Mapping and analyzing prospective technologies for learning

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The Technology Outlook for Norwegian Schools 2013-2018 presents the findings of a project led by the New Media Consortium (NMC). The New Media Consortium is an international community of experts in educational technology. This includes many stretching from practitioners who work with new technologies on campuses every day to the visionaries who shape the future of learning at think tanks, labs, and research centers, but also staff, boards of directors, advisory boards, and others helping the NMC conduct cutting edge research.

Since the launch of the Horizon Project in March 2002, the NMC has held ongoing dialogs with hundreds of technology professionals, campus technologists, faculty leaders from colleges and universities, and representatives of leading corporations. As the centerpiece of NMC’s Horizon Project, the NMC Horizon Report series charts the landscape of emerging technologies for teaching, learning and creative inquiry around the globe.

Each year, an Advisory Board considers the results of these dialogs and also looks at a wide range of articles, published and unpublished research, papers, and websites. This is done to generate a list of technologies, trends, challenges, and issues that knowledgeable people in technology industries, higher education, and museums are thinking about.

The Horizon Project Norway is a collaboration between the New Media Consortium, authors of the Horizon Report series, and the Norwegian Centre for ICT in Education. The goal of the project was to create a special Horizon Project report focused expressly on primary and secondary education (K-12) in Norway. The report from Horizon Project Norway identifies significant developments in technologies supporting teaching, learning, and creative inquiry in Norwegian primary and secondary education.

Mapping and analyzing prospective technologies for learning is not rocket science. It is rather about systemic knowledge, trends, and scenarios. All the work underpinning the report makes use of the NMC’s Delphi-based process for bringing groups of experts to a consensus, in this case concerning the impact of emerging technologies on teaching, learning, or creative inquiry in Norwegian schools the next five years. Dozens of technologies, meaningful trends, and critical challenges are examined for possible inclusion in the report.
Every NMC report draws on the considerable expertise of an internationally renowned Advisory Board that first considers a broad set of important emerging technologies, challenges, and trends. It then examines each of them in progressively greater detail, reducing the set until the final list of technologies, trends, and challenges are identified.

The final topics, challenges, and trends in the present report are:

**Technologies to Watch:**

**Time-to-Adoption Horizon: One Year or Less**
- Bring Your Own Device (BYOD)
- Cloud Computing
- Flipped Classroom
- Social Media

**Time-to-Adoption Horizon: Two to Three Years**
- Games and Gamification
- Mobile Learning
- Online Learning
- Open Content

**Time-to-Adoption Horizon: Four to Five Years**
- Learning Analytics
- Natural User Interfaces
- Real-Time Machine Translation
- Wearable Technology

**Top Trends expected to have significant impact in Norwegian schools**

To assure this perspective, the advisory board researches, identifies, and ranks key trends that are currently affecting the practice of teaching, learning, and creative inquiry in education. It then uses these as a lens for its work in predicting the uptake of emerging technologies. These trends are surfaced through an extensive review of current articles, interviews, papers, and new research. Once identified, the list of trends is ranked according to how significant of an impact they are likely to have on education in the next five years. The following trends have been identified as key drivers of technology adoptions in the period 2013-2018. They are listed here in the order they were ranked (from the most important to the less important) by the Norwegian advisory board:

1. **Social media** is changing the way people interact, present ideas and information, and communicate.
Education paradigms are shifting to include online learning, hybrid learning, and collaborative models.

People expect to be able to work, learn, and study whenever and wherever they want.

As the cost of technology drops and school districts revise and open up their access policies, it is becoming more common for students to bring their own mobile devices.

Openness: concepts like open content, but also open data, and open resources, along with notions of transparency and easy access to data and information are becoming valuable.

Key challenges related to teaching, learning, or creative inquiry that Norwegian schools will face during the next 5 years

They are listed here in the order ranked by the Norwegian advisory board. Like the trends, the ten challenges - described below - were drawn from a careful analysis of current events, papers, articles, and similar sources. However, the personal experience of the advisory board members in their roles as leaders in education and technology is also included.

1. Initial teacher training and in-service training is lagging behind in the digital domain. Current approaches to initial teacher training and in-service training in digital tools and pedagogies are insufficient for the need.

2. Teachers and schools remain dependent on physical textbooks. Norwegian teachers are grounded in a strong textbook culture.

3. Digital skills and the use of ICT for learning do not appear to be embedded in reform efforts, measurement strategies, prioritized areas, and national programmes to any appreciable extent.

4. The demand for personalized learning is not adequately supported by current technology or practices.

5. Digital competence in the curriculum should be revised or embedded in new ways.

The Norwegian Horizon report brings inputs to the debate about technologies expected to play a decisive role in shaping future learning strategies in the short-, medium-, and longer term. I do hope the Norwegian report constitutes a reference and straightforward technology-planning guide for educators, researchers, administrators, policymakers, and technologists. It is our hope that this report will help inform the choices that institutions make about technology to improve, support, or extend teaching, learning, and creative inquiry in primary and secondary education.

We need to consider the introduction and implementation of technologies in learning in relation to the dynamics, evolution and needs of learning systems in further discussion. Learning takes place in a complex ecosystem where one must be aware of technology trends, but at the same time not become too technology driven. Thus, technologies become inseparable from their affordances and impact on learning. Furthermore, education is understood in a holistic manner. From this perspective, policy making should not be “bewitched” by fashionable technologies, or risk massive cyclical investments in different kinds of technologies that have little effect on developing better
teaching and learning practices and outcomes. A systemic approach to school innovation is inspired by technology and driven by pedagogy.

According to the new OECD report *Innovative Learning Environments*: “Innovating the elements of the ‘pedagogical core’ - the content, the digital and physical resources, and the profile of teachers - goes hand in hand with organisational relations and dynamics appropriate to transform such innovations into powerful learning for the 21st century. In many cases this means to rethink the kind organisational patterns that deeply structure schools - the single teachers, the classroom segmented from other classrooms each with their own teacher, the familiar timetable structure and bureaucratic units, and traditional approaches to teaching and classroom organisation” (OECD, 2013, p. 72).

References

NMC Horizon Report: [http://www.nmc.org/horizon-project](http://www.nmc.org/horizon-project)


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1. [http://www.nmc.org/horizon-project](http://www.nmc.org/horizon-project)