

Future Trends in K-12 Education

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In the following report, Hanover Research outlines projected trends in K-12 education. Hanover turns to a wide range of secondary literature to outline topics such as personalized learning practices and online and hybrid learning efforts. Throughout, Hanover provides concrete examples of the future of K-12 education through profiles of innovative schools and districts already employing the technology and pedagogical approaches that will be increasingly common in the future.

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EXECUTIVE SUMMARY

INTRODUCTION

Although elementary and secondary education has changed significantly over the past 20 years, futurists and educational technologists suggest that the next 20 years will see even more drastic shifts. These experts expect personalized learning approaches,¹ increased use of online and hybrid educational environments,² and the development of increasingly precise tools for determining effective educational practices to take on increasingly central roles within K-12 education in the coming years.³ With the rapid proliferation of new educational technologies and increasing access to “big data,” these developments have the potential to radically transform current educational practices.⁴

In this report, Hanover Research considers future trends in elementary and secondary education in depth. Hanover turns to a wide range of recent literature and commentary to identify trends, and explores various topics, from the future of the K-12 classroom to more general considerations of the evolution of district administration. Throughout the report, Hanover provides examples of developments at schools on the cutting edge of innovation, to highlight examples of what the future of education might look like.

KEY FINDINGS

- **The future of K-12 education will largely hinge on the development and adoption of new educational technologies.** Classroom design and pedagogical approaches will increasingly rely on web-based tools and devices to ensure efficient and effective student and teacher collaboration and interaction. School and district administration will also rely on increasingly sophisticated systems to effectively secure and manage large amounts of student and personnel data.
- **Research suggests that the K-12 classroom of the future will be designed to ensure connected and collaborative learning options.** Future classroom spaces will feature desks and furniture designed and placed to support collaboration and increasingly personalized interactions between students and teachers. Classrooms will also incorporate a wide range of technologies, from mobile devices and computers to interactive white boards.

¹ Tanenbaum, C., Le Floch, K., and Boyle, A. “Are Personalized Learning Environments the Next Wave of K-12 Education Reform?” Education Issue Paper Series. American Institutes for Research. August 2013. pp. 1-21. http://www.air.org/files/AIR_Personalized_Learning_Issue_Paper_2013.pdf

² Horn, M. “The Rise of K-12 Blended Learning.” *Forbes*, January 27, 2011. <http://www.forbes.com/sites/michaelhorn/2011/01/27/the-rise-of-k-12-blended-learning/>

³ “Horizon Report 2013: K-12 Edition.” The New Media Consortium. 2013. pp. 21-23. <http://www.nmc.org/pdf/2013-horizon-report-k12.pdf>

⁴ Zaino, J. “What Big Data Means for K-12.” *EdTech: Focus on K-12*, June 25, 2013. <http://www.edtechmagazine.com/k12/article/2013/06/what-big-data-means-k-12-0>

- **Future K-12 classrooms will rely heavily on educational technologies to deliver content, enable constant access to educational materials, and provide personalized feedback to students on their performance.** The fast pace of technological advances suggests that, regardless of learning space, students and teachers will have access to increasingly large amounts of content and more effective virtual tools in the coming years. In essence, blended learning approaches – employing mobile devices and even incorporating innovative elements such as game-based learning – will likely become essential to instructional content delivery.
- **Fully virtual K-12 classrooms will become more common in the future, with many students never setting foot in a physical classroom space.** While over 250,000 students are already enrolled in fully online schools, this trend will become more prevalent in the coming decades. Students across the United States will have the opportunity to receive all educational content and complete all coursework within their own homes. Though these schools may still incorporate some face-to-face interaction, in general, students and teachers will have access to “virtual spaces” where they can collaborate online with mobile devices, laptops, or tablet computers.
- **The rise of “big data” and the development of more accurate learning analytics software will be central to improving student outcomes in the near future.** The New Media Consortium predicts that learning analytics will allow teachers and administrators to develop increasingly personalized learning paths within the next two to three years. As more and more students complete coursework through digital technologies, learning analytics tools will be able to more precisely adapt to and assess student learning needs.
- **Both “big data” and cloud computing technologies will also play an important role in improving district administration practices in the future.** Research indicates that district leaders will turn to cloud-based data storage more often to reduce costs as they have the opportunity to gather growing amounts of data on facilities, employees, and students. Used correctly, these databases will allow for the development of more efficient school systems that can better meet stakeholder needs.
- **Educational entrepreneurs and evolving standardized testing policies will also play an important role in the future of K-12 education.** Educational entrepreneurs, already influential in the education technology world, will lead the way in the development of innovative educational approaches. The future of standardized testing – which will likely become increasingly effective at measuring student learning – will also likely drive curricular development and the content taught in K-12 schools.

THE FUTURE OF STUDENT LEARNING, THE K-12 CLASSROOM, AND K-12 ADMINISTRATION

In this report, Hanover examines the future structure of the K-12 classroom, pedagogical practices, and district administration. Hanover's review considers several topics central to current discussions of educational development, including online and hybrid learning; personalized learning frameworks; and the move toward cloud-based administrative systems.

