

ASSESSMENT OF AI IMPACT ON LECTURES AND THESES IN UNIVERSITY EDUCATION

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Abstract

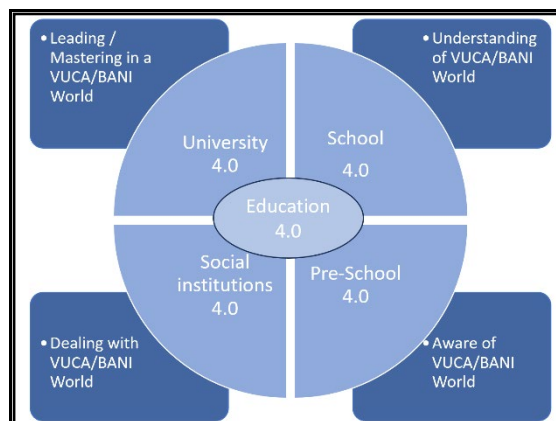
Since the release of ChatGPT, generative AI has become more and more important almost in all areas in society, which includes university education. How can AI support professors in teaching and students in their preparation of thesis? How can the interactions be improved in an AI world between professors and students? To answer these two research questions, two lectures have been evaluated with different AI focus: 1) Management of modern technologies with focus on group workshops in which students discuss virtual in breakout sessions by using and avoiding AI; and 2) Digital transformation with focus on individual preparation of project documents to presentation in video according to Elevator Pitch method. Each of 2 typical Master and bachelor theses have been assessed regarding AI helps and differences of quality. The results of this paper recommend the critical but selective and comparative use of AI both in lectures and theses to enhance the interaction between professors and students in universities.

Keyword: *University education, AI, lectures, theses, interactions.*

1. Introduction

In times of VUCA/BANI environments, the education sector faces numerous challenges, particularly since the release of ChatGPT in November 2022. In Wang R. & Contino G. (2024), the concept of Education 4.0 was discussed extensively, see Figure 1.

Figure 1. Education 4.0 in connection with VUCA/BANI (An evolution from a VUCA-appropriate to a BANI- appropriate framework, Wang R. & Contino G. (2024).



Within this framework, the concept of University Education 4.0 emphasizes the educational objective of “*Leading and Mastering in a VUCA/BANI World*,” recognizing that today’s students will become the leaders of tomorrow.

Against this background, it becomes increasingly important for professors and students to collaboratively define learning objectives and establish a mutual understanding regarding the appropriate use of artificial intelligence methods — both in classroom / digital teaching and in the supervision of academic theses.

Based on a targeted analysis at both bachelor’s and master’s levels, two digitally supported courses in modern formats were examined:

- *Management of Modern Technologies* for master's students in IT Management, and
- *Digital Transformation* for bachelor's students from various academic disciplines.

In addition, bachelor's and master's theses were systematically analyzed with regard to the application and integration of AI technologies.

From this context, the following research questions emerge:

1. How can AI support professors in teaching and students in the preparation of academic theses?
2. How can interactions between professors and students be improved in an AI-driven educational environment?

2. Samples from lectures

In recent years, lectures at universities have become increasingly digitalized. On the one hand, this development was accelerated by the COVID-19 pandemic; on the other hand, it has been significantly enabled and advanced by generative artificial intelligence technologies.

The selected courses analyzed in this study were conducted at the FOM University of Applied Sciences.

2.1. Management of modern technologies

This module is designed for first-semester master's students in the IT Management program. The course is conducted entirely in a digital teaching format. Most students already possess several years of professional work experience and demonstrate strong IT competencies. They are generally highly familiar with the use of AI technologies and have often already gained experience with AI applications during their bachelor's studies and bachelor's thesis projects.

The module consists of both theoretical and practical components. The theoretical part covers topics such as technology management, innovation management, and modern technologies including artificial intelligence, quantum computing, and SmartX technologies (see Wang, 2025). The practical component includes group work based on real application scenarios of modern technologies.

Typically, around 50 students participate in the course, allowing multiple groups to be formed for collaborative project work.

2.1.1. Group work example. Hereafter is a typical sample of group work in this module:

Work in groups (breakout sessions) on the following topics:

- Industry 4.0 vs. Made in China 2025
 - Industry 5.0 or Industry 4.1
 - IoT vs. IIoT
1. Analyze the differences and specific challenges, taking into account technological, ethical, and organizational aspects. Identify at least three key challenges.
 2. Develop appropriate solutions for the identified challenges. Provide concrete recommendations for action and outline measures for how these challenges can be addressed.
 3. Present your findings (10 min. per group).

