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Chatbots in Higher Education Teaching

Generative chatbots such as ChatGPT, Bing AI or Claude offer teachers and students help with research, text production or checking formalities. In the following, we present specific scenarios for use of generative chatbots in higher education teaching in order to show lecturers possibilities of how this technology can be integrated into their own teaching

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1. Prompting

Although the communication with chatbots does not require any programming skills, there are some aspects and features that need to be considered.
Instructions to the chatbot are usually given in everyday language via an input mask. This makes the dialogue supposedly human. However, it should be noted that these chatbots are based exclusively on probabilistic models. Thus, the bots do not "understand" the meaning of the input. Consequently, the result must always be checked for correctness. Additionally, to achieve useful results, the prompts must be cleverly formulated, e.g. with the help of the following four prompting elements:

- **Context:** Specify the context of your prompt. By providing additional information, the accuracy and quality of the output generated by the chatbot can be improved.
- **Target group:** Identify your target group and take into account their knowledge and experience. Provide this information to the chatbot using precise and easy-to-understand language.
- **Aim:** Describe precisely what goal is to be achieved with your prompt and consider what kind of information the chatbot needs to achieve this.
- **Data source:** If you enter additional data, make sure that the data is of high quality and accuracy.

EXAMPLE

By using ChatGPT, you can offer your students a new way to improve their writing skills and produce texts faster and more effectively. To introduce your students to ChatGPT, you can use the following prompt:

"As an *educational content creator in higher education*, you are supposed to *create engaging and informative educational materials such as textbooks, online courses and lecture notes*. My first request is for a lesson plan to learn how to create prompts in ChatGPT. The lesson plan should be aimed at *undergraduate students who already have basic knowledge of using ChatGPT*. Design a detailed description of the *lesson plan with learning objectives, learning content and teaching methods*.

In addition, the following other aspects should be considered when prompting:

- **Fine-tuning:** Adapt your prompt to a specific subject or task by fine-tuning it with a specific data set.
- **Testing and optimising:** Test your prompt and optimise it if necessary. Monitor the chatbot's output and implement strategies to improve performance.
- **Continuous learning:** Implement continuous learning to ensure that the model stays up-to-date and can adapt to new information.

Further guidance on prompting can be found for example here.

2. Chatbots in Lesson Planning

You can also use chatbots in the planning and preparation of your teaching. This applies, for example, to getting support in the conception and structuring of your courses as well as the selection and elaboration of teaching methods.
Below, you can find some specific prompting suggestions on how you can use chatbots for different aspects of planning and preparing your teaching. Please note that the suggested prompts do not necessarily lead to an immediate result, but may require further processing steps (e.g., fine-tuning), as explained in the section above on prompting.

2.1 Concept and Structure

Let the chatbot develop suggestions for semester and course schedules, e.g., with the following prompt:

> *"Act as a creator of educational content in higher education. Create a semester plan for me for the course "Fundamentals of Statistics" for the Bachelor's degree program in Sports Science. The course is a lecture that lasts 14 weeks for which students can earn 3 ECTS. Students can take the course in the first part of the bachelor's program."*

Let the chatbot develop suggestions for suitable assessment formats, e.g., with the following prompt:

> *"Act as a creator of educational content in higher education. The lecture "Fundamentals of Statistics" within the Bachelor's Degree Program in Sports Science has the following learning objectives: Students are able to…*
>
> - *explain basic concepts of statistical methods*
> - *create, read and critically evaluate graphs*
> - *select appropriate methods for simple statistical problems, perform analyses correctly and interpret the results*
>
> *Approximately 250 students are expected to attend the lecture. Suggest four different forms of assessment that can be used at the end of the semester to check as efficiently and validly as possible whether the students have achieved the above-mentioned learning objectives."*

Let the chatbot develop suggestions for suitable learning outcomes, e.g., with the following prompt:

