

Look! Sound

By Peter Wu, ECE '17

Introduction

Music is one of the most beloved art forms on the planet, present in nearly all cultures throughout the world. However, it also presents one of the most puzzling riddles: Why do certain arrangements of sound please the brain, and are thus perceived as music, while others simply are heard as unpleasant collections of noise? While this is still a highly-debated topic undergoing further research, it has been proven that dopamine, a chemical in the brain associated with feelings of pleasure, is released when listening to music (Salimpoor, 2011). One theory put forward by the authors of this study to explain this phenomenon is that this pleasure is caused by the listener's expectations and the anticipation for these expectations to be met. In an article published in *Time Magazine*, Michael D. Lemonick, *Time's* science writer, interviewed Dr. Salimpoor, who proposes the idea that listening to music can "tap into a brain mechanism that was key to our evolutionary progress." (2013). Humans' ability to recognize patterns and use past experiences to guess what will come next is part of what allowed humans become so successful. Listening to a song puts the brain through this exact process, evoking an emotional and intellectual response in the listener.

The Need for Technology

Recently, studies have shown that the environment in which children are raised not only affects their lifestyles and values, but also the music they will be exposed to and enjoy (Young, 2016). In the view of Susan Young (2008), technological

advances and a globalized world have led to vastly different musical experiences in childhood. Compounding this effect, digital media has led to increased musical exposure early in life, with children bringing developed musical perspectives to the classroom (Lum, 2009). Young (2008) emphasizes that "these changes have barely impacted on schooled music practices which remain fixed and conventional, and out of step, in my view, with the complex, everyday practices of the 'digitised' and 'diversified' everyday music world." (p. 703) While music education technology does exist, it is generally not implemented within education systems, and thus must be found and purchased by individual parents. Though there is no consensus regarding the most effective methods, researchers agree that music education must be changed to accommodate technological advances and a globally connected society (Young, 2008, Kim, 2013, Baratè, 2015).

Learning Theories

Learning theories propose hypotheses regarding the nature of how children learn. Laurie Taetle (2002) asserts that before the 1960s, music education and research was largely uninfluenced by learning theory. Since then, learning theories have become the basis for both research and teaching, shifting the focus of music education from the teacher to the student. Taetle describes learning theories as falling into three main categories; behavioral, cognitive, and constructivist.

In short, behavioral theories examine outside forces and their influence on learning, cognitive theories focus on the child's internal development and how this affects their learning, and constructivist models hypothesize that each individual constructs knowledge for themselves. Lessons learned from these learning theories point towards the need for creating a child-centric model of music education and developing educational programs that can break music down into digestible chunks of information.

Children's Musical Development

Previously, children under the age of three were typically seen as a blank slate developmentally (Young, 2016). However, research within the last 10 years has proven infants to be musically competent, although not in the ways that adults traditionally measure competency. Researcher Paul G. Morehouse asserts that although young children do not possess the ability to perfectly distinguish pitch, rhythms, or meaning from songs, they still innately understand the form of music. He also links musical understanding with language, stating that the ability to organize sounds into coherent units is an ability all humans possess (p.85). Morehouse believes that music activities also improve children's social and emotional skills by promoting interaction between children when creating music. Further, music-making develops motor skills by requiring rhythmic movements corresponding to the music, and improves language skills through pattern recognition. While this certainly is encouraging to music educators, it also poses the additional challenge of finding the most effective way to teach music to every unique child, especially as a growing body of research suggests that there is no single manner in which all children learn music (Young, 2016).

Technology as an Educational Tool

Increasingly, technology, whether in the form of serious games, sharing music over the internet, or apps to create music, are being viewed as key supplements to providing musical education. A child's enjoyment of music is often linked to a desire to continue learning, and active participation in musical activities led to more interested and engaged learners (Lum, 2009).

Technology provides a unique opportunity for active engagement and entertainment in a way that traditional music education cannot. Serious games (video games made for the purpose of teaching) are one example of this. Serious music game design, while still relatively unexplored, has several proponents. Studies in Italy and Taiwan (Baratè, 2013, Szu-Ming, 2014) have detailed the design of a serious game for music education, while a study in Australia (Gower, 2012) explored the use of commercial music games, like Guitar Hero, in an educational manner. While none of these studies reported definitive results, all suggest improvements for the implementation of educational technology, and anecdotally show increased engagement and learned skills in subjects. In a study in South Korea, applications used for music sharing and creation were used to encourage music engagement among elementary schoolers (Kim, 2013). Kim argues that the internet is now widely used in nearly all other educational fields besides music, and thus it is only natural that music education should begin to utilize this tool (p.415). Kim found that technology-mediated music education engaged students, encouraged active participation, and prompted them to creatively interact with music.

Conclusion

The use of technology in formal music education is largely unexplored. Preliminary studies show children have higher levels of engagement and enjoyment of musical activities that involve technology. Ultimately, technological advances will simply allow educators to better meet these principles by engaging students on their own terms and taking into account the cultural diversity present in many Western countries. While some parents incorporate music education technology into their children's daily lives, it is ultimately the responsibility of music educators to continue the process of integrating technology into formal education to stimulate interest and meet the diverse needs of all, even at the risk of declining interest in traditional music education.

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