

Adaptive Use Musical Instruments for the Physically Challenged

Elizabeth Groeneveld

The Adaptive Use Musical Instruments for the Physically Challenged (AUMIPC) project uses digital technology to enable people with little voluntary mobility to create and perform electronic sounds and sequences, in order to participate in solo and ensemble music improvisation and composition.

The AUMIPC requires only a computer equipped with a digital camera to work. Users sit in front of the computer screen and see an image of themselves with a focus spot (or coloured tracking dot) on their face, which provides a point of reference. While this spot can be moved to adapt to a particular person's needs, it is often focused on the tip of nose.

In one version of the program, the participant sees one horizontal and one vertical line forming a grid of four squares on the computer screen. Each square represents a different pre-programmed percussive sound. By slightly moving their heads either laterally or vertically, the user can move the tracking dot into one of the four quadrants. These movements allow the user to access these percussive sounds and to create rhythmic patterns. Additionally, a virtual keyboard can be played with lateral head movement along the keys to create scalar melodies.

Led by musician, composer, and humanitarian Pauline Oliveros, the AUMIPC project has brought together the expertise of technicians at the Rensselaer Polytechnic Institute (RPI) and the community education initiatives of Oliveros's Deep Listening Institute. The initial computer program (in Max/MSP/Jitter) was created by Zane Van Duzen, an undergraduate student at RPI, and has since been further developed by Zevin Polzin.

In collaboration with improviser and occupational therapist Leaf Miller, the AUMIPC was first used in workshops with disabled children at Abilities First, Inc., located in Poughkeepsie, New York. Since these initial workshops, the AUMIPC has been made available as a free Internet download; the program is now in use by therapists both nationally and internationally. The AUMIPC has also been showcased in China by new media artist Byeong Sam Jeon.

The AUMIPC is designed with improvisation in mind. Its focus is on holistic creative development rather than the traditional music pedagogy models employed in other settings. Thus, this approach focuses less on "hitting the right notes" or playing and mastering set pieces of music. Instead, the AUMIPC uses music as a way for participants to express a range of affects, both by themselves and in response to, or in conversation with, others. While the AUMIPC can be used by anyone, Oliveros's focus has been on working with children who have profound physical disabilities. In taking these participants as its starting point, the project attempts to make musical improvisation and collaboration accessible to the widest possible range of individuals. This approach also

opens up the possibility of learning more about the relations between ability, the body, creativity, and improvisation, from within a cultural context that does not always acknowledge disabled individuals as full subjects.

The collaborative work of Oliveros and Miller has shown that the AUMIPC opens “a creative, empowering portal” for children who live in extreme isolation because of their inability to move or speak (Oliveros). In sessions with Miller at Abilities First, participants have successfully created music in interaction with other players. These musical exchanges, as Oliveros argues, hone physical movements with more precise control and help participants gain “a greater ability to learn and interact in their environments.” Moreover, the AUMIPC fosters creative and collaborative skills that allow participants to find and express their own voices, and to build musical exchanges with others.

Now working in partnership with the ICASP project, the future objectives of the AUMIPC include creating new flexible interfaces, digital controls, computer programs, and inputs and outputs to musical instruments. These technologies will be designed with children with very little mobility or other impairments as their focus, in keeping with the AUMIPC’s goal to make musical expression accessible to people of all abilities. The intended outcome of the project is to enable the physically challenged to create and perform electronic sounds in ensembles and to both improvise and compose their own music.

Further Reading

Bodner, Ehud, Dorit Amir, and Avi Gilboa. "Emotional Communicability in Improvised Music: The Case of Music Therapists." *Journal of Music Therapy*. 44.3 (2006):198-225. Print.

"Centre for Interdisciplinary Research in Music Media and Technology." Web. <http://www.cirmmt.mcgill.ca>

Davis, Lennard J., *Enforcing Normalcy: Disability, Deafness, and the Body*. London and New York: Verso, 1995. Print. Greenidge, E. "Connecting to Music: Helping a Disabled Teen Join the Band." *Rehab and Community Care Management*. Fall (2000): 49-50. Print.

Kirk, R., M. Abbotson, R. Abbotson, A. Hunt, and A. Cleaton. "Computer Music in the Service of Music Therapy: The MIDIGRID and MIDICREATOR Systems." *Medical Engineering and Physics*, 16 (1994): 253-58. Print.

Knox, Roger, H. Yokota-Adachi, J. Kershner, and J. Jutai. "Musical Attention Training Program and Alternating Attention Brain Injury: An Initial Report." *Music Therapy Perspectives*. 21.2 (November 2003): 99–104. Print.

Knox, Roger, Andrea Lamont, Tom Chau, Yani Hamdani, Heidi Schwellnus, Ceilidh Eaton, Cynthia Tam, Patricia Johnson. "Movement-to-Music: Designing and Implementing a Virtual Music Instrument for Young People with Physical Disabilities." *International Journal of Community Music* B.1 (2005). Web.

Lerner, Neil, and Joseph Nathan Straus. *Sounding Off: Theorizing Disability in Music*. CRC Press, 2006. Print.

Lubet, Alex and Na'ama Sheffi. *To Dance Beneath the Diamond Sky with One Hand* (Special Issue on Disability Studies and Music, Part One). *Review of Disability Studies: An International Journal*. 4.1 (2008). Web. <http://www.rds.hawaii.edu/downloads/issues/pdf/RDSv04iss01.pdf>

Lubet, Alex and Na'ama Sheffi. *To Dance Beneath the Diamond Sky with One Hand* (Special Issue on Disability Studies and Music, Part Two), *Review of Disability Studies: An International Journal*. 4.2 (2008). Web. <http://www.rds.hawaii.edu/downloads/issues/pdf/RDSv04iss02.pdf>"<http://www.rds.hawaii.edu/downloads/issues/pdf/RDSv04iss02.pdf>

Miranda, Eduardo R., and Marcelo M. Wanderley. *New Digital Musical Instruments: Control and Interaction beyond the Keyboard*. Middleton, Wisconsin: A-R Editions, 2006. Print.

Moser, Ingunn. "Disability and the Promises of Technology: Technology, Subjectivity and Embodiment within an Order of the Normal." *Information, Communication & Society*. 9.3 (2006): 373-95. Print.

Nantais, T., B. Lee, J. Davies, and R. Knox. "A System for Creating Computer Music as an Occupational Therapy Activity." In M. Binion (Ed.) *Proceedings of the 16th Annual Conference of RESNA Washington, DC: RESNA Press, 1993: 420-22*. Print.

Oliveros, Pauline. "The Adaptive Use Instruments Project." Interview. <http://www.cycling74.com/story/2007/12/7/131419/186>

Schwellnus, H., C. Tam, T. Chau, R. Knox, P. Johnson, and Y. Hamdani. "Using Movement-to-Music Technology for Play with Children with Special Needs" *Occupational Therapy Now*, September 2002. Web.

Tam, Cynthia, H. Schwellnus, C. Eaton, Y Hamdani, A Lamont, T Chau. "Movement-to-Music Technology: A Play and Music Experience for Children with Physical Disabilities." *Occupational Therapy International*. 14.2 (2007): 99-112. Print.

Williams, J and J. Brabyn. "A Study of Accessibility to Electronic Music Synthesizers and Sequencers by Blind Musicians." *Proceedings of the 15th Annual Conference of RESNAI*, 12 (1992): 147-49. Print.