



Horizon Project

NMC Horizon Report Preview

2015 K-12 Edition



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The NMC Horizon Report Preview provides summaries of each of the upcoming edition's trends, challenges, and important developments in educational technology, which were ranked most highly by the expert panel.

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Long-Term Impact Trends: Driving K-12 Ed Tech adoption for five or more years

Rethinking How Schools Work

There is a focused movement to reinvent the traditional classroom paradigm and rearrange the entire school experience — a trend that is largely being driven by the influence of innovative learning approaches. Methods such as project- and challenge-based learning call for school structures that enable students to move from one learning activity to another more organically, removing the limitations of the traditional bell schedule. Century-old practices in which students learn subject by subject are perceived by many as an antiquated approach to teaching and learning. The multidisciplinary nature of contemporary approaches has brought attention to innovative designs of the school atmosphere that link each class and subject matter. As learning becomes more fluid and student-centered, some teachers and administrators believe that schedules should be more flexible to allow opportunities for authentic learning to take place and ample room for independent study.

Shift to Deeper Learning Approaches

There is a new emphasis in the classroom on deeper learning approaches, defined by the Alliance for Excellent Education as the delivery of rich core content to students in innovative ways that allow them to learn and then apply what they have learned. Project-based learning, problem-based learning, inquiry-based learning, challenge-based learning, and similar methods foster more active learning experiences, both inside and outside the classroom. As technologies such as tablets and smartphones are more readily accepted in schools, educators are leveraging these tools, which students already use, to connect the curriculum with real life applications. These active learning approaches are decidedly more student-centered, allowing learners to take control of how they engage with a subject and to brainstorm and implement solutions to pressing local and global problems. The hope is that if learners can connect the course material with their own lives and their surrounding communities, then they will become more excited to learn and immerse themselves in the subject matter.

Mid-Term Impact Trends: Driving K-12 Ed Tech adoption over the next three to five years

Increasing Use of Collaborative Learning Approaches

Collaborative learning among both teachers and students is a growing priority for schools, especially around how it can stimulate educational technology uptake. According to a report published by the European Commission, “Survey of Schools: ICT in Education,” around 40% of grade 11 students already engage in collaborative work at least once a week. Research studies have revealed that teamwork exercises and cooperative learning environments bolster student engagement and performance. Approaches such as project- and challenge-based learning promote group work around solving a problem or achieving a collective goal. Similarly, an increasing number of teachers are participating in collaborative professional development opportunities that allow them to share best practices and learn from each other.

Shift from Students as Consumers to Students as Creators

A shift is taking place in the focus of pedagogical practice in schools all over the world as students across a wide variety of disciplines are learning by making and creating rather than from the simple consumption of content. Creativity, as illustrated by the growth of user-generated videos, maker communities, and crowd-funded projects in the past few years, is increasingly the means for active, hands-on learning.

Short-Term Impact Trends: Driving K-12 Ed Tech adoption over the next one to two years

Increasing Use of Hybrid/Blended Learning Designs

Perceptions of online learning have been shifting in its favor as more learners and educators see it as a viable alternative to some forms of face-to-face learning. Drawing from best practices in online and face-to-face methods, blended learning is on the rise in schools. The affordances blended learning offers are now well understood, and its flexibility, ease of access, and the integration of sophisticated multimedia and technologies are high among the list of appeals. Recent developments of business models for schools are upping the ante of innovation in these digital environments, which are now widely considered to be ripe for new ideas, services, and products. While growing steadily, the recent focus in many education circles on the rapid rise and burnout of massive open online courses (MOOCs) has led to the view that these sorts of offerings may be fad-like. However, progress in learning analytics; adaptive learning; and a combination of cutting-edge asynchronous and synchronous tools will continue to advance the state of online learning and keep it compelling, though many of these methods are still the subjects of experiments and research by online learning providers and schools.

Rise of STEAM Learning

The importance of high-quality science, technology, engineering, and mathematics (STEM) learning experiences has been the subject of many discussions among thought leaders in the past few years — especially as it relates to improving local and national economies by stimulating greater innovation and a more competitive global marketplace. However, as a response to this focus, a growing number of voices have articulated the need to better integrate humanities and arts education into these STEM classes and programs, hence the movement of STEAM learning. This trend has especially gained traction as there is more multi- and cross-disciplinary learning taking place at schools, revealing how these seemingly disparate subjects are interconnected. Experiencing the full spectrum of STEAM education can help students generate more well-rounded skill sets and views of the world.

