Project Brief

We collaborated with community partners *Stem From Dance* (SFD) and *Community Word Project* (CWP) to develop the *Creative Computing Cookbook*, an online resource hub for middle to high school students. It includes foundational content about physical computing components and breakdowns of past projects. It aims to help novices explore the intersection of art and physical computing.

Considerations

1. How can we account for overlapping content and users?
    a. CWP works with high schoolers using 1) Arduino Uno 2) Arduino IDE
    b. SFD works with late elementary/middle schoolers using 1) Adapted Adafruit Trinket 2) Microsoft's MakeCode
2. How can we support learners in exploring the intersection between dance and technology?
3. How can we inspire learners to create unique interactive visual art with physical computing components?
4. How can we keep students engaged on the site?

User Research

We worked with teaching artists from a range of creative disciplines to review our lo-fi designs. Over two 60-minute sessions, they navigated the website and offered design feedback and reflections on how a resource like this could support their work.

<u>Findings</u>

1. Preferred a robust filtering system that valued both artistic concepts and technical concepts equally
2. Emphasize breaking down creative examples as a source of inspiration on the home page
3. Curricular tags on each project page

Worked Examples in Creative Computing

The teaching artist's input evolved how we thought about the content of the website. We decided to research worked examples and how they could be applied to the creative computing context. Worked examples provide learners with step-by-step expert solutions and have a strong empirical foundation in Cognitive Load Theory (Ayres & Sweller, 2013; Sweller et al., 2011). While worked examples are well-established in mathematics and programming education, limited research examines how they operate in creative computing environments where problems are partially ill-defined and expressive outcomes are valued. Prior work demonstrates that worked examples can be effective even in broader domains such as design

(Rourke & Sweller, 2009). Our team held a study with dance instructors to develop such content.

1. Ayres, Paul, and John Sweller. "Worked examples." In *International guide to student achievement*, pp. 408-410. Routledge, 2013.
2. Sweller, J., Ayres, P., & Kalyuga, S. (2011). Cognitive load theory. New York: Springer.
3. Rourke, Arianne, and John Sweller. "The worked-example effect using ill-defined problems: Learning to recognise designers' styles." *Learning and Instruction* 19, no. 2 (2009): 185-199.

Content Development

We asked 3 SFD dance instructors to create short dance choreographies with LED strips, tilt sensors, and buttons through different prompts. Some of the videos involved attaching the sensors to the body, while others used props. After processing these videos, they were asked to annotate their dances by reflecting on their thought process and experience using the electronics.

We created 10 full videos and edited each video into smaller clips that include the dancer's annotations. The same was done with past CWP projects, with annotations relating to the interactions with sensors. This breakdown guided our designs for the beta version of the site.

Solution
[clips of beta version]

Others on the team worked closely with visual design and created a mockup with our user flows.

[images of new version]

Impact
Students used the website during the 2025 summer iteration of the CWP program, using it to aid their first hands-on experience with the physical computing electronics through an activity.

Next Steps
Development of the new designs and with implementation on user-created content to expand the project to include several members of the community