> *"Act as a creator of educational content in higher education. Formulate five learning objectives for the lecture "Fundamentals of Diagnostics". In doing so, refer to the usual competence framework for first-year students in psychology and use adequate phrasing, especially with regard to the verbs. Finally, assign them to Bloom's taxonomy levels."*

2.2 Selection and Elaboration

Let the chatbot develop suggestions for suitable teaching methods, e.g., with the following prompt:

> *"Act as a creator of educational content in higher education. In the seminar "Diagnostics in Neuropsychology", the basics of test-theoretical quality criteria are taught in a 90-minute session. Approximately 20 master's students of psychology will take part in the*

seminar. There is the possibility of having students prepare and review content before and after the session. Students usually bring their own laptops. In a first step, create an outline of the 90-minute session and, in a second step, formulate appropriate suggestions on how to support active learning."

Let the chatbot develop suggestions for individualized learning and teching materials, e.g., with the following prompt:

"Act as a creator of educational content in higher education. In the master's seminar "Personality Development", psychology students are asked to design individual interventions based on case studies.
Please wait for my input before proceeding to the next assignment.
As a first step, I will name four main topics to be covered in the seminar. Please wait until I have mentioned all four topics before you continue with the next task.
After I have named all four topics, formulate case studies directly related to these four topics that are 100 words in length. Do not mention any interventions."

Let the chatbot develop suggestions for drafts for performance assessments including suitable assessment criteria grids, e.g., with the following prompt:

"Act as a creator of educational content in higher education. The lecture "Diagnostics in Psychology" concludes with a 60-minute written exam where students have to answer five open-ended questions. The following topics are to be tested [fill in at least five topics here]. Students should prove that they have understood the content and can transfer it to at least one practical example.
As a first step, you are to create five open-ended questions. We will revise these questions until I am satisfied. In a second step, you will create assessment criteria and a scoring grid for the five final questions."
…

"I am not satisfied with the questions you generated. Replace [all questions; question number X]."

3. Integrating Chatbots into Teaching and Learning Scenarios

Currently, many strategies for the use of chatbots in teaching are discussed. In the following, we present a small selection, sorted by complexity (simple, medium, and elaborate) and structured by didactic coherence (learning objectives, teaching/learning methods, and assessment controls). No empirical results on the effectiveness of these strategies exist yet. Therefore, these are merely ideas and recommendations.

3.1 Simple Strategies

3.1.1 Factcheck

Idea:

- Review chatbot-generated texts with students for content accuracy

Learning Objective(s):

- Evaluate information and its sources critically
- Acquisition and meaningful use of knowledge

Teaching Method(s):

- Have a chatbot generate output on a specific question
- Text or content analysis in individual or group work
- Addition of further sources in order to discuss quality and relevance of the available sources

Assessment(s):

- Comparison of students' results with model solutions
- Presentation of arguments and conclusions by the students
- Peer feedback, e.g., in small groups or group puzzles

3.1.2 Best Prompting

Idea:

- Develop the best prompt or prompting strategy to solve a given task or assignment with your students

Learning Objective(s):

- Use chatbots and prompting strategies efficiently and effectively
- Understand and apply basic prompting

Teaching Method(s):

- Have students complete assignments individually or in small groups
- Apply iterative approach with specified number of revision cycles
- Have students document their work process or prompting strategy

Assessment(s):

- Have students record and / or present their solutions to the individual or group assignments
- Provide feedback on the solutions, both during and after the process
- Evaluate students’ documentation of the process or prompting strategy

3.1.3 Chatbots as Learning Assistants

Idea:

- Students can use the chatbot to get feedback on their assignment

Learning Objective(s):

- Interpret feedback from the chatbot and apply it to own assignment
- Develop and implement more effective strategies with the help of a chatbot

Teaching Method(s):

- Introduce a chatbot as a learning companion, define specific tasks for its use and discuss the results of these tasks with your students, e.g., in peer feedback groups
- Address individual strengths and weaknesses as well as efficient ways of working, which the students then can practice

Assessment(s):

- Check application and give feedback

3.2 Medium Strategies

3.2.1 Assessment of chatbot-generated texts

Idea:

