Mechanism:** Transformers use attention mechanisms to weigh the importance of different words in a sentence when making predictions. This allows them to capture long-range dependencies in text.
- **Large-scale Training Data:** LLMs require access to massive amounts of text data for effective pre-training. This data helps them learn grammar, semantics, and world knowledge.
- **Parameter Tuning:** LLMs have a large number of parameters (often in the billions), and fine-tuning these parameters on specific tasks is a critical part of their effectiveness.
- **Inference Engines:** The deployment of LLMs often involves building inference engines that take input and generate text-based outputs.

In the case of LLMs like GPT (Generative Pre-trained Transformer) and similar models, the inference engine is a neural network that has been pre-trained on a massive amount of text data and then fine-tuned for specific NLP tasks. During pre-training, the model learns to capture linguistic patterns, grammar, semantics, and world knowledge from the training data.

When an LLM receives some input, the neural network processes this input through its layers, applies learned weights and transformations, and generates an output based on its interpretation of the input and the context provided. The neural network's architecture, often based on the Transformer architecture, includes mechanisms like self-attention, which allows it to weigh the importance of different words in the input sequence when making predictions.

This neural network-based approach enables LLMs to handle a wide range of language-related tasks, from text generation and completion to language understanding and translation. The strength of these models lies in their ability to capture both local and global context information within the text, making them highly effective in natural language understanding and generation tasks. Moreover, during conversation, the pre-learned weights of the neural network are adapted dynamically. In this way the system is able to learn on the “fly” and is continuously expanding its knowledge.

### 3 CLASSROOM EXPERIENCES

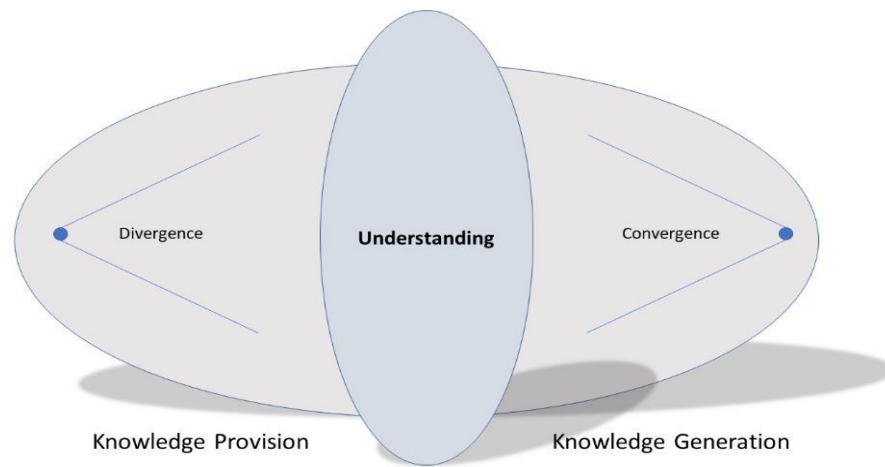
In this section we review recent findings affecting educational design and preparation, effectiveness of learning support, and digital assessment capabilities. Recent studies reveal applications of ChatGPT in several education-relevant areas (cf. Javaid et al., 2023; Kasneci et al., 2023; Mizumoto et al., 2023; Rudolph et al., 2023; Šlapeta, 2023), ranging from creating

educational content to increasing accuracy of linguistic exam scoring. In their exploration study Murgia et al. (2023) challenged ChatGPT with respect to supporting 4th grade classes in completing information discovery tasks. Their response analysis included qualities like readability and language across disciplines and revealed the impact of dynamic model changes – ChatGPT changes response behavior while being used. A major result was that prompts can impact generated responses requiring more in-depth studies. Such studies are of high relevance when chatGPT is used for composing high-quality argumentative writing, as dialogical and structural aspects are essential.

When Su et al. (2023) were looking on whether ChatGPT could replace peer learners to practice argumentation skills and support facilitators providing feedback, ChatGPT had the potential to support argumentative writing classrooms. Its limitations mainly concern logical reasoning when conversations need to be developed towards argumentative threads. ChatGPT rather guesses the meaning of users' ambiguous expressions instead of asking for clarification. Facilitators need to set specific goals and clear instructions when using ChatGPT as argumentative writing assistance in classrooms – a direction of use already indicated by Kasneci et al. (2022).