Although many of the classroom models, instructional practices, and administrative strategies discussed in this report already exist in some form, continued advancements suggest that they will become more prevalent in the coming years. Throughout this review, Hanover particularly emphasizes the importance of technological development, as this will be a key driver in shaping the future of K-12 education.

THE FUTURE K-12 CLASSROOM/LEARNING ENVIRONMENT

With the proliferation of relatively inexpensive laptops, tablets, and mobile devices, a growing number of teachers and students have access to learning tools that have the potential to transform educational approaches.⁵ Although these new devices feature in this report's discussion of future pedagogical approaches, they also play an important role in considerations of the future structure of the K-12 learning environment. Their development has led educators and futurists to suggest a variety of different potential structures for the K-12 classroom of the future, from the continued use of the physical K-12 classroom to the development of a fully online learning environment.⁶ In this subsection, Hanover considers three conceptions of the future K-12 classroom:

- **The physical K-12 classroom;**
- **The blended learning classroom;** and
- **The fully online classroom.**

Below, Hanover presents information on the physical learning environment of the future K-12 classroom in conjunction with a discussion of blended learning practices, as these are already closely connected and will remain so in the future. This discussion provides a logical starting point for a broader analysis of numerous other potential trends in the future of K-12 education, for both individual learners and school districts more broadly. It further allows Hanover to discuss trends at both the macro- and micro-levels, detailing how both school districts and individual students will be impacted by changes to the K-12 classroom model.

⁵ Britland, M. "What is the future of technology in education?" Inspiring Teaching Blog. *The Guardian*. June 19, 2013. <http://www.theguardian.com/teacher-network/teacher-blog/2013/jun/19/technology-future-education-cloud-social-learning>

⁶ McCrea, B. "Affording the Classroom of the Future." *THE Journal*. August 8, 2012. <http://thejournal.com/Articles/2012/08/08/Affording-the-Classroom-of-the-Future.aspx?Page=1>

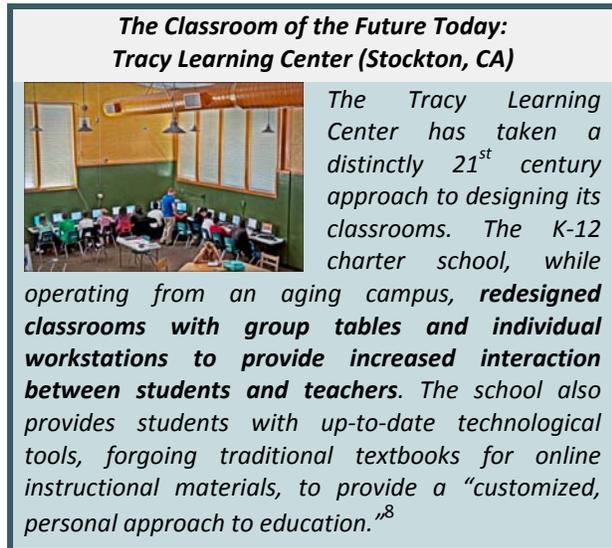
THE FUTURE K-12 CLASSROOM: INCREASING BLENDED LEARNING SPACES

The future K-12 classroom space, according to educational facilities designer Susan Smith, will “be more flexible than its predecessors.” As teachers incorporate more project-based and personalized learning approaches, physical classrooms will be redesigned to be able to adapt and accommodate more “individual study, small group learning, and even collaboration across different classes and subjects”:⁷

A space meant to accommodate 30 students, for example, would be built with moveable walls that could be quickly opened to allow multiple instructors to teach to 60 or more students in a large group.

Desks and furniture within this future space will be specifically designed and placed to support collaboration and personalized interactions between students and teachers. Students may have individual workstations and group tables, for instance, “to foster [these] hands-on and collaborative projects.”⁹ One report on future learning spaces, focusing on designing the “21st Century K-12 Classroom” suggests six design elements essential for the new approaches being implemented in K-12 education now and into the future:¹⁰

1. Desks and furniture that support collaboration;
2. Ample electrical outlets;
3. A “smart” teacher lectern;
4. Lighting that is easy to control;
5. Physical space that goes *beyond* the single classroom; and
6. Fewer expansive gathering areas.



Educators also suggest that the future K-12 classroom will integrate technology on a much larger scale than is seen in most current classrooms. Students will have consistent access to a variety of devices, such as laptops and tablets, which allow for increasingly immersive, connected learning experiences.¹¹

⁷ Ibid.

⁸ Manzo, K. “Transforming Classrooms into 21st-Century Work Spaces.” *Education Week*, June 25, 2009. http://www.edweek.org/dd/articles/2009/06/26/04classroomlook_necc09.h02.html & “About our School.” Millenium High School Tracy Learning Center. <http://tracy.mhs.schoolfusion.us/modules/cms/pages.phtml?pageid=110107>

⁹ Ibid.

¹⁰ Quoted from McCrea, B. “Designing the 21st Century K-12 Classroom.” *THE Journal*, January 18, 2012. <http://thejournal.com/Articles/2012/01/18/Designing-the-21st-Century-K12-Classroom.aspx?Page=1>

¹¹ Manzo, Op. cit.

