

# Hitting the right note

Technology is giving disabled people access to music making like never before

**P**laying and listening to music is an important part of the enjoyment of life, but disabled people have struggled to take part in musical activities.

Now advances in technology are opening up music making to a greater number of people than ever before through novel musical instruments, inclusive music notation and accessible digital recording equipment.

Many disabled people rely on technology to compose, perform and learn about music – from blind people using Braille scores, to physically disabled people using assistive technology to control computers.

“Assistive technology can range from the low tech, such as joysticks or switches instead of a mouse, to hi-tech motion sensors that can harness any physical gesture,” explains Doug Bott, a programme manager at accessible music organisation Drake Music.

Recent developments in electroencephalography have even enabled Mick Grierson of Goldsmiths College, University of London to play musical notes just by thinking about them.

“With the right support and the right teaching there is pretty much no limit to what you can do,” says Tim Burgess, founder of Raised Bar, a music technology training and development company.

“A blind student recently completed a Masters degree at the Birmingham Conservatoire. You have got to be determined to do it, but that is true of anyone doing a Masters.”

Music is more accessible now, agrees Tim Swingler, project director of musical instrument company Soundbeam.

“In therapy, the client may have a drum but they may not be contributing to the music, because they have assistance to hit the drum. With assistive technology they have a choice whether to hit it or not.”

The quality and choice of adaptations is likely to get a boost next year with the launch of a competition to design one-handed instruments that can emulate any of those used in a classical orchestra.

The One Handed Musical Instrument (OHMI) Trust is offering two awards: one for a concept instrument capable of development, for which the winner will be awarded research and development funds, and the other for playable instruments which will be awarded an OHMI-Ars Electronica Prize.

“It is driven by the fact that hundreds of thousands of people with disabilities in the UK, and millions across the world, are excluded from music making because musical

instruments all require two highly functioning hands and arms to play to any standard,” says the Trust.

OHMI is planning that the winning instrument(s) will give public performances in Linz with the Bruckner Orchestra and in Britain with a UK orchestra yet to be decided. The organisers hope that the UK performance will be broadcast nationally.

The OHMI project involves a collaboration between the City of Birmingham Symphony Orchestra, Ars Electronica, Drake Music, and HemiHelp.

Further information on the rules of the competition and how to enter can be found on <http://bit.ly/Ws5BzM>.

Over the following pages we look at some of the key developments in assistive music and the organisations behind them.

## Magic Flute

Some innovators have come up with new technology-based instruments. For example, the Magic Flute is for people who wish to play traditional musical instruments but have no hand or arm mobility.

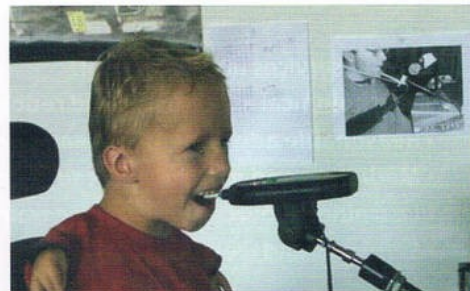
It was co-developed by Ruud van der Wel, the founder of the My Breath My Music Foundation in Rotterdam.

The Magic Flute consists of two separate parts, a flute and a control device with a display. It is fixed to a tripod and blown through a short, narrow pipe. The stronger you blow the louder it sounds, while head movements up and down determine the pitch.

The musician can select different instruments sounds or access the user settings without the help of another person by using ‘sip & puff’ control functions.

As a teaching aid, the display also shows which notes the musician is playing. The Magic Flute can be connected to other electric sound sources, such as a keyboard, a synthesizer or a computer, enabling the user to generate a variety of different instrument sounds ranging from the flute, saxophone, guitar and even percussion.

“The Magic Flute hits two birds with one stone: providing lung training exercise and therapy while opening up the opportunity for



Glen plays the magic flute



the player to participate in music making," explains Ruud van der Wel.

"It has become very popular in the Netherlands, particularly since 11-year-old Glenn won the national television Cappies Award in 2011 playing the instrument."

## Soundbeam

The exotic sounds that can be produced from merely waving at the award-winning Soundbeam raise a smile wherever it is played.

The electronic instrument is a MIDI controller that can be connected to up to four ultrasonic beams and switches to turn movement into sound.

Documentary composer Edward Williams, who wrote the scores for David Attenborough's *Life on Earth* TV series and many other natural history programmes, had the idea for Soundbeam, which he originally saw being used in contemporary dance.



The first model appeared in the mid-1980s and was produced by the British synthesiser manufacturer EMS, who created the synthesiser used in Pink Floyd's iconic *Dark Side of the Moon* album.