In the early stages of the course, the professor is very pleasantly surprised by the well-prepared presentation; not only is the content solid and comprehensive, but the presentation slides are also of high quality — even though students were instructed not to use AI in their group work so that group members could discuss the material intensively.

At the end of the semester, some students report that AI was used almost always in the group work. The added value of the discussion is not fully realized. For this reason, the group work in this example was adjusted as follows:

Assuming there are 5 students in the group, the tasks were reformulated as follows:

Work in groups (breakout sessions) on the following topics:

- Industry 4.0 vs. Made in China 2025
 - Industry 5.0 or Industry 4.1
 - IoT vs. IIoT
1. Four of you use different AI tools: ChatGPT, Perplexity, DeepSeek, Gemini. One student works without AI.
 2. Each group has the same task:
 - Analyze the differences and specific challenges, taking into account technological, ethical, and organizational aspects. Identify at least three major challenges.

- Develop appropriate solutions for the identified challenges. Provide concrete recommendations for action and outline measures for how these challenges can be addressed.
- 3. Compare and analyze the results from various AI tools and those produced by the students without using AI tools.
- 4. Present your findings (10 minutes per group).

2.1.2. Key results. The example described above is just one of more than 10 group exercises in this module in which students repeatedly use AI. By adapting the exercises to include the deliberate use of AI, students can observe the varying results produced by different AI tools and assess their reliability for themselves through discussion. An important aspect is the work produced by students without the use of AI. This clearly highlights the advantages of AI — comprehensiveness and systematic approach—as well as its disadvantages: some incoherent results or overly interpreted data from websites.

This approach also fosters greater trust between students and professors.

2.2. Digital transformation

The module is designed for various Bachelor of Arts and Bachelor of Science degree programs. There are often more than 70 students, even though a maximum of 60 students is allowed per course. This high demand also demonstrates how important the topic of digital transformation is. Students from the following degree programs attend the module: Business Informatics, Management and Digitalization, International Management, Social Sciences, Healthcare, Digital Media and Marketing, Business Administration, etc.

For this reason, students have diverse technical and academic backgrounds and hold varying expectations. The module includes numerous exercises. It is consistently noticeable that students tend to rely on AI during exercises because they have limited familiarity with the subject matter. This also means they are not always able to assess whether the AI results are accurate, which could pose a risk to their education.

The module is taught digitally, in person, or in a hybrid format. The content is primarily drawn from Wang R. (2019, 2024, 2026). Typical topics include digital strategy, digital mindset, digital management, and digital technologies. The course covers Transformation Canvas, Digital CRM, Design Thinking, and other methods. For the final assessment, students are required to submit a sales video (elevator pitch) along with explanatory supporting material.

2.2.1. Exercise example.

Hereafter is a typical sample of group work in this module:

Exercise and Presentation

Develop a business idea related to your professional field, formulate two key hypotheses, and outline a quick validation strategy to test your idea.

1. Brainstorming: In small groups, develop a business idea that solves a specific problem.
2. Describe:
 - a) The problem (in one sentence).
 - b) Your target audience (Who is affected?).
 - c) Your solution (in one sentence).
3. Formulating hypotheses: Formulate two key hypotheses regarding your business idea.
 - a) Problem hypothesis: Does the problem actually exist?
 - b) Solution hypothesis: Would your target audience use your solution?
4. Validation strategy: Draft a quick plan for how you could test one of the hypotheses.
 - a) What method will you use (e.g., survey, landing page, interview)?
 - b) Who would you survey or involve?
5. Presentation of results: Present your business idea, hypotheses, and validation strategy.

2.2.2. Key results. In order not to use AI, the exercises should be designed with strong relations to the professional activities of students. Through such real cases students should be able to think about their business life and remain creative.

The example above also demonstrates the direct benefits for students, as it allows them to solve a current problem in their field without relying on AI, but rather through direct interaction with other students, and then receive feedback from the professor during the presentation.

3. Samples from thesis

Over 50 theses (since 2023) have been evaluated in the context of this publication; these were produced with varying degrees of AI involvement. If students have written a thesis with the help of AI, they must cite the AI sources in accordance with the FOM's AI guidelines; see the Rector's Office (November 15, 2023). In principle, authenticity and integrity are always maintained by students when AI is used. Below, two positive examples are evaluated, which clarify when the use of AI in a thesis is appropriate and when it is not, from the perspective of the supervising professors.

