AI

ARTIFICIAL INTELLIGENCE IN TEACHING AND LEARNING
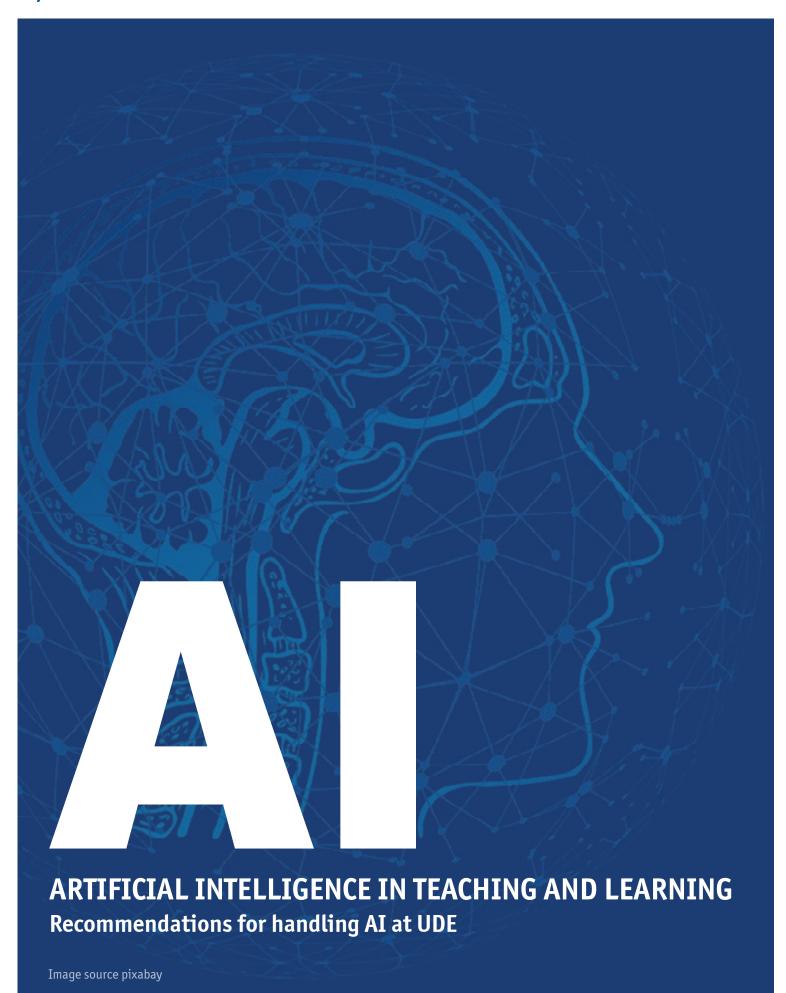
Recommendations for handling AI at UDE

Artificial intelligence in teaching and learning
Recommendations for handling AI at UDE

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CONTENT

1. AI IN A UNIVERSITY CONTEXT

With these guidelines, the University of Duisburg-Essen (UDE) would like to provide its members guidance and recommendations on how to handle AI technology in teaching and learning. As the field of AI technology in particular is subject to rapid changes, these guidelines are to be updated and expanded on a regular basis.

AI systems affect the world we live in and are already being employed in various fields. This also applies to the education sector and to teaching and learning at universities. In order to identify and embrace the potential and the challenges of AI-based tools in the context of work and research or for learning, one needs to understand the processing operations and the implications for society. Therefore, the use of AI-based systems in teaching at universities necessitates that employees, teaching staff, researchers and students develop the skills required to use AI-based systems appropriately and responsibly and in a way that suits the particular task. From a technical perspective, the processing, analysis and exploitation of data (data literacy) is also of particular importance as an overarching topic in research, the work environment and learning. The 'Future Skills 2021' framework from the Stifterverband initiative includes knowledge of data analytics and AI as one of the 21 competences ('Technological competences' category) that will be relevant in the future.[1]

1.1. Artificial intelligence

Artificial intelligence (AI) is widely discussed throughout society. The visions of our future with AI that are publicly discussed range from great enthusiasm regarding potential applications to cultural pessimism in view of the resulting risks. But what exactly is artificial intelligence?

In general terms, AI refers to engines that are self-learning and can reason and act independently.[2] At the same time, AI is also an academic subdiscipline of computer science that can be subdivided into different fields. However, when AI is referred to in everyday conversations or in the media, the term used is frequently not AI but machine learning (ML). ML is a branch of AI where algorithms scan data for patterns. When processing new data, the system independently generates solutions on the basis of statistical probabilities. Machine learning can be categorised as **narrow AI**. Models from this field can be deployed to fulfil specific tasks (play chess, generate texts, etc.). For such purposes, the system must be trained with a great amount of data.