Su et al. (2023) also suggested that facilitators should assign learners higher-order tasks requiring idea development and creative task accomplishment, even though argumentative writing (see above, Murgia et al., 2023) can be effectively supported. However, students should be able to challenge ChatGPT's responses (de Winter, 2023), even with inputs from ChatGPT in addition to scaffolding provided by facilitators (Su et al., 2023). De Winter (2023) studied ChatGPT in the context of completing high school exams in the Netherlands on the topic of English reading comprehension, resulting initially in a mean grade of 7.18 on the Dutch scale of 1 to 10. It compared quite well to the mean grade of all students who took the exam in the Netherlands (6.99). Using GPT-4 for the same exams, a score of 8.33 was achieved, outperforming average Dutch students in the domain of English language comprehension. Since GPT-4 could identify potentially incorrect answers, the way exams are provided to students needs to overcome ChatGPT-enabled generation of valid answers 'by click on demand'. Consequently, assessing student knowledge and the entire facilitating strategy in the classroom should be revisited (Darby, 2023).

Figure 2 – ChatGPT’s contributes to both, to divergence when providing knowledge, and to convergence when generating knowledge to complete a learning step, i.e. to develop (informed) skills.



Source: Authors

Eke (2023) suggests embedding ChatGPT as (essential) part of academic educational practice by ensuring integrity through establishing ChatGPT training and capacity building opportunities for both facilitators and learners. Its literal use minimizes resources to be spent for risk assessment and to establish specific integrity policies. She also addresses the developer side by suggesting to collaborate in the construction of trusted tools for identifying possible dishonest use of AI tools with OpenAI and other large language model creators to ensure informed use and to address academic integrity concerns explicitly along development cycles. The findings allow to position the contributions of ChatGPT so far in a continuum of learning practice (see Figure 2), namely opening up the information space for learning processes, and thus, contributing to knowledge provision, and refocusing to complete an assignment or learning task after processing the provided information and adjusting it.

#### **4 SOME GUIDANCE FOR THE CLASSROOM**

In this section we categorize the contributions of ChatGPT to classroom teaching and learning, and provide experiential practice from the facilitators’ perspective based on the authors’ educational ChatGPT activities in the last year.

Table 1 Facilitator involvement when using ChatGPT.

	<b>Class preparation</b>	<b>Guiding the accomplishing of learning tasks or completing of assignments</b>	<b>Assessment of learner results</b>
Factual knowledge provision	Check explanations of terms and concepts required to accomplish learning tasks and to complete assignment  Content generation	Provide additional input and feedback  Support scaffolding	Check for accuracy and integrity
Procedural knowledge provision	Check indications and explanations of problem-solving processes required to accomplish learning tasks and to complete assignment	Provide additional input and feedback  Support scaffolding	Check for accuracy of procedure & correctness of results & integrity
Writing education/ knowledge generation	Check explanations of structuring text according to the learning tasks or assignment	Provide additional input and feedback  Support scaffolding	Check for accurate search and selection of sources & coherence of argumentative writing & originality and integrity of results

Source: Authors

We have grouped the activities set as teachers/facilitators and the observed activities from learner behavior according to preparing class (attendance), work (support) on assignments, and assessment – see Table 1 and 2, respectively. The second dimension we think needs to be considered in the context of Knowledge Management is the type of knowledge and skill development corresponding to the objectives of the course. In the authors' academic teaching context there are 3 main types of course settings or courses that need to be differentiated in terms of supportive facilitation:

- *Factual knowledge provision*: It comprises conveying background, theories, concepts, and exemplary applications of domain knowledge, and can be presented to learners in terms of material and lectures.
- *Procedural knowledge provision*: It qualifies learners to solve problems in a specific domain by applying conceptual and methodological inputs to the learners.
- *Academic knowledge generation*: It requires writing in term of processing and structuring academic



knowledge to develop and answer a specific research question.

Table 2 Learner involvement using ChatGPT.

