WHITE PAPER:
A TRANSFORMATION THAT PROPELS ADVANCES IN STUDENT LEARNING
Organized under the auspices of AASA — the School Superintendents Association — the Digital Consortium is a group of approximately forty superintendents from across the United States. Organized by superintendents for superintendents, the purpose of the Consortium is to provide school district leaders with the opportunity to work as critical friends. Together, the group will learn and take action together, and gain insight into emerging and successful models of best practices using digital media in support of engaging and effective learning experiences.

The members of the Consortium were invited to participate based on the knowledge and expertise they could bring to the group. A number of superintendents in the group have been recognized either by AASA or by their home state as champions for technology in education. The group includes superintendents with varying experience as it relates to digital transformation. Some are currently leading districts that are many years into a successful digital transformation, while others are in the process of scaling up pilots and working with staff to refine and develop plans for more effective and extensive implementation of digital resources. Districts vary in overall size, in configuration (some are K–12, others high school only, and others are K–8), in location (rural, suburban, urban), and in the socioeconomic status of the communities they serve.

Group leaders explicitly stated that they see the Consortium as an opportunity to recognize, use, and grow collegial expertise; a strategy that they feel is a valuable component of digital transformation within school districts. The group is not focusing on the specific technology that a district may choose to use, but rather, their focus is on information and communication technology (both hardware and software) in general and its potential to transform teaching and learning within public schools.

In 2016, the Consortium held its initial meeting at Discovery Education headquarters in Silver Spring, Md., in April, and has had two follow-up meetings—one in Chicago, Ill., in July and one in Napa Valley, Calif., in October. Discovery Education is a leading provider of digital textbooks and curriculum-based digital content for K–12 school districts.

This white paper will present current research on a number of themes that came to light during these meetings. For the purpose of this paper, lessons learned and opportunities to be investigated as a result of the group’s work will be organized into the following sections:

• The Role and Focus of Leadership
• A Relentless Emphasis on the Instructional Core
• Technology as an Accelerator of Learning
• Advocacy for Digital Equity
• Unanticipated Consequences and Next Steps

THE ROLE AND FOCUS OF LEADERSHIP

A report1 studying the use of technology in education looked at twenty-nine Organization for Economic Co-operation and Development (OECD) countries and 13 partner countries. The report concluded that the impact of technology in the classroom is at best mixed. PISA (Programme for International Student Assessment) results showed no significant improvement in student achievement in reading, mathematics, or science in countries with large investments in the use of technology for education compared with countries with much smaller investments.

Even knowing the results of the OECD research study, many educational leaders still see technology as a great equalizer that has the potential to be a major game changer for some of their least advantaged students. Consortium members have evidence within their own ranks2 that a properly managed digital conversion can have a markedly positive impact on student achievement. All members want to ensure that current and future investments in technology lead to improvements in achievement for all students. The superintendents desire to come together, share best practices, and grow their expertise in terms of what it takes to lead a digital conversion that propels advances in
student learning and narrows achievement gaps among student groups.

**Culture Trumps Everything**

Since the group began working together in April 2016, some of the core beliefs of this group of educational leaders have come to the forefront.

**Belief #1: Leaders have a responsibility to provide ubiquitous, uplifting leadership.**

The responsibility to provide ubiquitous, uplifting leadership was explicitly mentioned by one of the superintendents during a presentation at the initial meeting of the group, and it has remained a clear core belief of the group. When they meet, group members encourage, compliment, and acknowledge one another. They share vignettes that illustrate how they encourage the staff members they lead in their home districts, and they exchange ideas for recognizing and acknowledging both students and staff. These superintendents warmly praise colleagues who present at these meetings, and they work together collaboratively to define what the group hopes to accomplish and to decide how the group will do its work.

**Belief #2: Educators have a responsibility to make a difference in the life of every child they serve.**

Some superintendents express it differently, but at one time or another, nearly every superintendent in the group spoke to his/her commitment to empower every child. One spoke about her school district’s mission as a promise they make to every student. Several shared personal testimonies about how an educator made a difference in their lives and how that experience influences them to this day. And in summarizing one of the meetings, a superintendent commented that the job of a superintendent is about relentlessly doing what is right for kids.

**Belief #3: The answers to the challenges facing public education will come from the collective expertise of the people doing the work.**

Several of the superintendents said now is a critical time to refocus the education reform agenda. With the passage of the Every Student Succeeds Act (ESSA) lending a greater emphasis on leading reform at the state and local level, these superintendents spoke of their desire to grow their own knowledge of best practices that are actually working around the country. They also spoke to the importance of having ongoing ways to communicate and share their ideas with other superintendents. So in addition to the face-to-face Consortium meetings, the superintendents stay in touch virtually using self-directed learning tools.