BLENDED LEARNING AND “BYOD” (BRING YOUR OWN DEVICE)

In general, the K-12 classroom of the future will likely rely heavily on educational technologies to deliver content, provide constant access to educational materials, and provide feedback to students on their performance. The fast pace of technological advance suggests that regardless of learning space, students and teachers will have access to increasingly large amounts of content and more effective virtual tools within the coming years. The New Media Consortium (NMC) suggests that within the next five years, the K-12 classroom will incorporate technologies such as cloud computing, mobile learning, and 3D printing, among others.¹² Figure 1.1 outlines these coming developments and details when the NMC anticipates these technologies will be widely adopted.

Figure 1.1: Technologies Impacting the K-12 Classroom within the Next Five Years

TIME TO ADOPTION: ONE YEAR OR LESS
<ul style="list-style-type: none"> • Cloud Computing • Mobile Learning
TIME TO ADOPTION: TWO TO THREE YEARS
<ul style="list-style-type: none"> • Learning Analytics • Open Content
TIME TO ADOPTION: FOUR TO FIVE YEARS
<ul style="list-style-type: none"> • 3D Printing • Virtual and Remote Laboratories

Source: New Media Consortium

The expanding use of digital technologies suggest that blended and hybrid learning – which incorporates online and virtual learning in conjunction with face-to-face instructional interactions – will become increasingly common in K-12 education in the coming years. Students and teachers will have access to digital tools at all times and will be able to increasingly communicate using these technologies.¹³

Research suggests that mobile devices, such as smartphones and tablets, will drive the creation of a more “dynamic learning environment.” Students and teachers will be able to incorporate their *own* mobile devices into learning experiences in more numerous and varied ways. With their simple interfaces and potential to provide fast connections to digital learning resources at any time, these will be important tools in reshaping classroom approaches and interactions, and, as is discussed below, in providing students with more personalized and project-based learning opportunities.¹⁴

¹² “Horizon Report 2013: K-12 Edition,” Op. cit., pp. 4-5.

¹³ Norris, C. and Soloway, E. “Mobile Devices Are K-12’s Pearl Harbor.” *THE Journal*. October 7, 2013. <http://thejournal.com/articles/2013/10/07/mobile-devices.aspx>

¹⁴ Panagos, T. “The Future of Education: BYOD in the Classroom.” *Wired*. September 17, 2013. <http://www.wired.com/insights/2013/09/the-future-of-education-byod-in-the-classroom/>

THE “GAMIFICATION” OF THE CLASSROOM

Some futurists suggest that the increased use of technology may lead to “gamification” – in essence, the use of video games and gaming technology for educational purposes – within the future K-12 classroom.¹⁵ While the current educational gaming market is relatively small and primarily aimed at parents rather than teachers,¹⁶ the potential benefits and appeal of gaming approaches suggest that gamification will soon find a place within K-12 classrooms.

The expansion of gamification appears likely, as the costs of associated technologies are projected to decline in the coming years.¹⁷ Already, schools have made significant efforts to incorporate gaming approaches into their curricula. For example, GameDesk’s PlayMaker School, an experimental school within the New Roads private school in Los Angeles, is already teaching students through a number of interactive, game-based teaching approaches.¹⁸

**Videogames and the Future of Education:
Gamedesk’s PlayMaker School (Los Angeles, CA)**

The PlayMaker School, “reflects a revolution in education designed to prepare students for 21st century success.”



The school provides students with state of the art technology as well as a curriculum structured around the principles of “creation, imagination, and adventure.”

Students have access to videogames, and are taught through freeform learning modules, all of which are designed around national educational standards.

Source(s): GameDesk, PandoDaily

THE ONLINE CLASSROOM AND THE RISE OF K-12 DISTANCE LEARNING

The future of the physical K-12 classroom suggests a move toward the increased use of online and digital learning tools to provide content and supplement in-person experiences. A number of educators have already taken the next step, forgoing the physical educational space altogether in favor of fully online K-12 programming. The Evergreen Education Group estimates that, in the 2011-2012 school year, nearly 275,000 U.S. students attended fully online schools spread across 31 states and the District of Columbia. These fully online programs are commonly offered through charter schools and are often administered by private education management organizations (EMOs), such as K12 Inc., which “contract to provide courses, software, teacher professional development, and other key management and logistical support.”¹⁹

¹⁵ Smith-Robbins, S. “‘This Game Sucks’: How to Improve the Gamification of Education.” *Educause Review*, February 7, 2011. <http://www.educause.edu/ero/article/game-sucks-how-improve-gamification-education>

¹⁶ Lynch, M. “The Slow Gamification of K-12 Classrooms.” Education Futures Blog. *Education Week*, October 25, 2013. http://blogs.edweek.org/edweek/education_futures/2013/10/the_slow_gamification_of_k-12_classrooms.html

¹⁷ Tack, D. “Serious Games and the Future of Education.” *Forbes*, September 12, 2013. <http://www.forbes.com/sites/danieltack/2013/09/12/serious-games-and-the-future-of-education/>

