# Evidence-Based Affordances of E-textiles in Exploring Computer Science

## 📕 E-Textiles Exploring Computer Science Curriculum:

- Pre/post surveys on students' perceptions of computing showed positive, significant gains in students' self-confidence in solving CS problems, fascination with computing and ability to be creative with computing.
- Teacher evaluations of students' final projects revealed robust learning in the areas of basic programming and computational circuitry as well as strong learning across more challenging computational concepts.
- During the unit, using portfolios, students demonstrated abilities to communicate about computation. They also reported under-assessed CT practices like debugging, iterating, and collaborating.
- Portfolios provided a viable formative and summative assessment and met a need to promote communication skills.
- Portfolios provided students with opportunities to reflect on the process of making electronic textile projects, shaping their perceptions of themselves in relation to computer science and supporting computer science identity construction.


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## 👩🏾‍💻 Teaching Practices that make the E-textiles Curriculum Successful

- Teachers succeeded in broadening access to maker activities and deepening participation in computing by valuing student expertise, promoting connections with personal interests, and establishing home-school connections.
- Teachers engaged in teaching practices that supported values of iteration, revision, and working through mistakes. These included teachers modeling their own processes and mistakes in making projects, modeling students' mistakes to the wider class, and supporting personalized projects that resulted in unique "bugs" or challenges for each student.
- Teachers leveraged local resources and contexts, drawing upon the assets and funds of knowledge of their students' communities, to adapt classroom activities as well as developed new perspectives on computing as ways to foster inclusivity.


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## Debugging & Problem Solving Gains with E-Textiles

- When debugging e-textiles projects the type of problems mattered less for overall success than the strategies used in solving them.
- We conceptualize Debugging by Design, a new way to enable and empower students in debugging—by designing creative, multimodal buggy projects for others to solve.
- The DbD approach may support students in near-transfer of debugging skills and the development of a more systematic approach to debugging.
- While designing and solving bugs students engaged in growth mindset practices such as choosing challenges that led to more learning, praising effort, approaching learning as constant improvement, persisting after setbacks, and developing comfort with failure.


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**Curriculum & guides: http://exploringcs.org/e-textiles**


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