

The SKUG Centre Playing and composing without limits

Resource centre for inclusive music education



Playing and composing without limits

The SKUG centre is a part of the Culture school (for art and music) in Tromsø, with the aim that anyone who wants to play a musical instrument or compose music has the opportunity to do it, regardless of their level of disability. SKUG's instruments can be customised to each individual student to enable them to play, and hopefully master an instrument. Sometimes this can be done with very small adaptations or adjustments, but some situations require custom flexible instruments. Music and computer technology linked together provide many possibilities for making custom instruments for each individual, which can be played with a single, possibly tiny, body movement, or even just by moving your eyes!

As well as playing individually or together, SKUG students also cooperate with other students in the Culture school, with everyone getting the opportunity to play together in concerts and performances.

Staff at the SKUG centre



Elin Skogdal Music teacher / technology developer / administrator



Einar Berg-Olsen Music teacher / technology developer / administrator



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This page (QR code) describes the SKUG centre's presentation at the conference "Inclusive Art Education", held by the Norwegian Centre for Art and Culture in Education, October 2016:

It includes a video of Dr. Tim Anderson giving his views on the significance of the SKUG Centre nationally and internationally.



Contents

| Playing and composing without limits | 2 |
|--|------|
| Inclusive music education at the SKUG centre | 4 |
| How we work | 5 |
| Teaching | 5 |
| Special projects and development work | 6 |
| Spreading knowledge | 6 |
| Teaching | 7 |
| SKUG teaching at the Culture school | 7 |
| SKUG teaching in kindergarten | 7 |
| SKUG teaching in primary school | 8 |
| Music department at College | 8 |
| SKUG students at University | 8 |
| Assistive Music Technology used by the SKUG Centre | 9 |
| E-Scape | 9 |
| Eye control | . 10 |
| Colour keyboard | . 11 |
| Switch colour keyboard | . 11 |
| E-Musicing | . 12 |
| Apollo Ensemble | . 13 |
| Magic Flute | . 13 |
| Ableton Live and Reason | . 13 |
| Collaboration | . 14 |
| SKUG Centre projects – a timeline | . 15 |
| Future Plans | . 18 |
| Links and resources | . 19 |
| Links to the SKUG Centre's collaboration organisations | . 19 |
| Contact information | . 20 |

Inclusive music education at the SKUG centre

The Culture school's philosophy is that "All should succeed", and years of systematic development work by the SKUG centre means that many more people can now be included in the term "all".

The target groups for the SKUG Centre are people with disabilities who need an adapted musical instrument or composition tools to learn to play or compose. Some people can only move their eyes, a foot, or a finger, or have reduced control of their movements. To have access to, and learn how to play, an instrument with your eyes or other small movement means the difference between being able to actively participate or just be a passive spectator. Custom musical instruments and methodologies also create more opportunities for students with learning disabilities. The pathway from starting to learn how to play an instrument to being able to create music can be made shorter and learning can be divided into small steps.



The instrument is adapted to the musician

The 1998 Norwegian Education Act states that "training shall be adapted to the abilities and the guidance of the individual student...". The 2006 United Nations Convention for people with disabilities states that: "Mankind should take appropriate measures to give people with disabilities the opportunity to develop and utilise their creative, artistic and intellectual abilities, not just for the sake of itself, but also for the enrichment of the community". The Convention also states that to be denied reasonable arrangements should be considered as being discriminated against because of a disability.

The Anti-discrimination and Accessibility Act (DTL) was introduced in Norway on 1st January 2009, to give people with disabilities protection from discrimination. The law applies to all social situations.

The new structural plan for Culture schools in Norway describes how culture schools should serve as a local resource centre. The SKUG Centre has an active role as such a resource centre, and partners with kindergartens and schools to help them to better meet the requirements of teaching where *everyone* can participate.



