What if children could learn to compose music as easily as they learn to finger-paint?

Composer Morton Subotnick first asked himself that question in the late 1960s. Today, with the help of scholars at Arizona State University’s School of Music supported by the Institute for Studies in the Arts, the answer finally is a resounding “Yes.” Subotnick is known as one of the world’s foremost composers of electronic music. His newly released CD-ROM is called Making Music. When children plug the disk into systems at home or school, parents and teachers may soon discover a fledgling Mozart in their midst.

Subotnick first outlined the idea for Making Music in 1967. “My daughter was about four years old at the time,” he recalls. “She was finger-painting. Watching her paint, I realized that we didn’t have anything similar in music that a kid could deal with. Of course, the technology just wasn’t there.” Recent advances in personal computer technology finally have made Subotnick’s idea viable, though he had tried to make it happen several times during the past 20 years.

His persistence is no surprise to Mark Coniglio, Subotnick’s programmer. “Current technology is a limitation he constantly is trying to escape,” Coniglio says.
Making Music has already achieved some notoriety, including a recent blurb in Newsweek. More importantly, the project is attracting the interest and approval of music educators across the country. In fact, it was at a music educators’ conference that Subotnick’s ideas first reached the ears of Sandra Stauffer, an asu associate professor of music education. Her interest, combined with Subotnick’s enjoyment of collaborative projects, led to the testing of his cd-rom at a su’s School of Music.

The ASU Connection  In 1993, Stauffer was doing the planning for a symposium in Virginia. She was in the middle of her term as president of the Society for General Music Education.

“The symposium was supposed to address ideas for schools of the future: what they’d look like, what kids would be like, what music and the arts would be like, and what role music would play for the education of children in the next century,” Stauffer recalls. “One of my colleagues recommended that we get Morton Subotnick as a speaker. He is known as a composer with an interest in children’s education as well as technology.”

Subotnick demonstrated an early prototype of Making Music at the symposium. The response was very positive. As Stauffer saw it, Subotnick had brought his finger-painting idea to life.

“Simply put, the program allowed children to just do it,” Stauffer says. “Children could design, make patterns, and make sound without being encumbered by having to learn the notation or learning how to play the instrument first.”

Timing was perfect for a collaboration. Subotnick already was working with asu on a multimedia artwork through the Institute for Studies in the Arts. He and Stauffer joined forces a few months later.

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Stauffer’s research interests focus on how children think about music. She planned to examine specific questions by studying children as they worked with Subotnick’s program. During the 1994-1995 academic year, children were brought to a su from a nearby Tempe elementary school to sit down and play with Making Music.

The cd-rom is divided into three main creative modules and some game sections. In the first module, the child is presented with a mostly blank screen on which it is possible to draw with the computer mouse.

Sound comes from the computer’s speaker as the child draws. Drawing up on the screen plays a higher sound; down, a lower sound. The horizontal axis represents time, and does not come in to play until the child wants to hear the whole work.

When the drawing is complete, the child presses a button and the program plays through the drawing from left to right. At any time, the child can change the tempo and the timbre of musical instruments-used in his or her composition.

The second part of the program, “Melody & Rhythm,” allows the child to play with rhythm and melody. There are a number of scales to choose from, including a variety of whole and half-tones. Some of these scales are quite familiar to Western listeners. Others sound much less familiar, perhaps more Oriental.

At the same time the child is looking at the melody, he or she also sees a separate representation of the rhythm. Whenever the user touches one of the buttons, the rhythm and melody merge, and play together. Pressed a second time, the melody and rhythm separate once again, to be modified anew if the child so desires.

The third section is called “Building Blocks.” A number of simple songs are displayed and represented by icons. Making Music shows the user how that musical structure is present in each of these simple songs.

For example, in “Mary Had A Little Lamb,” the structure is a-b-a-c, where the first and third verses repeat:

- a Mary had a little lamb
- b Little lamb, little lamb
- c Mary had a little lamb
- d Whose fleece was white as snow

The program allows the child to recombine the items. They might take the first melodic and rhythmic verse of “Mary Had A Little Lamb” and repeat it, or even take sections from other songs to create new song combinations. Ultimately, the child can create personal song structures from the melodies and rhythms he or she created in the previous sections of the program.

Two additional sections—“Flip Book” and “Games”—allow users more opportunities for mixing, matching, and comparing music.

Give A Kid A Hammer...And?  Subotnick did much of the initial design and programming of Making Music at his home in Santa Fe, N.M. He first tested his ideas at home.

“I have a 10-year old, and he has friends. All of my son’s friends are a part of my life,” Subotnick explains. “I can do something with them that will work in one way. But if you take kid off the street, the situation changes.”

Enter the role of the testing the program at a su.

“Here in Santa Fe, we had the neighborhood kids shout ‘Yay!’ whenever someone got an answer right, and ‘Boo!’ when they got it wrong. We all thought that was very cute,” Subotnick says. “But when we tried that at a su, the kids were horrified. They hated being booed.”

Testing Making Music with children in Santa Fe and at asu highlighted how different the responses from individual users could be.

“There are some very definite patterns to the ways that the children work,” Stauffer explains. “Some children tend to dot the screen all over, while some make big swipes of things. Others have very definite shapes that they draw.”

Creativity appeared in all kinds of ways. Stauffer says that one fourth-grade boy wanted “to make a piece that sounds like mournful people.”

“He had certain sounds that he liked to work with,” she explains. “He put them at the bottom of the screen and made wavy lines, then grouped a bunch of them together, and slowed it down. The result sounded like mournful people.”

A second student drew variations on the Star Trek Federation Insignia, applying different timbres and dynamics, while another created a composition based on his name, using a squiggly introduction and a crash at the end. A fourth student created a very baroque sounding piece by experimenting with the way it looked on the screen.