One focus area in research is the development of **artificial general intelligence** (AGI) with the aim of simulating human intelligence. Such an AI system would then be able to solve various types of problems, learn without human intervention and plan for the future. At this point, general AI exists in theory only and there is no consensus among experts as to which criteria a system would have to meet in order to be categorised as general AI and what capabilities it needs to have to be considered intelligent.[3] For this reason among others, it is doubtful whether AI technology will reach a stage of development – similar to a science-fiction scenario – that will allow it to operate as a self-referential system and potentially supersede humans.[4]

However, it is undeniable that AI systems are evolving and will assume an increasingly pivotal role in the social, political and economic spheres. Lenzen (2020) points out three 'threats that are more real' than autonomous machines: (1) surveillance technology, (2) autonomous weapons systems and (3) continuing monopolisation of large corporations.[5] Thus, it appears important to arrive at a consensus regarding the fields of application of AI technology and its limitations. In order to allow for informed actions and decisions, it is crucial to enable and promote the development of relevant competences in (teaching) staff and students.

1.2. AI language models

In November 2022, the launch of ChatGPT, a chatbot that was initially available free of charge, further fuelled the debate. ChatGPT is a tool that allows users to submit requests in dialogue form and receive answers generated by AI. In a dialogue with the system, large volumes of text can be processed, e.g. for producing new texts, translations, interpretations or summaries. The underlying 'GPT' (generative pre-trained transformer) AI model is a large language model (LLM). LLMs can be categorised as narrow AI and are based on the method of machine learning. It is important to note that the learning objective of an LLM is the structural make-up of sentences and texts. An LLM only learns correct facts and logical connections by chance because they usually occur much more frequently in the training data than erroneous information and false statements. Texts that are generated by LLM have their basis in probability calculations or, as Pasquinelli (2017) puts it, in 'statistical induction'. A tool such as ChatGPT, therefore, produces texts by gradually predicting, on the basis of the data it has been trained with, which word is likely to follow the words already produced. The input from the user that specifies the task for the AI – the 'prompt' – serves as the initial text fragment in this process.

> **A peek behind the scenes of AI text generators (in German):**
> https://www.soekia.ch/gpt.html

The way in which AI language models process data and handle user input has direct implications for the quality of the generated texts and the classification of the tools with regard to copyright and data protection.

2. OPPORTUNITIES AND LIMITATIONS OF AI TOOLS

2.1. Quality of AI-generated texts

The technological leap manifested by ChatGPT was particularly evident in the *linguistic* quality of the texts it produced. At the same time, it was quickly found that the quality with regard to *form and content* depends strongly on the prompts entered and can vary from one discipline to another. Depending on the wording and the tone of the prompt, results can differ and make it necessary to use an iterative approach to entering prompts or revise the text. With many AI tools, it is unclear which datasets the relevant system accesses. Thus, it is also unclear whether new political developments or scientific findings are considered in the results. Furthermore, references are not stored during the training process of an LLM, which may mean that references produced by an LLM may be wrong or even refer to sources that do not exist at all. Better-quality AI-generated texts with regard to content might be achieved by not submitting a request directly to an LLM, as is the case with ChatGPT, but instead having an AI-based tool (such as the AI-supported Bing search) gather sources from the Internet using a traditional search function and then having AI create a summary.

> **Issues to consider when using AI text generators such as ChatGPT:**
>
> **Authenticity:** Some facts and sources are fictitious or hallucinations.[6]
>
> **Transparency of results:** It is unclear which data from the Internet was processed or which data was included in the AI language model.
>
> **Up-to-dateness:** The data used may not take into account current political developments and scientific insights as the model may have been trained in the past.
>
> **Handling of biases:** The quality of the output depends on the quality of the input (prompts) among other things. Since the algorithms on the data included are trained and curated by humans, the results can be biased and perpetuate stereotypes, for example.[7]

2.2. Copyright

As a general rule, the following applies with regard to copyright: AI-based programs for producing texts cannot be considered the author or creator of the texts they generate as defined in the Act on Copyright and Related Rights (*Urheberrechtsgesetz*; UrhG). Pursuant to Section 2 (2) of the UrhG, only an author's **own intellectual creations** constitute works within the meaning of the UrhG. Such creations can only be produced by a **natural person**.

However, if AI tools such as ChatGPT are used as a resource and the user makes a significant intellectual contribution of their own, protection of the result under the user's copyright is possible.

As it is unknown which data AI tools access or which sources they use, it is theoretically possible that copyrights are breached as other people's work is replicated in whole or in part if AI-generated material is published without reviewing it. Therefore, it is not recommended that AI-generated texts be adopted in teaching and learning without reviewing them first.