¹⁸ Holmes, D. “Gamedesk’s ‘Classroom of the Future.’ Why is it so hard to reinvent K-12 education?” PandoDaily. April 29, 2013. <http://pandodaily.com/2013/04/29/gamedesks-classroom-of-the-future-why-is-it-so-hard-to-reinvent-k-12-education/> & “Overview: PlayMaker School.” GameDesk. <http://gamedesk.org/platforms/playmaker-school/>

¹⁹ Watson, J., et al. “Keeping Pace with K-12 Online & Blended Learning 2012.” Evergreen Education Group. 2012. pp. 24-25. <http://kpk12.com/cms/wp-content/uploads/KeepingPace2012.pdf>

The rise of virtual schools highlights another potential future for the K-12 classroom, especially given parallel developments at the postsecondary level – namely, MOOCs (Massive Open Online Courses) and other types of online programming.²² Available data suggest that enrollment in fully-online K-12 offerings will continue to grow, and that more school districts will begin to offer virtual enrollment opportunities in the coming years.²³ Students across the United States will have the opportunity to receive all educational

content and complete all coursework within their own homes through virtual “academies.” Furthermore, students and teachers will have access to “virtual spaces” where they can collaborate online “using their mobile devices, laptops, and tablet computers.” In essence, one iteration of the classroom of the future will not exist as a physical space, but rather as a digital network connecting individuals from a range of geographies.²⁴

**All-Virtual Content with Face-to-Face Aid:
Arizona Virtual Academy (Statewide, AZ)**



While the Arizona Virtual Academy has long offered fully-online curricula, in 2010 it partnered with YMCAs across the state to create “drop-in centers” for students. Centers provide students with options for face-to-face socialization even while completing coursework online, and help ensure students have a physical space in which they can work with teachers and tutors.

Source: *Education Week*,²⁰ Arizona Virtual Academy²¹

VIRTUAL LEARNING, FACE-TO-FACE SUPPORT

While many virtual schools completely move away from classroom settings, others embrace distance education only partially and offer online-only learning alongside face-to-face instructional support. These “hybrid” schools are one of the newest approaches to providing effective fully-online content for K-12 education, and will likely continue to expand in the future. One such institution, the San Francisco Flex Academy, opened in 2010. Its students complete their coursework at laptops within the former San Francisco Press Club.²⁵ Though all courses are completed through virtual learning:²⁶

Flex Academy also has teachers of core subjects—English, history, math, and science—on site, who meet with small groups of students throughout the day to troubleshoot areas where students are lagging, based on information collected by online assessments.

²⁰ Davis, M. “‘Hybrid’ Charter Schools on the Rise.” *Education Week*. June 15, 2011.

<http://www.edweek.org/dd/articles/2011/06/15/03hybrid.h04.html>

²¹ “Home.” Arizona Virtual Academy. <http://www.k12.com/azva/home#.Um8v7fmkrww>

²² Gorbis, M. “The Future of Education Eliminates the Classroom, Because the World Is Your Class.” *Fast Company*. March 4, 2013. <http://www.fastcoexist.com/1681507/the-future-of-education-eliminates-the-classroom-because-the-world-is-your-class>

²³ Watson, Op. cit., p. 27.

²⁴ McCrea, “Affording the Classroom of the Future,” Op. cit.

²⁵ Davis, Op. cit.

²⁶ Ibid.

This example highlights another emergent model for the virtual K-12 classroom, a model that effectively “flips” the classroom and ensures that students have access to virtual content and face-to-face support needed to complete coursework.

FUTURE PEDAGOGICAL APPROACHES

Suggestions for the design of the K-12 classroom of the future, whether it is a physical or virtual space, typically are based on assumptions about the types of teaching and learning practices that future educators will employ. More specifically, the K-12 classroom of the future will be designed to allow for collaborative and more hands-on projects as well as increasingly individualized, student-centered study.²⁸ With improvements in educational technologies, these practices will become more common, as students are provided with new resources – such as mobile devices – that allow both collaboration and more personalized engagement.^{29, 30}

This subsection focuses on two pedagogical approaches projected to spread in the future: project-based learning (PBL) and personalized learning. Throughout, this subsection will emphasize the technological advances that are helping to make the discussed approaches possible and effective.

**Project-Based Learning and 21st Century Skills:
The PRIDE Academy (Santee, CA)**

The PRIDE Academy at Prospect Avenue School has designed its curriculum around inquiry and project-based learning practices, delivering instruction through a variety of technologies. For example, kindergarten classes use “Interactive Promethean Boards,” computers, netbooks, iPods, and “ActiVotes” (Interactive texters), among other technologies, in an interactive, student-driven curriculum.



Source: Santee School District²⁷

PROJECT-BASED LEARNING

While project-based learning has been a component of pedagogical practices since the early 1900s,³¹ educators and futurists suggest that it will become one of the major teaching approaches in the near future.³² As discussed above, K-12 education will likely move toward the development of classrooms specifically designed to encourage more project-centered practices, such as those at GameDesk’s PlayMaker School.³³ Students will have the opportunity to work on their own or collaborate with other students in exploring and developing a proposed project. Students will have the support of a teacher trained to

²⁷ “Kindergarten Technology and Project Based Learning.” PRIDE Academy, Santee School District. <http://www.santeesd.net/Page/3956>

²⁸ McCrea, “Affording the Classroom of the Future,” Op. cit.

