

Digital Literacy

Elissa Hozore and Betsy Diamant-Cohen



Elissa Hozore is the Computer Science Education Specialist at the Maryland State Department of Education. She is a former elementary instructional technology teacher.



Betsy Diamant-Cohen is a children's librarian with a doctorate, trainer, consultant, and author. She enjoys translating research into practical information for children's librarians, designing and offering online courses, and presenting webinars to children's librarians. With many libraries

incorporating STEM into the programs and services that they offer, Betsy invited Elissa Hozore to share some of her favorite resources.

Computers are a fact of life in the twenty-first century. Reading and math literacy have long been considered essential, and technological literacy is emerging as equally important to children's (and adults') ability to understand and engage with their world. However, just as it is crucial to learn to write as well as to read, it is crucial that children engage as programmers, as creators, and not only as consumers, of technology.

Dr. Marina Bers, a leader in early childhood technology education, believes that developing the skills necessary to create with technology promotes new ways of learning and expression while teaching children to think critically and collaborate with others. Digital technologies can enable “a sense of mastery, creativity, self-confidence, and open exploration” and should foster the same spirit of self-directed play that children experience in a playground. This does not occur when children passively play computer games or even when they copy instructions to make a robot work. It happens when children wonder about how to make a robot do something new, when they set a goal for themselves and learn how to accomplish it, and when they persevere, iterate, and “debug.” It occurs when they learn how to program a computer.

Bers and others have created developmentally appropriate tools to foster programming literacy in young children. Dr. Annette Vee, an English professor at the University of Pittsburgh, says, “Just as textual literacy helps us navigate a world full of texts, programming literacy can help us navigate a world full of code—which is the world we now live in.”

Resource: The DevTech Research Group

<https://sites.tufts.edu/devtech/>

The Developmental Technologies Research Group, directed by Professor Marina Umaschi Bers at the Eliot-Pearson Department of Child Study and Human Development, Tufts University, aims to understand how new technologies that engage in coding, robotics, and making, can play a positive role in children's development and learning. The research involves theoretical contributions, design of new technologies, and empirical work to test and evaluate the theory and the technologies. Bers has written several books including *Blocks to Robots* and *Coding as a Playground: Programming and Computational Thinking in the Early Childhood Classroom*.

Two articles by members of the DevTech Lab include:

What Learning Python Taught Me about Computer Science Education for Young Children

<https://www.edsurge.com/news/2020-06-16-what-learning-python-taught-me-about-computer-science-education-for-young-children>

Madhu Govind, a doctoral student in the DevTech Lab, discusses three compelling reasons for computer science education for all, especially early learners: computer science education can support social emotional development, can foster complex cognitive processes, and can empower individuals in much the same way textual literacy can.

Hybrid Learning to Support Children’s Positive Technological Development: Communication

<https://www.csteachers.org/Stories/hybrid-learning-to-support-children%E2%80%99s-positive-technological-development-communication>

One of a series of blog posts about supporting children’s Positive Technological Development during remote and hybrid learning. In this post, Emily Relkin from the DevTech Lab describes a research project called Coding as Another Language. There are suggestions for encouraging students to communicate creatively by using technology and by using activities that are unplugged—that do not require electronics.

Articles by Annette Vee

Is Coding the New Literacy Everyone Should Learn? Moving beyond Yes or No

<http://www.annettevee.com/blog/2013/12/11/is-coding-the-new-literacy-everyone-should-learn-moving-beyond-yes-or-no/>

In this blog post from 2013 Dr. Vee makes the case that learning computer programming is not only a literacy, but that if everyone learns to code there are significant implications for society.

Understanding Computer Programming as a Literacy

<http://d-scholarship.pitt.edu/21695/1/24-33-1-PB.pdf>

This is an academic article that discusses many of the ideas in the blog in greater depth. In it Vee argues “that programming and writing have followed similar historical trajectories as material technologies and explain[s] how programming and writing are intertwined in contemporary composition environments. A concept of ‘computational literacy’ helps us to better understand the social, technical, and cultural

dynamics of programming, but it also enriches our vision of twenty-first century composition.”

Other Resources

Computer Science in Early Childhood Education

<https://k12cs.org/pre-k/>

This is an excerpt from a chapter of the K-12 Computer Science Framework. The authors describe how computer science education can easily be consistent with play-based pedagogy. The concepts of patterns, problem solving, representation, and sequencing, all elemental to computer science, are also the powerful ideas of literacy, math, and science. Computer science can serve as “a natural extension that builds on what educators already do in their daily practice.”

Linking Literacy and Computer Science in Elementary School

<https://www.edutopia.org/article/linking-literacy-and-computer-science-elementary-school>

This article describes how literacy and computer science were taught simultaneously in a project of Los Angeles Unified School District.

Synthesis Blog: Integrating CS (Computer Science) and CT (Computational Thinking) in the Pre K-8 Grades

<https://stemtlnet.org/theme/june2020-synthesisblog>

This article has recommendations for teacher leaders, researchers, policy makers, and administrators about integrating computer science and computational thinking, making them widely accessible to young children, and the importance of all students learning these essential skills to educational equity. &