My Music Mosaic

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Abstract. All Greater Good Foundation, in conjunction with students and faculty at the University of Advancing Technology, are using music as a tool to help children and teenagers in difficult circumstances communicate and express themselves visually. The program called, My Music Mosaic, will connect to a musical keyboard which will allow for real time visual/emotional input. My Music Mosaic gets children who have experienced trauma in their lives to share their feelings in a more innovative manner. The team will be making connections to abstract emotions with input like time, sound, and force. Input is then transferred into shapes, transparency, line, three dimensions, size, color and movement on the computer.

Keywords: new forms of communication, music as communication, music and emotions, high risk teenagers use music to express themselves, music mosaic, turning music into visual art, visualizing music.

1   Introduction

This paper will be used to describe the methodology and research behind the My Music Mosaic program. It will show research into the users, decisions behind color and design choices as well as how it was implemented. At the end there is brief section about the user testing that has been conducted since the first version of the program came out.

2   Defining the Users

2.1   Context of San Diego

San Diego is located in Southern California by the Pacific Ocean. The average temperature is 70 degrees Fahrenheit [1]. The San Diego area was approximately 4,206 sq miles with an overall population of about 3,095,313 in the 2010 census [2]. According to the same census, the San Diego area was composed of approximately 26.5% or 821,263 children and teens under the age of 19. The mean household income is $63, 857. About 2.6% of the population were victims of a crime in 2010; this number increased to 2.8% in 2012 [3].

2.2   Children and Teenagers

Teenagers and children born around 1994 or beyond are considered part of both Generation Y and Generation Z. Cell phones become prevalent around 1995 along with computers, meaning most children and teens of the Y and Z Generation have always known about or owned cell phones and computers. A recent Pew survey indicates that nearly 25% of teens use their cell phone to access the internet [4].

2.3   Victims of Abuse

Abuse. According to the National Child Traumatic Stress Network (NCTSN) in 1997 nationally 64% of 12 to 17 year olds experienced a traumatic event like being sexual assaulted, physically assaulted or witnessing violence [5]. In 2011 3.4 million referrals were made to Child Protective Services and 19% were sustained [6]. These victims suffered neglect, physical, and sexual abuse. According to Administration for Children and Families 76,644 children and teens under the age of 18 were abused in California in 2010 [7].

Treatment Programs. There are treatment programs like the San Diego Center for Children that offer support to children and teens that have had traumatic experiences happen to them. Places like this offer counseling and learning. It is not just physical safety that is important after a child or teen is abused, but also emotional safety as he or she tries to get used to a new environment [8]. My Music Mosaic was specifically requested as a way for children and teens living at this group facility to express their emotions and reduce stress as they become familiar with their new surroundings. The artwork created can then be shared and put up in their rooms to help them feel a sense of accomplishment and to help with feelings of loneliness or stress.

3   Color

3.1   Basic Color Schemes

Color Palettes. My Music Mosaic allows the user to choose his or her own color palettes. Each note on the keyboard is assigned a color value based on the color palette chosen. The color palettes themselves have been designed to take various themes inspired by popular culture, different kinds of sight and everyday life. Some of the basic color palettes include a rainbow palette, a shades-of-blue palette, and a shades-of-purple palette.

Perception. While considering the users and the original intention of the project, a decision was made to research the effect color can have on the mind. Colors can represent certain ideas and feelings based on previously-cemented perceptions [9]. While choosing the color palettes, the team chose to create colors that stereotypically represented these perceptions. For example, rainbows are usually representative of things that inspire happiness and excitement, while grays paired with dark blues might represent depression.

3.2   Color Blindness

When developing this program, some careful consideration was put into the fact that the team did not have access to specifics about the intended users. One avenue that was explored was color blindness, because one of the main components of the program was the use of color. Using a triadic color scheme, a color palette was created representing a few different types of colorblindness [10]. These color palettes were designed specifically for color blindness so the series of colors may appeal to someone with color blindness, but may not be appealing to those who do not have color blindness. Since these colors are not commonly seen together in what is considered normal vision, these color palettes explore different areas of expression.