2.3. Data protection

As has already been mentioned in the previous passages, large volumes of data are stored and processed during the development of AI systems. Most of the time, it is unclear which data resources are used specifically and which sources they come from. Therefore, it is also unknown whether personal data of EU citizens was gathered and whether it was stored and processed in accordance with the GDPR. As a result, it is difficult for individuals to exercise their rights, e.g. the right to access their data or have it erased.[8] If the personal data of any third parties is processed while using an AI tool, the individuals in question would have to be asked to give their consent. However, the logistics for that would be impracticable.[9]

From the users' perspective, on the other hand, the questions is what personal data the system gathers (e.g. as early as during the registration process) and whether any additional data is stored and consolidated when entering the prompts, thus allowing inferences to be made about the users.

Against this backdrop, it is even more important to develop the ability to apply critical thinking to one's own interactions with and use of AI-based systems.

3. AI SKILLS

As part of their studies, students are not only to acquire expert knowledge and the essential capabilities for their respective discipline but also learn other key skills. In view of current developments, this includes, in particular, the consolidation of AI skills.

3.1. Promoting and strengthening AI skills

Even though AI-generated texts, for example, may appear well composed at first glance, they can contain content-related errors or aspects that need to be critically assessed. This is where AI skills and AI literacy[10] are becoming increasingly important. AI literacy refers to the competence or the acquired knowledge that is necessary in order to use AI in a way that is suitable to the context and one's intended purposes.[11] This involves questions such as 'How can I apply AI programs in a targeted manner?', 'What data and processes are used in the background?', 'How do requests need to be worded in the tool in order to provide adequate results?' or 'How do results or the output have to be evaluated?' – all of these questions refer to AI literacy.

The key point is that teaching at university should systematically promote and strengthen AI skills in order to prepare today's students for professional life in the age of AI. In doing so, interdisciplinary perspectives are just as relevant as subject-specific domain knowledge that students acquire during their studies. At present, it is crucial to convey basic knowledge about AI and skills regarding the use of AI tools to a wide audience. It must be assumed that AI tools have the potential to change the ways in which we teach and learn. This potential can be exploited in different ways in the context of academic education. It is therefore essential that teaching staff, in particular, be encouraged and equipped to use AI tools themselves, experiment with them and integrate them into university teaching in a sensible way. This can lay the foundations for establishing essential AI skills across all disciplines.

3.2. Basic knowledge, using and reflecting upon AI tools

The central AI skills that are relevant in view of current developments include **(1) specialised and basic knowledge**, i.e. conveying basic knowledge about AI and how it works, and **(2) handling AI programs**, i.e. the use cases and applications that need to be prioritised in order to reach a wide audience of students and teaching staff.[12] Learners should be familiarised with the way AI tools work and what they are capable of in order to ensure that they are applied correctly, effectively and in a sensible way. As a consequence, instruction in basic knowledge and application perspectives should be complemented by the dimension of **(3) reflection**, which is generally concerned with the critical assessment of AI-based systems. This includes perspectives on human influence on AI (potential influence that humans may have on the technology), for example, and also ethical and legal aspects and standards.[13]

The AI skills mentioned above are significant because AI programs are not without flaws and, at the same time, ethical and legal questions must be reflected upon. This refers, among other things, to the abuse of AI technology (e.g. disinformation, potential academic misconduct), data bias[14] or even product development (e.g. precarious employment of clickworkers, intransparent algorithms).

Both federal and state government initiatives are providing an increasing number of self-study options surrounding the topic of AI. The 'AI Campus' platform, which is funded by the German Federal Ministry of Education and Research (BMBF) is a recommended resource that offers digital learning opportunities (e.g. videos, podcasts or online courses) free of charge. The material can either be used for one's own learning or, ideally, be integrated into classes, thus addressing and further elaborating on the topic of AI.

Here is a selection of free online courses provided on the AI Campus platform, among others:

Introduction – 'Elements of AI': https://www.elementsofai.com
Introduction – 'Launchpad to AI': https://ki-campus.org/courses/aiquestions2021
Further English-language resources are available on the openHPI platform from the Hasso Plattner Institute: https://open.hpi.de/channels/ai-service-center

3.3. AI skills enhance educational opportunities

All in all, the use of AI programs in education contexts offers various benefits, but it is important to bear in mind the challenges and risks and to use the technology responsibly and in a targeted and reflected way. In doing so, the commercialisation of AI tools and the consequences for education institutions must be taken into account (e.g. licence costs incurred for tools from third-party providers with commercial interests of their own). Systematic promotion, shared rules and equal opportunities with regard to access can help counter the current disparity when it comes to the development of digital and AI skills. Easily accessible measures such as cross-curricular learning opportunities for students that combine AI tools and online offerings can help students acquire robust basic knowledge about AI for improved participation and equitable opportunities in an increasingly digitalised (professional) world as early as in their studies.

In order to provide support with the opportunities and challenges that AI tools entail across all disciplines, a framework on how AI is to be handled in teaching and examinations is necessary and will be explored in the next section.

