

BOUNCING TOWARDS THE FUTURE WITH KANGAROO PANZE

HUMAN MEDIA INTERACTION IN MUSIC EDUCATION



Girl playing and singing together with kangaroo Panze.

The computer as the music teacher of the future? Yes and no ... In this article we would like to introduce some opportunities we see for the use of novel technologies in music education, now and in the future, in schools and at home. The need and importance of music education for our children is of great concern to musical life nowadays. Often the available resources in time and money are not enough to guarantee the quality and quantity needed.

For several years now, researchers at the Human Media Interaction group of the University of Twente have been working on technologies that can support music education. Not in substituting the human artistic work, but rather in tools supporting the training of musicians in order to make the education more efficient and in cases where media can add some 'rare' skills to certain essential musical processes. Media could e.g. mentor pupils in their practice



Ensemble playing together with a virtual conductor.

sessions (for example the virtual conductor, see sidebar), or even helping them to learn new skills. Early music development could be stimulated by letting children sing songs together with a computer, or play musical games (for example 'Panze', see sidebar).

The projects have been tested on a small scale, and the results are promising. In the case of Panze, children quickly mastered the interaction with the system and often eagerly sang songs and danced together with the lovable kangaroo. There is no substitute for a real-life human teacher, but these experiments show that technology can really help children with their music development. It will take a while – even these projects are still in a research phase – but eventually these technologies could become important tools that will let us give our children the music education they deserve, and grow up to live a rich musical life.

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References

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The Virtual Conductor

We have designed and implemented an artificial conductor that is capable of leading, and reacting to, human musicians in real time. The conductor is a virtual human projected on a large screen in front of the orchestra (see picture). It can read digitised sheet music and conduct the piece. It can listen to the performance of the human musicians and use advanced audio processing algorithms to evaluate their performance. Most importantly, it can adapt his conducting movements to give corrective feedback through its gestures. Currently the artificial conductor can give feedback on the tempo with which the musicians play and on their dynamics.

Once further developed, such a virtual conductor could be used in several ways. It can act as a rehearsal conductor, for example to help musicians rehearse the more technical aspects of a piece of music with an ensemble. It could also be used by small groups of children in a school of music to explore aspects of ensemble play: the conductor provides some structure and support, but still lets the children work in a self-reliant and autonomous way.

The conductor could also be used to help student conductors, by working as a reflective tool, showing examples of good conducting and typical conducting mistakes and allowing the student to experiment with ways of conducting while playing along on an instrument to feel how musicians would interpret the gestures. Combining the conductor with an artificial orchestra such as the one displayed in the Vienna House of Music, a system could be envisioned that detects the student's mistakes and graphically shows them to the student in combination with the correct way of conducting.

Finally, an artificial conductor could be made available through the internet to provide the casually interested layman with easy and engaging access to the art of conducting.

Panze: Stimulating Children's Musical Expression

Panze is the name of the animated kangaroo who is featured in an interactive system for preschool music education. Nowadays, not all parents and kindergarten teachers are able to make music with the kids. Often they do not have the time, or they simply have little experience in making music themselves. We experimented with a system that will interact with the child in much the same way that an adult would try to sing or dance with their child. The interaction was modelled after the Dutch 'Music on the Lap' method, and focused on developing a sense of beat and timing, a sense of dynamics, and listening skills. The system consists of an animated kangaroo – Panze – on a television screen, and a kangaroo-shaped doll that the child can use to communicate with Panze. The animated Panze acts as a role model for the child, singing songs and dancing. The child responds by singing and moving along with Panze and by clapping. Panze responds to the sounds and movements of the child, although in the current stage an adult observer is still required to help Panze sense the child's actions. The child can choose songs and the musical instruments that accompany the songs by putting instrument-shaped toys and plastic CDs into the pouch of the kangaroo doll. The chosen instruments and songs are visible on the television screen.

The system is designed for use at home by the child alone, without help from others. Hence children would be able to play with the system even if their parents cannot help them in their development.