Technology: A Musical Explosion

Michael J. Wagner

Music Educators Journal, Vol. 75, No. 2 (Oct., 1988), pp. 30-33
Published by: MENC: The National Association for Music Education

Technology: A Musical Explosion

by Michael J. Wagner

Not long ago, students came to school without headphones attached. Cars did not have cassette players or radios. Music machines were called stereos, record players, Victrolas, or miracles. Many music teachers can remember when their school's record player was "state-of-the-art." Look at yours: Is it a "record changer"? Does it play in "living mono"?

Michael J. Wagner is a professor of music education at Florida International University, Miami, and is national chairperson of MENC's Affective Special Research Interest Group (SRIG). Photographs courtesy of the author and Royal Palm Elementary School, Miami.

Does it have a "flip-over needle" and play at 78 rpm? Now all that is history.

It's different now than it was then. Music (not what we teach in school), *real* music (the stuff our students listen to), is a way of life for the children of the 1980s and 1990s. Now, before getting angry at the "high tone" of that last statement, visualize the layout of your local music store. Move mentally up and down the rows of records, reading the labels on the bins. Move from "Pop" to "Jazz," from "Top 40" to "Classical." Take a mental excursion to browse through whatever is "current." Have you found the bin labeled "School Music"? You won't find "our music" there unless you buy music that many of your students have already "consumed."

Smaller and better machines

Today more people are hearing more contemporary music at higher fidelity than at any other time in history. They are playing *their* music on lighter, more compact, more portable, less expensive players than ever before. And they carry their music with them everywhere. Because of the availability of this technology, our school music curricula may need to be examined in light of the broadened and increased music-listening habits of today's students. Although this listening sophistication generally occurs within a rather narrow range of contemporary popular music, today's consumer-oriented music is often appealing to our students because of its incredible fidelity.

A technological explosion is occurring, and it has left music teachers gasping. Music machines (both musical instruments and playback devices) now use complex electronic components such as amplifiers, equalizers, and even sophisticated music processors. But many music teachers don't even know how to turn these devices on. Do you know how to play a compact disc, a synthesizer, or a wind processor? What do you know about digital sampling? Whether you recognize it or not, today's music is alive and thriving, and *all* of it is in some way electronic. Just an arm's length away from our profession, changes in sound technology—both its creation and reproduction—have been happening all along.

Digital recording

When you listen to your music, you no longer put on a hard rubber "platter" and wind up your Victrola, dig out favorite "45s" and pile a stack on your phono-changer, strap a nickel to the head of your tone arm, or put in an eight-track tape cartridge. If you've kept somewhat abreast of technology, you've probably adjusted both the tracking weight and the anti-skating force of your stylus, cartridge, and tone arm to reduce wear on your treasured records. You may even have set the controls on your stereo's graphic equalizer to enhance the sonic proportions of your listening environment.

Yet, with the advent of compact discs (CDs), one has only to insert a disc and press a button for the most error-free sound reproduction imaginable. Simply stated, when sounds are recorded digitally, all pitches in the range of 20 to 20,000 Hz and all levels of loudness covering a hundred-decibel range are converted to "bits" (the kind of information computers understand) instead of the continuously fluctuating information that analog tape recorders store.

Recordings made on older tape machines stored a magnetic equivalent of the fluctuations that were produced when the diaphragm of the microphone was moved back and forth by the vibrations of the sound it was recording. In the digital recording process, the sound information leaves the microphone and passes through an analog-to-digital converter (ADC), which samples the sound spectrum at least 50,000 times per second and converts the information into bits. It is the flow of these bits that is recorded on the tape. If editing is necessary, it is accomplished with great precision by transferring the proper stream of bits into a computer and making the necessary changes numerically. When the taped digital information is played back through a digital-to-analog converter (DAC) and reconstructed first as voltage fluctuation and then as sound, there is no hiss or tape noise because only the recorded bits of information are reproduced, and other sounds on the tape have no digital or numerical value.