Meeting organizers have structured each meeting in a way designed to build a spirit of collegiality and help participants connect on multiple levels. Most presenters are members of the group—an approach that reinforces the belief in the collective expertise in the room. In addition to more traditional keynote presentations and panel discussions, speakers also share Ignite sessions. A traditional Ignite session ([www.ignitetalks.io](http://www.ignitetalks.io)) is five minutes long. Speakers have 20 slides and each is timed to be on the screen for 15 seconds. The slides are predominantly images related literally or figuratively to the ideas the speaker is sharing. For Digital Consortium speakers, it was recommended that the first and last slides present a key question for the audience to consider. Through the Ignite sessions, participants learn a bit more about their colleagues and something about what drives or motivates them.

Another component of the meetings is time for superintendents to work together in small groups to identify and refine problems of practice. Identifying a problem of practice is one of the strategies used by districts implementing instructional rounds to improve teaching and learning ([http://hepg.org/hel-home/issues/25_3/helarticle/improving-teaching-and-learning-through-instructio](http://hepg.org/hel-home/issues/25_3/helarticle/improving-teaching-and-learning-through-instructio)). The Consortium members have agreed to identify specific problems associated with digital transformation. Each member of the group will select a problem that they wish to refine further and then investigate in more detail within their own district. As a member of a collaborative team, each superintendent will develop expertise and then be in a position to share what he/she has learned with other superintendents across the nation.

Two of the initial three meetings have also included visits to schools and opportunities to talk directly with students and teachers who are using digital technologies in innovative ways. In July, Consortium members interacted with students and teachers from Deerfield Public School District 109 (Deerfield, Ill.) and Leyden High School District 212 (Franklin Park, Ill.). Then in October, they had the opportunity to visit and interact with students and teachers from Phillips Elementary School, American Canyon Middle School, and New Tech High School. These schools are all part of the Napa Valley Unified School District (Napa Valley, CA).
The focus on establishing and growing a culture of collaboration and on developing collegial expertise relates to two key skills used by superintendents who have successfully led multiyear digital transformations that resulted in increased student achievement. The superintendents in the Consortium recognize the importance of organizational culture and that substantive change is most likely to happen when colleagues come together to figure out how best to respond to the challenges they encounter daily as they work to do what is in the best interest of every child. Bringing groups of professionals together and empowering them to develop solutions to difficult problems acknowledges the expertise in the group and makes it more likely that group members will buy into and support a solution that they helped to develop. It also makes it more likely that the proposed solution will take into account the day-to-day realities that practitioners face.

Recent studies published by a large, multinational consulting company that specializes in helping private industry with transformational change speak to the importance of leading with culture as part of a holistic approach to change. The authors of this study recommend the following:

- **Understand the strengths and weaknesses** of your organization’s culture. Use the organization’s cultural strengths to build the momentum needed for successful change.
- **Work with staff** to identify a few critical behaviors that need to change. Focusing on the “critical few” avoids a situation in which staff members are overwhelmed and then consequently take a this-too-will-pass attitude.
- **Connect staff** to a moral imperative in which they believe. Build pride and commitment around the difference the change will make.
- **Use peer networks** to reinforce the benefits of change. Although it is important for leaders to communicate the benefits of change, the message is more powerful coming from peers.
- **Use storytelling** as an additional tool to build and develop organizational culture. A few widely known and repeated stories about the organization’s journey and transformation can be a source of staff pride and help reinforce the importance of change.

Leaders who want to make meaningful change in an organization must be attentive to the organization’s culture, because recent research on change clearly indicates that culture trumps everything.

### The Compelling Moral Imperative

The intellectual category focuses on the importance of raising expectations and closing learning gaps for all students. Teachers need to know that the change is about a deep commitment to preparing students for a future that cannot be fully envisioned.

Comparing education to medicine and talking about how 21st-century medicine is significantly different from medicine of the 1950s, while education is in many ways unchanged, is not an impressive rationale. Even emphasizing with teachers the amount of time that students use digital devices outside of the classroom and then arguing that they should be able to have similar access during school is not an argument that will sway significant numbers of classroom teachers. Instead, most teachers need to hear that leaders are committed to doing what it takes to support teachers in using the technology as a tool to help change how learning happens in the district.