Solvable Challenges: Those which we both understand and know how to solve

Creating Authentic Learning Opportunities

Authentic learning, especially that which brings real-life experiences into the classroom, is still all too uncommon in schools. Authentic learning is seen as an important pedagogical strategy, with great potential to increase the engagement of students who are seeking some connection between the world as they know it exists outside of school, and their experiences in school that are meant to prepare them for that world. Use of learning strategies that incorporate real-life experiences, technology, and tools that are already familiar to students, and interactions from community members are examples of approaches that can bring authentic learning into the classroom. Practices such as these may help retain students in school and prepare them for further education, careers, and citizenship in a way that traditional practices are too often failing to do.

Integrating Technology in Teacher Education

Teacher training still does not acknowledge the fact that digital media literacy continues its rise in importance as a key skill in every discipline and profession. Despite the widespread agreement on the importance of digital competence, training in the supporting skills and techniques is rare in teacher education and non-existent in the preparation of teachers. As teachers begin to realize that they are limiting their students by not helping them to develop and use digital competence skills across the curriculum, the lack of formal training is being offset through professional development or informal learning, but we are far from seeing digital media literacy as a norm. This challenge is exacerbated by the fact that digital literacy is less about tools and more about thinking, and thus skills and standards based on tools and platforms have proven to be somewhat ephemeral.

Difficult Challenges: Those we understand but for which solutions are elusive

Personalizing Learning

Personalized learning includes a wide variety of approaches to support self-directed and group-based learning that can be designed around each learner's goals. Solving this challenge means incorporating into school activities concepts such as personalized learning environments and networks, adaptive learning tools, and more. Using a growing set of free and simple resources, such as a collection of apps on a tablet, it is already quite easy to support one's ongoing social and professional learning and other activities with a collection of resources and tools that is always on hand. There are two paths of development for personalized learning: the first is organized by and for the learner, which includes apps, social media, and related software. School goals and interests are driving the other path, primarily in the form of adaptive learning. In this pathway, which envisions the development of tools and data streams that are still some time away from being seen in schools, adaptive learning is enabled by intervention-focused machine intelligence that interprets data about how a student is learning and responds by changing the learning environment based on their needs. While the concept of personalized learning is fairly fluid, it is becoming more clear that it is individualized by design, different from person to person, and built around a vision of life-long learning.

Rethinking the Roles of Teachers

Teachers are increasingly expected to be adept at a variety of technology-based and other approaches for content delivery, learner support, and assessment; to collaborate with other teachers both inside and outside their schools; to routinely use digital strategies in their work with students; to act as guides and mentors to promote student-centered learning; and to organize their own work and comply with administrative documentation and reporting requirements. Students, along with their families, add to these expectations through their own use of technology to socialize, organize, and informally learn on a daily basis. The integration of technology into everyday life is causing many education thought leaders to argue that schools should be providing ways for students to continue to engage in learning activities, formal and informal, beyond the traditional school day. As this trend gathers steam, many schools across the world are rethinking the primary responsibilities of teachers. Related to these evolving expectations are changes in the ways teachers engage in their own continuing professional development, much of which involves social media and online tools and resources. While fully online schools are still relatively rare, an increasing number of teachers are using more hybrid and experiential learning exercises, and experimenting with social media and other ways of building learning communities.

Wicked Challenges: Those that are complex to even define, much less address

Scaling Teaching Innovations

Our organizations are not adept at moving teaching innovations into mainstream practice. Innovation springs from the freedom to connect ideas in new ways. Our education institutions generally allow us to connect ideas only in prescribed ways — sometimes these lead to new insights, but more likely they lead to rote learning. Current organizational promotion structures rarely reward innovation and improvements in teaching and learning. A pervasive aversion to change limits the diffusion of new ideas, and too often discourages experimentation.

Teaching Complex Thinking

It is essential for young people both to understand the networked world in which they are growing up and also — through computational thinking — to understand the difference between human and artificial intelligence, learn how to use abstraction and decomposition when tackling complex tasks, and deploy heuristic reasoning to complex problems. The semantic web, big data, modeling technologies, and other innovations make new approaches to training learners in complex and systems thinking possible. Yet, mastering modes of complex thinking does not make an impact in isolation; communication skills must also be mastered for complex thinking to be applied meaningfully. Indeed, the most effective leaders are outstanding communicators with a high level of social intelligence; their capacity to connect people with other people, using technologies to collaborate and leveraging data to support their ideas, requires an ability to understand the bigger picture and to make appeals that are based on logic, data, and instinct.