	<b>Preparation for class attendance</b>	<b>Accomplishing learning tasks or assignments</b>	<b>Assessment</b>
Factual knowledge provision	Get familiar with topic by asking for relevant foundations and elementary concepts and methods	In case of need for further explanations search for alternative forms of conveying factual knowledge	Check for accuracy
Procedural knowledge provision	Check for methods and ways to explain and solve problem in the addressed domain	Ask for exemplary and sample problem solving according to classroom assignment  Check achieved results for plausibility or/and correctness	Check for accuracy of search and selection of sources & coherence of argumentative writing originality & integrity of results
Writing education/ knowledge generation	Check for explanations of understanding and structuring text according to the learning tasks or assignment	Provide input on how to handle learning task & how to complete assignment	Check for accuracy of search and selection of sources & coherence of argumentative writing & originality / integrity of results

Source: Authors

As can be seen from the table entries several teaching and learning activities in classes can be addressed and supported by ChatGPT. We exemplify some of them according to our experiences in the field, ranging from problem solving to scientific text composition. They deliver deeper insights in educational practices involving ChatGPT, and show how to adjust the interaction to the respective teaching and learning task.

#### ChatGPT CASE 1: PROBLEM SOLVING BY ChatGPT?

Assume the following assignment: Two young children, Joe and Eric visit a store because they want to buy honey. The seller says that this one who knows how to count up to three will get the honey. Joe says "three, two, one" and Eric says "zero, one, two, three". Who gets the honey? We show the interaction sequence with ChatGPT:

ChatGPT

In this scenario, Joe gets the honey. The seller stated that the one who knows how to count up to three will get the honey. Joe correctly counted up to three by saying "three, two, one," whereas Eric counted from zero to three. Since Joe counted up to three in the correct order, he is the one who gets the honey.

Authors: This is wrong because Joe counted for three down in the wrong order. He was asked to count up to three.

#### ChatGPT

Apologies for the confusion. You're right, Joe counted down from three instead of counting up. In that case, neither Joe nor Eric correctly counted up to three. Joe's counting was in reverse order, and Eric's counting started from zero. Given that neither of them counted up to three as requested, it would be up to the seller to decide who gets the honey based on their own criteria or rules.

However, this answer is still controversial: According to the set up, it doesn't matter whether counting starts with 0 or 1.

This case so far reveals that a user needs essential proficiency to master a domain or task, and to provide accurate feedback to ChatGPT indicating what is (not) correct, in order to trigger ChatGPT to go into depth accurately. In the showcase, the subsequent answer needs to be discussed. Although being analyzed quite well, it has not been determined from where to start counting – the word "to" only means that counting must be in ascending order. However, ChatGPT could be used as guide to improve skills and knowledge, as the following dialogue reveals:

A(uthors): Two young children, Joe and Eric visit a store because they want to buy honey. The seller says that this one who knows how to count up to three will get the honey. Joe says "three, two, one" and Eric says "zero, one, two, three". Who gets the honey?

#### ChatGPT

Eric gets the honey. The seller stated that the one who knows how to count up to three will get the honey. Eric correctly counted from zero to three (0, 1, 2, 3), which includes all the numbers up to three. On the other hand, Joe counted down from three to one (3, 2, 1), but he didn't count up to three as the seller requested. Therefore, Eric wins the honey.

A: Eric corrects himself and says "minus one, zero, one, two, three". Who gets the money now, Eric or Joe?

#### ChatGPT

Now, Joe gets the honey. Eric's new counting sequence is "minus one, zero, one, two, three," which includes five numbers. While it does include the numbers up to three, it also includes additional numbers (negative numbers). In contrast, Joe's initial counting sequence was "three, two, one," which does not include all the numbers up to three. Since Joe's counting sequence follows the condition set by the seller (counting up to three), and Eric's new sequence goes beyond three, Joe gets the honey.

A: This is not correct because Eric still counts up to three. He starts counting with a negative number. There is no condition saying where and at which position the counting must start.

### ChatGPT

Apologies for the confusion in my previous response. You are right. There is no specific condition stating where the counting must start. Given that Eric correctly counts from "minus one, zero, one, two, three," he includes all the numbers up to three, just like Joe's counting sequence. However, Eric's counting sequence has more numbers, including negative numbers. Since both Joe and Eric correctly count up to three, the seller should give honey to both of them as they both meet the condition set by the seller. They both deserve to be rewarded for their efforts in counting up to three in their unique ways.

A: No, that is also not correct. Joe is not counting up to three. He counts down from three to one.

