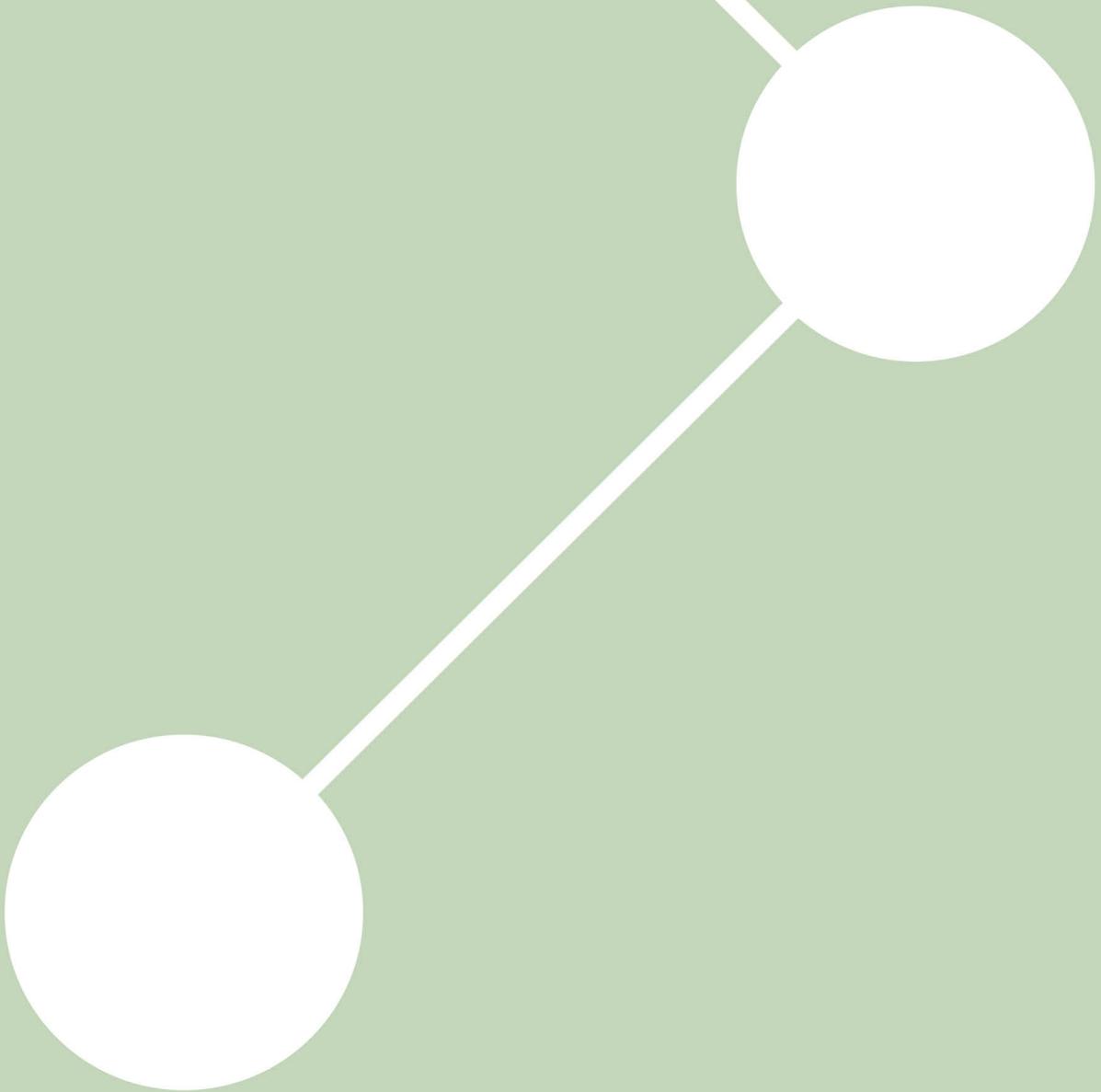


# **HOW TRANSPARENT IS THE MODELLING?**



# Modelling Education

The text box on the screen is very small. Maram types a few sentences and describes the idea that she is so excited about. She finds it difficult to find the right words. In fact, she does not have a definite idea yet, only a vague initial thought. Maram is not even quite sure if this thought even makes sense. She becomes uncertain as she is typing. Now she cannot even see the first few sentences of her text in the small text box on the screen anymore. She does not want to scroll up again – what if the system breaks! Better submit the text quickly. What will the others think about her idea? Her text is saved as “suggestion 1” by the system and is shown to the other students of her group. Also Emmi is typing her idea. She has already written her text in a word processor the day before, has revised it several times and has saved it. Now she just copies her text into the software that her, Maram and the rest of the group is using, and clicks ‘submit’. “Suggestion 2” appears on the screens of all group members. Now all students in the group can vote for suggestion 1 or 2. The result is unanimous! Everyone voted for suggestion 2. That went fast. Maram is disappointed that her text did not lead to any other reactions – no comments or inquiries – from the rest of the group.

## From quantity to quality?

The software, however, reports to the teacher: “The group cooperated well”. When several suggestions are made (participation) and the group decides on one (consensus), quantitative measures about participation and consensus lead to a qualitative assessment of another concept: cooperation. Data-based technologies not only determine such concepts and operationalise them, they also provide and structure possibilities of interaction. Datafication, modelling and formalisation are the foundations of digitisation. Determining the models behind digital systems is part of the software development. But only if these models are made visible, users can understand how education and learning is understood in a specific software. This transparency allows for understanding, critical inquiries and impact assessment. Everyone should be able to have a say in discussions about learning and education.

“There is no raw data, but data by design” (N. Selwyn). What are data, what do they have to do with modelling and what does modelling have to do with education? Data are automatically generated through the use of data technologies. They automatically appear and are part of the operability of the technical system. These data reveal nothing about *us*, but rather about our behaviour in exactly the way in which the respective data technology makes it possible and visible. The design and concept of the technical systems thus significantly influence the way in which participants of educational processes become visible and