4. HANDLING AI IN TEACHING AND EXAMINATIONS

It is undisputable that AI tools will have an impact on our graduates' professional lives and also on those of our teaching staff. With AI, structuring, consolidating and processing large volumes of information will be possible in a much faster and easier way than humans could ever carry out these tasks. The underlying ideal scenario is that human and artificial intelli-

gence can be combined, thus yielding better-quality results.[15] These advantages can also be taken up in teaching in order to give students an opportunity to deal with such tools early on.

4.1. Academic work using AI

Various fields of application can already be identified in which AI can significantly support academic work. If used competently, these systems have the potential to facilitate work and writing processes, free up creative capacities and expand perspectives. As a prerequisite for this, students must already be familiar with general standards and methods of academic work and writing in order to be able to verify the AI-generated results.[16] If this is the case, AI tools can provide added value for academic work.[17] Students can use them for research purposes in order to get a quick first overview of a new subject area or have them summarise academic texts. They can be employed to help create an initial structure, central questions and lines of argument for a paper or to find examples to illustrate, contextualise and contrast with students' own ideas. AI can provide writing-checker type support during the writing process in the form of feedback on spelling and content, editing and vocabulary suggestions for improving the text. Furthermore, AI tools can be used to translate one's own or other people's texts. However, the results should not be used without editing in this case either.

AI translation tools

AI tools such as DeepL are commonly used for translating texts. At first glance, DeepL appears to be helpful. However, 'academic German', for example, is quite different from 'academic English'. For instance, English sentences tend to be shorter, the passive voice is used less frequently and it is acceptable to use the personal pronoun 'we'.

4.2. Teaching and learning with AI

Teaching staff can also make use of the benefits of AI tools in their own work. In addition to facilitating their work on academic papers, AI can be employed for purposes such as developing teaching and learning material, creating quizzes or examples for their students, or preparing feedback on student assignments.

Moreover, teaching staff can make AI part of the subject matter in their classes and promote the creative and critical use of such tools. They can help their students word their prompts in a target-specific manner or carefully check the facts of a response generated through AI. They can show students how AI tools can be employed to process large volumes of information, find inspiration on phrasing or check their own lines of argument for potential weaknesses.

Thus, teaching staff act as guides and facilitators in an education environment that is continuously changing. They provide opportunities for critically assessing AI tools and encourage a joint reflection on their use in classes, keep track of their students' learning progression and give them feedback.

4.3. Examination formats under pressure

AI tools can add value to teaching and learning, yet they also cause issues with regard to assessments. Written examination formats where students are unsupervised, such as essays or papers, are particularly prominent in the debate surrounding the potential fields of application of AI. Summarising literature or comparing widely disseminated theories and models are tasks for which AI tools, thanks to the training data available on the Internet, can already produce results of a quality comparable to that achieved by students. Especially in the educational and social sciences and the humanities, this results in significant pressure to adapt examination approaches as these disciplines rely relatively heavily on written work for assessing their students' learning progress.

An additional problem is that AI-generated texts cannot be identified and proven beyond any doubt to have been AI generated. Each text is a sequence of words that has been calculated on the basis of probabilities. Slight variations in the

prompt and the use of random variables result in AI responses being unique, at least with regard to style. Hence, even detection software (such as GPTZero) is not able to reliably distinguish AI-generated texts from texts produced by humans. Due to low detection rates and numerous false positives (texts written by humans that were categorised as AI generated), even OpenAI, the company behind ChatGPT, decided to draw consequences and withdraw its own AI Classifier software product from the market six months after its release.

As long as there is no definitive means of tracing texts back to AI tools, banning their use does not appear very effective. At the same time, the problem cannot be ignored or put on the same level as the issue of ghostwriting that is already known because that would be tantamount to tacitly accepting unfairness and disparity.[18]

The integration of innovative technologies opens up new ways of imparting and acquiring knowledge. In view of current developments, it appears sensible to critically assess examination formats and their content and to adapt them where necessary, as well as making the requirements clear to students.

4.4. Adapting examinations

Examinations are intended to indicate which competences students have already acquired. Tasks that can relatively easily be solved using AI tools are becoming increasingly unsuitable for written examinations where students are unsupervised. Teaching staff should be encouraged to critically review examination formats and their content with regard to the tasks that students can be expected to fulfil themselves, and adapt them if necessary.

The learning objectives of each class or course provide guidance on this. They define which learning outcomes students work towards and can be categorised into taxonomy levels that illustrate the degree of difficulty and complexity of the tasks that students are required to master.[19] Replicating and understanding something requires a lesser degree of cognitive effort and skills than applying formulas, analysing a new situation or developing one's own solution to a subject-related problem. At present, the strengths of AI tools manifest themselves predominantly at the lower taxonomy levels. Therefore, written examinations for which students are unsupervised should aim for students to reach the higher levels.

