Cooking Key Lime Pie and Learning with Dr. Matt Marino and Eli Marino

Dream2B is a video game co-developed between the University of Central Florida Toni Jennings Exceptional Education Institute and Dr. Jessica Hunt, a UCF alumni and Associate Professor at North Carolina State University. The game teaches 3 - 6 grade students in Tier 2 classrooms about conceptual understanding of fractions. Concurrently, it teaches them about science, technology, engineering, and mathematics (STEM) and information, communication, technology (ICT) careers. The game is aligned with national standards, includes multiple high leverage teaching practices, and is based on the Universal Design for Learning framework. Play the game at: https://downtown-gamedev.itch.io/modelme

Higher education faculty need to understand business-as-usual, or what we are currently doing, is not working. Individuals with disabilities are historically underemployed, especially when it comes to STEM and ICT careers. This trend has been exacerbated by the Covid-19 pandemic. According to the Bureau of Labor Statistics, among people aged 16 - 64, the employment rate for people without disabilities was 62% in 2020 compared to 18% for individuals with disabilities.

We need to do something different. We need curricular materials that are fun and engaging for kids and we need teachers who know how to integrate them with effective instructional practices.

Our goal with this project is to teach students in elementary school about fractions at the same time we introduce them, their teachers, and parents to STEM and ICT careers.

Evidence suggests students with disabilities are not engaging in the coursework necessary to pursue these careers. Those decisions are being made as students enter middle school.

Why? First, the students struggle to understand the mathematics concepts necessary for algebra and second, students do not have an adequate understanding of STEM and ICT career choices. Dream2B is designed to address both problems.

The game starts with explicit instruction (HLP 16) during a tutorial where students learn how to play the game. They must demonstrate their ability to play the game correctly before they can proceed to the different game worlds and levels. We call the skills in the tutorial “gameplay mechanics.” Once we know they can play the game, we can support their cognition and metacognition related to fractions. We do this using dynamic hints where students must think about their actions in the game. The game is linked with a curriculum Dr. Hunt developed as part of an early career award for the National Science Foundation. The dynamic hints, or scaffolded supports (HLP 15), link the game to the curriculum. Other strategies include providing positive and constructive feedback to guide students' learning (HLP 22) and the use of strategies to promote active student engagement (HLP 18). The character customization feature is an example of this.