- Evaluate chatbot-generated texts with students

Learning Objective(s):

- Evaluate and classify (subject-specific) content

Teaching Method(s):

- Have a chatbot generate a text on a complex problem - if necessary through prompts or queries that build on each other
- Assess the quality of the text in individual or group work by means of an assessment criteria sheet or grid
- If necessary, ask students to make corrections of critical passages

Assessment(s):

- Discussion of the results in groups or by peer feedback
- If necessary, assess corrections
- Fill in structures

3.2.2 Filling Structures

Idea:

- Students create the content to a chatbot-generated grid or structure concerning a specific problem

Learning Objective(s):

- Improve writing and speaking skills
- Convey subject-specific scientific knowledge in written form

Teaching Method(s):

- Have a chatbot create a structure grid for a specific problem(s)
- Have students fill in the chatbot-generated structure grid with content building blocks
- Have students work alone, in writing workshops, or peer feedback groups

Assessment(s):

- Assess and provide feedback on content and formal quality of students' submissions

3.2.3 Summary Comparison

Idea:

- Students compare their own text summaries with chatbot generated summaries or they compare different chatbot-generated summaries

Learning Objective(s):

- Improve writing and speaking skills
- Compare and discuss subject specific scientific texts

Teaching Method(s):

- Have students and or chatbots generate summaries with limited word count (e.g., 250 words)
- Have students compare student summaries with chatbot-generated summaries or different chatbot-generated summaries using an assessment criteria grid
- If necessary, let students create the assessment criteria grid together or in groups beforehand
- If necessary, have students adjust their and / or the chatbot-generated summaries.

Assessment(s):

- Discuss results of assessment criteria grid analysis
- If necessary, assess (revised) summary and give feedback

3.3 Elaborate Strategies

3.3.1 Identifying Problems

Idea:

- With the help of a chatbot, formulate problems to be worked on as part of a project seminar together with students

Learning Objective(s):

- Identify, specify, and formulate problems.
- Develop research questions

Teaching Method(s):

- Building on theoretical and empirical foundations, have students use a chatbot to formulate problems on a given topic
- Combine the different problems the students came up with and further specify them (with the help of a chatbot)
- Select a problem to work on further, taking into account the amount of work that can be done in the course

Assessment(s):

- Close supervision and contextual assessment of the creation and subsequent processing of the problem by the lecturer

3.3.2 Role Playing

Idea:

- Students interact and discuss with a chatbot, which takes on different roles and positions

Learning Objective(s):

- Assume and practice different roles
- Practice and reflect on how to deal with specific situations, problems, or challenges

Teaching Method(s):

- Assign different roles to chatbot to practice specific situations, problems, or challenges, then discuss them
- Students can select different scenarios in groups and take on different roles
- Chatbots can additionally give feedback to students

Assessment(s):

- Close supervision and coaching by lecturers

3.3.3 Chatbot Debates

Idea:

- Students argue against a chatbot

Learning Objective(s):

- Take different points of view and argue them
- Formulate own opinions
- Deal with differing opinions in a critical but constructive way
- Communicate effectively to defend own opinion and / or persuade others (including chatbots)
- Use critical thinking skills to evaluate and critically challenge arguments

Teaching Method(s):

- Organize and prepare a debate between students (alone or in small groups) and a chatbot
- Let the students develop arguments / a line of arguments beforehand
- Students can present their arguments to the chatbot and use its responses to further improve them

Assessment(s):

- Close monitoring and contextualization of the debate and its results by lecturers

4. Guidelines

The University of Bern has published guidelines on the use of AI-supported aids and answers central questions in a FAQ list that is continuously updated. In addition, there is a proposal from the legal service of the University of Bern to adapt the declaration of independence (Click here to get to the page).

Finally, a first legal assessment by the Ruhr University Bochum can be referred to for further orientation, which can be found here.

5. Further Information

Additional information is provided during in-house perspective workshops. If you are interested, please contact us by e-mail.