The bottom line is that most teachers want to know that the change is about a deep commitment to raising expectations and closing learning gaps for all students. Teachers need to know the district is committed to taking the time to identify tools that will make it easier for classroom teachers to facilitate personalized learning in an effort to better meet the needs of the diverse students in their classes. They also need to be reminded how technology is changing the world around us and that educators have always been about the business of preparing students for a future that cannot be fully envisioned.

It is important to acknowledge up front that the data on student achievement after implementing a technology initiative are mixed. It will be vital for teachers to acknowledge that such initiatives are really about changing teaching and learning and that technology is a tool with the potential to help.

### Recognizing, Using, and Growing Collegial Expertise

One way to keep the focus on improving student learning is to bring teachers together to talk about what schools can do to improve student
achievement. What tools will help? What needs to change? Knowing the culture of the district, leaders will establish opportunities for teachers to learn and work together. Some districts have been very successful with summer institutes. Others use early release days to focus on professional learning for teachers. In other districts, teachers come on weekends or participate in extended-day professional learning opportunities. Some districts work with local colleges to set up programs that make it possible for teachers to pursue advanced degrees or earn certifications in areas that will benefit the district’s focus on improved student learning and using technology as a tool to make that happen.

Effective administrators use formal and informal teacher leaders to serve on advisory committees, to lead study groups, and to research what is happening in other districts around the country. They invest time in building a community-wide understanding of the need to change what the district is currently doing. They think through questions like the following: Should the district set up a pilot program at one or more schools? How will lessons learned in the pilot be captured and shared with others in the district? How will the district ensure that the pilot is scalable? If the district decides against a pilot, what will the approach be? How will the district ensure that changes are leading to improvement in student learning? What corrective mechanisms will be built into the implementation process? How will lessons learned be shared across the district?

School district leaders participating in the Digital Consortium expressed their desire to transform teaching and learning in ways that will result in significantly improved student achievement. These leaders want to raise the average achievement of students in their districts and they want to narrow and eventually eliminate gaps in performance among student groups. They are also focused on ensuring that school system graduates are ready to work, learn, and live as productive members of a society that may look very different in the future than it does today. The group has ongoing discussions about technology and digital resources as tools that have the potential to facilitate desired transformation.

However, the background question is inevitably, “Where must the emphasis be if technology is to achieve its potential for transforming schools?”

What is the Instructional Core?

Richard Elmore, Harvard University School of Education Anrig Research Professor of Educational Leadership, states:

There are only three ways to improve student learning at scale: You can raise the level of the content that students are taught. You can increase the skill and knowledge that teachers bring to the teaching of that content. And you can increase the level of the students’ active learning of the content… That is, everything that’s not in the instructional core can only affect student learning and performance by, in some way, influencing what goes on inside the core.

Elmore indicates, “The instructional core is composed of the teacher and the student in the presence of content… It is the relationship between the teacher, the student, and the content.”

Teachers are required to have a great deal of knowledge and skill if they are to provide high quality instruction. They must know their learners and their needs. They must understand where a given child is in terms of what that child is expected to learn in a given school year, and they must understand what it takes to move a child forward on his/her individual learning pathway. To help children move forward and continue to grow, teachers must have a deep understanding of the content and skills they are expected to teach. They must understand learning hierarchies and dependencies.

Are students required to master a given concept or skill before they move on to other content in the curriculum or will they see the concept or skill many times in the future? Teachers must understand common misconceptions that children bring to class with them and how it affects learning today’s lesson. Teachers must also have deep knowledge of the pedagogy needed to teach the areas of the curriculum for which they have responsibility. They need to have access to solid examples in order to accurately explain concepts, worthwhile instructional tasks that develop both student content knowledge and important skills that students
need to succeed in life after graduation from high school. Teachers need to have access to well-designed assessment tasks that help them know what students know and understand and where students still have gaps in knowledge and skills.

But the instructional core is about more than the knowledge and skill of the teacher. It is also about the content the teacher is expected to teach. Is what students are expected to know and be able to do rigorous? Will it help prepare students for their life after graduation? Does the teacher have access to well-designed instructional resources that align with content standards? Does the content of the class also include developing critical thinking, collaboration, communication, and creativity in students?

The final component of the instructional core is the student. For students to learn as much as possible in a given class, they must feel comfortable and accepted as members of the class. Students must choose to pay attention, to stretch themselves to work on tasks that are challenging, to take risks, and to do all of the work that is required to develop new knowledge and skills. Students must be willing partners in the work of developing and growing their minds—partners who reflect on the processes that occur in and outside of the classroom and who communicate what is and what is not helping them to learn.

