Making the Match: Right-Sized Technology for K-3 Students

Integrating technology into the classroom is about more than just buying devices. In order to ensure investments are relevant and impactful, IT decision makers must work with teachers and other stakeholders to better understand unique student needs, school expectations, and how technology can help connect the two.

About this paper

This paper looks at the developmental, social, and academic needs of younger learners, and how the right devices can help students and their teachers connect in powerful, positive ways that boost student engagement, the success of technology-driven learning initiatives, and ultimately, student achievement.

- Younger students respond well to touch-enabled devices that create interaction and help students guide their own learning.
- The same students also do best with devices built to support their diverse multimodal learning styles and strengths.
- Students and teachers alike do best when they are supported in full-featured collaboration around important concepts and subjects.

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The mechanics of engaging younger students

Research consistently shows students learn best when they are valued, engaged, and empowered. A primary obstacle to student success, at all grades, is the perception that the learning taking place at school is sometimes disconnected from how the real world works, where real accomplishment is more important than grades. This means hard work at school is seen as a diversion from, not a direct route to, eventual success beyond the academic years.

This makes the younger years a critical period for engaging students and convincing them that learning matters now and in the future. Opportunities lost now can't be regained, and students will become harder to engage and educate. So how do educators guarantee students stay involved and empowered? Research identifies three key modes of engagement: behavioral, social-emotional, and cognitive.

Behavioral engagement: creating selves, understanding others

Behavioral engagement refers to the level and nature of student participation in school activities, class discussions, group collaborations, and after-school programs.

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Collaboration is not just a good idea; it's been proven to be a foundation for future success.[1] Traditionally, the lower grades are where habits of poor behavioral engagement first surface, with some students succeeding and other students shrinking in the face of opportunities for cooperation and collaboration.

This is where technology can make a meaningful difference. Several studies find that elementary students who are reticent about face-to-face activities become more engaged when they participate in online venues, such as social media and interactive classroom management environments such as Edmodo or LanSchool™ by Stoneware®.

When students have more choices on how to interact with others, **they become engaged behaviorally and cognitively,** both easily enabled and encouraged by technology that is designed to be interactive, intuitive, and multimodal. It makes students more likely to participate and also makes that participation deeper and more meaningful along the way.

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Social-emotional engagement: building community and interconnectedness

Social-emotional engagement refers to students' sense of identity and belonging formed in the early grades, relying heavily on learners' ability to form and maintain healthy relationships with others, and to collaborate and cooperate with those same people. One study notes:

"Computers enhance children's self-concept, and children demonstrate increasing levels of spoken communication and cooperation. Children share leadership roles more frequently and develop positive attitudes toward learning."[2]

The social-engagement perceptions and relationships built and nurtured in school remain very powerful. These include personal concerns such as recognizing emotions, problem solving, and goal setting, as well as interpersonal challenges such as building empathy, cooperating and negotiating, and working effectively in groups.

Technology can help by giving students an additional framework for building their own social identities and interacting with others. Whether it's through school tools or age-appropriate social media, students are able to work and share with peers and as a collective group in new ways. This can help students feel connected while also helping them find new ways to manage disappointment or loneliness.

Cognitive engagement: critical investments and decisions

Cognitive engagement refers to students' psychological investment in school — their perception that learning is important and worth significant effort and will "pay off" for students in both the short and long term. Like the other modes discussed, successful cognitive engagement is critical for early learners. A lack of real, meaningful engagement at this stage doesn't bode well for future school years.

[1] Dean, Ceri. "Chapter 3." *Classroom Instruction That Works: Research-Based Strategies for Increasing Student Achievement.* 2nd ed. ASCD, 2012. Print.

[2] Haugland, Susan. "Computers and Young Children." *ERIC Digest.* 1 Apr. 2000. Web.

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One powerful way for teachers to improve cognitive engagement is to provide age-appropriate authentic work similar to that done by professionals in the "real world." The growing popularity of project-based learning and similar methodologies connects directly to these needs.

Beyond the broader potential of the group work and critical thinking that supports project-based learning, cognitive engagement also demands students learn self-regulation and management of time, priorities, and resources. Whereas traditional rote learning and drill-based instruction don't lend themselves to these skills, technology-driven learning and collaboration are an ideal match.

While theories around student engagement have been studied for years, **newer brain research gives educators compelling new evidence for the potential of multimodal learning** and how teachers and students can benefit from understanding the variety of learning skills and strengths.

The power of multimodal learning: stronger engagement across the board

While theories around student engagement have been studied for years, newer brain research gives educators compelling new evidence for the potential of multimodal learning and how teachers and students can benefit from understanding the variety of learning skills and strengths.

