

Proposal: Learning by drawing

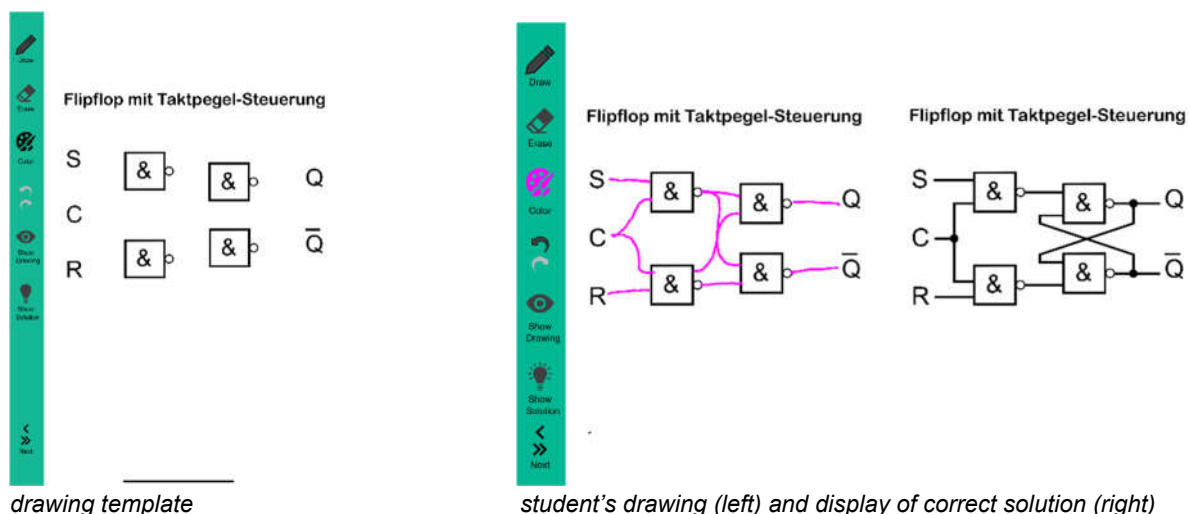
Graphics and diagrams play a central role in STEM disciplines. They are an important asset in presenting complex concepts and relationships, which is why they are essential for many degree programs at TUM.

According to a number of studies performed on STEM subjects, drawing constitutes an especially effective studying method for this type of content. Drawing stimulates a variety of learning processes that make students engage more deeply with the lecture material (Wu and Rau 2019). Additionally, drawing trains the ability to communicate knowledge effectively, which is invaluable for both the professional world and the discourse in the scientific community and amongst students.

Even though the various benefits of learning by drawing have been shown, it is currently underutilized in higher education. Only a few classes encourage students to create drawings of their own. This is why we want to help instructors design guided drawing activities within their lectures that enable every student to engage in key steps of the learning process. Our overarching goal is to expand the curricula at TUM by including the teaching method of digital drawing.

Digital drawing has clear advantages over pen and paper. It allows for more accessible drawing exercises, as the creation of complex graphics can be guided step by step. Furthermore, during the exercise, the focus can be put on different aspects of a diagram dynamically. By analyzing data created during the drawing process (What was usually drawn first? Which errors occurred most often?), both students and instructors can get valuable feedback on the exercises.

We are working on a web app that realizes drawing as a digital learning method. In the current version, users work through exercises page by page while drawing onto provided templates. To get feedback on their drawing's correctness, they can display solutions for each drawing exercise. Feel free to try it with different examples on www.learningbydrawing.com !



Our vision is to develop a subject-spanning platform that will integrate drawing as a learning method into the digital ecosystem at TUM. We want to help instructors with identifying suitable content and designing drawing exercises and make them available to students.

We would be grateful to use this opportunity to further innovate the teaching methods employed by TUM!

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