The focus should be on tasks where students are required to apply analytical and problem-solving skills and critical thinking. Students could be tasked with critically assessing a situation that came up in class, making reference to current developments that are not or cannot be included in the training data, or developing solutions to highly specific subject-related problems or cases and giving reasons for their solutions. These are tasks that cannot be solved to a satisfactory level using AI tools even though such tools can be used to support the writing process.

Furthermore, teaching staff can prioritise formative assessment, e.g. in the form of portfolios, in order to give students more frequent feedback over the course of their learning process. Instead of having one big examination at the end, several partial tasks that are interconnected can be planned over the course of a class in the form of a cumulative or portfolio assessment where students document their learning outcomes on the basis of the assignments set by the teaching staff. This can also include documentation tasks and reflective reports that also cover the constructive and critically considered use of AI tools in fulfilling a task and thus make it a subject of discussion within the class itself.

The critical review of assessment formats and their content can also lead to a change in the examination situation. If the primary learning objectives involve practical reading, writing or oral expression skills as is the case when learning a foreign language, a supervised examination such as a written test or an oral exam is a significantly better choice.

4.5. Providing transparency by means of 'Rules for Tools'

Every assessment situation requires transparency. Students need to know whether and to what extent they are allowed or even expected to use aids. There is currently still a high level of uncertainty with regard to this. Quite a few students are concerned because they do not know which aids are acceptable to use or how they can make clear that they have actually produced a piece of work without using any aids.
Therefore, teaching staff should clearly state in their classes what their stand on AI tools is and what effect this has on reaching the learning objectives and on the assessment situation. With his 'Rules for Tools', Christian Spannagel has presented a very helpful approach to this: he allows the use of aids such as ChatGPT but, at the same time, he also delineates the applicable conditions and limitations (Spannagel 2023).

Rules for Tools

With his 'Rules for Tools', Christian Spannagel makes clear which aids are acceptable to use and how their use needs to be indicated in the context of his classes:

https://csp.uber.space/phhd/rulesfortools.pdf

Transparent communication regarding expectations and requirements is also necessary in the context of examination regulations to ensure that the consequences of AI use are dealt with properly. The leeway provided in examination regulations is crucial for supporting teaching staff in their work and not placing undue burdens on them.

5. THE IMPACT OF AI ON EXAMINATION REGULATIONS

Higher education institutions are obliged to apply the principle of equal opportunities when conducting examinations. This means that equitable assessment conditions must be ensured for all students and examination offences must be prevented. The information given below is intended to provide practical guidance and reduce uncertainties with regard to these topics. The aim is to create a fair and just examination environment where each student has equitable opportunities.

As has already been explained, it is important for students to know which AI tools are acceptable to use and which are not permissible when compiling written work for assessment. Teaching staff must also take a stance on the use of AI in examinations in order to be able to assess their students' performance appropriately and with due consideration of equal opportunities.[20] Examiners are to clearly define the information regarding aids and communicate it to their students in advance. This includes not only stating which aids are permissible but, with respect to examination offences, clearly and unambiguously specifying which aids may not be used. The latter should be done in the form of a non-exhaustive list ('... however, the use of AI/AI tools, among others, is not permissible'). The following sections serve to delineate the legal implications that the use or the banning of AI tools entail in the context of examinations.

5.1. Defining permitted aids

In order to prevent uncertainty and create transparency as regards permissible aids, teaching staff should provide relevant information as guidance. This could be given on the cover page of a written exam or as part of the task set for a paper, or included in the declaration of own work.

When submitting their final thesis, students affirm in writing that they completed the work – or, in the case of group work, the part of the work that they marked accordingly – independently and that they have used only the stated sources and aids and have referenced all quotations.[21]

If the obligation to reference the aids used is already mentioned on the cover page of an exam or as part of a task set, it is not necessary that the aids be explicitly stated in the declaration of own work. The advantage of this is that the declaration of own work does not need to be updated every time an aid is included or taken off the list.

It is also possible to include passages that explicitly mention aids in the declaration of own work and, in doing so, differentiate whether or not an obligation to reference the aids used applies.

Declarations of own work (in German)[22] from [University of Münster](#) (last accessed: 7 September 2023)

Declarations of own work (in German) from [RheinMain University of Applied Sciences](#) (last accessed: 7 September 2023)

Breaches regarding the use or referencing obligation of aids used constitute examination offences (see Section 5.3).

5.2. Checking the authenticity of written work for assessment

Checking the authenticity of written work for assessment is extremely difficult, if not impossible, when it comes to AI tools. However, minor indicators, even at the textual level, can give rise to an initial suspicion.

How can an examiner identify indicators of the use of AI tools or ghostwriting?

The following can be particular indicators of this:

- The performance differs noticeably from that usually demonstrated by the candidate.
- The style of the work is too uniform.
- The vocabulary used is too specific.
- The text contains strange formatting.
- Or it contains abrupt changes in style.