Advances in MRI technology have led to an explosion of new knowledge related to the brain. A key finding is that the brain has two channels for receiving information: one for text and auditory information and one for visual images. Researchers are finding that well-designed multimedia presentations combining visuals with text, speech, or sound take advantage of both channels of the brain, providing learners with more information than traditional text-based learning resources and increasing retention.[3]

Multimedia presentations also activate both areas of working memory, greatly increasing the volume of information students can process and their ability to move the information into long-term memory. Preliminary research suggests the following:[3]

- Students remember more of what they learn if they learn in a media-enriched environment as opposed to text alone.
- Students learn better when pictures are close to the words they illustrate.
- Students learn better when extraneous words, pictures, and sounds are excluded.
- Students learn better when animation is accompanied by narration rather than on-screen text.
- Multimedia learning is more important for beginners than advanced learners.
- Material requiring higher-order thinking benefits more from diverse and effective media than basic-skill-level material.

[3] Fadel, Charles, and Cheryl Lemke. *Multimodal Learning Through Media: What the Research Says.* Cisco Systems, 2008. Web.

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Prepared for success: boosting student academic achievement

Engaging younger learners is a challenge for teachers and instructional specialists, but when done successfully, a student's chance of academic achievement is greatly improved. As the paper discussed, technology can make a meaningful impact on this achievement, preparing students not just for immediate achievement but also for sustainable success that will follow them throughout the rest of their schooling.

Early intervention, huge impact

There is evidence that **technology, when effectively used, can have a greater impact on elementary students** than on those at the secondary or post-secondary level.

Even as technology begins to crowd classrooms across the country, parents and students may not understand how critical IT can be to the success of important new methods of instruction. There is evidence that technology, when effectively used, can have a greater impact on elementary students than on those at the secondary or post-secondary level.

- One study shows that tablet technologies improve student handwriting skills in the primary grades and help students write for longer than in a paper environment.[4]
- Additional research finds that today's digital books can close early reading skills gaps that arise from the different amounts of time parents spend reading to their children.[5]
- Collaboration not only promotes student engagement but is also a key factor in supporting academic achievement. Research finds that tablet computers promote positive collaboration both inside and outside the classroom.[6]

As discussed earlier regarding engagement, technology helps students develop "schemas," mental frameworks based on experience that connect ideas and are critical to developing expertise in any field. To develop the most powerful schemas, students must have experiences similar to those of experts in the real world. Active learning strategies, made more powerful and persuasive by technology, involve student work similar to that done by professionals. This is often referred to as "authentic learning," seen as key to constructing effective schemas.

With the help of well-informed curriculum specialists and dedicated teachers, technology can give students access to the authentic work and real-world information that foster improved learning in science and social science. It allows students to interact virtually with outside experts and professionals of all kinds, as well as other students around the world, broadening their knowledge and sense of connectedness well beyond the walls of their classroom or school.

[4] Arrowood, Dana, and Theresa Overall. *Using Technology to Motivate Children to Write: Changing Attitudes in Children and Pre-service Teachers*. Proceedings of Society for Information Technology & Teacher Education International Conference 2004, 2004. 4985-4987. Print.

[5] Talley, Susan, David F. Lancy, and Thomas R. Lee. "Children, Storybooks and Computers." *Children, Storybooks and Computers* 38.2 (1998): 116-28. *Reading Horizons.* Web.

[6] Chung, Ya-hui, and Daniel J. Walsh. "Constructing a Joint Story-Writing Space: The Dynamics of Young Children's Collaboration at Computers." *Early Education and Development* 17.3 (2006): 337-420. Web.

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Available with both Windows and Chrome OS, **Lenovo devices are built to open up a whole new world of digital resources and possibilities** for students and staff alike.

Making a difference: Lenovo® devices and young learners in the classroom

With research pointing toward huge benefits of age- and curriculum-appropriate technology, it's clear why more educators are relying on it to help them expand curriculum and collaboration possibilities in and out of the classroom. As the world's leading provider of education technology and solutions, Lenovo is uniquely qualified to help educators make the move to IT-powered, research-driven learning transformation.

With an award-winning portfolio of Intel-powered, education-built devices and solutions, Lenovo can help you support students, need for need and challenge for challenge. Based on the evidence about making younger learners more successful, Lenovo's tablets and convertibles are purpose-built to help students understand and explore their world and selves, learn how to cooperate and collaborate, and solidly engage with their coursework today and going forward.

Tablets and education-built laptops: empowering interaction and exploration

Lenovo tablets and education-built laptops are well suited for younger users for lots of reasons. They are designed for maximum ease of use, giving students immediate and up-close access to education applications and resources, as well as other tools and services the students may already learn every day.

Available with both Windows® and Chrome OS™, Lenovo devices are built to open up a whole new world of digital resources and possibilities for students and staff alike. This means support for everything from basic digital assessment requirements to advanced learning methodologies, all without sacrificing basic manageability or smarter IT spending.

Building strong, multimodal digital skills

While both laptops and tablets are great for K-3 learners, tablets particularly are a perfect platform for helping students build the basic digital skills they'll need for immediate and long-term success. This should always start with training (for both teachers and students) around the basics of online safety and citizenship. Once that's done, Lenovo technology can open up all sorts of opportunities.