Arne and Øyvin Kristoffer playing, using head switches

How we work

Teaching

Depending on the situation, students either come to the SKUG centre for their lessons, or are visited by SKUG staff at their own school or kindergarten. Teaching focuses on the learner exploring music, finding "his" instrument, then learning how to play this instrument in individual or group sessions. Interaction is an important part of learning how to play, so our aim is for students to have tuition in groups, building social and professional relationships, and performing music together at concerts.



James Bond concert

Although the SKUG centre operates as an independent education facility, we want our students to feel included in the Culture school. We therefore often cooperate with other music students and students from other disciplines. For example, in 2016 we created a multi-media performance working with authors and artists from Gaza, along with music and theatre students from the Culture school.



Gaza concert – performance of piece composed for keyboard switches, alongside trombone with filter, with recited poems from the Tamer institute in Gaza.

Special projects and development work

As well as supporting internships for NAV (The Norwegian Labour and Welfare Administration) for short periods, the SKUG Centre has two employees with disabilities who perform an outstanding job as composers, musicians and instrument testers. Through the creation and performance of their music, they show what is possible, and they are important employees helping to determine whether new musical instruments can really work for those who use them. Development of new instruments, methodology and teaching materials is in line with



The SKUG group rehearse

the new structural plan's focus on the important role of Culture schools in local development work and research.

The SKUG Centre utilises systems, and distils and extracts ideas from music technology, game development, and accessibility technology specially designed for people with disabilities. SKUG employees, working with their students, have completed several research and development projects in which new instruments are developed, tested and assessed, then used for teaching. All such development work is based on observed needs and feedback from students. In this way, the people who play the instruments are important participants in the research and development work at the SKUG Centre.

Spreading knowledge

The SKUG centre is keen to disseminate the knowledge it has gained – it does this through presentations at meetings and conferences, project work and writing of articles and book chapters.

To expand and share our knowledge we have built up an international network of organisations and contacts, both practice-based and academic. We meet regularly at conferences, meetings, workshops, and through research networks. One of the bands at the SKUG Centre visited and played with a group of musicians with disabilities



Tim and Einar at work at the SKUG Centre

in Edinburgh, and we've had visits by professionals and disabled musicians here in Tromsø. In June 2017 SKUG held a 10 year anniversary conference, which was a meeting point for professionals from all over Europe.

By presenting music and information about all the possibilities for supporting inclusive music education, we hope to inspire others to take advantage of the opportunities which are available, and create a more diverse picture of who can be a music student / musician. The SKUG Centre provides courses for children, youth, teachers, parents and assistants. The best way to get acquainted with new ways to play is to try yourself! The SKUG Centre also provides advice, sales and set-up of custom musical instruments for kindergartens, day-care centres, schools and individuals.

Teaching

SKUG teaching at the Culture school

Most of the regular music education takes place at the Culture school in Tromsø, mainly in the SKUG Centre's room. This contains many computers, a lot of custom music technology and even more enthusiasm from students and teachers. When we teach student groups there is not much room left to move around the room, but good music will be made!

The students ages range from 5 to 55, and although some students have individual sessions, most of them play in groups. Getting a group education gives each student the opportunity to develop individually and interactively. We also build up the social environment in the groups, and the students "push" and inspire each other to practice and develop further.



The SAFD group plays with eye control, colour keyboard, switches and sensors

According to the Culture schools' structural plan, all students should have the opportunity to learn, create and perform music. At the SKUG Centre, all students get an instrument that is adapted to let them play independently. One of the aims of the teaching is that everyone should learn to play their instrument so well that they can participate and interact with other musicians, and all students are given the opportunity to play concerts or performances. We often perform music where there is a mix of custom music technology and traditional musical instruments. For example, a student at the Tromsø Conservatory of Music has composed and performed a piece for Xbox controller/E-Scape and Cello.