Content Standards and Future-Ready Students

Now is a critical time in America’s educational reform movement. Disillusioned that the nation has not made more progress in closing achievement gaps and improving student performance, Americans have progressed from No Child Left Behind, moved on from the Race to the Top, and are now focused on Every Student Succeeds. But the country is not starting over from scratch. Americans have strong feelings about what has not worked in education in the first decade and a half of the 21st century. Many Americans (parents and community members as well as teachers and school administrators) are concerned about the focus on standardized testing and on changes to teacher evaluation and school accountability. Many educators see value in the Common Core State Standards, although they are not uniformly supported. Teachers and administrators who support the standards are pleased to see more consistency across states. They actually see value in the skills and dispositions their students are developing in response to English Language Arts standards that require students to engage in close reading of text and to provide evidence for their answers. They are also impressed with the growing mathematics competency students are developing as they spend more time mastering standards that stress a balance among conceptual understanding, procedural fluency, and the habits of mind of mathematically proficient individuals.

On the heels of the Common Core State Standards for Mathematics and for English Language Arts (ELA) and Literacy in History/Social Studies, Science, and Technical Subjects, new standards have been released for science (Next Generation Science Standards), social studies (College, Career, and Civic Life Framework for Social Studies State Standards), physical education (SHAPE National PE Standards), and for other disciplines as well. Some disciplines (e.g., fine arts) are in the process of developing and releasing new standards. Advances in the cognitive sciences and a better understanding of how humans learn inform these new standards. The new standards documents also infuse principles from the Common Core documents for ELA and mathematics and take into account lessons from other countries as to the components of a world-class education.

These new standards influence student learning by changing the content students are being taught. The standards that have been released thus far seek to raise the rigor of classroom instruction and to focus teachers more on the skills that students need to develop throughout their educational journey. State departments of education, school district offices, and professional organizations are all working to provide new professional resources that will empower teachers with the knowledge and skills needed to provide instruction that will enable students to achieve the competencies outlined in the new standards. Traditional publishers and new content providers are all working to develop instructional materials that align with the new standards in hopes that school districts will select their resources to support instruction.

Each new standards document, in its own way, acknowledges that schools must prepare today’s young people for a future world that may differ markedly from the society in which we live today. These documents speak to what students should know and be able to do when they graduate from K–12 educational institutions. They tend to be silent on issues related to how students will be taught, where they will learn, and what instructional materials they will use. One group of thinkers did come together to rethink fundamental aspects of how education is delivered in America. They developed a document entitled Education Reimagined: A Transformational Vision for Education in the US.

The vision put forth in the 12-page document published by Convergence envisions moving from an educational system that is school centric to one that is learner centric.
Technology is also used to diagnose student learning needs and for content delivery.

The vision includes five elements that will guide innovation and development of diverse models. The goal is the eventual development of one or more models that yield excellent learning experiences for all children. The elements are as follows:

- Competency-Based Learning: Students are allowed to take the time they need to demonstrate mastery in defined domains of knowledge, skills, and dispositions. Students who need help to accelerate the pace of competency development receive additional resources.
- Personalized, Relevant, and Contextualized Learning: Students’ passions, strengths, needs, family, culture, and community influence the design of learning experiences so that students participate in learning that is personalized, relevant, and contextualized.
- Learner Agency: Students are active participants in the design and implementation of learning. In ways that are developmentally appropriate, students have choice and voice as to what and how they learn.
- Socially Embedded Learning: Learning experiences are grounded in meaningful interactions with family, peers, qualified adults, and community members. In addition to face-to-face interactions, students use technology to interact virtually with others to support and enhance learning.
- Open-Walled Learning: Learning experiences happen in myriad places and at a variety of times. Students may learn in person, through virtual experiences, or through a blend of both. Learning in authentic environments within the community is a valued component of the educational experience.

Participants in the Digital Consortium plan to use the elements of the vision to inform some of the work they will do within their own school districts in support of digital transformation. The goal is to develop many innovative models and approaches and to then share information on the promise and challenges associated with the different models.

**Learning and Teaching**

Research\(^{14}\) has shown that job-embedded, ongoing professional learning is key to providing teachers with what they need to improve pedagogy and improve learning outcomes for students. Although the phrase that is often heard is “teaching and learning,” for today’s teacher, it is more appropriate to speak of “learning and teaching.” In an educational landscape that is constantly changing (new standards, new assessments, new resources, new technology) and one in which researchers are routinely providing better information about how humans learn, educators find that professional learning is more important now than it has ever been.