- Tablet and laptop (when equipped) touch control gives students immediate access to technology, tapping into their natural curiosity and giving them tactile access to learning and collaboration resources.
- Stylus support on tablets and laptops (when available) helps children develop better handwriting and drawing skills.
- Durable, easy-to-use technology supports stronger multimodal learning development by giving students the ability to read, listen, write, draw, create multimedia, and publish their work — all from a single device.

- Laptops and tablets are also a better match for student ergonomic needs than traditional desktop configurations and let students work in more places, including desks, tables, even floors.[7]
- Full support for peripherals and accessories makes full-featured learning in classes, labs, and libraries easier.

Driving stronger collaboration

Tablets and laptops can drive collaboration in important ways — tablets especially. Lenovo devices are designed to match the technology (e.g., tablets and smartphones) that students use outside of the classroom, and the intuitive nature of the Lenovo devices makes for more immediate and natural adoption, as well as easier cooperation and collaboration.

- Windows or Chrome-based devices can be easily shared between students right out of the box.
- Superior A/V makes high-quality recording / playback of audio and video simple and straightforward.
- VoIP-optimized A/V architecture and feature set make collaboration beyond the classroom possible through Skype and other platforms.
- Superior device durability eliminates worries about broken technology, boosting student confidence and their willingness to try new things.
- Chrome and Windows both have cloud-ready tools (Chrome OS is completely cloud-built) that can allow students easier access to learning resources and simplify IT support along the way.

Lenovo education-built devices are **designed for the real-world challenges imposed by constant student use** in and out of the classroom.

The durability difference

Many schools choosing consumer devices quickly realize they aren't always up to the challenge. Lenovo education-built devices are designed for the real-world challenges imposed by constant student use in and out of the classroom. From our commitment to building devices that are tough enough to meet and exceed military specs to innovative features such as rubber bumpers, reinforced hinges, and spill-resistant keyboards, Lenovo durability will make a huge difference in how far your IT investments can go.

Lenovo devices up close

Lenovo's comprehensive portfolio was designed to boost technology across your entire school or district, from network to endpoint device. While our server, desktop, and workstation products have their own distinct education benefits, the ThinkPad® 11e and ThinkPad 10 are especially suited to help boost the engagement and achievement needs outlined in this paper.

[7] Straker, L.M. "A Comparison of Posture and Muscle Activity during Tablet Computer, Desktop Computer and Paper Use by Young Children." *Ergonomics* 51.4 (2008). Web.

THINKPAD® 11e SERIES

Available with Windows or Chrome OS, and standard laptop or convertible, the ThinkPad 11e series brings maximum education-ready productivity and flexibility to student learning and collaboration.

- High-powered Intel® Core™ M processor
- Military-grade durability boosted by ruggedized features, including rubber bumpers, reinforced hinges and ports, scratch-resistant display, and spill-resistant keyboard
- Top cover LED lights display classroom activity
- With ActivePen, students experience the familiarity of the pen-and-paper feel on a digital display well beyond a traditional stylus*
- Up to 8 hours of battery life for all-day learning
- Dolby® Advanced Audio™ and VoIP-optimized webcam for easy collaboration
- Built-in Google Chrome OS includes 100GB Google Cloud Storage™ and easy access to a wide world of Chrome educational apps
- Four distinct learning modes: Laptop, Tablet, Tent, and Stand*

* ThinkPad Yoga™ 11e version

THINKPAD 10 TABLET

This 64-bit multimode device gives students tablet computing possibilities and a whole lot more, with the performance you expect and the durability they need.

- Full-PC performance with Intel Atom™ processor
- Easy campus portability: weighs less than 1.3 lb.
- Windows 8.1 and touch support mean thousands of new specially designed Windows apps
- Robust port support for easy productivity, including USB, micro HDMI, and micro SD
- Amazing 10 hours of battery life for longer learning and sharing
- 1920 × 1200 WUXGA display for easy viewing that drives big learning and collaboration
- Superior audiovisual support, including integrated speakers and dual microphones, 8MP rear-flash camera, and 2MP webcam
- Add key accessories for powerful multimode support
- Digitizer pen support for easy notes, notations
- Optional keyboard with full touchpad

Lenovo and you: building a solid foundation for future success

As the world's #1 provider of educational technology, Lenovo understands the challenges of integrating technology and learning in big, meaningful ways that boost student outcomes, without adding unnecessary work for staff or distractions for students. Our experts can help you build a technology plan that goes beyond devices, empowering students and staffs with new tools, and giving IT the ability to lead the way toward sustainable digital district leadership that transforms learning in and out of the classroom.

Our education-built devices are designed for long hours and hard work, maximizing each and every one of your technology dollars. Students, staff, and administrators all benefit from the advantages and efficiencies Lenovo technology can bring to how they work, teach, and learn. By building solid foundations for early K-3 learners, the right programs can ensure student success today, tomorrow, and well beyond graduation.

To learn more about how Lenovo can help your young learners' success today and tomorrow, visit www.lenovo.com/education or contact eduteam@lenovo.com for more details. Follow us on Twitter at @LenovoEducation.

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