THE MOVERS' MOVEMENT: MUSICAL TWISTER

Amanda Alef, Krithika Jagannath, Tulsi Mehta

Abstract

The Movers' Movement – a collaboration between Amanda Alef, Krithika Jagannath, and Tulsi Mehta at the Harvard Graduate School of Education - was formed in September 2013 with a mission to create active learning experiences that integrate the physical and digital worlds. Inspired by Constructionist learning theories, embodied learning, and the Maker culture[1], we developed an educational tool we called Musical Twister, an interactive digitized mat based on the game Twister™ under the guidance of Dr. Karen Brennan. The mat produces musical sounds through software when users touch certain circles on its surface. Through a public installation of our prototype, we documented participants' experiences, analysed their responses and created user profiles for the different kinds of learning we observed. This project revealed one of the dilemmas of constructionism – the balance between structure and freedom. We believe that embodied learning experiences designed with the right amount and quality of scaffolding have positive implications for education. Not only does The Musical Twister function as an interactive artwork, but it may also be an enjoyable addition to a traditional classroom environment. Its abstract and malleable design allows us to imagine many different values for the circles, and what they could represent.

Keywords constructionist learning, maker culture, embodied learning

1. Introduction

1.1. Background and Related Work

The body enables us to experience our physical world and similarly, technology enables us to look at ourselves from the outside. Yet, how often is the body forgotten in our interactions with the digital world? John Dewey (1983) alluded to the body as a locus of learning in his statement: "The limitation that was put upon outward action by the fixed arrangements of the typical traditional schoolroom … put a great restriction upon intellectual and moral freedom." Unfortunately, the design of modern-day learning environments continues to discourage movement, confining learners to specific spaces or to their devices. Our research focuses on how digitally-enhanced physical objects can engage the mind, body and technology seamlessly to create active learning experiences. We drew inspiration from the game Twister™, "the first popular American game to use human bodies as playing pieces" which consists of a floor mat patterned with colored circles (Asakawa & Rucker, 178-179). Although similar digitized interactive games like *Shadow Showdown* (Martin et. al, 2013) exist, whole-body interactions are inadequately explored in

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[1] http://en.wikipedia.org/wiki/Maker_culture

educational contexts. We developed a cardboard *Musical Twister* mat *(Figure 1)* comprised of aluminum foil circles connected to a Makey Makey[2] unit and Scratch[3] software that produces piano notes when users touch specific circles. Musical notes of other instruments, such as the drum, banjo, or flute could be created by modifying the Scratch software through a simple procedure.
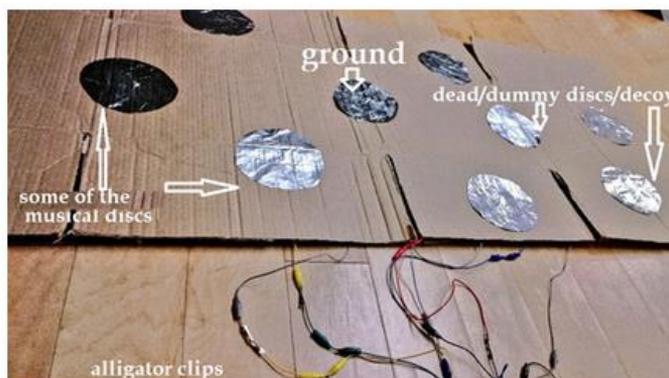

Figure 1: Musical Twister Prototype Version 4

2. Testing the Musical Twister

We designed a Constructionist learning experience in which users could create music by using their whole bodies to interact with the mat. In a public installation *(Figure 2)* of our *Musical Twister* prototype, we collected data from a random participant sample of forty-five students and staff at the Harvard Graduate School of Education. Prompted by minimal written instruction to *remove their shoes and explore the mat using their whole body*, users were free to choose the nature, style and duration of their exploration. Users were also allowed to collaborate with others if they chose to or explore the mat on their own. They had to learn through exploration that they were required to navigate the mat kinesthetically in order to generate patterns of sounds and some even created musical tunes.

Figure 2 Public installation

We gathered observational data of participants' experiences through photos and videos, and transcribed users' comments. Additionally, user feedback was collected through a questionnaire that encouraged users to reflect on how they used their senses to interact with the mat. Upon identifying general characteristics of observed user behavior and feedback, we classified users into three main user types: "Problem Solvers," "Explorers," and "Music Makers." While every user interacted with the mat in slightly different ways, nearly everyone fell into one of these three profile types. The main purpose of the public installation had been to understand how users might interact with such an educational tool. We recognize that formal research would enable us to analyze the data further.

3. Findings and future direction

Our study surfaced the dilemma of free exploration versus instructional scaffolding, and revealed the crucial role of the facilitator in Constructionist learning experiences. The right balance between structured exploration and free play would encourage a deeper exploration of both the mat and the body. Further, we would like to examine how one might learn core subjects through the multi-sensory platform of *Musical Twister*. We imagine *Musical Twister* used in a variety of informal and formal applications ranging from an interactive artwork to an engaging and playful addition to a traditional classroom space. In future work, we will examine the use of gesture-based and/or sensor-based technologies and other such emerging technologies to design interactive Constructionist learning experiences in which learners could engage with body, mind, and brain.

References

[1] Asakawa, G., & Rucker, L. (1992). The toy book (pp 178-179). Knopf.

[2] Dewey, J. (1938). Experience and Education (Chapter 5: The nature of freedom). New York, NY: Collier Books.

[3] Martin, M., Gavin, J., Cermak-sassenrath, D., Walker, C., & Kenobi, B. (2013). Shadow Showdown: Twister in a Digital Space, 3–4.