The latest version – Soundbeam 5 – has an integrated sound chip that removes the need to connect to an external MIDI instrument. It is called Soundbeam 5 because it has five functions: synthesiser, sampler, amplifier, drum machine and soundbeam.

Individual notes, chords or sounds can be assigned to each beam. The range of the beams, how they react to movement, how many notes or chords they make available and their pitch can all be programmed by the user.

"Soundbeam is quite different to the kind of technology involved in sensory rooms because it demands a certain amount of imagination," explains Tim Swingle, Soundbeam's project director. "It is not a gadget you just turn on and for that reason it does have challenges in training people how to use it."

"We encourage teachers to think of it as a though it was any other kind of musical instrument. You need to think 'what do I need to do to help a child get the best out of it'."

It comes with two libraries: one containing musical instruments, the other recorded samples of sound – geese, spectators at a football match, a tractor and so on.

"It is very programmable. We recently put together a set of sounds for bonfire night. We have tried to square the circle with all the things people wanted to do with it and still keep it simple," says Swingle.

Unlike some other software-based educational applications which involve individual students interacting primarily with a computer, Soundbeam encourages collaborative group activity.

"It is perfect for classroom-based projects designed to encourage learners to gain an understanding of the essential building blocks of music and to assemble these into something creative and original," says the company's website.

To mark 25 years of making music with Soundbeam, the company is inviting its 4,000 users to submit video examples of their Soundbeam work to YouTube, with cash prizes for the best entries.

The judging panel includes Led Zeppelin bassist John Paul Jones, conductor Charles Hazlewood, and Edward Williams himself. Submissions – closing date is Friday April 12 2013 – should be of new and original Soundbeam work in any style or genre uploaded as films on YouTube of at least two minutes duration. Audio only recordings are not acceptable.

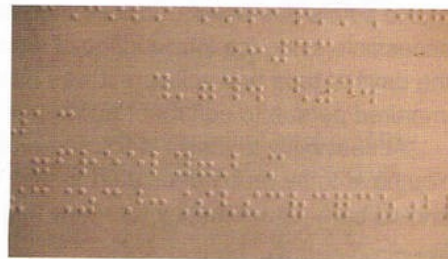
## Prima Vista Braille Music Services

Up until now, blind musicians have had to rely on charities and other organisations to produce transcriptions of the works they needed to access. This was often a lengthy process with no guaranteed delivery date.

However, Lydia Machell, of Prima Vista Braille Music Services, has developed innovative software, launched in 2011, that makes it possible to mass-produce Braille music for the first time.

The software works directly with publishers' digital scores, files which are produced as part of the print production process. The system earned a US patent in 2011, with a European patent pending.

Music publishers allow Prima Vista



Prima Vista has made Braille music more readily available





access to copyright material in return for a small royalty on sales.

There are currently nine major publishers working in partnership with Prima Vista, with others preparing to join the scheme. Prima Vista is a member of both the Music Publishers Association and the

UK Association for Accessible Formats.

Existing Braille music libraries tend to concentrate on classical music. Prima Vista is creating a diverse catalogue of works ranging from pop and jazz to piano methods, exam pieces and full-scale choral works. Prima Vista's customers include music students and teachers across Europe, North America and Asia.

Prima Vista sells its Braille editions from its website where customers may opt for downloadable scores or embossed scores delivered by post.

## Dancing Dots

The American company Dancing Dots has also developed technology to make it easier for sighted musicians to produce Braille scores.

Founder Bill McCann developed Goodfeel, software that enables musicians to prepare a Braille score without needing to be a Braille music specialist.

Users can scan a score or import MusicXML files from Finale, Sibelius and other notation programs. Then use a program called Lime to edit the score with a PC or MIDI musical keyboard before outputting it as Braille.

## Raised Bar

Tim Burgess was a semi-pro keyboard player until he lost his sight in his early twenties. He retrained as a programmer, but seven years ago returned to music, helping musicians to access notation and audio technology and setting up a company called Raised Bar.

He points out that sound recording has become less accessible since the introduction of digital technology. In the days of tape and scissors it was easier for a visually impaired person to edit recordings.

"Accessibility to music is the same as a car in 1908. You have to be pretty dedicated to take it on. But this should be a natural hobby for many more visually impaired people," he told *Ability*.

Last year he began an ambitious project to build an accessible mixing desk that replaces the knobs, sliders and displays on a conventional device with accessible

voice operated controls.

The SurfaceReader uses off-the-peg screen reading packages (Jaws, Window-Eyes, Dolphin Supernova, System Access and NVDA) to make MIDI-based control surfaces talk.

