Electronic Textiles Student Survey (target: grades 9-12), developed for Exploring Computer Science E-textiles Unit.

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Information on <u>validation</u> is available in the following publication:
Kafai, Y. B., Fields, D. A., Lui, D., Walker, J. T, Shaw, M., Jayathirtha, G., Nakajima, T., Goode, J., & Giang, M. T. (2019). Stitching the loop with electronic textiles: Promoting equity in high school students' competencies and perceptions of computer science. SIGCSE 2019, Minneapolis, MN: ACM.

<u>*Note*</u>, some items were adapted from: Competency in STEM Beliefs: Chen, Y.-F., Cannady, M. A., Schunn, C., & Dorph, R. (2017) Measures Technical Brief: Competency Beliefs in STEM. Retrieved from http:// www.activationlab.org/wp-content/uploads/2017/06/CompetencyBeliefs_STEM- Report_20170403.pdf

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PRE SURVEY

Instruction: We will be giving you this survey at the beginning and end of the year and we would like to match up your responses. We don't have access to your school records nor can we identify you. Therefore this will be confidential.

Identifying Information:

Who is your teacher? _____ [pick from a list]

What period is this class?

Competency in STEM (Activation Survey, translated to e-textiles): The following questions ask about your perspectives about specific science activities. Please indicate how much you agree or disagree with the following statements? **4=Strongly Agree 3=Agree 2=Disagree 1=Strongly Disagree**
- I think I am very good at: Figuring out how to fix things that don't work.
- I think I am very good at: Explaining my solutions to technical problems.
- I think I am very good at: Solving problems.
- I think I am very good at: Coming up with new ways to solve technical problems.
- I think I am very good at: Coming up with new ideas when working on projects.

Fascination with STEM (Activation Survey): The following questions also ask about your fascination with specific science activities. Please indicate how much you agree or disagree with the following statements?
4=Strongly Agree 3=Agree 2=Disagree 1=Strongly Disagree
- I love designing things!
- I want to learn as much as possible about computer science
- Designing new things makes me feel excited
- I talk about how things work with friends or family

Values of CS: (Activation Survey, translated to CS) The following questions ask about your perspectives about the value of computer science. Please indicate how much you agree or disagree with the following statements?
4=Strongly Agree 3=Agree 2=Disagree 1=Strongly Disagree
- Knowing computer science is important for contributing to my community.
- Knowing computer science is important for me in the future
- Thinking like a computer scientist will help me do well in:
  - **4=all my classes 3=most of my classes 2=a few classes 1=none of my classes**

Computer Science & Creativity/Personal Expression (created ourselves, based on AP Computer Science Principles ideas): The following questions ask about your perspectives about creativity and personal expression in computer science. Please indicate how much you agree or disagree with the following statements? **4=Strongly Agree 3=Agree 2=Disagree 1=Strongly Disagree**
- I can be creative in computer science.
- I can express myself in computer science
- I can make things that are interesting to me in computer science

End of Survey (Demographic information):
- Before your current computer science class, have you taken any computer science classes or workshops before this year? (Y/N)
- What is your gender? (F, M, Other/Decline to indicate)

- What is your ethnicity? (African American / Black, Asian American / Pacific Islander, Latino / Hispanic, White / Caucasian, Decline to indicate, Other (please specify): ___)
- How often do people in your home talk to each other in a language other than English? (4- All the time, 3- About half the time, 2- Once in awhile, 1- Never)
- Who in your family has attended college? (Check all that apply) (Mother, Father, Sibling (Brother and/or Sister), Grandmother, Grandfather, No one, Other (please specify): ___)
- What is your first name and first initial of your last name? _____

POST SURVEY

Identifying Information:

What is your first name and first initial of your last name? _____

Who is your teacher? _____ [pick from a list]

Competency in STEM (translated to e-textiles): The following questions ask about your perspectives about specific science activities. Please indicate how much you agree or disagree with the following statements?
4=Strongly Agree 3=Agree 2=Disagree 1=Strongly Disagree

- I think I am very good at: Figuring out how to fix things that don't work.
- I think I am very good at: Explaining my solutions to technical problems.
- I think I am very good at: Solving problems.
- I think I am very good at: Coming up with new ways to solve technical problems.
- I think I am very good at: Coming up with new ideas when working on projects.

What were some highlights from your e-textiles experience? _____

E-Textiles Specific Content:

The following questions ask about your confidence carrying out specific E-Textiles related activities. Please indicate how confident you feel that you can: [4=Very confident, 3=somewhat confident, 2=not really confident, 1=not at all confident]:

- Use conductive thread to sew a functional e-textiles project.
- Identify ways to revise the design of an e-textiles project to make it work better (like restructuring a circuit diagram so less sewing is involved, using a common ground, or thinking about where to place lights and circuits on a stuffed animal)
- Design a functioning circuit diagram that someone else could read and use.
- Identify a problem in someone else's circuit diagram for an e-textile project (like a place where negative and positive lines are crossing, or .
- Diagnose a short circuit in an e-textiles project that doesn't function properly.
- Code lighting patterns for a project
- Interpret and resolve a problem in someone else's code in an e-textiles project (like figuring out the problem an error message is identifying)
- Read a sensor and figure out appropriate ranges to use in an interactive e-textiles project
- Use "if" statements to sync lighting patterns with sensor readings in an e-textiles project

What made the e-textiles unit different from other things you have done in this class?
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Fascination with STEM (Activation Survey)

Response Options and Coding: The following questions also ask about your fascination with specific science activities. Please indicate how much you agree or disagree with the following statements? **4=Strongly Agree 3=Agree 2=Disagree 1=Strongly Disagree**

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