

Adaptive learning technologies in Dutch schools

EXECUTIVE SUMMARY

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Context

Adaptive learning technologies (ALTs) are computer applications that customise content based on user input to support teaching and learning. These technologies provide learning analytics, helping teachers make informed decisions to improve teaching. For students, ALTs offer adaptive feedback and adjust exercise difficulty to match skill levels. This case examines two examples of ALTs: Snappet and Gynzy.

Snappet is an ALT platform used in primary education for subjects like mathematics, vocabulary and reading. It operates on a tablet and is widely used in the Netherlands, Belgium, France, Italy, Spain and Germany. Snappet's adaptivity is based on the Elo algorithm system. Based on the student's past exercise performance, it presents exercises with a 75% probability that the student will get right to maintain student motivation. It records real-time data on learner performance, displayed on teacher dashboards developed with teacher input.

Gynzy has a similar ALT feature, but it is also an interactive whiteboard application with classroom and lesson management functions. Gynzy focuses on STEM and active learning principles to enhance student achievement in English, reading/writing, arts and mathematics. Like Snappet, Gynzy offers lesson plans that can be used along the ALT exercises that are aligned with the Dutch curriculum.

Both tools collaborate with educators and researchers, especially the NOLAI unit of Radboud University. For instance, Gynzy is collaborating on a [project](#) promoting inclusion to integrate large language models to adapt learning content for students with language difficulties.

Dutch schools have autonomy in choosing educational technologies, with decisions made by school boards. Digital tools are widely used for learning, and there are initiatives to promote ethical and safe use of education data by organisations like SIVON and Kennisnet.

In this case study, multiple stakeholders were interviewed to understand different perspectives on the impact of ALTs in Dutch schools. The insights from these interviews can be organised under the [three pillars of the Agile EDU framework](#).

Regulation and rights privacy

- The [privacy agreement](#) guidelines and pledging platform help ensure that data collected by ALTs is used responsibly and ethically. The privacy agreement developed by Kennisnet adapts the General Data Protection Regulation (GDPR) to the educational context in the Netherlands. It defines schools as data controllers for students' and teachers' personal data when using digital learning resources and tests. By signing up to this covenant, suppliers like Snappet and Gynzy agree to safeguard the privacy of students and teachers using their products. Another initiative is the [Value Compass](#) for the digital transformation of

education. The compass establishes a common language and aims to facilitate discussions between stakeholders about digital education and the processing of student data.

- One concern raised was that higher-performing students seem to benefit more from ALTs, potentially creating a digital divide. School funding and digital skills also contribute to this divide. ALT's proficiency level calculations are dynamic, but potential biases need further investigation.

| Data in use for teaching and learning

Teacher trainers, researchers and teachers who used ALTs mentioned some lessons learned.

- Studies carried out by researchers and published in peer-reviewed journals mainly suggest that students have higher motivation and improved mathematics and spelling/writing skills after using ALTs. These studies also reveal other interesting findings. First, a classroom implementation study suggests that higher-performing students benefited more from using Snappet than lower-performing students. Second, when students use a computer or digital tablet in the classroom, it is likely that they get distracted and use these devices for non-class activities such as going on social media. Third, the research literature shows that there is a large variation in how frequently teachers inspect the data presented on the dashboard.
- Teachers need support to effectively use ALT data. Training and learning communities can help teachers become empowered users. Teachers can use detailed data from ALTs to plan support for both high and low-performing students. However, teachers need to be aware of the limitations of ALT data and use their professional judgment in conjunction with the data.
- Students use ALT for doing exercises on their own. ALTs could incorporate functions to engage students in monitoring their learning and making decisions to develop their data literacy and self-regulation. For instance, the NOLAI lab has developed an add-on called the [Learning Path](#) app that visualises ALT data in the form of a learning curve, with a playful design, and prompts students to reflect on their learning curve and how they should set future learning goals.

| Data governance

- Dutch schools are autonomous in procuring digital tools, with support from private initiatives. ALT data can provide valuable insights for education research, but privacy regulations may limit data sharing. The role of big tech in providing infrastructure for local EdTech companies is significant (e.g., cloud servers). In this sense, smaller EdTech companies might not have full control over where their data are stored and transferred to.

- The Ministry of Education supports the use of such tools due to its vision of a data-driven education. Private initiatives either working for the government (e.g., Kennisnet) or representing schools (e.g., SIVON) support schools with guidance on procurement, negotiations, and use of such tools.
- According to researchers, there is a shift of power from the school to the EdTech in organising classrooms. ALTs have a vision of pedagogy, and they have an impact on classroom behaviour and how and what kind of data is generated by students and teachers.

Recommendations

1. Teachers need to be consciously aware that students might sometimes be distracted, frustrated by low scores or have too much screen time. Sometimes a student might still need more support, even when the data dashboard suggests otherwise. Therefore, teachers need to sometimes make their own judgment about students based on personal observations in the classroom.
2. Not only for ALTs but in the case of all digital tools, when choosing them, teachers and school leaders should reflect on the benefits and possible risks and how digital tools shape classroom practices.
3. EdTech companies can develop ALT features that promote student self-regulation and data literacy, encouraging students to take an active role in their learning.
4. Integrate elements that encourage collaborative learning. ALTs might increase student motivation because they gamify studying, but they are based on individual practice. Schools can find the right balance between individual practice and collaborative activities. ALTs can also address this by suggesting collaborative activities in their lesson plans.
5. Regularly collect and incorporate feedback from teachers to improve ALT content and functionality. Developers should be in regular collaboration with teachers to collect feedback on what is going on in the classroom.
6. The ALTs in this case study set a good example as they address balancing digital and non-digital activities in their lesson plans more and more. They also recently improved their algorithm, which does not need as much data as before, giving teachers more flexibility with working outside the tool.
7. Policies can be put in place for researchers to have more access to ALT data to analyse enabling factors, as well as incentivising more collaborations with researchers, as happening with NOLAI.
8. Policy makers could look for alternatives to support European EdTech and reduce their dependency on Big Tech services.



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