However, indicators are not proof, of course. Close cooperation between examiners and candidates can provide certainty.[23]

The criteria mentioned above can already constitute grounds for examiners and/or the examination boards to conduct a hearing. With regard to final theses, colloquia are also possible if the subject-specific examination regulations provide for them.

Hearing

The use of AI tools in the context of compiling a written piece of work for assessment can constitute an examination offence under the examination regulations or be an instance of use of inadmissible aids.

The legal consequence of such an examination offence or of the use of inadmissible aids is that the relevant examination will be graded a 'fail' (5.0). This is usually determined by the responsible examination board. The student is given the opportunity to make a statement as part of a hearing before a decision is made.[24]

The hearing is an instrument that serves as evidence in the context of establishing the facts. We would like to point out that a hearing does not necessarily have to be in written form; it can also be carried out by inviting the candidate to an in-person discussion (potentially with the involvement of the examiners) at the discretion of the responsible examination

board. During this discussion, the candidate is to be given the opportunity to make a statement regarding the suspicion of an examination offence/use of inadmissible aids in question. In this context, they can also be asked questions that aim to elicit answers showing the train of thought that resulted in the assessed work. Based on the oral explanations, it can be discerned whether the candidate is able to put the results of their written work into context, give reasons why they proceeded the way they did and position their approach in the wider framework of their discipline. Thus, it can be assessed whether the candidate is able to demonstrate that they produced the work they submitted for assessment independently and without using AI. If the candidate is unable to demonstrate this convincingly, this can constitute *prima-facie* evidence of an examination offence, reversing the burden of proof as a result. Then, it is the candidate's responsibility to prove that they have produced the work independently and without using AI.[25] It is urgently recommended that the hearing be documented in writing.

Therefore, candidates are to be given the opportunity to make a statement as soon as doubts arise.

Colloquia in the context of final theses

In **accordance with Section** 9 (2) (a) of the General Examination Regulations (RPO) for Bachelor's Degrees and Section 8 (2) (a) of the RPO for Master's Degrees, final theses can be complemented with a colloquium. Colloquia can be optional, additional, accompanying and/or creditable. Case examples could be included in the General Examination Regulations.

The faculties are at liberty to decide whether to include a colloquium in their examination regulations and to define the ways in which it is to be used. The options are to make it either compulsory or optional by having the colloquium complement the written work to be assessed.

In cases where this is suitable, a colloquium can also take the form of a group examination. By increasing the number of participants (currently up to four pursuant to the RPO), examiners can hold a higher number of oral exams and it is easier to compensate for cancellations (e.g. no-shows).

Example of a colloquium being included in the examination regulations:

Master's in Software and Network Engineering

Section 22: Master's thesis and colloquium

The master's thesis is an assessed written work that usually completes the academic qualification of the master's degree programme in Software and Network Engineering. In the master's thesis, the student is to demonstrate that they are able to independently deal with a problem from the field of Applied Computer Science within a defined period of time and in accordance with academic methods. The master's thesis is accompanied by a colloquium in which the student presents and discusses the preliminary and/or final results of their work. 30 credit points are awarded for the master's thesis in combination with the colloquium.

Potential new procedures

In addition to the hearing in cases of initial suspicion and conducting colloquia, it is being considered that examiners be granted the additional right to subsequently verify the performance of students with regard to papers by means of a kind of oral examination in the form of random checks.

However, such an additional instrument for the purpose of verifying the performance for an assessment must first be checked from a legal perspective and then discussed and approved by the Senate a part of an amendment procedure for the RPO. The possibility of submitting a corresponding proposal to the Senate, provided that it passes the legal check, is currently being considered.

5.3. Handling (attempted) examination offences[26]

If teaching staff have forbidden the use of certain aids and it is discovered that they were in fact used, e.g. because a student's contributions in class or performance in other assessments do not correspond to the expected performance in the written work to be assessed and this is confirmed in the hearing and/or the presentation, this indicates a deliberate attempt at an examination offence. In addition and in particular, this constitutes a breach of the declaration of own work. In both cases, this not only undermines the assessment process, it also constitutes a violation of the principle of equal opportunities.

(Attempted) examination offences

As has been explained several times, the use of AI systems is not equivalent to an original source. Instead, the texts are generated on the basis of other sources (training data). Therefore, an AI-generated text is not a work as defined by copyright laws unless a significant level of own intellectual input is involved. Consequently, the uncredited use of AI writing tools such as ChatGPT, for example, is not explicitly mentioned in what current definitions of academic misconduct state as offences. The reason for this is that AI writing tools work exclusively on the basis of probabilities and it is thus only very rarely the case that they produce content with wording identical to that of copyrighted works.[27]

If an AI system specifies sources, there is a risk that these are either made up, i.e. hallucinations, or that the sources given do not support the facts described. Such cases constitute academic misconduct or an examination offence by the users.

If examiners consider the use of AI systems inadmissible and candidates do use one, this is an examination offence.

