



Digital R&D Fund
for the Arts

Making Digital Work: *Accessibility*

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Sharing the learning
from the Digital R&D
Fund for the Arts



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Accessibility

The UK has a long and proud history of supporting and producing work by disabled artists and those artists and organisations are constantly evolving their practice in response to what new technology can offer.

Over the years there have also been advances in support of audiences with access needs, providing them with additional services such as audio description, captioning and signed performances. These services to date have generally tended to be bolted on to existing performances rather than natively designed and built into the overall experience. This is one of the opportunities that digital presents — new ways of using technology to support both artists and audiences in as seamless, convenient and authentic way as possible.

Accessibility is one of the major learning themes from the Digital R&D Fund for the Arts. The accessibility work across the R&D Fund projects has mainly been focused specifically on improvements for disabled people. But as the projects have reported, improving access for a targeted section of an audience often improves it for all. The user testing that makes a better product for disabled people in an audience has benefits for everyone.

In this guide you will find five articles which each explore a key principle to making accessibility work.

Jo Verrent is Senior Producer at Unlimited and a disability arts consultant with a particular interest in accessibility.

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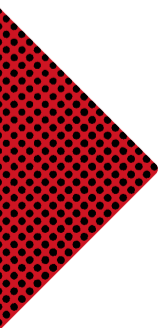
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Audience Focused

Autism is a lifelong condition that affects how a person relates to others and can make it difficult for them to interpret situations or make sense of the world around them. The isolating nature of the condition can make this an extremely difficult audience to reach.

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Written by Gaynor Aaltonen,
a specialist in design and
wellbeing.

Autistic children tend to need very clear structure in their lives and often a very set daily routine. New experiences can be daunting.

So could autistic children be helped to enjoy the anarchic environment of a circus? Quite a task. Circus Starr is, as they say, a 'Circus with a Purpose'. The not-for-profit troupe travels the country and hands out over £1.3 m-worth of free tickets a year, giving disadvantaged children the chance to go to a live performance. After many years on the road, though, the circus was beginning to realise that autistic children were missing out. There is a huge spectrum at play in autism, but many children are nervous of new situations, flashing lights and loud noises. To get the most out of their free tickets, children needed to be able to prepare for their visit in advance.

When Circus Starr decided to tackle the problem by producing *Show&Tell*, an interactive *Social Story*[™] app, Nesta's interest was piqued. Designed for children to use with parents and carers, through a range of images, audio, footage and text the app would help children visualise and explore an experience in advance. Could this be a project that other creative organisations could benefit from directly? If a digital app could calm the fears of autistic children in one situation, could the same idea apply in other situations or with other artforms?

In the final app children can edit the material themselves and upload their own captions and images. They can edit and play back their own story book as many times as they like: in other words, the app can function as a kind of digital diary.



“We realised that there had to be a balance between fun and keeping it simple—too many bells on and it simply didn’t work for this audience.”

How did Circus Starr research this demanding audience? Cath Logan, the Community Engagement Manager at Circus Starr, was determined to develop, test and measure the impact of the app with children and their families. Built-in app analytics would help, but not with the up-front design. Working alongside Therapy Box and Glyndwr University, Logan also contacted the National Autistic Society for help and the expertise of consultant Heather Wildsmith became vital to the project’s up-front planning and design.

Logan recruited a tight test group of five children and their parents before taking the project wider, to regional autism support groups. They made the focus group situation relaxing and informal—on reflection, perhaps too informal. Logan’s view now is that you mustn’t be too eager to please. “People might be saying they don’t like it—but the problem might be the interface, not the entire feature. You have to take time over your decisions.”

“Nesta was very good at making us focus on the process, encouraging us to take an iterative approach—get to a certain level and then reflect and test. I think that is really the only way to produce a fit-for-purpose app.”