It is designed to run in the background, intercepting messages going between a commercially available digital audio workstation and its control surface.

Using SurfaceReader hardware controls announce their names and provide feedback such as which function a control is set to.

The project was developed from Burgess's earlier Mackie Display Reader application. A complete rewrite of the original concept was made possible by a donation from the Elizabeth Eagle Bott Memorial Fund, administered by the Royal National Institute of Blind People.

"We pretty much have SurfaceReader doing what we want it to do. At the moment we are providing protocol rules for five devices with two more to follow," says Burgess. "We just need a bit more work on documentation to help users develop their own configurations and to share them."

If you are an electronic musical instrument manufacturer or an audio-based software house, there are very good reasons why you need to be talking to us, Burgess continues.

For each item of equipment you produce which is made accessible, you are presented with a direct sales opportunity. For every piece of midi equipment you make accessible, you are gifted a loyal customer."

## Full Pitcher Music Resources

Audrey Podmore of Full Pitcher Music Resources says when she used music technology to provide workshops for people with a wide range of special needs, it involved carting around a carful of hi-tech equipment.

*continued on p26*

**Join the Band**  
Play the Magic Flute

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"Now, the built-in sounds are good and portable computers are powerful enough to use virtual sound libraries of the highest quality," she says.

Computer access, which for many required control boxes and lots of switches with trailing leads, can often now be achieved with one simple mouse replacement.

"These developments mean that music leaders no longer need lots of IT skills and setting up time, and more can contemplate using a computer to resource their music sessions," she adds.

Full Pitcher has developed computer grids for music making: the company's MIDGrid software displays up to 200 boxes that can be assigned notes and chords.

The notes are selected by a mouse, trackball or joystick and played back through the host system's soundcard or an instrument that uses the midi standard.

"This year, I published GridPlay for carers and teachers," says Podmore. "This is a playback version of MIDGrid grids (each of which is a mini-application) and an e-book on using the grids with severely disabled people, all the fruit of 35 years experience in the field."

## Drake Music

Drake Music has been promoting the use of assistive music technology since 1998 through courses and programmes that bring disabled and non-disabled music students together.

Teaching is done in Bristol and the South West, Manchester and the North West, and London and the South East.

At the end of 2011 the charity launched Introduction to Music, an accessible music course devised in association with the Open College Network South West Region.

The course combines practical performing and composing activities with learning and assessment resources for Clicker 5 software, which is physically accessible to almost any student.

Bradley Warwick, the first student to take the course, uses two switches to control the Clicker 5 software on his computer. He has been able to learn about key musical concepts, watch films and listen to audio clips. He also completed a range of assessment tasks using Clicker, without adult intervention.

Products developed by Drake Music include E-scape, PC-based music composition software using switches and scanning, and the MidiCreator switch and ultrasonic beam MIDI controller.

"Although we're a small organisation we have big ambitions, and we see the next couple of years building on the work we have undertaken and increasing our reach," says Carien Meijer, chief executive of Drake Music.

"Technology is providing opportunities for us to find new ways to both make music and collaborate and

increasingly to share resources."

## The Quintet

Click2Go's the Quintet is a music machine that can be operated by any type of switch. The device is designed to be used by teachers, therapists, parents and others who want to use music in an activity with children or adults.

It can be played by up to five people. Each player can step through the notes of a song, tap a tempo, play the chords of a melody or trigger complete passages of songs.

There are 128 different instruments to choose from,



with each user playing a different one at the same time. There are accompanying memory cards with 10 songs on each. The card is plugged into the back of the machine to transfer the songs across.

A 10 position rotary switch on the Quintet's front panel enables users to choose which song they want to play.

Because a user does not need to be an expert in music to operate the Quintet, says Click2Go, it can be used in many situations including classroom activities, music therapy workshops, occupational therapy sessions and much more.

## Links for further information

Click2Go – [www.click2go.ie](http://www.click2go.ie)

Dancing Dots – [www.dancingdots.com](http://www.dancingdots.com)

Drake Music – [www.drakemusic.org/](http://www.drakemusic.org/)

Full Pitcher Music Resources – [www.fullpitcher.co.uk/](http://www.fullpitcher.co.uk/software)

Magic Flute – [www.mybreathmymusic.com](http://www.mybreathmymusic.com)

Midi Grid – [www.midigrid.com](http://www.midigrid.com)

Prima Vista Braille Music Services – [http://](http://primavistamusic.com/)

Raised Bar – [www.raisedbar.net](http://www.raisedbar.net)

Skoog – [www.skoogmusic.com](http://www.skoogmusic.com)

Soundbeam – [www.soundbeam.co.uk](http://www.soundbeam.co.uk)

The One Handed Musical Instrument (OHMI) Trust – [www.ohmi.org.uk](http://www.ohmi.org.uk) ■



# Why the Skoog is no square

The distinctive Skoog cube is delighting players of all capabilities. Here is the story of how the instrument came about

In late 2006, a team of researchers from the University of Edinburgh teamed up with a group of education specialists called The Tapestry Partnership.

