



Seven recommendations for *the digital transformation of education*



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At a time when the impact of digital technology on education is a major issue in society, Inria is publishing a new white paper on “Education and Digital Technology: Challenges and Issues”. Focussing on education THROUGH digital technology, as a vector of educational transformation, and education IN digital technology, Inria provides an analysis of the subject as well as recommendations for the digital transformation of education.

Digital transformation of education: what are the scientific challenges? What are the societal issues?

The white paper opens with an **overview of the impact of digital technology on the education sector**. Based on these observations, the authors stress the need to understand the scientific and technical foundations of this transformation and show the link between learning computer science and awakening critical thinking.

As Gérard Giraudon, coordinator of the white paper, says, **“we must urgently consider mastering the basics of digital technology as part of the culture of the citizen in the 21st century”**. Questions such as **What is data? What is an algorithm? What is the purpose of programming? How does a machine calculate? are all key elements”**.

> *Training teachers and personalising learning*

Two major challenges are identified:

- **Training teachers** (and others in positions of responsibility in education) who have to be able to adapt to a constantly changing environment in spite of the lack of training time during their careers which is a real stumbling block.
- > **Success for all**, which particularly depends on **digital inclusion**. This includes material aspects (access to equipment and especially networks), use (using tools and acquiring good practices) and comprehension (correct use of the systems employed and introduction to computational thinking). In this quest for success for all, digital technology helps offer personalised learning to each student, in particular the most vulnerable who are excluded from schooling or suffer from a disability.

> *Digital science to accompany these transformations*

To accompany these transformations, research is needed in areas such as **development** and the **critical study of digital devices and algorithms** in education, in synergy with research in neuroscience. **Modelling the learner** (initial knowledge, cognitive functioning in the context of a task etc.) is the first scientific hurdle to be cleared, while the **evaluation of the impact of digital technology** is still in its very early stages, especially in terms of motivation and commitment.

> *Three main challenges*

The first challenge is that of **digital sovereignty** and **mastering learning data**. The second challenge is economic by nature and involves maintaining access to education for all, regardless of finances, bearing in mind that the additional cost of failure at school is nearly €20 billion a year. Lastly, there is the challenge of lifelong digital learning allowing people to adapt, including the need to learn how to learn.

Seven recommendations for the successful digital transformation of education

- *Research actions*
 - Develop research projects in digital science for academic success.
 - Develop rigorous methods for the evaluation of digital education.
- *Training in digital technology*
 - Scale up the digital training of teachers
 - Move towards a 'popular and citizen digital university' to provide digital science training for all.
- *Public action*
 - Create the conditions for the development and updating of digital educational resources as a common good.
 - Ensure the portability of personal educational data and develop the interoperability of software solutions.
 - Create an EdTech observatory.

These recommendations were shared with the participants of the Forum for Digital Technology for Education held on 4 and 5 November 2020.

Digital technology for education: Inria is strongly committed

The digital transformation of education is an area that Inria, as a public research institute for digital science and technology, has been involved in for several years through various actions in connection with teaching digital technology: creating **MOOCs** dedicated to training teachers in digital technology (SNT, ICN, etc.), **mediation actions** to bridge the gap between digital science and the general public, the **deployment of successful projects** such as Class'Code and 1 scientist, 1 class: Chiche!, and the involvement of Inria's **project teams**: Corse, Flowers, Mnemosyne, Potioc, Scool and Wimmics.

Inria intends to play its role as a partner of the education system to the full and to use its expertise to help promote the digital sovereignty of France. This white paper is part of Inria's aim to boost its contribution to public policies, as defined in its 2019-2023 objectives and performance contract.

Find out more about Inria's education-related activities at <https://www.inria.fr/en/digital-education>

About Inria:

Inria is the French national research institute for digital science and technology. World-class research, technological innovation and entrepreneurial risk are its DNA. In 200 project teams, most of which are shared with major research universities, more than 3,500 researchers and engineers explore new paths, often in an interdisciplinary manner and in collaboration with industrial partners to meet ambitious challenges. As a technological institute, Inria supports the diversity of innovation pathways: from open source software publishing to the creation of technological startups (Deeptech).
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