If, on the other hand, the use of an AI program is permitted and it is only used as a source of inspiration or an impulse, examiners should make it a requirement that the aids used be stated at the beginning or at the end.

Breach of the declaration of own work

The examination board can request the student to sign **a declaration in lieu of an oath** stating that they produced the work to be assessed independently and without unauthorised assistance from others. The relevant stipulations must be legally based on the examination regulations. Those who then commit an examination offence commit an administrative offence. An administrative offence can be punishable with a fine of up to €50,000.[28]

In the case of a false declaration in lieu of an oath, even a minor breach constitutes a punishable offence pursuant to Section 156 of the German Criminal Code (*Strafgesetzbuch*; StGB). Pursuant to Section 156 of the StGB, whoever falsely makes a declaration in lieu of an oath before an authority which is competent to administer such declarations or falsely testifies whilst referring to such a declaration incurs a penalty of imprisonment for a term of up to three years or a fine.

A corresponding written declaration could be given preference as a less drastic alternative to a declaration in lieu of an oath. In such cases, a breach would be merely an examination offence instead of a criminal offence. Yet, even in cases where a declaration in lieu of an oath is used, the measures imposed range from the grading of the performance as a *'fail'* or the exclusion of the candidate from repeat examinations to declaring that the act constitutes an administrative offence to an expulsion of the student and even to pressing charges against them.

In cases of doubt and/or where there are no applicable stipulations on colloquiums or complementary oral examinations, you can refer back to the above-mentioned stipulations on examination offences in Section 22 (4) of the RPO for Bachelor's

Degrees or Section 21 (4) of the RPO for Master's Degrees: if there is a suspicion of an examination offence, which includes the use of ChatGPT, the student in question must be given the opportunity to make a statement. This can be done either in writing (usual procedure in cases of plagiarism) or orally in front of the examination board in consultation with the examiners.

6. WHAT COMES NEXT?

UDE would like to enable its employees, teaching staff and students to critically reflect on AI technology and to independently use and discuss it in their teaching or learning. The use of AI tools and also debates about AI provide huge potential for developing specialised skills, on the one hand, and for contributing to shaping transformation processes within society on the other.

Further training opportunities for members of UDE

Rapidly developing technologies make continuous further training of teaching staff indispensable. The corresponding information and further training opportunities should be incorporated in internal qualification measures on university didactics at central or faculty level, for example. In this context, an interdisciplinary exchange among teaching staff and opportunities to try out AI technology in premises with suitable infrastructure are particularly important. This is also true for students, who can thus be given access to AI technology. Lecture series that are offered on a regular basis can provide information on new developments in the field of AI to members of UDE as well as interested individuals from a wider public.

Integrating AI into study programmes

Research findings and the skills developed through further training should be included in the curricula of study programmes wherever this is possible and useful. This covers topics such as algorithms, data mining and data analysis as well as ethical, social and legal issues. With its wide scope of teacher training courses, UDE considers it its duty to offer future teachers the opportunity to understand AI technology, apply it properly and transfer its use to their teaching practice in schools.

In order to systematically integrate AI into teaching at UDE soon and with low thresholds, an 'AI toolkit for UDE' could be put together, where selected material (e.g. online courses offered by the AI Campus) is presented, sorted by target group, prior knowledge and focus areas. Self-produced material could also be made available in line with the concept of open educational resources (OER). Inspired by an approach used at Humboldt-Universität zu Berlin, the Faculty of Economics and Business Administration offers a self-contained, creditable course called *'Einführung in die künstliche Intelligenz'* (introduction to artificial intelligence) from the AI Campus to gain 4 credit points in the 'Key skills' section. This course has been included in the module handbooks for the degree programmes that explicitly require modules in the field of key skills. Those attending this module will be supervised and examined by qualified contracted teaching staff who are responsible for holding the computer-based examination.

Using AI in the context of examinations

The ever-increasing availability of AI tools makes it necessary that regulations be established for examinations. However, UDE understands the debate surrounding AI as an opportunity to critically review existing examination formats with regard to the competencies to be developed by students. As shown in Section 4.4, this can comprise setting tasks that focus on analytical, reflective and problem-solving skills, for example, but also switching to formative assessment in the form of e-portfolios.

From a legal perspective, corresponding stipulations, such as the examiners' right to check the authenticity of seminar papers and final theses by means of subsequent oral examinations, can be incorporated into the examination regulations. In order to keep the workload for that to a minimum, introducing more group examinations would be an option. Amendments to the examination regulations and/or the general examination regulations are within the scope of responsibility of the University or the faculties respectively.

UDE would like to encourage teaching staff and students to contemplate the potential and the challenges that AI brings to the teaching environment and to use it to shape teaching and learning processes in a responsible and critically reflected manner.

