John Halloran and Jason Arnold

B., Susan, “Classroom Teachers’ and Music Specialists’ Perceived Ability to Implement the National Standards for Music Education,” Fine Arts Academy of Rio Rancho, Rio Rnacho, NM, 1999

Susan Byo investigates the level of musical education in the system. One of the difficulties of music education is there are specialist teachers and generalist teachers. Specialists already have a depth in education and have spent a considerable amount of time studying the material. Generalists have not nearly spent as much time with material and do not have a more formal curriculum that focuses on the basis of music history. The research conducted examines the extent of the curriculum of music in both teachers’ perspectives. Bothoven should serve as an early precursor to creating a fundamental education robot.

G. Weinberg, A. Raman, and T. Mallikarjuna, “Interactive jamming with Shimon,” Proceedings of the 4th ACM/IEEE international conference on Human robot interaction - HRI '09, 2009.

Researchers built a robotic marimba player to improvise with actual musicians. In this case the focus was put primarily on creating its own music with a focus on temp. The social interaction of this robot looks at visual cues from humans and moving focus to different sources of noise, focusing primarily on the leader. Musical interaction bases of a Markov Chain and analyzes patterns to play appropriate notes. The Improv works in Call-And-Response, Accompaniment, and Solo Mode.

G. Hoffman and K. Vanunu, “Effects of robotic companionship on music enjoyment and agent perception,” 2013 8th ACM/IEEE International Conference on Human-Robot Interaction (HRI), 2013.

The focus was to look at how humans and robots perceive music and enjoy it. The robot design is actually able to listen to music and follow along by tapping its foot. Be it in schools, the workplace, or nursing homes, robotic experience companions could shape people’s perception of external occurrences. People’s reactions could also be purposefully manipulated by a robot’s apparent reaction to them, thus encouraging people to enjoy activities more, or “sweeten a bitter pill” when a negative outcome is unavoidable.

T. Hashida, T. Naemura, and T. Sato, “A system for improvisational musical expression based on player's sense of tempo,” Proceedings of the 7th international conference on New interfaces for musical expression - NIME '07, 2007.

This examines using technology to recognize tempo. The hardware design in this system uses multiple senses. Tempo can be sensed through pushing a button on a single or multiple switch, shaking, and blowing. Through these devices a computer algorithm can develop the tempo in which the human is working in.

G. Weinberg and S. Driscoll, “Toward Robotic Musicianship,” Computer Music Journal, vol. 30, no. 4, pp. 28–45, 2006.

Researches developed Haile to play a Native American pow-wow drum, a unique multi-player instrument that supports the collaborative nature of the project. So in this case the researches aimed this project to aim at involving humans and the robot to play a drum together. This allows for a more concise involvement with allowing both any human and the robot to play together. Both can work together to maybe create a new rhythmic style.

Trotter, Robert J. "Robots Make Intelligent Teachers." *Science News* 104.5 (1973): 76. *Society for Science & the Public*. Web. <http://www.jstor.org/stable/3958577>.

Machines are great teachers is they can apply certain human concepts such as intelligent summary applications, describe detailed exercises, and emphasize repetition. By learning to program a com- puter to generate music, pictures or mechanical processes, a student can develop the mental tools to think about temporal, tonal, geometrical and physical matters.

Allsup, Randall Everett. "Mutual Learning and Democratic Action in Instrumental Music Education." *Journal of Research in Music Education* 51.1 (2003): 24. *SAGE*. Web. <http://www.jstor.org/stable/pdf/3345646.pdf>.

This article details music educational aspects where the most productive characteristics of a group are identified. For example, when studying and composing jazz music or popular style, fun, nonobligatory, and self-directed characteristics inspire some of the best and most fully-developed music construction rather than those who choose other genres. The relationships and peer learning tactics are used to their highest potential when interactive genres are chosen.

Feay-Shaw, Sheila. "Multicultural Perspectives on Research in Music Education." *Bulletin of the Council for Research in Music Education* 145.Summer (2000): 15-24. *University of Illinois Press*. Web. <http://www.jstor.org/stable/pdf/40319019.pdf>.

Quantitative research in the field of music education over the years has been employed to answer questions related to all aspects of the field, with considerable attention given to basic techniques of instructional practice. This discussion looks at several multicultural concerns that are brought out through quantitative methodologies in music education research. These concerns are highlighted by the use of standardized tests of musical ability, by the ways in which subject groups are described, and by the way in which generalization of results are interpreted in selected research sutdies that were published in the Journal for Research in Music Education.

Holland, Simon. "Artificial Intelligence, Education and Music: The Use of Artificial Intelligence To Encourage and Facilitate Music Composition by Novices." Open Univ., Walton, Bletchley, Bucks (England). Inst. of Educational Technology, July 1989: 305. <http://files.eric.ed.gov/fulltext/ED329452.pdf>.

Simon Holland focuses on developing methods to further music education using both Artificial Intelligence, robotics, and HRI. The first part of this article focuses on visual representation of “Harmony Space”. Harmony is a big focus of this educational approach, noting that the focus on harmony “considerably reduces the prerequisites required for novices to learn about… activities that would normaly be very difficult without considerable theoretical knowledge or instrumental skill.” The second part of this study uses a “knowledge-based tutoring system.” The article explains that new domains, such as music, must be taught at incremental levels using categories referenced as “chunks, styles and plans.”

Combining these two aspects of this research, we have concluded that the best way to begin teaching a musical ear is to focus on a foundational aspect, or “chunk”, of music such as harmony. In doing so, the structure and relationship of music can be better understood, all the while preserving a musical novice’s creativity and fresh vision.

Madaule, Paul. "Listening Training and Music Education." Early Childhood Connections: Journal for Music and Movement-based Learning, Spring 1997, 4, no. 2. <http://listeningcentre.com/pdf/07listening02.pdf>.

This article begins by describing Paul Madaule’s background in musical education and his difficulty to learn music in general due to dyslexia. After a French doctor further diagnosed his dyslexia as a “listening problem,” Paul quickly caught up in school and music after only a few months of therapy and pursued studies in psychology. He studied students across the Americas (Canada, US, Mexico, and Central America) with identified learning disabilities (ADD, dyslexia, auditory processing problems) and even those with a generally poor academic performance. After treating these students, their grades increased and their symptoms declined. This article delves further into the biological structure of the body, describing the balance between the “cochlear – vestibular” system, noting its function to perfect a person’s balance, perspective, and general place in the world.

By developing an understanding of both rhythm and melody, students were able to integrate their more focused ears into other aspects of education such as math or science. Therefore, by musically training an ear, whether by harmonic steps or rhythmic structure, a student may develop further and faster. In doing so, the chances of a student grasping more complicated concepts drastically increases, furthering their ability to build upon their obtained musical knowledge.