can articulate themselves. This is closely linked to the way in which pupils, teachers, students – in short: teaching and learning – are modelled, in other words: conceived, in a specific educational software. Usage and users of these tools are preconfigured. This implementation process is influenced by reflective as well as unconscious ideas about compliant usage, about users and also about theoretical concepts of education. The modelling or the models behind the software are usually not accessible for the users – the participants in the educational setting. Fundamental principles and derived concepts such as “cooperation” are definitely and unmodifiably determined.

## Transparency?

From a pedagogical perspective, the models that underly data technologies in the educational sector must be made transparent and accessible for users and interested parties. These models are produced in the process of software development. They exist. These models are usually created in a uniform notation (language): UML Unified Modelling Language. As this notation needs to be learned in order to use it, there are aspirations in the community of Interaction Design that aim to develop models in a way in which they can be understood and created without any technical know-how. This would allow many people with different skills and experiences to be involved in the development of data technologies and to critically reflect on their modelling. There are a number of design decisions that are being made in the conception, the implementation and the programming of data technologies. Therefore, the models that are being used should be updated throughout the entire development process and they should be made available to users.

# Questions

- How are learning processes being transferred into data and (allegedly) operationalised? What is understood as ‘learning’? From which activities are data being generated? Is, for example, attention equated with learning? Can attention be detected by the gaze of one’s eyes?
- How are complex concepts such as engagement, successful studying, elaboration, problem solving, participation, initiative or critical thinking datafied (transferred into numerical values and made measurable)?
- Which indicators make different forms of cooperation detectable in a specific system?
- How is the “ideal interaction” described?

# Literature and References

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UNBLACK THE BOX is a network initiative founded in 2019 by researchers from education science, sociology, information technology, media and health education, as well as teachers in schools, universities and pedagogical training. Our goal is to enable educational institutions and teachers to respond to the growing datafication and digitization of education with enlightened, critical and conscious decision-making, even without extensive IT knowledge.

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