As well as face-to-face interviews, Logan used questionnaires and monitored social media feedback. It was research that made the team kill off some of their darlings—ideas that you love but don’t really work—having a ‘clap-ometer’, for instance. “We realised that there had to be a balance between fun and keeping it simple—too many bells on and it simply didn’t work for this audience.”

Were any mistakes made? “Yes. I think that’s why it can be important to take it slowly. We did at one point take the ‘after-story’ tool out. This was after some negative feedback. We needed to keep to our original purpose. The tool is good on lots of levels; it helps the children to look back at their own photos, and they get a lot out of it.”

Developing the app was expensive in terms of time. Logan says it was almost a full-time job—at points. “I think that’s one reason why you need a very clear idea of what you want to achieve at the outset. We’d done a lot of research and that helped. Mapping things out in advance is really important.”

Logan finishes: “People who are anxious about something new can be taken through it step by step via a visual process. Over the next few years I think we are going to see a lot more projects like this one.”

When it came to looking at digital sound technology that works well for people with learning disabilities, it was obvious to the team behind **SoundLab** that testing would be all.

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Written by Iain Aitch,
a writer who specialises
in the arts and technology.
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This would mean that the target audience were at the centre of every aspect of the project and that live experimentation would trump theory, pretty interface design or software gimmicks.

Producing both software and a guide to creating music-making experiences, the team, drawn from arts organisation Heart n Soul and Goldsmiths University, sought to learn as they went. As a result, their SoundLab Guide and SoundLab Framework software (along with the SI-App) are practical, tested and should succeed in making music creation more accessible to those with learning disabilities.

“We decided on a research experience that had participants coming and making stuff with very little explanation,” says project lead Justin Spooner. “It was like ‘have a go at this and see what you think’. We learnt a lot from that and got user feedback really early on, improving our workshops and making them focused.” This ability to explore and research unhindered ensured results were based on research, rather than using research to prove what the team already believed.

“If you get locked into thinking and knowing exactly what you are going to solve or discover then the creativity is sucked out of it from the beginning,” says project owner Mark Williams. “You’re probably going to be disappointed with the results if you work that way. Find out what you need to solve. You have to embrace user testing and ensure that whoever you are trying to make your work accessible to is at the very heart of the project.”

Sound Thinking Techniques

SoundLab's commitment to user testing not only produced results but also impressed technology businesses they worked with. The R&D Fund allowed for the kind of user-specific testing that tech companies can only dream of. "What we said to companies was that we planned to test out lots of technologies in lots of different ways with lots of different people," says Spooner. "They would often say 'yes, that's very much like the process we wish we had done'. If you are developing software like this you should be looking at the innate complexity of your system, the weirdness of language you use, the actual purpose of your product."

The project was initiated in reaction to the sheer scale of music-making software that is available. It was driven as much by the desire to share as it was the need to make practical discovery. "It wasn't a lack in the market place," says Spooner. "It was just that no one was asking the questions. We didn't think about a new thing in the market place, we just wanted to make our lives easier and then make other arts organisations and music facilitators' lives easier. It's not a therapeutic process, it is an artistic one."

Williams believes that there is a lot to be said for highlighting the advantages for artists when it comes to working with groups around accessibility. "Working with a group whose default position is very innovative and experimental is one of the drivers for attracting the calibre of people who get involved," says Williams. "Everybody wants to inhabit this space of expression and creativity where we don't know exactly what will happen."

The SoundLab Guide will share the findings of the team and they feel it is important that all of their knowledge is shareable one way or another. The SoundLab Framework software is open source and the team are keen to consider releasing the SI-App version of it in the same way. But they want it to be about much more than releasing their findings and letting others make their own interpretations: "One of the things we are planning at the moment is a sharing event," says Williams. "We want to facilitate a day which is very playful and is all about making and learning together. We also want to bring in some of the technology partners who have been offering their stuff for free during the project."

Disseminating the legacy of this project is key. It has the potential to influence and inform many more software projects that target accessibility for those with learning disabilities. ▲

“You have to embrace user testing and ensure that whoever you are trying to make your work accessible to is at the very heart of the project.”