If you have any questions regarding the use of AI in teaching and learning or about this manual, or if you have any proposals for the inclusion of AI in study programmes, please do not hesitate to contact us at ude-ki@uni-due.de

SUMMARY OF THE MOST IMPORTANT RECOMMENDATIONS

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1. **Apply critical thinking to the use of AI tools and the associated opportunities and limitations:** Knowledge about the technology's opportunities and limitations is a prerequisite for the competent and responsible use of AI tools. This includes both the critical assessment of their application and the results, and keeping in mind the commercial further development of the systems. Regular events that offer information and opportunities for debate could help give all members of UDE insights into new developments.

2. **Establish opportunities to build and strengthen AI skills:** Students should acquire AI skills through opportunities offered at the University in order to prepare them for a future professional life that will be shaped by AI – in both education and the business sector.

3. **Utilise AI tools to support academic work, teaching and learning:** If AI tools are used competently, they have the potential to facilitate work and writing processes, free up creative capacities and expand perspectives. Teaching staff can deal with AI as a subject in their classes and exploit its advantages when developing material and tasks.

4. **Provide transparency as to which aids are permissible to use for exams:** Clear designation of permissible aids for examinations serves to eliminate uncertainty on the side of students as to which aids may be used in the context of an examination and which are forbidden. At the same time, it is intended to prevent unwanted behaviour. This contributes to integrity and fairness in the examination process.

5. **Question and further develop examination formats:** Written work to be assessed where students are not supervised (e.g. seminar papers) still has a great significance in the academic context and cannot be easily replaced. In order to ensure equal opportunities for all students, it might be necessary to rethink and further develop forms and content of examinations.

6. **Use and further develop instruments for checking the authenticity of work submitted:** In cases where there is an initial suspicion, examiners can also conduct a hearing in the form of an in-person conversation in order to verify the authenticity of work submitted. In addition to this instrument and the colloquium in the case of final theses, it is being considered to additionally introduce subsequent oral forms of examination, which need to be further examined from a legal perspective and would have to be integrated into the general examination regulations.

7. **Establish further training for teaching staff:** Establishing further training for teaching staff is an important milestone on the road to building and expanding skills in handling AI tools.

ENDNOTES

1   See Suessenbach et al. (2021).
2   See Hao (2018).
3   See Heinrichs et al. (2022: 169 ff.).
4   Ibid. (2022: 172 ff.).
5   See Lenzen (2020: 122).
6   In the context of AI text generators, 'hallucination' refers to the fact that texts are produced not on the basis of the truthfulness of content but rather on the basis of statistical probability. Thus, AI text generators always display results even if the information required to solve the task is not contained in their training data. Referenced sources or correlations that AI produced as a mere string of words and that do not exist but appear plausible at first glance are examples of this.
7   See Albrecht (2023:39 ff).
8   See Mühlhoff (2023).
9   Mühlhoff (2023) further points out the issue of predictions that AI systems make about individuals or groups of persons that constitute a breach of privacy if used for making decisions. These predictions include forecasts regarding an individual's behaviour (e.g. shopping behaviour), personal attributes (e.g. sexual identity, wealth, level of education) or personal risk factors (e.g. mental or physical health issues, addictive behaviour, credit score). Mühlhoff uses the term 'predictive privacy' in this context and calls for an adjustment of data protection regulations to cover AI and big data in order to ensure the protection of privacy with regard to technological innovations.
10 See Wienrich et al. (2022).
11 Ibid.
12 Another category is the nature of the context, which examines, among other things, the introduction of AI systems in a specific environment, e.g. a company (for more details see 'Competence development for APlattform Lernende SystemeI' 2021: 4).
13 See Wienrich et al. (2022: 15).
14 See Lopez (2021).
15 See Spannagel 2023 mit Bezug auf Salomon 1993
16 See Salden et al. (2023: S. 14)
17 See Fleischmann (2023: S. 20f)
18 Fleischmann (2023: p. 30).
19 See Bloom (1976).
20 This also applies if teaching staff compile examinations or reports using AI tools. In such cases, teaching staff should also critically review the results.
21 See Section 19 (10) of the General Examination Regulations (RPO) for Bachelor's Degrees and Section 18 (10) of the RPO for Master's Degrees.
22 A revised version of UDE's declaration of own work is planned.
23 From 'Der kleine Plagiats- und Täuschungskompass, Umgang mit Täuschungen und Plagiaten an der THM', first edition/May 2013, p. 10.
24 See Section 22 (4) of the RPO for Bachelor's Degrees/Section 21 (4) of the RPO for Master's Degrees.
25 See Birnbaum: ChatGPT und Prüfungsrecht; NVwZ 2023, 1127
26 For definitions of examination offences and attempted examination offences see Section 22 (4 ff.) of the RPO for Bachelor's Degrees or Section 21 (4 ff.) of the RPO for Master's Degrees.
27 See Fleischmann (2023: 10)
28 See Section 22 (6) of the RPO for Bachelor's Degrees or Section 21 (6) of the RPO for Master's Degrees.

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