Professional learning experiences have the greatest impact when they are ongoing over the course of the school year and include opportunities for teachers to practice what they are learning and receive feedback on implementation. To be most helpful, professional learning experiences should address specific challenges associated with teaching identified concepts and skills within a content area. Learning experiences related to generic topics are less likely to influence a teacher’s instructional practice and unless teachers change what they do in the classroom, there is no change in student learning. When professional learning experiences strengthen working relationships among teachers, the results can include better instruction and more success in identifying and resolving challenges associated with student learning. Bringing teachers together to learn and work in teams has proven to be one of the best ways to organize professional learning.\(^{15}\) The experiences are most powerful when the teachers are given the opportunity to observe in each other’s classrooms and to provide one another with constructive feedback. Giving teachers the opportunity to watch one another teach and to then discuss why a teacher asked a given question or responded in a specific way builds the expertise of all members of the group and results in long-term benefits for teachers and students.

Teachers grow tremendously as professionals when they have the opportunity to work with other teachers to plan and implement a lesson. When the learning cycle also includes looking at student work and making decisions about how to modify the lesson or about what next steps in instruction should be, the collaboration among teachers has the potential to improve learning outcomes for students.

A focus on professional learning is not only for teachers but for all involved in the education of students. School administrators, paraprofessionals, teacher leaders, support staff, counselors, and related services professionals all need opportunities to come together in both job-alike and cross-functional groups to develop and expand professional expertise. When everyone who is working to help students grow and develop puts time and energy into growing professionally and then using their expertise to help students, schools see growth in student achievement and they see closing of achievement gaps. When every staff member is committed to doing what is needed to help each student succeed, a school or an entire district builds a culture of achievement. In such a culture, students thrive and grow and student achievement has the potential to soar.
Originally published in October 2001, Good to Great: Why Some Companies Make the Leap and Others Don’t examined a large number of companies to identify an elite group that produced outstanding results over a period of years. The team then studied those companies to identify the management principles that explain their move from average to outstanding. The finding relative to technology was not what people were expecting. Instead of technology being a major factor that created the growth in these companies, Collins asserts, “Like the Daytona 500, the primary variable in winning is not the car, but the driver and his team. Not that the car is unimportant, but it is secondary” (p. 156). “When used right, technology becomes an accelerator of momentum, not a creator of it” (p. 162). This business principle seems to explain the lackluster results seen within K–12 education. Numerous school districts have made major investments in technology only to find that the investment has had little impact on student achievement. Collins’ work implies that districts must invest their energy in improving student learning. Great districts then find ways that technology can be used to enhance the work that they are doing. The concept that technology is an accelerator of momentum helps to explain the OECD findings cited earlier in this paper. When school districts put massive investments into technology before building the discipline needed to focus consistently on student learning, their efforts do not lead to substantial improvement in student achievement. Instead, districts that have used technology to markedly change student achievement understand the organizational culture of the district and invest the time to build the foundation needed for digital transformation. They are careful to keep the emphasis on student (and staff) learning and to work with a continual focus on how technology can be used in service of learning.

A Preliminary Theory of Action

How do school districts increase the use of high-quality instructional tasks that engage students and increase student achievement? Educators recognize the tremendous diversity in every classroom and they recognize that teachers need to meet the individual learning needs and engage the interests of each student. With more rigorous learning standards, teachers need ways to fill gaps for students who are struggling and get them back on track. Well-designed instructional tasks have the potential to help with these challenges.

Teachers need to give each student the time that student needs to demonstrate mastery of some common learning goals, how much variation in learning approaches and learning resources is desirable? What skills will teachers need in a system that emphasizes personalized, competency-based learning?

A lot of discussion has occurred about personalizing learning for students, but learning also needs to be personalized for educators. What support will teachers need to move from where they are now to where they...
will need to be in a system that focuses on student-centered, personalized learning? What support will school administrators need to lead learner-centric educational systems? Yes, when used well by skilled teachers and administrators, technology has the potential to improve instruction, but what will it take to develop the skills needed to use technology well?

What is the role of 21st-century instructional resources in a transformed educational system? How will instruction change to encourage teachers and students to use technology appropriately in a variety of places and at varying times? How does the district put processes in place to vet and acquire the digital resources needed to support new ways of teaching and learning? What delivery systems will the district put in place to keep things simple and dependable for educators, students, and parents? What new skills will district staff, students, and parents need to make appropriate and effective use of new technology and resources used in a transformed educational system?