"Their goal was to change the fact that there was no musical instrument designed specifically for children with physical and learning disabilities," says David Skulina, chief executive of Skoogmusic.

The partnership wanted to produce an instrument that would meet the needs of children with a broad range of disabilities and that would allow them to learn and progress as musicians on an equal footing with fully able children.

By 2008, the first prototype musical instrument was ready and the two lead researchers, David Skulina and Ben Schögler, began working extensively with teachers and pupils in special schools across Scotland to hone and develop their ideas. The prototype was the first version of what would become the Skoog.

The Skoog is a new musical instrument that uses cutting-edge technology to give the control, nuance and expressivity of traditional musical instruments to those who, for one reason or another, cannot pick up and play such an instrument.

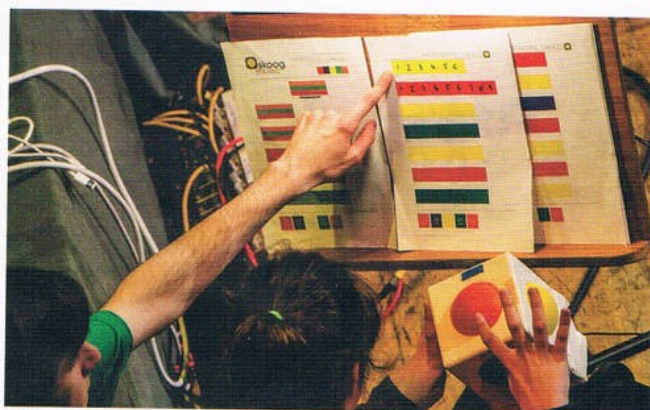
"The Skoog can give children the same control over sound as a violinist has over a violin, or a flautist over a flute," said Nigel Osborne, the British composer.

In 2009, Skulina and Schögler formed Skoogmusic, a spin-out company of the University of Edinburgh, and the Skoog was officially launched to the education community at BETT 2010, the tradeshow for education technology.

The Skoog is now widely used in special needs classrooms across the UK and around the world. This year it made the transition from the classroom to the stage, with a Skoog soloist with cerebral palsy featuring alongside a mainstream ensemble as part of the London 2012 Cultural Olympiad.

But what exactly is a Skoog? Roughly hand-sized, the Skoog is a soft, spongy cube that plugs into a computer or laptop's USB port. By touching, pressing, squashing, twisting or tapping the Skoog's five colour-coded sides, users can play a wide range of instruments.

Dynamic sensors within the Skoog respond to the user's movements, and the software converts these movements into sound via attached loudspeakers



Skoog scores at Drake Music Scotland's Technophonia

or headphones. The Skoog uses physical modelling synthesis to mimic the behaviour of real musical instruments and this creates a direct correlation between the gestures a player makes while interacting with the Skoog and the sound that is produced.

It is "one of the most exciting technological developments for disabled children and adults of any age, for some time," says Petrina Lodge, head of education at Meldreth Manor School.

The software is extremely simple to use, which makes it ideal for use in the classroom, as teachers need no specialist knowledge. There are currently around 20 physical modelling instruments and it even has a built-in sampler so users can record their own sounds.

This opens up the opportunity for using the product in other areas such as literacy and numeracy, or speech and language therapy, and it comes with a number of pre-recorded samples (singing, animal noises and so on).

The Skoog can also be used as a MIDI controller to interface with other programs and devices such as synthesizers, samplers and sequencers.

Because the surfaces on the Skoog are colour-coded, music can be written out in the form of graphical 'skores' using coloured blocks to show the user which button to press and for how long. There is a raft of support material, resources and tutorial videos available from the Skoogmusic website.

One of the latest features of the Skoog software is music-box mode. Instead of assigning different notes to different faces of the Skoog, a sequence of notes is pre-determined so that each time a player touches the Skoog the next note in the sequence sounds.

Designed for people with limited movement, the player still controls how and when each note is played and retains full control of expression, tempo and articulation.

"From musicians who want to experiment, to disabled children who may struggle to play any instrument, the Skoog creates a level playing field for interaction and integration with players of all capabilities," says Skulina. ■ [www.skoogmusic.com](http://www.skoogmusic.com).