In the production of compact discs there are three steps. The original recording session is step one, the "mix-down" (careful balancing of each recorded track aurally with every available track) is step two, and the "mastering" (the actual transcription) is last. At each of the three steps, either analog or digital recording is possible. On the back of many compact discs there is a code: DDD, ADD, or AAD. The "D" stands for "digital" and the "A" for "analog." The code gives a history of the processes used to store the recorded information. To many audiophiles, these processes are extremely important.

The compact disc is manufactured by using a laser to burn tiny pits into a plastic surface. Under the clear plastic protective coat, the disc's information is a spiraling line of peaks and valleys, with the depth of the valleys specifying the audio information stored there. Compact disc players use laser light reflection rather than a mechanical stylus to "read" the information encoded on the disc as it spins. Friction and wear on surfaces where sound is encoded and stored are largely eliminated. Because the information stored on the disc is a "read only memory" system (ROM), anything stored there has a digital code serving as an "address" and can be accessed from any other place on the disc. Therefore, getting from one place to another on the disc or programming the disc player to play a series of compositions in any order you wish is a simple matter.

Digital audiotape (DAT) recorders will be available soon; these machines will allow us to make digital recordings. It is still questionable whether we will be able to record material from compact discs, because circuitry may be built into the DATs or new CDs that will simply not allow us to break the copyright laws and rerecord material that is available for sale commercially.

A new breed of instrument

Today's music sounds *different*: not the forms or the styles, but the instruments themselves. This generation's popular music has a different set of timbres than did previous styles. Drums are now electronic, as are guitars, keyboards, and basses. New instruments have their own unique sounds.

Not one composer wrote music for the trombone until *after* the trombone was invented. The machines of our civilization always influence the kind of music that is composed. The gadgets, the gizmos, the widgets, the innovative contrivances always come first.

During the 1950s rock and roll bands were relatively small instrumental groups playing on acoustic instruments designed originally for the folk equivalent of chamber playing. Because rock and rollers needed greater amplification, more microphones and amplifiers were added, and the equipment was made increasingly powerful. This helped, but it simply was not enough. Electronic pick-ups were developed to transmit sound directly from the instruments (not from the air, as we hear and as microphones pick up). The acoustic "box" (resonating chamber) of the instrument was replaced with an amplifier and speaker, each in a separate unit. Basses and guitars began to be made with solid bodies, eventually using fiberglass and other materials, and the bass players began to hang their instruments by straps around their necks as guitarists do. Because those early electronic instruments simply did not *sound* like their acoustic counterparts, a new instrumental sound was created. Overamplification of the instruments, which produced a distorted, fuzzy sound, came to be part of rock music and was enjoyed by musicians and audiences alike. Technology definitely changed the music of the late 1950s and early 1960s.

Electronic instruments

If sounds could be changed electronically, they could also be *produced* electronically. The instrument developed for creating sound was called a synthesizer. This technological marvel produces an electronic equivalent of sound vibration with oscillators. It can manipulate every part of a musical tone from its onset, through its sustained portions, to its decay.

The synthesizer itself has been undergoing a metamorphosis. Because of electronic miniaturization and specialization, bits and pieces of synthesizers and the older electronic organs have become the workings of electronic keyboards, drums, and other new musical instruments, and synthesizer sound production has progressed from tubes to transistors to microchips and from analog to digital. You can even find keyboard-type devices in the configuration of a saxophone or a trumpet. These very new "wind controllers" are sensitive to air pressure from the player's embouchure, thus controlling loudness, and may be configured and fingered like the instruments they are modeled after. Incredibly, the digital synthesizer is beginning to bend to the wishes and needs of the woodwind and brass player. Ask your local music dealer to show you literature about the electronic wind instrument (EWI) and the electric valve instrument (EVI).