3.1. Master thesis

Steffen D. (2026) has written an excellent master's thesis that addresses an interdisciplinary topic at the intersection of medicine, law, and computer science: an experimental study on patients' perceptions of AI in dermatology. In this master's thesis, which spans over 100 pages, a range of scientific methods were employed, including literature review, study design and experimental manipulation, data collection and measurement instruments, sampling and recruitment, statistical analysis using R, and ethical considerations. In principle, all of these methods can be applied and optimized using AI. However, that would no longer constitute an independent scientific work.

In this master's thesis, AI was applied in areas where it was appropriate. Table 1 provides an overview and analysis of mater Thesis of Steffen D. (2026):

Table 1. Areas with usage of AI and not.

Topics in thesis	AI used?	Which AI?	If AI used?
Language Grammar	Yes, this is just a check of spelling, punctuation and simple grammar, not real creative work.	DeepL Write	
Advertisement with fictive portraits	Yes, this is only a simulation of a dermatological station, in order to avoid any personal data which is strongly protected in Germany.	Google Gemini 3	
Online survey	No		AI can be used to generate data. If used, then the data are not real and the results are not the own. This would be unacceptable.
Literature study	No		Students often use AI to research in literature if the correct algorithm is written. However, Literature study is an important research activity, especially if the topics are interdisciplinary.
Interviews	No		Students could use AI to generate expert interviews which happen sometime in courseworks. But experts often need interaction with interviewer and this cannot always follow a given manner.
Citation	No		Index of citation can be generated automatically, but only index, not the use of citation in the text and footnotes.
Programming R	No		Nowadays AI generates codes without bis issues. However, R is used for statistical analysis and the parameter must be checked and correct so that the following steps with analysis can be correct.
Statistical analysis	No		This is a very crucial part in the thesis and provides basis for the answer to the research questions. If AI were used, the thesis could fail, based on current code of conduct.
Presentation of results	No		If a perfect presentation is generated by AI, but the contents are from the author, this could be accepted, because power point is also a tool for layout.

3.2. Bachelor thesis

Ruhstorfer, R. (2024) explores a very interesting topic: how concertgoers experience a live concert even when the artist is not physically present. The occasion for his study was “Falco – In Concert” at the New Year’s Eve party in Vienna in 2024. Before the performance, the host mentioned that Falco would be performing “live” on stage later. It became clear relatively quickly that Falco would not be on stage in person, but rather his original band. Acting as his representatives, contemporary artists performed his songs with a slightly different musical touch, yet staying true to the original.

To investigate the acceptance of such a concert, Ruhstorfer, R. (2024) simulated an event using augmented audio. He interviewed audience members using software tools and analyzed their experiences. Ultimately, he was able to answer his research questions: “How do users perceive the simultaneous audio output of different sounds from two channels?” At the same time, he also used the Design Science Research (DSR) method to answer his other research question: “How can the audio output of a virtual performer be technically realized and played back in sync with the audio output of a live performer?”

Since the creative idea was developed by the author — which constitutes the core of the thesis — the student used 3 AI tools to simplify the necessary supplementary work in his thesis. In addition to ChatGPT, he used noScribe, version 0.3, and udio, model 1.5, as he also indicated.

The tool “noScribe” was used for an initial transcription of the audio files. After using the tool, it was found that this transcription was still very error-prone in some parts and had to be manually corrected. Especially with dialectal pronunciations, the tool cannot transcribe without errors, and the author had to make many manual corrections. The AI tool Udio was used to generate music, resulting in two compatible music files that can be played in parallel and complement each other. The prompts for this were relatively simple, so the first attempt immediately produced two suitable audio elements. The AI chatbot ChatGPT was used to obtain assistance with programming the artifact and to correct errors in the code.

All prompts for the AI tools have been attached to the bachelor’s thesis for verification.

4. Conclusions

AI has become indispensable in nearly all areas of science and teaching. For this reason, students should not be prohibited from using AI. On the other hand, creativity and group discussions must not be neglected. Therefore, AI applications in teaching should be proactively incorporated into the curriculum, and students should be encouraged to critically evaluate AI results and use them to inform their learning.

The two research questions can be answered positively based on the examples and analysis from the lectures and the theses.

To the research question: How can AI support professors in teaching and students in their preparation of theses? The answer lies in constant coordination between students and professors. When it comes to the core of the thesis — such as independent and creative work — AI should be used as little as possible. In the supporting sections, AI can be used, especially since all these must be completed within a specified timeframe.

To the research question: How can interactions between professors and students be improved in an AI-driven world? The key to answering this research question lies in interaction and the trust between professors and students. On the one hand, students must be encouraged to use AI in exercises — and to use it correctly; on the other hand, exercises can be designed so that solutions can only be derived from practical experience.

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