SKUG teaching in kindergarten

The SKUG Centre has undertaken several projects in a kindergarten in Tromsø, and in recent years there has also been regular education in one to two kindergartens. The kindergartens are perhaps the most inclusive venue we are working in, where all the children participate in the vast majority of activities and all "rush" around each other. The children are used to someone needing more help and, for example, playing special instruments. All the children think this is exciting and want to participate in music lessons to experience and explore music with our students.

SKUG teaching in primary school

The main desire of SKUG is that all schools should have some custom musical instruments that can facilitate *everyone* in the school to participate in regular music lessons. For example, a student who

can play the chords of songs with a switch can be resource who can accompany the rest of the class. There is a more work to do in this area, but through the projects we have conducted with groups and classes we see that it is possible to include all students in music education using appropriate instruments. The importance of singing as an instrument in primary schools and kindergartens has inspired us to make it easier for students without speech to 'sing' using a switch to play an instrument with sampled (digital audio) song phrases.



Music lesson with assistive music technology as an instrument – enjoyed by *all* the children!

Music department at College

The music department at Kongsbakken High School offers specially adapted music education for students aged 16-19. The SKUG Centre has collaborated with students and teachers over the years in various projects, concerts and knowledge development.

SKUG employees Øyvin Kristoffer Solberg and Vibeke Aagaard Johansen both started their career and development towards becoming professional music workers in the music department there. For students from the SKUG Centre who wish to pursue music further, it is important that they can start specialisation at a college that facilitates everyone to learn music.

SKUG students at University

The Conservatory of Music in Tromsø (part of UiT, Norway's Arctic University) has been open to adapting courses for students who play a "special" instrument, and may need to apply alternative methods to complete subjects.

In collaboration with NAV, the SKUG
Centre's two music workers have completed
an adapted education course. There have
also been several music students who have
studied with alternative learning
programmes and assessments, adapted
instruments or methodology. The SKUG
Centre has taught on, and been advisers for



Student using an Xbox controller with E-Scape as her main instrument

the development and implementation of this type of study. We see the need for this to be further developed into more permanent and formalised inclusive study opportunities. This will provide new knowledge for all students and teachers, and this knowledge and experience will also enable students to take part in working life.

Assistive Music Technology used by the SKUG Centre

Assistive music technology involves a combination of various systems, eg computer programs, synthesisers, controllers, sensors or switches. The SKUG Centre builds and tries out technological solutions with particular system combinations and settings that create new "instruments" adapted to the needs of an individual student. Below are some of the instruments used by the SKUG centre.

E-Scape

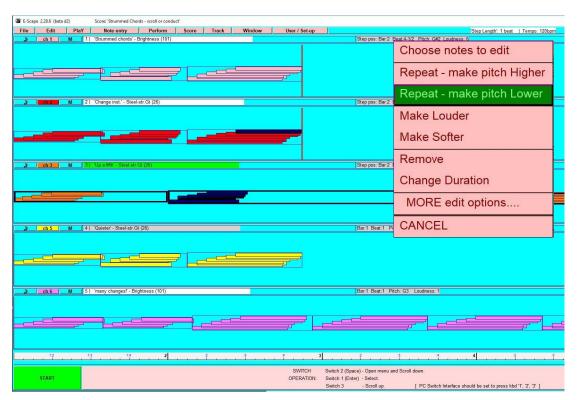
E-Scape is specialist music software developed by Dr. Tim Anderson (Inclusive Music). It enables almost anyone to play music live, and can act as a musical instrument for a single musician or a group.

It can be played in many different ways – eg using switches, sensors, keyboard, mouse, eye control or MIDI instrument.

A composer can also control all its functions to compose their own music, eg choosing pitch, rhythm, instruments, etc. via a series of menus.



Øyvin Kristoffer composing using two switches

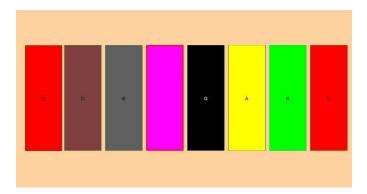


Performing live with E-Scape, or composing with switch-controlled menus

Since their formation, the SKUG centre has collaborated actively with the developer, testing and suggesting features and improvements.