3.3   Borrowing from the World

Many of the remaining color palettes that were not considered basic or for color blindness were designed represent colors of objects in everyday life or experiences in everyday life. Some of these palettes include a fire palette (composed of reds, oranges and yellows), a traffic palette (composed of yellows, reds, greens, grays, whites, and blues), and an ocean water palette (composed of various shades of blues and greens).

4   Design

4.1   Overall Aesthetic

The My Music Mosaic interface was designed to be especially accessible for children and teens. The program was designed to incorporate the idea that the user should be able to interact with the keyboard and program as intuitively and easily as possible. The design limits complicated interactions by hiding the save menu and not cluttering the start menu with too many options. This allows for the users to focus on playing music and not having to go through the process of learning a complex program beforehand.

4.2   User Interface

The beginning start screen was designed to be minimalistic so users can explore the variety of color pallets and change the background color at their leisure. If the user did not want to choose anything, they can just hit start and go with the default options to begin playing. As users choose different palettes and backgrounds, their choices are reflected in the My Music Mosaic title and the on-screen background changes. After pressing the start button, a simple message appears on-screen that communicates to the user that they can start playing and that they can click for the menu. Once the user starts playing with the keyboard, the message disappears and brushstrokes start to appear on screen representing the colors chosen from the color palette and the instrument they are using. When the user has finished playing, they can click the mouse to access the pause menu where they can save, start over, quit, or get help. The pause menu is designed in a similar art style as the main menu, so that the user knows that he or she is still in the program.

4.3   Brushes and Paths

The brushes that are used in the main part of the program were made by the designers to represent different kinds of real world art supplies. The different types of brushes are roller brush, palette knife, dry brush, paint splat, paint drip, watercolor, calligraphy, spray paint and chalk. Most of the brushes were composed of three separate images combined in the code. The reason for this is that some brushes follow a different path than other brushes when they are being drawn. Each of the splats consist of only one image, as these images were intended to show up on screen very quickly to represent percussion instruments. All of the brushes start on a sine wave and a random angle is chosen in code for where they get drawn, but their path is either another sine wave or a straight line.

5   Implementation

Open Source Programs
Since the project was being completed on behalf of a non-profit organization, the choice was made to create the project using open source technology. My Music Mosaic was created in Processing [11] using a library called proMIDI [12]. One programmer completed all of the programming for the project for the sake of consistency.

Variables
The location of brushes, the effect of holding down a note on a brush, and the size of the brushes were modified throughout the process using code. The location of a note is dependent on when the key is pressed, and follows the path of a sine wave. If a user hits a note hard, it will appear larger than if he or she played it softly. When a user plays the notes quickly, the brush will appear short, whereas if they hold a note it will appear much longer. Otherwise, the colors of the notes and the background of the program are chosen by the user at the start screen.

Iterations
From the programming aspect of the project, the first step was to learn how to read input from the musical keyboard to draw a line on the screen. The line drawn was based on the timing of the note. The program uses a black and white brush image that is then colored in the specific manner created by the designers. Color palettes were added once the brushes were perfected.

6   User Testing

The first round of user testing provided meaningful feedback. It was a small sampling of college-aged students who volunteered to try the program. The students were given a small survey before they tried using the program to compare how similar these users were to the target audience. The students were observed by the team using the program with little to no direction, to test how intuitive and easy the program was for

a first-time user. Afterwards, they were given another longer survey to see if their mood had changed, whether they felt the program represented the music they were playing, and to give them a chance to explain any problems they encountered. The user-testing yielded clues about some of our menus, how users exit a program or menu and whether they read instructions. Further user testing will continue in May in San Diego with the intended users being observed and surveyed.

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