Underrepresented Youth Creating Culturally-Relevant Games

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By incorporating culture into working with technology, SDK Bridge attempts to inspire underrepresented youth to consider pursuing careers in technology fields.

Youth from underrepresented groups—including those who are Native American or have African heritage—typically don’t have many role models in the technology industry. As a result, they may not feel as though they belong in technology careers.

SDK Bridge (http://sdkbridge.com)—where SDK stands for software development kit on the writing side of the business and software development for kids on the teaching side—provides a mixture of for-profit technical writing and nonprofit teaching. Writing SDK and API documentation provides the majority of the company’s revenue and takes the financial pressure off the nonprofit teaching activities that are designed to reduce the “digital divide.”

SDK Bridge has been addressing this issue by teaching classes for middle and high school students that combine technology skills and cultural education.

We teach culturally-relevant classes involving videogame creation that are funded by local nonprofit organizations and designed specifically to engage teenagers from underrepresented groups. In these classes, students build games by creating media and configuration files for custom software built by SDK Bridge, providing experience in working with technology that goes beyond a keyboard and mouse interface. The classes are project-based, with the final projects reflecting the students’ culture. The goal is to give students a taste of working in technology in a manner that feels relevant to them.

SDK Bridge has conducted three recent classes for youth aged 11 to 18 with Native American and Ethiopian heritage and is committed to continuing to offer these types of game design classes for underrepresented youths.

DANCE ARCADE GAME

The dance arcade class is designed to integrate visual design, music, and physical movement with the learning of markup language and user interface design. The final project of this class is a dance game based loosely on the Dance Dance Revolution arcade game. For the class, students learned about user interface design, basic audio editing, and XML.

Native American middle school students from the Seattle-based Tierra Madre Fund, which focuses on building leadership and supporting innovative projects that honor and maintain traditional knowledge, worked with a native artist to hand-draw user interface elements, which were then scanned to create image files. The students created XML files to configure the user interface and images for the dancing game’s four stepping boards. Native American community members built the physical stepping boards and connected them to the game via a Phidget I/O circuit board.

For the music, the students created audio mashups of traditional songs, modern music by Native American artists, and spoken word audio. Figure 1 shows one student project, which was modified to display the four user interface states, and Figure 2 shows the game being played.

WII DANCE GAME

The Wii dance game is designed to integrate music, dance, and imagery with learning markup languages, physics, and 3D coordinate spaces. The final project is a dance game using the Nintendo Wii remote based on Nintendo’s Just Dance game.

To create the game, a dancer is videotaped while dancing with a Wii remote. During the recording, the Wii remote’s acceleration values...
are captured as a function of time. During play, the video file is played and the player attempts to mimic the dancer’s motions. Scoring is based on how closely the player’s accelerations match the recorded dancer’s accelerations.

At Horn of Africa Services, high school students with Ethiopian heritage created dance routines for games that use Ethiopian music and traditional hand movements. Working with an Ethiopian teacher, the students created images to indicate how well the player did in the previous one second of play. They also painted a backdrop to use for their dances.

For each new dance step, a photograph was taken of the student to illustrate the position. These images move along the bottom of the screen to tell the player that a new dance step is coming up. The students then create XML files to configure the images and specify the timing for the dance steps. Figure 3 shows a screenshot from a student’s game.

**SPEECH RECOGNITION AND ETHNOBOTANY**

Our speech recognition and ethnomBOTANY class is designed to integrate Native American language and ethnombotany with concepts behind attribute-value specifications such as JSON as well as speech recognition. With support from the Tierra Madre Fund, Native American students learned about speech recognition applications and took a field trip to a Native American garden, where an ethnombotanist talked about the names for the plants in Lushootseed (a local indigenous language) and described how they were traditionally gathered and used. Students shot digital photographs of the plants and took notes.

The students created media and configuration files for two applications: a plant identification game in Lushootseed and an ethnombotany application in English. They used English phonetic equivalence for the Lushootseed names in their game. They also created audio recordings of plant names in Lushootseed as well as English-language descriptions of how plants were gathered and used.

Creating an application that responded to the spoken word by playing an audio file made it possible to more accurately reflect the oral-based learning style of Native American culture. Students created configuration files using JSON, which indicated what image and audio files to use and provided words for the participant to recognize.

**IMPACT**

For each class, we attempt to measure changes in attitudes about technology. We’ve used surveys and experimented with the Implicit Association Test (https://implicit.harvard.edu/implicit), which attempts to measure subconscious associations between concepts.

For both types of measurements, we’ve seen small improvements in attitudes toward and associations.
By incorporating culture into working with technology, SDK Bridge attempts to inspire underrepresented youth to consider careers in technology fields. The classes give students an opportunity to experience technology that they’re otherwise unlikely to work with in school, such as gaming hardware and speech recognition. Students clearly enjoy the classes and have succeeded in creating engaging projects that express their culture.

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Figure 3. A student’s Wii dance game with two players.