Eye control

An E-Scape 'Performing Screen' displays graphical "buttons" containing music (a note, chord or phrase), which play as soon as the musician looks at a button. To make it easier for a beginner, you can set the buttons (eg with phrases) to only play in a pre-determined order, to make the song sound "correct".



Eye-controlled C major scale



SKUG musician playing using eye control



Eye controlled playing with improvisation

Each button in this screen has a picture of an accordion and a phrase that is part of an improvisation. Students can choose freely what phrase to play and so create their own performance. The same system can also be used on a touch screen where you play by touching the button you want to play.

Colour keyboard

Colour keyboard is another part of E-Scape, utilising the Figurenotes coloured graphic notation system (see links at end). With notes on a score display, some students find it hard to focus on where they are in the score and what the next thing they are going to play is. In colour keyboard, the keyboard keys are labeled with colours, and matching colours are shown for each note on the computer score display. If the student plays the wrong key, the correct note on the screen blinks, but nothing plays. When the correct key is played, the note plays, and then disappears from the screen. Thus the first note in the display always shows the next key to be played. This makes it far easier for anyone to learn to play tunes and chords even if they can not read music.



A pupil plays Colour keyboard

Switch colour keyboard

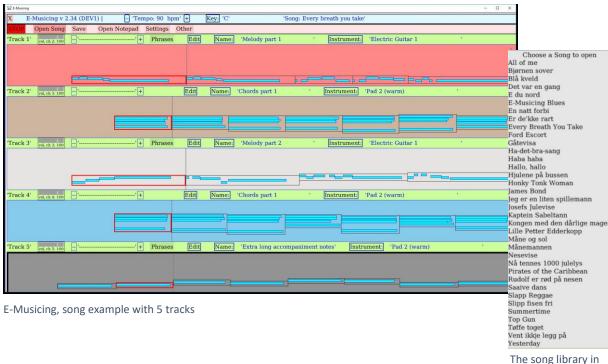
This instrument was developed by the SKUG team as an alternative to Colour Keyboard, replacing the keys of the music keyboard with switches that use the same colour system. The advantage of this is the ability to place the switches further apart, and to take away any switches which are not used in the song. This makes the system even easier to begin with and learn how to play, even for students who do not have good fine motor control. The instrument has a wireless link to the computer, making it easier to place wherever needed.



Switch Colour Keyboard

E-Musicing

The E-Musicing software was developed by SKUG in collaboration with Tim Anderson (with support from Sophie's Minde charity), and acts as a switch-operated songbook. Each song can contain instrumental notes or phrases, or digital audio samples, which can be played in turn by one or more musicians, each using a switch. Songs are designed for different age groups, and also how the student is able to use a switch (eg with slow or faster movements).



The song library ir E-Musicing

The instrumental notes can be played using the computer's built in synthesizer, but for better instrument and sound quality, one can use a softsynth such as Coolsoft Virtual MIDI Synth (donationware, see links at end).

E-Musicing is designed to be very easy to use for musicians and teachers/helpers, and does not require you to know a lot about music or technology.

When you open the software you can choose a song from a library which is then ready to play. You can also display the song lyrics with chords so that they can be sung and played on other instruments as well. An online library to provide more songs is also under development.

Kaptein Sabeltann



Lyrics and chords for the song "Kaptein Sabeltann"

Apollo Ensemble

Apollo Ensemble is a system which enables you to play music or control pictures, video and lighting, using a wide variety of switches and sensors, game controllers, or other devices.

The SKUG centre use it in conjunction with E-Scape, and the combination provides us with countless opportunities to create customised instruments. This system is used in weekly teaching, and also to create performances or concerts where students can play music, but also control light and images at the same time.