²⁹ Andersen, M. “The World Is My School: Welcome to the Era of Personalized Learning.” *The Futurist*, 45, 1. January-February 2011. <http://www.wfs.org/content/world-is-my-school>

³⁰ Lenz, B. “Project-Based Learning: Debunking the Myths and Fallacies.” Blog Post. Edutopia. October 8, 2013. <http://www.edutopia.org/blog/pbl-debunking-myths-fallacies-bob-lenz>

³¹ “Research Spotlight on Project-Based Learning.” National Education Association. <http://www.nea.org/tools/16963.htm>

³² Bell, S. “Project-Based Learning for the 21st Century: Skills for the Future.” *The Clearing House*, 83. 2010. pp. 39-43. http://images.bie.org/uploads/useful_stuff/PBL_Skills_for_the_Future.pdf

³³ “Overview: PlayMaker School,” Op. cit.

effectively guide them through the genesis and completion of the effort,³⁴ which will commonly be within STEM (science, technology, engineering, and mathematics) subjects.³⁵

While already proven effective through a variety of research studies,³⁶ PBL in the future will benefit from the development of educational technologies that will help limit the costs of the approach and provide increased support for students and teachers. Students can turn to web-based sources in researching topics of interest and furthermore can:³⁷

use a multitude of applications, including Web 2.0, for their projects. Students may use a wiki to share knowledge or blog with other students to troubleshoot during the process segment of their projects. In the presentation phase, students may use various technologies to display their learning. Their audience may receive a podcast, a video, a photo story, a comic, and so forth.

Across the country, school districts are already making efforts to integrate currently available technologies with PBL practices. The future classroom will likely continue these efforts, integrating mobile devices and other technologies into effective project-centered teaching.³⁸

PERSONALIZED LEARNING AND IMPROVING STUDENT ASSESSMENT

The future of K-12 education, though increasingly reliant on effective project-based learning approaches, will also turn to more generalized personalized learning strategies. With the improvement of learning analytics software, students will have curricula and coursework specifically designed to cater to their interests and needs. While some schools across the United States have already adopted personalized learning strategies, these will become increasingly well-developed in coming years – a trend tied to the development of effective student assessment software, the concept of learning analytics, and the rise of “big data.”³⁹

Personalized Learning and the Development of Effective Learning Analytics Technologies

The New Media Consortium suggests that “learning analytics” will become commonplace within K-12 schools in two to three years. Learning analytics uses:⁴⁰

data and analyses to adapt instruction to individual learner needs in real time, in the same way that Amazon, Netflix, and Google use metrics to tailor recommendations and advertisements to consumers. Applied analytics can help transform education from a standard one-size-fits-all delivery system into a responsive and flexible

³⁴ Bell, Op. cit., p. 39.

³⁵ “STEM/STE(A)M Initiatives Program.” Classroom of the Future Foundation.
<http://www.classroomofthefuture.org/welcome.asp?loc=stem/about>

³⁶ Vega, V. “Project-Based Learning Research Review.” Edutopia. December 3, 2012. <http://www.edutopia.org/pbl-research-learning-outcomes>

³⁷ Ibid., p. 42.

³⁸ For one example of how a school district is at least partially integrating PBL with technology, see “Project-Based Learning.” South Madison Community School Corporation.
<http://www.smadison.k12.in.us/education/components/scrapbook/default.php?sectiondetailid=6845>

³⁹ Andersen, Op. cit.

⁴⁰ “Horizon Report 2013: K-12 Edition,” Op. cit., p. 20.

framework, catered to meet the students' academic needs and interests. Important information can be gleaned from student work in online environments and leveraged to design adaptive software – programs that make carefully calculated adjustments and suggestions to keep learners motivated as they master concepts or encounter stumbling blocks.

As mobile devices such as smartphones and tablets become important tools within elementary and secondary classrooms, student learning data and learning analytics software will be used to provide teachers with feedback on how to effectively individualize each student's educational experience.⁴¹

Approaches to Personalized Learning

With the improvement in educational technologies, personalized learning will likely become a key component of K-12 education in the coming years. Teachers and school administrators will take a variety of different approaches to implementing personalized learning practices. Educators will turn to learning analytics and web-based learning software to determine effective learning strategies for each individual student, and these technologies will also be used more specifically to “detect patterns in student behavior that can help educators identify learning issues early enough to craft and implement solutions.”⁴⁴

The American Institutes for Research suggests four specific personalized learning approaches that schools will incorporate in the near future:⁴⁵

A Personalized Learning Environment: Adams County School District 50 (Westminster, CO)



In Adams County School District 50, leaders have turned to personalized learning approaches to reshape the curriculum.

