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## **S3 EP 05: carte blanche (EN translation)**

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## More Than an Answer Machine – Learning with Generative AI

Hello, I am Dominic Harion and I work in the Division du Stage ES at IFEN. In this context, I deal, among other things, with the question of how digital tools can be effectively embedded in teaching practice. In recent years, it is above all chatbots powered by generative artificial intelligence that are playing a new role in this regard. These are programs through which we, as well as our pupils, can communicate in natural language. What is crucial for teaching and learning is the distinction between open systems such as ChatGPT, Copilot, or Mistral, which respond without restriction, and didactically configured chatbots that we as teachers have deliberately shaped: with such bots, we determine what they may and may not do, provide them with topics and opening questions, and restrict their knowledge to precisely those texts and materials that are relevant to the pupils' learning process.

### WHAT THE RESEARCH SHOWS

What do educational research and pedagogy say about such an approach? The good news is that several meta-analyses – studies that have synthesized many individual investigations – arrive at a clear conclusion: when pupils work in a targeted way with chatbots, they understand content more deeply (cf. Alemdag 2023), are more motivated, and the perceived effort during learning decreases (cf. Deng et al. 2025).

At the same time, such studies show that the key to learning effectiveness does not lie in the digital tool itself. One research group investigated, for example, what happens when teachers are present during chatbot work – and when they are not. The result is unequivocal: with teacher presence, learners are more emotionally engaged and more autonomous. Without this presence, the digital tool loses much of its effectiveness. The chatbot therefore does not replace the teacher, but it can amplify their impact (cf. Li, Wu & Chiu 2025).

If, on the other hand, we deploy chatbots uncritically – allowing pupils simply to enter questions and copy the answers – we risk circumventing precisely what constitutes learning: independent thinking, the struggle to formulate ideas, the development of arguments. The primary question, therefore, is whether AI can support learning or whether it supplants thinking processes. The KI-Kompass emphasizes in this sense the necessity of learning *without*, *with*, and *through* AI: cognitive offloading is to be avoided (MENJE 2025).

This also means that for us as teachers and learning facilitators, what is required is not merely technology training in the narrow sense, but above all pedagogical expertise: how do I design tasks in such a way that AI promotes learning rather than shortcutting it – and what do I understand by “learning” in the age of artificial intelligence? Against this backdrop, the digitalization of schools is therefore not primarily about providing hardware or software: it consists in answering the question of which pedagogical needs these can meet and how digital resources can be rendered pedagogically purposeful.



## PRACTICAL APPLICATIONS

How might this look in practice?

Current AI models give each of us the opportunity to create chatbots and configure them with detailed instructions. This is likewise possible via the Fobizz platform, specifically designed for schools and available to us through the KI-Kompass. There are already individual pilot projects at Luxembourg schools using this infrastructure to design and test chatbots; for example, assistants that support learners in writing reports or in being introduced to systems of linear equations. The core principle is this: these chatbots do not provide answers. They ask questions and offer prompts. They help give shape to one's own thoughts. The intellectual work remains with the pupils.

On the basis of such experiences, we can derive three principles for getting started with chatbot work:

**First:** We should think about instructional design before deploying the technology. That is: what should my pupils be able to do, and how can a chatbot meaningfully accompany that process without replacing it – for instance in the sense of constructive, supportive scaffolding?

**Second:** We should remain present. A chatbot in the classroom that the teacher does not accompany is like a textbook that never comes to life. The pedagogical relationship, the dialogue, and indeed structured classroom management – no system can replace these.

**Third:** We may start small and specific. One chatbot for a single text type, a single type of mathematical problem, a single learning objective. This is easier to manage, easier to evaluate, and demonstrates impact without overwhelming anyone. Since chatbots can be duplicated and further developed at will – also as a team – we thereby lay the foundation for a digital assistant library.

## References

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