EarSketch

An authentic STEAM approach to broadening participation in computer science

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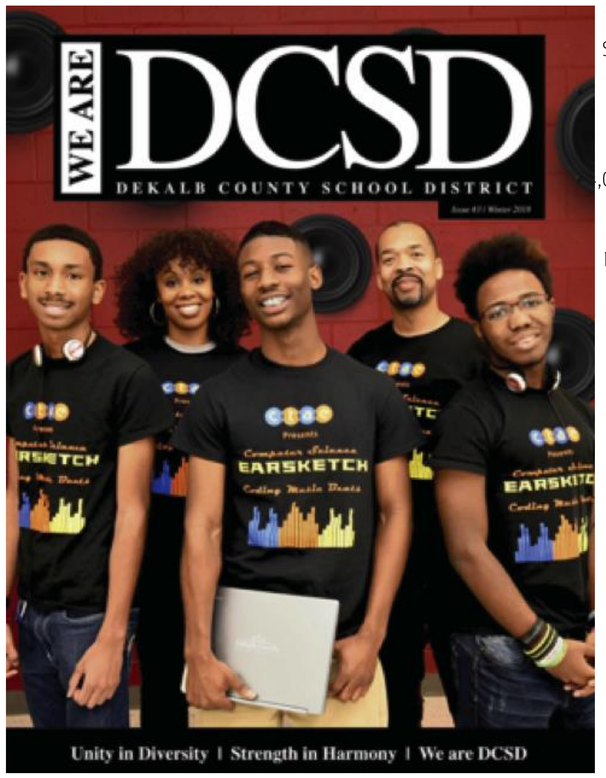
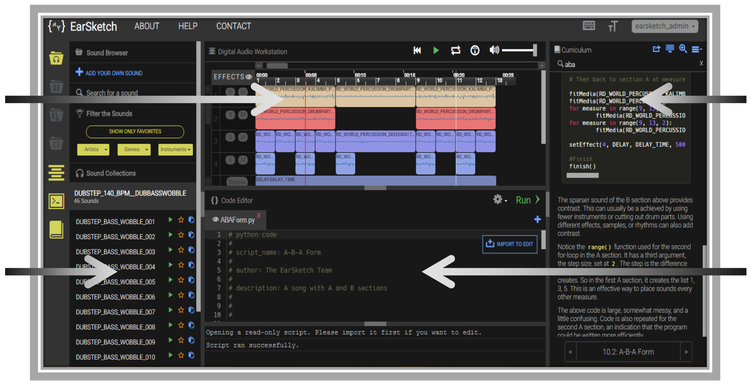


Digital Audio Workstation
See and hear the musical output of code. Music can be shared or downloaded.

Sound browser
,000+ sounds from Jay Z's sound engineer Young Guru and sound designer Richard Devine, from popular genres like dubstep and hip hop.

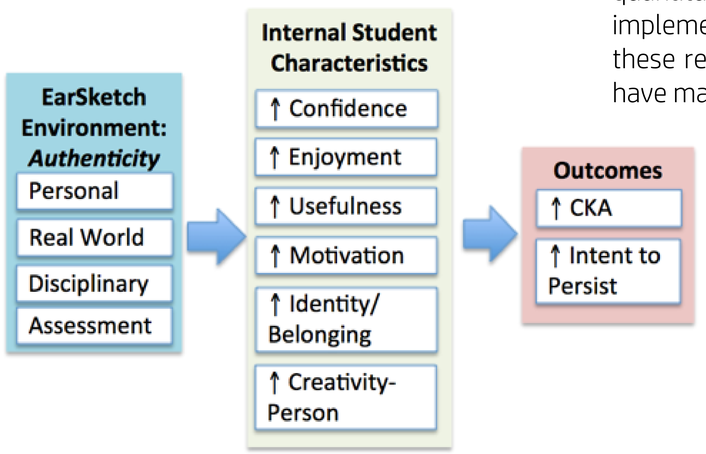


Curriculum for
- Computer Science Principles
- Intro to Digital Technology
- Hour of Code
- afterschool coding clubs