### ChatGPT

You are right, and I apologize for the oversight in my responses. Let's reevaluate the situation. Joe's counting sequence is "three, two, one," which counts down from three to one. Eric's counting sequence is "minus one, zero, one, two, three," which counts up to three but includes additional numbers (negative numbers). Given that the seller's condition is to find the one who knows how to count up to three, neither Joe nor Eric has met the condition perfectly. Joe counted down, and Eric counted beyond three by including negative numbers. In this case, neither Joe nor Eric correctly fulfilled the seller's condition of counting up to three, so neither of them gets the honey. The seller may request them to try again or may come up with a different challenge to determine who will get the honey.

A: You are not correct because Eric is right. He counts up to three beginning with the number minus one.

### ChatGPT

You are absolutely right, and I apologize for the confusion in my previous responses. Let's reevaluate the situation again: Joe's counting sequence is "three, two, one," which counts down from three to one. Eric's counting sequence is "minus one, zero, one, two, three," which counts up to three, starting from minus one. Given that the seller's condition is to find the one who knows how to count up to three, Eric indeed fulfills the condition perfectly. He counts up to three starting from minus one and includes all the numbers up to three. On the other hand, Joe's counting sequence counts down from three to one and does not fulfill the seller's condition of counting up to three. Therefore, Eric gets the honey, as he is the one who correctly counted up to three following the seller's condition.

A: Eric changed his mind and says "two, three". Who gets the honey now?

### ChatGPT

Now, Joe gets the honey. Eric's latest counting sequence is "two, three," which only includes the numbers two and three. This sequence doesn't count up to three, as it stops at three and doesn't include the number one. On the other hand, Joe's initial counting sequence was "three, two, one," which also doesn't count up to three as it counts down from three to one. Since neither of them counted up to three correctly, the seller might decide to give the honey to neither of them or come up with a different challenge to determine who gets the honey.

This sequence shows how continuous improvement of understanding a problem could help developing a correct solution, once supportive inputs could be provided. To that respect, ChatGPT can be considered as explainable digital learning system. Consequently, facilitators

could use ChatGPT to develop a narrative how a problem could be finally solved by developing an understanding of a solution space and developing variants of possible solutions.

### ChatGTP CASE 2: STRAIGHTFORWARD DELIVERY OF A THESIS?

A bachelor student had got an assignment for his thesis in Business Informatics in the beginning of the term. The procedure to follow is given by the following phases:

1. Formulate research question(s) according to the addressed topic – in this case it was ‘The Use of Bigraphs in Medical Cyber-Physical System Development’
2. Search for existing literature to answer the research question(s)
3. Select papers and resources to be analyzed to answer the research question(s)
4. Analyze papers and resources with respect to the addressed research question(s)
5. Develop answers to the addressed research question(s)
6. Discuss results and conclude with achievements, limitations, and further research

Besides regular meetings with the supervisor after completing step 1, 4, and 6 the results are presented in a plenary classroom setting to receive feedback by peers, experts in the field, and the supervisor. In this case, the student did not show up after accepting the topic to be handled for presenting (intermediate) results. He did not contact the supervisor before handing in the completed thesis from her perspective. A first check of the supervisor revealed some lack in coherence with respect to the structure and the results of the research. In particular, the results from step 1 did not match those from step 5. Consequently, the work was checked by plagiarism software which resulted in 86% generative AI-provided text. When being confronted with the result the student finally agreed with the results of the plagiarism check. The case shows a learner use of ChatGPT for generating text immediately stepping to convergence (the student could not answer questions referring to the content of the work), and not checking the validity of results before submitting the thesis for assessment.

## 5 DISCUSSION

ChatGPT performs well as reshaping tool when the user is already firm in a specific subject. It can also be beneficial for beginners in explaining simple issues. It also performs well in writing and selecting stories and poems, and can provide essential problem-solving capabilities - aside from the presented findings, an application of high school-leaving exams has led on the average to a grading of 2, which is the second-best examination grade in Europe. Moreover, a programmer can easily find code in specific programming languages for specific problems. However, if the problem has a certain level of complexity, ChatGPT may not find an

immediate solution. In this case, it requires decomposing the problem in sub problems, and merging the chunks of AI-generated code, while ensuring coherence with respect to the addressed topic and procedure.