But in addition to technology and instructional resources, redesigned systems may also need redesigned roles for those who support classroom instruction. As some districts infuse more technology into instruction, they are creating new roles for instructional support and mentor teachers. Some districts are rethinking the role of library/media specialists. How will current positions be restructured to fill needs that arise as a result of digital transformation? How will parents be included as full partners in the education of their children? How do districts systemically align resources to support the transformation of instructional practices?

Technology only transforms education when it is being used in powerful ways. What tools exist to help educators think about how technology is being used in a given task? There are several tools that immediately come to mind as important resources to help with the digital transformation of education. Dr. Ruben Puentedura has developed the SAMR model for technology integration as one tool to help educators think about how they are using technology in support of learning. The letters in SAMR stand for

- Substitution
- Augmentation
- Modification
- Redefinition

Teachers look at an instructional task and ask how technology is being used. Does technology act as a substitute, and the task could be done with no functional change without technology, or is technology a direct tool substitute with some functional change in the task? In both cases, technology is serving the function of enhancing the activity. When technology allows for significant task redesign or when technology allows for the creation of a new task that was previously inconceivable, then technology is transformational. Because the goal is to use technology to transform teaching and learning, teachers are encouraged to develop and use learning tasks that use technology in ways that are above the line (see Figure 2).

A second way to look at how technology is being used in support of student learning is a rubric developed by the Innovative Teaching and Learning Research Project. The rubric looks at how students use technology and whether it is used to construct knowledge or to design knowledge-based products. Teachers score an instructional task from 1 to 5 using the following rubric descriptions.

### Use of Information and Communication Technology (ICT*) for Learning Rubric

<table>
<thead>
<tr>
<th>SCORE</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>1</td>
<td>Students do not have the opportunity to use ICT for the learning activity.</td>
</tr>
<tr>
<td>2</td>
<td>Students use ICT to learn or practice basic skills or reproduce information. They are not constructing knowledge.</td>
</tr>
<tr>
<td>3</td>
<td>Students use ICT to support knowledge construction, but they could construct the same knowledge without using ICT.</td>
</tr>
<tr>
<td>4</td>
<td>Students use ICT to support knowledge construction, and the ICT is required for constructing this knowledge, but students do not create an ICT product for authentic users.</td>
</tr>
<tr>
<td>5</td>
<td>Students use ICT to support knowledge construction, and the ICT is required for constructing this knowledge, and students do create an ICT product for authentic users.</td>
</tr>
</tbody>
</table>

*In this rubric, the term “ICT” encompasses the full range of available digital tools, both hardware (computers and related electronic devices such as tablets and notebooks, e-readers, smartphones, personal digital assistants, camcorders, graphing calculators, and electronic whiteboards) and software (including everything from an Internet browser and multimedia development tools to engineering applications, social media, and collaborative editing platforms).
A third tool designed to help educators as they develop or select new learning tasks that will be part of a more learner-centric and personalized approach to education is Universal Design for Learning (UDL). UDL is a framework to improve teaching and learning for all students. The framework is grounded in what cognitive scientists have come to understand about how people learn. The UDL principles and guidelines drive the design of learning goals, assessments, methods, and materials in ways that can be customized and adjusted to meet the needs and interests of individual students. The UDL framework includes three principles and three guidelines related to each principle. UDL encourages educators to provide multiple means of engaging learners.

- Provide options for self-regulation
- Provide options for sustaining effort and persistence
- Provide options for recruiting interest

Examples might include using e-texts with text-to-speech capabilities in addition to print books. Material might also be presented using multimedia resources that include tools such as closed captioning or using screen readers with features such as alterable text size.

Provide multiple means of action and expression.

- Provide options for executive functions
- Provide options for expression and communication
- Provide options for physical action

Examples could include giving student options for how to demonstrate their learning, when appropriate, and could include options such as writing a paper or recording themselves explaining a concept or submitting a storyboard or an online concept map.

When options are built in from the beginning, instruction is more likely to meet the needs of many different kinds of learners and appeal to learners with a wide variety of interests and abilities.