*The school district partnered with the Re-Inventing Schools Coalition (RISC) in 2008 to facilitate these changes. Students no longer advance through grade levels but rather through **16 “readiness levels,” based around standards-based skills.** Whenever a level is mastered, students move on to the next, leading to classrooms with students of a variety of ages, all receiving personalized attention.*

Source(s): Big Picture Learning,⁴² Adams County School District 50⁴³

⁴¹ Saveri, A. “Five Future Trends That Will Impact the Learning Ecosystem.” Edutopia. June 19, 2013. <http://www.edutopia.org/blog/5-shifts-regenerating-learning-ecosystem-andrea-saveri>

⁴² McLester, S. “Learning Gets Personal.” Big Picture Learning. March 2011. <http://www.bigpicture.org/2011/03/learning-gets-personal/>

⁴³ “Competency-Based System Wiki.” Adams County School District 50. <http://wiki.adams50.org/mediawiki/index.php/SBS:Main>

⁴⁴ “Horizon Report 2013: K-12 Edition,” Op. cit., p. 21.

⁴⁵ Quoted from Tanenbaum, Le Floch, and Boyle, Op. cit., pp. 1-21.

- ✓ ***Using Personalized Learning within Blended Learning Environments*** – School districts will continue to turn to “technology-based instructional strategies, tools, and courses” to measure outcomes and provide more personalized learning content.
- ✓ ***Using Personalized Learning to Prepare Individualized College and Career Readiness Learning Plans*** – Personalized learning allows for the development of individualized learning pathways for every student. These individualized learning plans will be effective tools in supporting “teachers’ instructional decision making by outlining students’ academic strengths, needs, interests, and course requirements.” Furthermore, they will better ensure that students have a basic plan in place for determining future career and educational interests.
- ✓ ***Employing Competency-Based Educational Approaches within Personalized Learning Strategies*** – Personalized learning approaches can be especially effective within competency-based educational frameworks. Employing personalized learning and individualized instructional approaches allows for a stronger analysis of student competency in various subjects. As students in personalized systems move through educational content at their own pace, competency-based assessment can help ensure that they are meeting more specific requirements or developing the skills needed to succeed at the next level of education.
- ✓ ***Engaging and Empowering Key Stakeholders within Personalized Learning Approaches*** – Personalized learning requires that key educational stakeholders, such as teachers and parents, are fully invested and cognizant of the individualized learning plans of students. Providing professional development for those involved in directing personalized learning will ensure that students have a support system to guide them along their personalized learning path.

THE FUTURE OF K-12 DISTRICT ADMINISTRATION

Like classroom and pedagogical practices, the future of K-12 administration and school organization more broadly will be heavily impacted by educational technologies. Online and cloud computing technologies will allow administrators to maintain vast databases on students, teachers, and staff, and allow them to more effectively identify – and meet – district needs. Alongside future administrative practices driven, at least in part, by technological developments, a number of **unique school-wide organizational models** have also emerged. These new models will have at least some impact the future structure of the K-12 school district.

This subsection addresses future trends in K-12 administration and concludes with a discussion of the **school-wide enrichment model** (SEM), which promises to provide a specialized design to improve outcomes for both gifted and struggling students, and **STEM-focused schools**, which suggest possibilities for how educators might fully integrate technology into both practice and content at the K-12 level.

THE FUTURE OF SCHOOL DISTRICT MANAGEMENT: IMPACT OF CLOUD COMPUTING

The future of school district administration and management will be heavily dependent on the increased use of technologies. While basic administrative practices will not see major changes in the near future, storage and data access practices will change fundamentally, particularly as a result of the rise of cloud computing. Cloud computing, already playing an important role in data storage and access in the business world,⁴⁶ will rapidly come to shape data management practices in K-12 education as school districts outsource “significant parts of their infrastructure, such as email and backups, to cloud devices.”⁴⁷ The NMC suggests that cloud computing will be ubiquitous in K-12 districts within the next year. Cloud computing is already seeing increased use by districts. According to CDW’s 2013 “State of the Cloud” report, about 42 percent of U.S. K-12 organizations used at least some cloud technology in 2012, up from 27 percent in 2011.⁴⁸

Entering the Cloud: Irving Independent School District (Irving, TX)

Irving Independent School District has turned to Google Apps for Education to manage a Software-as-a-Service (SaaS) cloud computing system that allows the district to manage and direct resources for its 35,000 students. While the district currently only uses cloud services for less sensitive communications such as email, calendars, and educational software, **administrative leaders expect to increasingly place more sensitive information within cloud systems** as security improves over the coming years.

Source: District Administration⁴⁹



School districts will increasingly turn to cloud technology for broad administrative solutions, and the technology will be an especially useful tool in providing a secure and accessible space for storing large amounts of district data. For example, within a cloud system schools will easily be able to store huge quantities of student information that might be too costly to store on school-owned servers. These data could then be used in learning analytics approaches or other efforts.⁵⁰

While questions still remain about how secure cloud systems are, future security advances will likely lead to schools placing nearly all administrative information

within cloud storage systems.⁵¹ Cloud services are especially attractive as they alleviate many of the “financial burdens imposed by server-based infrastructures,” cutting the “cost and time required for server maintenance,” while offering “support for new tools that foster best computing practices for easy sharing and mobility.”⁵²

⁴⁶ Babcock, C. “Cloud Lets You Test Business Ideas Faster.” *Information Week*, October 22, 2013. <http://www.informationweek.com/cloud-computing/infrastructure/cloud-lets-you-test-business-ideas-faste/240162947>

⁴⁷ “Horizon Report 2013: K-12 Edition,” Op. cit., p. 4.