We consider ChatGPT not appropriate as an exclusive learning tool, since it takes a long time until the system recognizes the competence and learning level of a learner. For instance, when a user asks the system to explain the problem by Deutsch, he/she gets an excellent explanation. However, when the user is not familiar with tensors, the explanation does not help in understanding the problem – the text is a copy from a textbook enhanced with syntactic sugar. In this case, a longer conversation is needed: The learner first has to understand tensors, and if consequently not being familiar with matrix operations, another conversation on basic mathematics is required. This type of interaction may lead to processes not convenient for learners, as they feel lost and get confused.

Overall, similar to Joseph Weizenbaum's rule-based ELIZA program in 1966, neural network-based products such as "ChatGPT" or "Open Assistant" represent major progress in AI while imposing various challenges especially on the teaching community. Users, regardless of their role in knowledge provision or generation, need to learn to coexist with AI. As long as humans are in charge of deciding, AI chat bots can be valuable.

In some cases, artificial neural networks are producing other and sometimes better strategies for problem solving (see Barachini et al., 2022) than people. The more human cognitive processes can be simulated by neural networks, the more we have to pose the question how humans can coexist with digital agents without losing control, in particular over critical decisions.

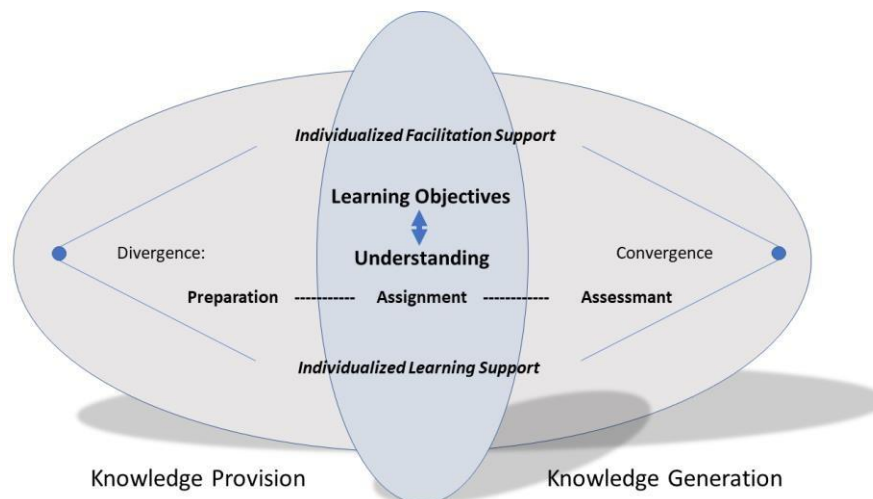
Some suggestions for evaluating scientific theses, e.g., in bachelor programs, can be derived from the experience in educational practice – some of them have already been recognized recently, e.g., Terry (2023):

- Approx. 20% of the text generated by AI software should be the maximum.
- The AI-generated text must not be generated in one block or paragraph but must be scattered across the thesis.
- If the 20% are fully exploited then more than one AI generator must be applied.
- The AI-generated text needs to be marked so that it can be clearly distinguished from the rest of the text (like literature references). The AI software (ChatGPT or Open Assistant or others) that has been used needs to be explicitly stated.
- Any credit point system needs to be reconsidered recognizing the potential use of ChatGPT or similar software. For instance, the theoretical part of a thesis could be awarded with less credits than the empirical part.
- Design, concepts, and methods have to play a more prominent role in the evaluation of a thesis.
- Oral examination and oral discussions should be more emphasized.

## 6 CONCLUSIONS

In this section we position and summarize the findings as shown in Figure 3. We consider ChatGPT supportive in class preparation, facilitating learning processes, and assessment, however requiring human intervention for developing human understanding and assuring quality of information and quality of content. Both, facilitators, and learners, can be supported, as indicated by our experience in the field and the findings that have been published recently. However, the learning objectives and regulations to be provided for utilizing ChatGPT need to be clarified upfront to create value for both types of stakeholders. We consider the individualized facilitation support critical for guiding the learning process to converge towards assignment-specific skill and knowledge development.

Figure 3 – ChatGPT’s application for individualized facilitation and learning support.



Source: Authors

In future scenarios imagine tactile sensors, artificial skins, optical pattern recognition, and LLMs being merged in applications. In this case, learning is accomplished not only through pre-trained text from Internet-based sources, but also through smelling, feeling, seeing, and hearing. Constituting digital selves in this way could simulate human behavior to then apply all the well-known classical knowledge management techniques for creating, sharing and preserving knowledge.

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