Trends, Challenges, and Developments Affecting Digital Transformation

Each year since 2009, the New Media Consortium (NMC) has released a report examining the “landscape of emerging technologies for teaching, learning, and creative inquiry.” The 2016 report was published in collaboration with the Consortium for School Networking (CoSN) and was released on September 14, 2016. Superintendents participating in the Digital Consortium received information about the report and an accompanying toolkit at the large group meeting in Napa Valley. The report identifies six key trends accelerating digital transformation of K–12 education. The trends are categorized into three time frames and are as follows:

Long-Term Trends— Have already been impacting technology adoption and will continue to have an impact for more than five years

- Redesigning Learning Spaces
- Rethinking How Schools Work

Mid-Term Trends— Will continue to be a factor in technology adoption for the next three to five years

- Collaborative Learning
- Deeper Learning Approaches

Short-Term Trends— Are impacting technology adoption now, but will become commonplace or fade away with the next one to two years

- Coding as a Literacy
- Students as Creators

The report was developed by a panel composed of fifty-nine education and technology experts from eighteen countries on six continents. For each trend, there is an overview; implications for policy, leadership, or practice; and a list of recommended resources that provide additional information.

The next section of the report contains six significant challenges that are impeding technology adoption. The challenges are listed in three categories and are as follows:

Solvable Challenges— Educators understand and know how to approach these challenges.

- Authentic Learning Experiences
- Rethinking the Role of Teachers

Difficult Challenges— Educators understand these, but solutions are elusive.

- Advancing Digital Equity
- Scaling Teaching Innovations

Wicked Challenges— Educators find these challenges difficult to define and are struggling to address them.

- Achievement Gap
- Personalized Learning

Each discussion of a challenge includes an overview; implications for policy, leadership, and practice; and recommended resources for further reading. Finally, the report includes a listing of six important developments in educational technology.
The developments are categorized by time to adoption within K–2 education and are as follows:

**Time to Adoption— One year or less**
- Maker Spaces
- Online Learning

**Time to Adoption— Two to three years**
- Robotics
- Virtual Reality

**Time to Adoption— Four to five years**
- Artificial Intelligence
- Wearable Technology

While many of the technologies were not developed solely for education, they have a clear role to play in K–12 education. Members of the panel that developed the report researched each technology development thoroughly and the discussion of each development includes an overview; relevance for teaching, learning, or creative inquiry; and recommended resources for further reading.

The toolkit released with the report includes ideas for sharing the report with staff and community groups. Although the superintendents in the Consortium may have been aware of the Horizon report, their understanding of its relevance to the work they are doing was heightened through their participation in the Digital Consortium.

**Distributed Leadership and the Development of Social Capital**

The toolkit accompanying the Horizon report includes a number of questions for the community to discuss and decide how best to answer the questions for their school district. School districts are working to answer questions similar to the ones presented in the toolkit and many others related to the use of technology. The answers and the data and information that the school districts are collecting are being used to inform a wide variety of pressing decisions.

In the past, some districts collected the information and then passed it on to members of the superintendent’s Cabinet. These decision makers, either working together with the superintendent or working independently in their individual areas of responsibility, then made the decisions that guided the digital transformation of the school district. And as issues and concerns would come up, this group of leaders would problem solve and identify resources to address problems and challenges. In more collaborative districts, a community, teacher, administrator, or cross-functional advisory committee provided input to the superintendent and Cabinet, but decisions were clearly made by a small group of top-level decision makers. Most readers can identify at least one school district that had major difficulties when attempting this type of centrally managed digital transformation. It is difficult for a central leadership group to manage all of the complexities associated with digital transformation and centralized decisions related to a variety of issues that are at the very heart of education do not always align with the culture of the varied communities served by a school district.

Contemporary researchers are providing more information about the importance of distributed leadership, social networks, and social capital for the success of complex school reform initiatives. In distributed leadership models, individuals who are not formally designated as leaders fulfill important leadership functions, such as looking for alignment with the educational vision of the community. In addition, when educators need help with challenging situations, they often use social relations to seek out the help or support they need. The school district’s social capital is not a characteristic of any one individual, but instead is a function of the relationships among teachers, between teachers and administrators, and among teachers, parents, and other key actors in the community. (p. 4)

Mooresville Graded School District (MGSD) in Mooresville, NC, a school district internationally known for its successful digital conversion, uses a distributed leadership model. The superintendent who led the initial conversion wrote, “every employee, every community member, and every student has the opportunity to lead and is expected to lead—and that leadership is not solely reserved for those at the top” (p. 2). The district consciously worked to develop a culture that empowers individuals at every level to create and support high-performance learning zones. The goal at the time of the initial implementation of digital resources was a positive social environment to support risk taking and maximum performance of staff and students. District staff members explicitly talked about loving children, enjoying their work, and being valued members of highly successful teams. Individuals at all levels of the organization came together and collectively worked to manage change and serve the community.