While guitars and basses have continued to be refined and upgraded electronically, the major technological innovations have happened in electronic drum and keyboard technology. Pressure-sensitive drum pads with synthesizer circuitry convert electronic impulses into an interesting array of percussive sounds that can be pitched in various ways. Another form of the electronic drum is the "drum machine." This is a percussion section ma-

chine that creates percussion sounds and has a computer memory. It can be programmed to create, store, and play back the sounds of the entire rhythm section of a song and can hold repertoire of various types of sounds in its memory for future reference.

Digital electronic keyboards have many of the devices found on older synthesizers but in updated and miniaturized forms. These include envelope generators (that shape the beginning and ending of tones), rhythm boxes (drum machines that play repeated rhythmic ostinatos of varying density and complexity), and timbre choices. Some include sound effects such as explosions and whistles. The newest keyboards have a number of digitally sampled sounds from which to choose: an array of traditional sounds that have been digitally recorded and stored in the keyboard's memory and can be played at any pitch or loudness just by pressing a key. Imagine that you can create the sound of an entire orchestral string section (digitally sampled), sweep up to a chord, and then program that sound as a cadential progression of IV, V, and I at the end of your own composition. It's quite a sensation. The possibilities, the innovations, and the new musical frontiers are there to be used creatively. If you happen to like the sound of handbells or a handbell choir, "punch them up" on your keyboard and have a go at experimentation and composition.

Computer interfaces

You can create exceptionally clear and accurate music, and you can also record it by using a Musical Instrument Digital Interface (MIDI) controller. It is now possible to store your compositions in the computer's memory. Depending on the programs you have for your computer, you can write your sounds on a score, play them back, and edit your compositions more precisely than you ever imagined.

A new beginning

For a musical reeducation, take a tour of a music store that has these instruments and audio components on display. When you discover that your fondest audio dreams can be realized, you can begin to plan a curriculum that uses the technology to which so many of your students already have access. The educational ramifications are awesome and awe inspiring. The new school music center will combine the traditional stereo with CDs, DATs, MIDI technology, keyboards (possibly a whole guitar, drum, and keyboard lab), and microcomputers. Technology has made music an even more intimate art than it was. Listen, and be amazed and dazzled by these technological innovations. Then, realize that understanding how these machines work can only increase your students' fascination with music. You need to learn about technology, enjoy it, and use it in your teaching. The future is beckoning!

Paul du Gay, "Doing Cultural Studies: the story of the Sony walkman"

READING E
Thomas A. Harvey: 'How Sony Corporation became first with kids'

Brand loyalty at a young age

After the first meeting the concept idea heated up very quickly. We got the design centre and advertising people involved. A product planning cycle that would usually take Sony fourteen months was harnessed to launch My First Sony in less than one year.

Once we had the name My First Sony we asked ourselves: why should we send a message to a child that Sony manufactures cheap radios? If we could create a product that made a long-term, favourable impression on children and be comparable in quality with the rest of the Sony line Americans know so well, we'd be building brand loyalty at a young age.

The target audience

Our target market is adults, generally working couples who are reasonably affluent. Sony is a brand name parents recognize and it connotes a quality image to them. Purchasers of children's products divide into two groups, those who are brand conscious and those who are price conscious. If parents are price conscious, they'll buy an inexpensive toy for their child and if it breaks in two months they'll throw it away. But price sensitivity wasn't our biggest concern – product quality was. If we put out a product that didn't work well, we'd lose a lot of adult confidence that we'd spent years building up.

Saving for the kids

In focus groups, parents agreed with our premise that there was a niche for quality electronics for kids. But they were sceptical about pricing – most of the products range from $34.95 to $89.95. The CD player introduced this year costs $199.

But quite frankly, even if parents had told us the idea was terrible, we'd still have gone ahead with it. Years ago, when Sony first showed the Walkman to dealers here in the US, they thought the company was crazy trying to sell a $200 stereo that didn't even record. But the company has a long history of pushing through products it believes in. Besides, there's a lot more marketing of upscale products to young consumers today. Parents who religiously scrimp and save on items for themselves will often have no trouble spending that extra dollar on something for their children.