⁴⁸ “CDW’s 2013 State of The Cloud Report.” CDW. 2013. p. 23. http://www.cdwnewsroom.com/wp-content/uploads/2013/02/CDW_2013_State_of_The_Cloud_Report_021113_FINAL.pdf

⁴⁹ Asher-Schapiro, Op. cit.

⁵⁰ Lynch, M. “Cloud Computing and K-12 Classrooms.” Education Futures Blog. *Education Week*, October 11, 2013. http://blogs.edweek.org/edweek/education_futures/2013/10/cloud_computing_and_k-12_classrooms.html

⁵¹ Asher-Schapiro, A. “Cloud Technology Forecast: Sunshine with Chance of Showers.” *District Administration*. June 2013. <http://districtadministration.com/article/cloud-technology-forecast-sunshine-chance-showers>

⁵² “Horizon Report 2013: K-12 Edition,” Op. cit., p. 11.

SCHOOL-WIDE ENRICHMENT MODELS

While in use since the 1970s, the school-wide enrichment model – an organizational approach to teaching and learning primarily aimed at gifted students – highlights a potential organizing strategy that K-12 school districts might turn to in the future for broader support for both gifted and struggling students. With its focus on individualized student learning and its use of a range of data in determining student needs,⁵³ it will likely benefit from improved learning analytic software and could broadly impact education. Unlike other organizational approaches discussed in this section, however, there is minimal literature addressing how this model might evolve over the coming decades.

In the typical school-wide enrichment model:⁵⁴

[A] talent pool of 15-20% of above average ability/high potential students is identified through a variety of measures including: achievement tests, teacher nominations, assessment of potential for creativity and task commitment, as well as alternative pathways of entrance (self-nomination, parent nomination, etc.). High achievement test and IQ test scores automatically include a student in the talent pool, enabling those students who are underachieving in their academic school work to be included.

But recent years have found the SEM creators to be more receptive to employing the model for all students, working to address three main goals:⁵⁵

- To maintain and expand a continuum of special services that will challenge students with demonstrated superior performance or the potential for superior performance in any and all aspects of the school and extracurricular program;
- To infuse into the general education program a broad range of activities for high-end learning that will: (a) challenge all students to perform at advanced levels, and (b) that will allow teachers to determine which students should be given extended opportunities, resources, and encouragement in particular areas where superior interest and performance are demonstrated; and
- To preserve and protect the positions of gifted education specialists and any other specialized personnel necessary for carrying out the first two goals.

With this broader approach, addressing the needs of all students, there is potential for the SEM approach to be applied throughout districts in coming years. As suggested above, though, there is little indication that it will have a major impact on future educational approaches more broadly.

⁵³ Renzulli, J. and Reis, S. "The Schoolwide Enrichment Model: Executive Summary." Neag Center for Gifted Education and Talent Development. University of Connecticut. <http://www.gifted.uconn.edu/sem/semexec.html>

⁵⁴ Ibid.

⁵⁵ Quoted from: Ibid.

STEM-FOCUSED EDUCATION AND “STEM SCHOOLS”

Education in science, technology, engineering, and mathematics (STEM) appears to be a major focus of future K-12 organizational strategies. School districts in the future will likely place a special focus on STEM-centered educational approaches, with many schools likely organizing administration and curricula around these concepts. Some schools already operate around a STEM-based education model, such as High Tech High,⁵⁶ and many more are placing increasing emphases on the subjects currently.⁵⁷ In the coming years, the development of these STEM-centric schools is unlikely to slow, particularly with the continued governmental emphasis on improving U.S. student STEM-related skills and competencies, and the numerous STEM groups that have developed to advocate and implement these programs.^{58, 59}

STEM-focused education of the future will likely incorporate the pedagogical approaches mentioned above, such as project-based learning and personalized learning. For example, STEM School Chattanooga already places a major emphasis on involving students in “project-and/or problem-based learning activities.”⁶¹ Furthermore, future K-12 schools, regardless of whether or not they adopt a STEM curriculum, will likely incorporate at least some aspects of the STEM approach. As discussed above, all schools will focus on incorporating PBL or personalized learning and on providing students with a wide range of technologically-focused activities to ensure that they are prepared for the increasingly digital world.

Innovative STEM Learning: MC² STEM High School (Cleveland, OH)

MC² STEM High School, part of the Cleveland Metropolitan School District, incorporates project-based learning alongside in-depth STEM class-work.

Students have access to a wide range of coursework and complete a number of class-led projects while also having access to internship and apprenticeship opportunities that provide them with experience in a variety of professions and assist with career planning.



Source: Edutopia⁶⁰

⁵⁶ “Our K-12 Schools.” High Tech High. <http://www.hightechhigh.org/>

⁵⁷ Murray, C. “The Secret to K-12 STEM Success.” *EdTech: Focus on K-12*. February 14, 2013. <http://www.edtechmagazine.com/k12/article/2013/02/shining-light-stem-success>

⁵⁸ See “Science, Technology, Engineering and Math: Education for Global Leadership.” United States Department of Education. <http://www.ed.gov/stem>

⁵⁹ Robelen, E. “New STEM Schools Target Underrepresented Groups.” *Education Week*. September 13, 2011. http://www.edweek.org/ew/articles/2011/09/14/03stem_ep.h31.html

⁶⁰ “STEM Connection: From Classroom to Workplace.” Schools that Work. Edutopia. <http://www.edutopia.org/stw-college-career-stem>

⁶¹ Donen, T. “STEM School Chattanooga – Reflections on Year One.” News. Tennessee STEM Innovation Network.