Time-to-Adoption Horizon: One Year or Less

Bring Your Own Device (BYOD)

BYOD refers to the practice of people bringing their own laptops, tablets, smartphones, or other mobile devices with them to the learning or work environment. Intel coined the term in 2009, when the company observed that an increasing number of its employees were using their own devices and connecting them to the corporate network. Since implementing BYOD policies, the company has reported up to 5 million hours of annual productivity gains, a statistic that is compelling many other companies to consider BYOD. In schools, the BYOD movement addresses the same reality; many students are entering the classroom with their own devices, which they use to connect to the school's network. While BYOD policies have been shown to reduce technology spending, they are gaining traction more so because they reflect the contemporary lifestyle and way of working and learning.

Makerspaces

The driving force behind Makerspaces is rooted in the Maker movement, a following comprised of artists, tech enthusiasts, engineers, builders, tinkerers, and anyone else who has a passion for making things. The turn of the 21st century has signaled a shift in what types of skillsets have real, applicable value in a rapidly advancing world. In this landscape, creativity, design, and engineering are making their way to the forefront of educational considerations as tools such as 3D printers, robotics, and 3D modeling web-based applications become accessible to more people. The question of how to renovate or repurpose classrooms to address the needs of the future is being answered through the concept of Makerspaces, or workshops that offer tools and the learning experiences needed to help people carry out their ideas. Makerspaces are intended to appeal to people of all ages, and are founded on an openness to experiment, iterate, and create.

Time-to-Adoption Horizon: Two to Three Years

3D Printing/Rapid Prototyping

Known in industrial circles as rapid prototyping, 3D printing refers to technologies that construct physical objects from three-dimensional digital content such as 3D modeling software, computer-aided design (CAD) tools, computer-aided tomography (CAT), and X-ray crystallography. A 3D printer builds a tangible model or prototype from the electronic file, one layer at a time, through an extrusion-like process using plastics and other flexible materials, or an inkjet-like process to spray a bonding agent onto a very thin layer of fixable powder. The deposits created by the machine can be applied accurately to build an object from the bottom up, layer by layer, with resolutions that, even in the least expensive machines, are more than sufficient to express a large amount of detail.

Adaptive Learning Technologies

Adaptive learning technologies refer to software and online platforms that adjust to individual students' needs as they learn. According to a paper commissioned by the Bill and Melinda Gates Foundation, adaptive learning is a "sophisticated, data-driven, and in some cases, nonlinear approach to instruction and remediation, adjusting to a learner's interactions and demonstrated performance level, and subsequently anticipating what types of content and resources learners need at a specific point in time to make progress." In this sense, contemporary educational tools are now capable of learning the way people learn; enabled by machine learning technologies, they can adapt to each student's progress and adjust content in real-time or provide customized exercises when they need it. In schools, many teachers envision these adaptive platforms as new, patient tutors that can provide personalized instruction on a large scale.

Time-to-Adoption Horizon: Four to Five Years

Badges/Microcredit

Badges are seen as a way to grant certification for informal learning in the form of microcredits. A key aspect of gamification is to build in easy-to-reach incentives, and badges are a simple way to bring that idea to learning. The concept behind badging draws on longstanding ways learning has been documented in other settings, such as the personal skills and achievement when a Boy or Girl Scout earns a merit badge. The approach is being used in learning environments like the Khan Academy, with promising results. People watch videos on specific subjects and earn new badges by doing so. Mozilla has published an open specification for badging — the Open Badge Initiative (OBI) — that enables providers and users alike to easily display their achievements on the web.

Wearable Technology

Wearable technology refers to devices that can be worn by users, taking the form of an accessory such as jewelry, sunglasses, a backpack, or even actual items of clothing such as shoes or a jacket. The benefit of wearable technology is that it can conveniently integrate tools that track sleep, movement, and location. There are even new classes of devices that are seamlessly integrated with a user's everyday life and movements. Smart watches, for example, are becoming commonplace, allowing users to check emails and perform other productive tasks through a tiny interface. A rapidly growing category of wearable technology takes advantage of the burgeoning interest in the "quantified self." The Jawbone UP and Fitbit bracelets are two examples that track how you eat, sleep, and move.