Returning to themes discussed earlier, it appears that building a culture that focuses on making good things happen for children and ensuring that all staff members see themselves as a part of that focus is an important
foundation upon which successful digital transformation is built. Effectively involving a number of individuals in the countless decisions associated with implementing a digital transformation (for example—what devices, which students, for what instructional tasks, for how much time, and how and when will progress be evaluated) is key to success.

Another major theme that permeated the discussion among the members of the Digital Consortium during the three large group meetings was the importance of using technology to help level the playing field for students living in poverty. Recent research informs us that while most low and moderate-income families have some Internet connectivity, many rely on mobile-only access and have inconsistent connectivity. School districts must keep equity as a focus of the work associated with digital transformation. And in this area, equity refers not only to access and use of technology, but also to how the technology is being used.

Traditionally, the digital divide referred to the gap between students who had access to the Internet and devices at school and home and those who did not. Significant progress is being made to increase Internet access in schools, libraries, and homes across the country. However, a digital use divide separates many students who use technology in ways that transform their learning from those who use the tools to complete the same activities but now with an electronic device (e.g., digital worksheets, online multiple-choice tests).

The digital use divide is present in both formal and informal learning settings and across high- and low-poverty schools and communities.

Experts working with schools with high percentages of students from low- and moderate-income families recommend researching the technology access of students within the school district. They then recommend a variety of approaches to provide students with access to learning resources outside of school. For example,

- Provide students and families with a directory of free Wi-Fi spots for students within the community.
- Provide mobile hot spots that families can borrow from the school district.
- Equip school buses with Wi-Fi so that students can have access while traveling to and from school.
- Work with business partners to locate broadband kiosks in community centers in low-income neighborhoods.
- Ensure that digital learning programs used at school have an offline option so that students can still do some work even without broadband access.

However, it is important that efforts to ensure equity go beyond ensuring access to learning resources. Educators must be sure that all students have access to powerful learning experiences in which technology is used to create, collaborate, solve problems, communicate, and innovate. Teachers and administrators must ensure that every child has the opportunity to use technology to pursue passions and develop products that can be shared with authentic audiences. At all costs, educators must avoid situations that have students only using technology to passively consume media created by others.

The consequences of change are never fully predictable. In contexts outside of education, technological transformation has sometimes yielded results very different from what was expected. For example, almost everyone thought that expanded technology use would reduce the amount of paper in the average office. Most office workers will tell you that the opposite has occurred. Because technology makes changing a document easy, people often have several slightly different versions of the same document. And there are still any number of leaders who insist that employees give them a hard copy of a final document before it is published or released to the public.

Some of the schools districts that have undertaken the kind of digital transformation envisioned by the superintendents participating in the Digital Consortium have seen marked increases in student achievement, decreases in student absence, and increases in graduation rates. These are all results that they were working toward and happy to see, but they also had some unexpected positive results. Districts have seen decreases in office referrals as students become more engaged in learning and unexpected increases in teacher attendance.

Technology has the capability to quickly provide extensive data on individuals and groups. What data do teachers, leaders, parents, and the general public need to be sure that every student is learning? What cultural norms need to be in place to ensure that data is used appropriately and that the privacy rights of educators and students are respected? What unexpected surprises will districts find when they study trend data over time?
The Digital Consortium has completed three large group meetings. Participating superintendents are considering what they are learning from one another and they are continuing to learn from educators, other staff, parents, students, and community members within their own districts. An important part of collaborating is collecting and sharing data with one another and then with a larger audience of interested colleagues. And the data that needs to be shared should be both qualitative and quantitative. What were early signs of culture shift as a district moved to greater use of technology? What’s the most meaningful anecdote that kept the staff encouraged when things weren’t going so well? How did student earning outcomes change over time? What other changes in staff or student data did your school district experience?

Members of the Consortium are using digital communication tools to stay in touch and to continue to advance the cause of learning and taking action together as critical friends. They also continue to deepen their understanding of emerging and successful models of best practices using digital media in support of engaging and effective learning experiences. Consortium members documenting the work they do has the potential to be an important contribution to the improvement of public education across the nation.

It will be exciting to watch the school districts led by these superintendents. How will student learning and achievement change in these districts over the next five to ten years? Will the digital transformation happen, and most importantly, will it propel advances in learning for all students? Digital transformation is a huge undertaking that has the potential to make a significant difference for public school students. However, everything we know indicates that it will only make the kind of difference that everyone wants to see when it is very well done.

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Established in 2014, the AASA Digital Consortium was created to support school district leadership in the areas of innovation, creativity and technology. For more information, visit [www.aasa.org/DigitalConsortium.aspx](http://www.aasa.org/DigitalConsortium.aspx).