Playing using switches which also controls the lighting

Magic Flute

Magic Flute is a wind instrument where you do not have to use your hands to play the different notes. You blow into a mouthpiece, then use head movements to change the pitch up and down. This is a stand-alone instrument, or it can be combined with software like E-Scape or Apollo Ensemble. The instrument is particularly suitable for improvisation, but you can also learn to play tunes.



Student from 'My Breath My Music' in Rotterdam playing Magic Flute.

Ableton Live and Reason

These are examples of software that offer many musical and sound creation options in combination with the systems listed above. In the SKUG centre, these programs are used to bring the music to "a new level" with very good instrument and sound quality. They provide many facilities to use switches and sensors to control sound effects, tone colours, filters and loops, in an expressive way.

Collaboration

The SKUG centre works with many other organisations:

- Schools and kindergartens Projects and collaboration are described in the "Teaching" section.
- NAV (The Norwegian Labour and Welfare Administration)
 - They provide financial assistance that enables people to get help with daily tasks and facilitate them working. This scheme allows the two music workers at the SKUG centre to work two days a week.
 - Their Assistive Technology Centre can, on application, provide students with custom musical instruments that they can use at home or in recreational activities.
 - o They have cooperated with the SKUG Centre to provide work training for individuals.
 - They support the development of aids and working practices, and for several years have backed major projects and development work by the SKUG centre.
- Day-care centres Two employees and several of our students have day-care places, and it
 has therefore been important for us to have good collaboration with the centres, and have
 regularly had concerts and workshops there.
- Living care / housing service Many of the SKUG centre's students live within, or in the short- term are supported by, living or care services. Their staff are responsible for getting students to rehearsals, concerts or regular music lessons, or ensuring they do the required preparations. We have developed good working relationships with these services, with which we keep contact, and have systems to make sure information about plans is sent and acted upon both ways. In turn, the services can see the value and importance of the students coming to lessons and concerts.
- Networking with professionals from different disciplines Managing inclusive music
 education requires knowledge of a variety of subject areas, for example alternative
 communication, ergonomics, and computer and accessibility technology. In order to provide
 the best possible service to students, it has been important for us to keep in touch with
 different professionals and academic centres that can give advice if necessary. One of our
 key partners is the National Centre for Art and Culture in Education, in Bodø.
- Foreign collaborators As we have found no one in Norway working with inclusive music technology in the same way as the SKUG centre, it has been very important for our professional development to keep in touch with institutions or organisations around the world who are doing similar or related work. The SKUG Centre is part of a research network at Huddersfield University and keeps in regular contact with other organisations in the Netherlands, England, Scotland, Ireland and Finland. The SKUG Centre has also participated in conferences on Assistive Music Technology in New York over Skype, and we are continually looking to contact others practicing in the field who can inspire and further develop our work. At the back of this booklet is a list of links to all our collaborating organisations.

SKUG Centre projects – a timeline

2003 - 2005:

First SKUG project – a collaboration between the NAV Nonite, Culture school and the Conservatoire in Tromsø.

2007:

- Workshop at Prestvannet school, Hagen (November).
- Opening of the SKUG centre (12th December).

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Opening of the SKUG centre

2008:

- Composition of music for the opening of the Northern Lights Festival (January).
- Workshop with student and teachers at primary school and Culture school (April).
- SKUG music workshop (June).
- Insomnia Festival workshop and concert at the Culture school (October).
- Music performance and presentation at the NFU Conference in Oslo (November).

2009:

- Composition of the music for the opening performance of the Northern Lights Festival, Tromsø (January).
- Presentation and concert at the ISAAC Conference at Sundvolden (April).
- SKUG training course for teachers (May).
- Soundroom project an interactive sound, light and music installation visited by school classes (June).
- Insomnia festival-workshop and concert (October).
- Project developing "Sensors with musical expression" in E-Scape (October).