Shopping trips

The first thing we did when we started designing the product was to visit toy stores and buy as many electronic toys as we could find. Many manufacturers simply take a well-known character like Mickey Mouse and put his picture on a tape recorder. We wanted My First Sony to look more like electronics products that already existed in the adult market, with special adaptations for kids. For instance, the radios and tape recorders for children had to be more durable and the corners rounded so they weren't sharp.

We also noticed during our store visits that toys for boys tended to be orange and black and toys for girls were pink and purple. We wanted something that would appeal to both sexes and age levels from four to eleven. So we decided to go for bright primary colours with universal appeal for children – red, blue, green and yellow.

A see-through package

The design team also spent several days in toy stores watching parents buying toys for their children. That led to an important decision about our packaging. We noticed that even though there were signs saying 'Don't Open the Packages' parents always ripped the boxes apart. Parents really wanted to hold and touch the product. So we used a see-through window on the front of the box that allows them to see the entire product without having to touch it.

Mother knows best

When children's products in toy stores and department stores are produced below $100, mothers make over sixty per cent of the purchasing decisions. Once you reach $100, the fathers start getting involved. Children have direct involvement in purchasing when the parent is buying something like an action figure or a GI Joe doll, but not with a product perceived as educational. So we advertise on national television to reach both parents, but

avoid Saturday morning cartoon shows which only kids watch. We also run print ads in women's magazines.

The advertising strategy

We spent about $2-to-$3 million to build awareness for the line. Your average toy commercial is a real flight of fancy for the child. Our commercials are aimed at parents. We asked our ad agencies to come up with spots that would assail mom's emotions rather than her mind. We wanted embraceable kids from a cross-section of America rather than highly stylized, up-scale children. The agencies came up with two variations of the song 'I like pizza pie, I like macaroni, but what I love is My First Sony'. Print ads show a group of children holding and playing with our products.

The retail environment

My First Sony has created a new merchandise category for toy stores and also helped attract a more affluent customer. We started out selling My First Sony to up-scale department stores and toy stores like Toys'R'Us and Child's World. Toy stores are the best vehicles for us. They attract customer traffic on a regular basis and kids drag their parents to them on the weekends. Now we're also expanding into some key electronics-retailers like Circuit City and selling in Europe and Japan.

Not a toy company

Sony does not want to be in the toy business, because it's very competitive and price sensitive. Once someone comes up with a new idea for a toy, another manufacturer will knock it off and steal market share like crazy. We're competing for shelf space with a lot of toy manufacturers, but we see the toy market as very different than ours. My First Sony is an electronics line for children. Adult electronics is gimmicky – we're pre-conditioned to look every year for a new model of the product we own. But with children, as long as the product meets their demands, they won't need another one for four or five years.

Expanding the line

This year we introduced five new products. These include the first CD player for children, a cassette tape-recorder and a wrist walkie-talkie. Our original products were versions of our adult products for kids. The second generation products are more sophisticated and offer interactive capabilities. They present much more of a learning experience for the child. For instance, the new cassette-recorder allows children to sing along *with* their favourite music and record their own voices. In the future, we may move into higher-end educational electronics product for children.

Music and software promotions

There is a lot of children's music and educational software available to parents but many are not aware of how much is actually out there. This fall we decided to team up with music companies to jointly increase our sales.

We launched a joint promotion with A&M Records, for example, this fall. It is a sampling program designed to help build awareness of compact discs for children. A CD of children's recordings is packaged inside about 10,000 My First Sony CD player boxes. We also launched a promotion this September with Peter Pan Industries. Consumers who purchase any of the My First Sony tape players will also receive two free sing-along cassettes.

Source: Harvey, 1988, pp. [illegible]