OTHER DEVELOPMENTS IMPACTING THE FUTURE OF K-12 EDUCATION

Trends external to K-12 school districts will also have a major impact on educational approaches within the coming years. While educators and futurists suggest a variety of more abstract developments that they believe will reshape K-12 educational practices, from “transforming urban learning landscapes”⁶² to “de-institutionalized production,”⁶³ in this subsection, Hanover focuses on two more concrete, developments in depth: the rise of the educational entrepreneur and changes to standardized assessments. This discussion explores how business concepts could potentially disrupt educational approaches, as well as how governmental decision-making may shape curricular standards.

THE EDUCATIONAL ENTREPRENEUR

Educational entrepreneurship is already impacting the development of instructional technologies and new pedagogical approaches. ‘Edupreneurs’ – often “former (and current) teachers, tutors, school administrators and parents” – are developing educational innovations that seek to improve the K-12 learning experience,⁶⁴ from innovative online tutoring options to web-based applications that help students raise scholarship money for postsecondary education.⁶⁵ As educational entrepreneurs receive greater support from venture capitalists and other funding bodies,⁶⁶ numerous individuals will likely try to develop a place within the market, leading to growing number of innovations. The future of K-12 education – as well as the learning technologies available to students – will likely be shaped, in part, by educational entrepreneurship. In the coming years:⁶⁷

[D]emocratized access to investment capital and startup know-how in education can turn any teacher, parent or student into an edupreneur, accelerating the diffusion of disruptive tools, models and applications for organizing teaching and learning.

THE FUTURE OF STANDARDIZED ASSESSMENT

Standardized testing will likely undergo a number of small but crucial changes in the coming years. While educational reformers have long advocated for discontinuing the use of standardized assessments,⁶⁸ most indicators suggest that these will remain an important part of the educational agenda. Test designers do appear to be designing assessments that more effectively test learning and analytical skills rather than content memorization. For

⁶² Saveri, Op. cit.

⁶³ “KnowledgeWorks Forecast 3.0 – Recombinant Education: Regenerating the Learning Ecosystem.” KnowledgeWorks. 2012. http://www.knowledgeworks.org/sites/default/files/Forecast3_0_0.pdf

⁶⁴ Paul, A. “Can Education Entrepreneurs Do Well and Do Good?” *Time*. February 15, 2012. <http://ideas.time.com/2012/02/15/can-education-entrepreneurs-do-well-and-do-good/>

⁶⁵ See “Raise Home.” Raise (beta). <https://www.raise.me/>

⁶⁶ For one example of a funder of educational start-ups, see “Programs, \$650M fund help entrepreneurs in education market.” *USA Today*. July 27, 2010. http://usatoday30.usatoday.com/news/education/2010-07-27-technology-test-entrepreneurs_n.htm

⁶⁷ Saveri, Op. cit.

⁶⁸ Rooks, N. “Why It’s Time to Get Rid of Standardized Tests.” *Time*. October 11, 2012. <http://ideas.time.com/2012/10/11/why-its-time-to-get-rid-of-standardized-tests/>

example, the Partnership for Assessment of Readiness for College and Careers (PARCC) – in the process of developing new standardized assessments – indicates that future assessments will be more technologically sophisticated and will incorporate more effective, competency-based measures of learning. In this vein, initial reports about the PARCC English/language arts exam suggest that it will be delivered in two parts – a performance-based assessment and a computerized exam – both of which attempt to assess learning more accurately than typical multiple-choice assessments.⁶⁹

The performance-based assessment, spread over two days, would involve a "research simulation" that asks students to read a suite of texts, including an "anchor" text such as a speech by a prominent historical figure. They would have to answer questions that require them to cite evidence from the text for their answers and write an essay. Another aspect of the performance-based test would require students to "engage" with literature (grades 3-5) or conduct literary analysis (grades 6-11) using a combination of shorter and longer texts.

The computerized end-of-year exam would focus on assessing student mastery as well:⁷⁰

[It] would employ six literary and informational texts and ask students to respond to machine-scorable questions, including ones that demand comparison and synthesis of the readings.

While this example provides only a preliminary indication of the future for standardized assessment, it does suggest that students of the future will be given more sophisticated standardized tests that better measure actual learning. Alongside the projected changes to pedagogical approaches discussed earlier in this section, future developments in standardized assessment hold significant potential for altering the way in which students learn.

⁶⁹ Gewertz, C. "New Details Surface about Common Assessments." *Education Week*. January 9, 2012.
<http://www.edweek.org/ew/articles/2012/01/11/15assess.h31.html?tkn=PVXF%2Fq2JvavZE3v40CNhGhD00DfoK3J7S0sg&cmp=clp-edweek>

⁷⁰ Ibid.

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