“The emotional response is there immediately,” Stauffer says. “The program is not just an intellectual exercise. The children respond to it in a meaningful way.”

Subotnick thinks that the program succeeds in communicating the fundamental ideas of music to some of the students.

“One boy made a piece of music with no changes of pitch. At first, I thought maybe that he couldn’t hear,” Subotnick says. “He hears fine. He just didn’t want to change pitch. He created variations of “Jingle Bells” using just the rhythm. He went slower and faster and used different timbres at the beginning and end.”

The student understood that pitch and rhythm are separate musical tools, Subotnick continues. “I thought he was dealing with Morse code at first. What he created is really conceptual art.”
Working in the 21st Century  Making Music may prove to be just one example of the changes we all will experience at both home and at work. For example, Stauffer believes that computer software such as Making Music will lead to more education taking place in the home. The dispersed geographical manner in which Making Music was created is in itself instructive.

Subotnick lives in Santa Fe, but teaches in Southern California at the California Institute for the Arts. Programmer Mark Coniglio, a composer in his own right, was in Valencia at Cal Arts for part of the time, but moved to New York City halfway through the programming of the project.

The cd-rom’s publisher, Voyager, is based in New York City, as were producer Jane Wheeler and the graphic designer who gave Making Music its final polished look. And of course, some of the final testing took place at a university.

“We tested about 60 versions of this program over the course of a semester,” Stauffer says. As children gave their responses, changes and suggestions were phoned to Coniglio, and then transferred back to a university.

“The Internet and 28.8 Kbps modems made this project a reality,” Coniglio adds.

Futurists say the way that people work and the nature of work itself will change. People will be hired as part of a team to accomplish specific tasks, then disband when the job is complete.

For the Making Music project, a university’s Institute for Studies in the Arts managed the teaming of disparate talents. The ability to communicate easily over long distances and to transfer large amount of information inexpensively also was a major factor.

Children and Creativity  Richard Loveless directs the Institute for Studies in the Arts. He believes that Making Music is the most profound thing done in music composition for children in this century.

Adds Sheilah Britton, the Institute’s arts research administrator, “Young children are so creative. This program lets them loose with no one telling them what to do. They really create music on their own.”

Using Making Music, Subotnick says he wants children to constantly be creating. “In the process, I want to lead them toward the actual language of music,” he says.

The composer currently is creating three additional cd-roms which will cover musical notation, sound (timbre) creation, and other aspects of music.

Subotnick’s motivation for the work is straightforward. “If you have a sense of social responsibility and responsibility to your species, then you want to leave something that someone else can build on. That’s the whole nature of what civilized human beings are all about. They pass things on, not just through their genes, but through acts of one sort or another, things that other people can expand upon.”

The production of Making Music was supported by ASU’s Institute for Studies in the Arts. For more information about the education research, contact Sandra L. Stauffer, Ph.D., School of Music, 602.965.4374. For more information about ISA-supported projects, contact Director Richard Loveless, 602.965.9438.
Creating New Art Forms

ASU’s Institute for Studies in the Arts was established by the Arizona Board of Regents in 1991 to encourage, facilitate, and fund innovative ideas and projects in the arts. Currently, the Institute is involved with more than 35 projects.

“Our mission is to work with artists, technologists, and scholars to create new art forms, and to use and implement new technologies,” explains Director Richard Loveless.

The Institute has got involved with a number of projects using computers.

“The computer is nothing more than a tool to integrate the languages that are formally separate in the arts and sciences,” Loveless says. “The computer manipulates numbers, letters, sound, image, and motion. All the language systems that are inherent in these different forms, whether science art or mathematics, are now interchangeable and interdependent within the computer.”

Institute members currently are involved in the production of five CD-ROM’s, as well as with the development of a system with which dance performers can modify music through their movements while they dance.

Loveless says that one of the most vibrant areas of research in the arts involves the use of computers to create new, interactive forms of art that combine the manipulative abilities of computers with the uniqueness inherent in live performances.

Loveless thinks that children and arts research are a potent combination.

“It’s very natural for children to think spontaneously and normally for them to think comprehensively in terms of the universe,” he says. “Children don’t think in terms of parts until they go to school. That’s when they separate out courses, languages, and subjects. Early on, children are in the natural condition of creativity.”

Collaborating on Morton Subotnick’s Making Music CD-ROM project was a natural for the Institute. “We wanted somebody who understands methodology and learning, someone who could work with kids and can test them, and we wanted a project with a well-known artist,” Loveless explains. “Funding the work with support from a major publisher connected well to what we do, because we can’t afford to do projects by ourselves. Making Music met everyone’s needs.”

Loveless says that Institute’s mission is always under examination. “The hardest job has been to convince people that we should have a focus on new applications of technology,” he adds.

Loveless thinks it is misleading to say that the Institute funds “computer art.”

He uses a bit of etymology to make his point. “Technology comes from the Greek ‘techne’, which means ‘making quality marks.’ My take has always been making quality marks with whatever technology you have in hand,” Loveless says. “A painter never says, ‘Oh, I make brush art.’ A sculptor never says, ‘Oh, I make chisel art.’ And I don’t say that we at the Institute make computer art. We don’t call an art form by its tool.”

As computers reach into every tiny corner of society, too are they becoming a force in art, allowing artists to do as yet unimagined forms of art.

“I don’t have a fascination with technology,” Loveless adds. “I have a fascination with the language used to express ideas, and the intersection of computers with language.”

It is in the expression of those languages where scholars at ASU’s Institute for Studies in the Arts hope to make their “quality marks.”

—John Svetlik