Northern Lights Festival, 2009

2010:

- Development project for the "touch-screen" instrument in E-Scape (January).
- Music project at Nansenveien kindergarten (February).
- Workshop at two schools in Manchester with Doug Briggs (April).
- Workshop at Trøgstad and Mysen culture school, supported by the Culture School Council (June).
- Installation "Movement to Music" at the Insomnia festival (October).



Music and lights controlled by switches and sensors at the Insomnia Festival, 2010

2011:

- Music project at Nansenveien kindergarten (April)
- E-Scape-training courses for teachers from around the country (March).
- Music project with Prestvannet school, with funding from the national project "Kulturskoleløftet" (March).
- Workshop in Rotterdam with Ruud van der Wel, My Breath My Music (June).
- Music project with Prestvannet school (November).

 Participate in the inaugural meeting (creation) of the Research Group for Adaptive Music Technology at Huddersfield University (November).

2012:

- Project / performance 'Movement Suite', supported by the Culture Council (June).
- Reception at the Royal palace, Oslo for projects supported by Princess Märtha Louise's Fund (September).
- Project to develop the instrument "Xylotouch" instrument for expressive playing, also with the support of Princess Märtha Louise's Fund (October).
- Project 'Music technology as an instrument in class', supported by "Kulturskoleløftet" (November).



Movement Suite - dancers and musicians interacting with switches and sensors

2013:

- Project at Nansenveien kindergarten, supported by "Kulturskoleløftet" (March).
- 'James Bond' concert produced and performed for schools (June).



Mathias, Frode and Sigurd playing a concert

- Workshop in Rotterdam (August).
- Lecture and workshop for PA caregiver students in Harstad (September).
- Meeting of the research group at Huddersfield University (november).
- 2nd project at the Nansenveien kindergarten, supported by the Culture school (November).

2014:

- Presentation at the Conference "Network for culture school related research" at the Norwegian Academy of Music (February).
- Knowledge exchange with teachers from Treloar special school (Hampshire, England), and other teachers in London (March).
- Release of a chapter written by the SKUG centre in the book "Inclusive practices: good experiences from the kindergarten, school and leisure" Universitetsforlaget (April).
- Project to develop "E-Songbook" switch-controlled song book software (June).
- Testing of E-Scape eye-controlled music-making system in Bristol and London (August).
- Lectures for PA caregiver students in Harstad (September).
- The SKUG centre band "Flame Wheels" visit and interact with disabled musicians in Edinburgh (October).



Flame Wheels band – Frode and Anders playing in Edinburgh

2015:

- Presentation at the 'Enable Ireland' conference / seminar, Dublin (February).
- Einar Berg-Olsen and Elin Skogdal completed their masters degree "The Music of Possibilities", based on research into their own practice at the SKUGcentre (February).
- Presentation at the conference "Aesthetics and children with special needs" at Oslo and Akershus University College (April).
- Project to expand facilities for adults in E-Songbook, with testing at Tromsø Day-care Centre (April).
- Performance of 'Peter and the Wolf', with SKUG students playing in collaboration with dance students (May).



Peter and the wolf concert

- Project "Find sound" loop-based music for musicians with little or no movements (June).
- Workshop in Rotterdam (August).
- Lectures for PA caregiver students in Harstad (October).
- Project to develop the "Colour keyboard" instrument (October).
- Presentation at Culture school open days in Tromsø (November).
- Presentation / demonstration at the SAMBA [National Centre for Art and Culture in Education] Conference, Kristiansand (November).
- Presentation / demonstration at music therapy conference in Bergen (November).

2016:

- Conference and workshop with Cork Music Works, Cork, Ireland (May).
- Multi-media show "It's not too late to dream" with SKUG musicians, drama students, and writers and artists from Gaza (June).
- Project "Eye-controlled musical instrument" [to further develop and improve Eye-controlled playing], supported by Sophies Minde and Princess Märtha Louise's Fund (June).
- Eye-controlled musical instruments knowledge exchange in Bristol (August).
- Project "New musical instruments" [to give switch players expression and improve colour keyboard], supported by Sophies Minde (September).
- Major year-long project to develop new "E-Musicing" software songbook, supported by Sophies Minde (2016-2017).

