

Use of intelligent technology in education

Intelligent technology is becoming ever more widespread in society, and hence also in education, where it is set to lead to fundamental changes. Intelligent technology can be used to support and enrich teaching, but also carries the risk of undermining the autonomy of pupils and teachers and making education a more one-sided process. Exploiting the opportunities offered by intelligent technology whilst managing the risks demands the active engagement of education professionals.

The rise of intelligent technology

Society has become increasingly digitalised over the last few decades, with one recent trend being the rise of intelligent technology. Examples of intelligent technology in education include adaptive teaching materials, automatic marking programmes, dashboards which display and interpret teaching and learning processes, and simulations with guidance for students when practising professional skills.

Intelligent technology offers a growing number of opportunities to support or adapt educational activities, or to do them differently. This technology is leading to fundamental changes that go beyond those resulting from digitalisation thus far. Use of intelligent technology in education requires careful consideration of its potential role, and the roles that teachers and others can play. Against this backdrop the Dutch Education Council, at the request of the Ministry of Education, Culture and Science, carried out an exploratory study focusing principally on the question of the likely changes in Dutch education resulting from the use of intelligent technology.

Intelligent technology can support and enrich education, but can also make it less appealing and more impersonal

The study showed that use of intelligent technology offers ample opportunities for enriching education, for example promoting autonomous learning, offering more inclusive education and enhancing motivation. On the other hand, the use of intelligent technology can also make education less appealing, with reduced personal contact, discouragement of initiative and undesirable forms of standardisation, monitoring, differentiation and profiling.

Intelligent technology requires active engagement from education professionals

The impact of intelligent technology on teaching and learning processes depends on how it is deployed. There is an active role here for teachers, educational leaders and government.

Teachers

For teachers, the rise of intelligent technology increases the scope to entrust some of the processes they have traditionally carried out themselves to the technology. This may support and ease the burden for teachers in some respects, but also make teaching more complex, because intelligent technology becomes an additional actor in the educational process. Active engagement of teachers is still necessary even when intelligent technology takes over some processes, and even when this technology is used to enable students to learn more autonomously or more in accordance with their individual needs and preferences. Teaching demands qualities that computers do not possess, such as situational alertness, pedagogical sensitivity and the ability to respond didactically to specific and unexpected situations.

Teachers' didactic and pedagogical expertise is essential in various aspects of teaching, including the presentation, discussion and (supervised) application of subject matter, testing and giving feedback, formulating learning objectives, giving assignments, making allowance for different educational needs and promoting autonomous learning. Their expertise is also essential in engaging pupils, organising joint activities, building interpersonal relationships with pupils and safeguarding their well-being and health. While intelligent technology can play a substantial role in all these processes, it is still subordinate to the role played by teachers. The challenge is to combine the power of the technology with the strengths of teachers.

Teachers also play a role in educational preparation, evaluation, design, improvement and innovation. The emergence of intelligent technology increases the importance of those roles, in that it demands consideration of all manner of technological, pedagogical, didactic and organisational issues. Teachers do this in conjunction with other experts, such as ICT specialists and educational scientists.

Educational leaders

Educational leaders (e.g., school principals, school heads, directors of studies, school district leaders) have a key responsibility for the way in which the use of intelligent technology is shaped. Their task is to ensure that pupils and teachers possess sufficient digital literacy to enable them to use intelligent technology responsibly and effectively. This avoids some groups of pupils benefiting more from the technology than others. These agents can also ease the teacher burden by bringing in technology support workers. And they can create scope for educational development, professional development and collaboration with other schools and teaching resource providers in relation to intelligent technology. All of this is based on a vision of what the education institution is seeking to achieve for its pupils and how intelligent technology can help attain that vision. A key principle is that the use of the technology does not deliver savings in terms of a reduced need for teachers.

Government

The government's task is to develop frameworks to protect privacy and data security around the use of intelligent technology. It also has a task in formulating attainment targets regarding the digital literacy of pupils, including using intelligent technology. The government is also responsible for regulating the market for intelligent educational technology and preventing market dominance by a small number of providers. Finally, the government can encourage the development of applications for intelligent technology in collaboration with education professionals. Involving teachers in the development of the intelligent technology, prevents the technology becoming an aim in itself. As the Dutch Education Council emphasizes in this report, technology in education should in the end always be a means of promoting the learning of students.

The full advisory report 'Inzet van intelligente technologie' (in Dutch) can be found at www.onderwijsraad.nl/inzet-van-intelligente-technologie

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