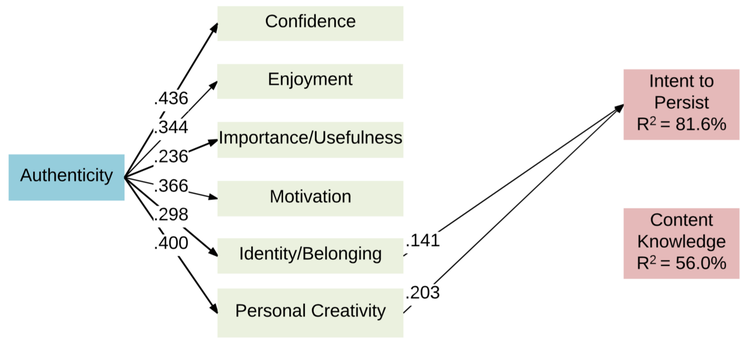
Code editor
Write code in **Python** or **JavaScript** to algorithmically add sounds, beats, and effects to a song.

EarSketch is a computer science learning environment and curriculum that seeks to increase and broaden participation in computing using a **STEAM (STEM + Arts)** approach. EarSketch creates an authentic learning environment in that it is both personally meaningful and industry relevant in terms of its STEM component (computing) and its artistic domain (music remixing). Students learn to code in **JavaScript or Python**, tackling learning objectives in the **Computer Science Principles** curricular framework as they simultaneously learn core concepts in music technology. They create **music through code** by uploading their own audio content or remixing loops in popular genres created by music industry veterans. No prior experience in music or computer science is required. EarSketch is entirely **browser-based and free**.

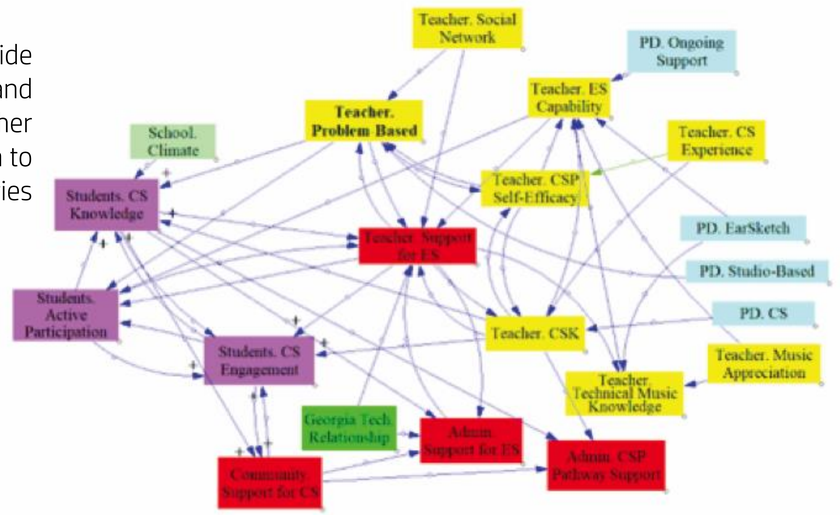
In 2017-2018 EarSketch partnered with 19 Georgia high schools across five districts to provide professional development and a community of practice for teachers and to collect qualitative and quantitative data on topics such as student engagement and content knowledge, teacher implementation and self-efficacy, and sustainability. (Data analysis is still ongoing.) In addition to these research partnerships, over **240,000 unique users** from all 50 states and 100+ countries have made music with EarSketch.



A student-level **theory of change** explains the relationship between authenticity and student outcomes via internal characteristics. The EarSketch team developed new instruments to operationalize authenticity and personal creativity within both music and computing contexts.



In a **path analysis** of 2016-2017 data, authenticity significantly predicted all six attitudinal constructs, and two of those attitudinal constructs significantly predicted intention to persist. Within personal creativity, the sharing construct significantly predicted intention to persist.



Through **systems dynamic modeling**, the EarSketch team is exploring how various attributes in a complex educational ecosystem affect the sustainability of an intervention like EarSketch. Above is a simplified causal loop diagram based on analysis of qualitative data. The team is currently building computational simulations of similar models to better understand which attributes most impact sustainability.

earsketch.gatech.edu

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