2017:

- Awarded the "Equality Award" for 2016 from NFU Tromsø!
- Project "A musical instrument for all!", supported by NAV.
- SKUG International Conference for adapted music making, with professionals from all over Europe meeting for collaboration and knowledge sharing (June).

Future Plans

- Larger rooms with more facilities To expand and continue the development of the SKUG Centre, the provision of more space with additional specialist facilities is absolutely necessary in order to provide a better and more comprehensive service to current and new students, music workers and teachers.
- Recruitment and training of more teachers and developers It is very important to find
 or train more teachers who have the knowledge needed to be able to provide good
 teaching and attend to all students. Here, the Music Conservatory at UiT (The Artic
 University of Norway) will be an important cooperation partner, working with the SKUG
 Centre to create Further Education courses in assistive music technology for music
 teachers, as well as to develop more knowledge about how inclusive music lessons can
 form part of a course of study in music.
- Adapted study places at the Music Conservatory The Music Conservatory is working to
 get funding for four student places which are aimed directly at student applicants where
 both physical facilitation, and subject content and methodology need adapting to the
 individual's needs. These adaptations should meet the obligations inherent in the
 Norwegian Anti-discrimination and Accessibility Act (section 9 and 11-12), and in the
 UN's Convention on human rights (article 24), in which the parties are obliged to ensure
 inclusive education at all levels.
- Spread the knowledge locally, nationally and internationally The Culture school in Tromsø is the only one in the country with a specialist music resource centre where assistive music technology makes it possible to cater for all students. Internationally also, there are only a few and scattered academic environments to be found within this field. There is great need for the spread of knowledge so that students at all levels in education courses can take an active part in music teaching. More inclusive music teaching will create more space and opportunities than they presently get, for people with disabilities to present their artistic expression in concert halls, and in voluntary and professional music life.



Rehearsal before final exam concert at the Music Conservatory. The piece "Electronic Dream Drone" was composed and performed by student Alina Fismen Bjerkli, playing Xbox controller/E-Scape/Reason, accompanied by Mario Machlik, cello.

Links and resources

On the website of the Culture school in Tromsø, the SKUG centre has a collection of useful links about inclusive music teaching and assistive music technology. This is updated regularly, and we would like to have new, good links on this list.

The page address is: http://kulturskolentromso.no/Musikk-og-instrumenter/SKUG/Linksamling or use the QR code:



Links to the SKUG Centre's collaboration organisations

Inclusive Music, Dr. Tim Anderson, York, UK http://www.inclusivemusic.org.uk/

Stiftelsen Sophies Minde https://www.ssm.no/

Nasjonalt senter for kunst og kultur i opplæringen

(The National Centre for Arts and Culture in Education, Norway)

http://www.kunstkultursenteret.no/

My Breath My Music, Ruud van der Wel, Rotterdam, Netherlands

http://www.mybreathmymusic.com/en/

Apollo Ensemble, Mark Hildred, York, UKhttp://www.apolloensemble.co.uk/

OmniMusic, Manchester, UK http://www.briggsaccordions.com/home.html

SoundOut, Dr. Grainne McHale, Cork, Ireland http://www.musicgeneration.ie/blog/article/music-

generation-cork-citys-soundout-director-and-tutor-grainne-mchale-pres/

Open Up Music, Bristol, UK http://openupmusic.org/

ElectroAT, Dublin, Ireland http://electroat.com/

Drake Music Scotland, Edinburgh, UK http://www.drakemusicscotland.org/

Figurenotes http://www.figurenotes.org/

Resonaari, Helsingfors, Finland http://www.helsinkimissio.fi/resonaari

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