



DIGITAL PENS AND TOUCH SCREENS

for a Natural Writing Experience

In a recent article,¹ Dr. Benjamin Lieberman notes that as infants, we know instinctively to reach out with our bodies to explore the new and exciting world around us. Our first fumbling attempts allow us to learn the advantages and limitations of our “built-in” tools—our hands and fingers. Soon, however, we learn that to have a more effective hold on our world, we need other tools that provide greater precision than our fingers, such as pens for drawing and writing.



This concept also applies to the digital world, and although we have learned to communicate through fingertip typing on our smartphones, this is not the ideal means of communication—especially for educational purposes. There are three different ways to interact with a mobile device using a modern touch screen:

- **Fingertip.** Touching the screen with a fingertip is convenient and intuitive, but imprecise.
- **Passive stylus.** This low-cost option works in a manner similar to using our fingertip. Usually, the passive styli have blunt tips, which means they are not very precise, limiting their usefulness for tasks such as note taking and graphing.
- **Active stylus.** These capacitive styli are pressure-sensitive, allowing users to draw fine lines and affording more accuracy. Active styli can be used to reinforce handwriting lessons for younger students. Older students can write out complex formulas, draw fine edges, and incorporate shading.

Unlike early styli that forced users' hands into unnatural positions, the active styli or digitized pens allow students to draw, write, highlight, annotate, and rest their hands on the screen for a natural writing experience. The pens coupled with sensitive touch screens are easy to use and feel natural in the hands of students of all ages. Key benefits of the digitized pens include the following:

- **Creativity.** Pens foster more room for an interactive, creative, and engaging learning experience for students, facilitating non-linear thinking at all age levels.
- **Usability.** Digitized pens reinforce handwriting lessons for younger students, allowing them to hold the pen in a natural way.
- **Flexibility.** Pens give students the flexibility to choose the best tool for the task at hand, whether it's a pen, their fingers, or the keyboard. The pen is a creativity tool. The keyboard is a productivity tool. Sometimes you need one, and sometimes you need both.
- **Efficiency.** Pens allow students in higher math and science classes to write out complex formulas and make diagrams more easily and quickly.

LEARNING AND TEACHING



Students of all ages benefit from digital pens and touch screens, across the curriculum.

- **Language arts.** Emergent readers can trace letters while hearing them enunciated. Students can mark nuanced pieces of literature in the margins. All grade levels can take notes, highlight and annotate reading assignments and worksheets, and create story and concept maps.
- **Math and science.** Students can annotate or mark things up with the pen, complete equations, create graphs and diagrams, record observations in class or in the field, illustrate concepts, create models, and follow hot-links to deeper content.
- **Learning.** 2 in 1 devices with sensitive touch screens and digitized pens support students' creativity and imagination. They can capture video and audio while taking notes, share class work, collaborate, and engage in peer review.
- **Teaching.** Teachers can interact with students working in more than one activity simultaneously and multitask among applications in areas such as lab work and research projects. They can annotate files, mark up student work on the fly, or sketch out illustrations to clarify concepts for their students.
- **Access.** Students and teachers can access a wide range of free, compatible software applications and digital content for education.

Conclusion

Digital pens and touch screens give students and teachers intuitive, powerful ways to interact with Intel® Education 2 in 1 devices. The choice between them allows users to draw, write, highlight, and annotate, with a natural handwriting experience.

To learn more, visit intel.com/education

¹ Benjamin A. Lieberman, Intel® Software Network "Pointing the Way: Designing a Stylus-driven Device in a Mobile World."
<http://software.intel.com/en-us/articles/pointing-the-way-designing-a-stylus-driven-device-in-a-mobile-world>.

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