Blind Leading the Blind

UCAN-GO, an indoor navigation tool for the blind, is a great example of user-led design, or co-creation. It stems directly from a user-group's wish list.

The app began as an informal game for children in a drama workshop. They were given a 'magic wand'. And in this particular workshop, which was for the visually impaired, what the children wanted was not buried treasure or unlimited candy, but to be able to go to the theatre—and be able to do that on their own.

The workshop was run by the arts co-operative UCAN. Based in Cardiff, UCAN (the Unique Creative Arts Network) exists to prove that visual impairment is no barrier to success, and helps young people with impairment to build confidence and self esteem through drama.

In only a few years, technology has made huge strides in visual assistance, but its reach is limited. As UCAN co-founder Jane Latham explains, while partially sighted people can confidently use mobile devices to navigate streets, city centres and roads when they are outdoors, once inside buildings, there is no GPS. Negotiating complex interiors like theatres can be very hard, and is a significant barrier to real autonomy.

"I hadn't realised until our 'game' that although our young people might be amazingly confident on stage, or going to visit a friend down the street, they dreaded trying to find their way through a building that was supposed to be 'public'."

The finished *GO* app helps you find your way through a building's interior by landmarks. It instantly improves accessibility. You can ask it to take you to your theatre seat, the nearest toilet or even tell you about the best wheelchair-friendly route.

Once funding was secured from the Digital R&D Fund for the Arts in Wales the development process was led by young representatives of its target audience: Megan John and Mared Jarman, who both live with visual impairment.

Written by Gaynor Aaltonen, a specialist in design and wellbeing.

The group's Bristol-based technology partner Calvium has a lot of experience with user-led design. As its marketing director Jo Reid says: "Co-creation is often really powerful, but in this case it was vital; there is such a huge range of difference in impairment within the potential users. Plus, this particular group of young people are great with technology: they were too valuable to ignore!"

Twenty-one year old Jarman, who as a teenager lost her sight to the progressive eye condition Stargardt disease, describes the finished app as "just like a friend in your phone." What she and John wanted was a very flexible tool that allows custom settings: "For instance some users will want more contrast, while others need different point sizes for type. There was a lot of work done on language and approach, to try to set the right, 'naturalistic' tone of voice, and where icons such as a wheelchair are used, they are designed to look active, and not helpless."

"The app has three functions," Jarman explains. "The *Overview* function helps users to build a mental map of the venue, while *Route* gets the user from A to B. The *Me* function allows users to personalise the app, tailoring it to suit their needs.'

With the help of the project partners, Cardiff's Millennium Centre and the Torch Theatre in Milford Haven, Jarman and John painstakingly mapped out buildings, wrote scripts and performed voiceovers. They got detailed feedback on language, navigation, audio instructions and design from other potential user groups, both sighted and non-sighted. Reid describes their creative and intuitive process as "following the Yellow Brick Road." Which seems apt, given the magic that seems to have attached to the project.

"It helps address a real deficiency in today's buildings," says Reid, "and it's a solution that is low-cost, requires no new infrastructure, and is easily updatable." For the moment *UCAN-GO*, downloadable free on iTunes, is only available for the Millennium Centre and the Torch Theatre. However, the hope is that the project can be scaled up. The aspiration is to grow the concept, to map more buildings; allow users to customise the app; perhaps developing more applications for those with agoraphobia or anybody nervous about visiting new places. This could also mean creating jobs for society's most disadvantaged group when it comes to employment¹.

As Jared says: "Let's not forget how this project began. With a magic wand." ▲



“Co-creation is often really powerful, but in this case it was vital; there is such a huge range of difference in impairment within the potential users.”

¹ Scope, *A million futures: Halving the disability employment gap*, April 2014

Tackling disabilities of all kinds has suddenly become a possibility, thanks to digital devices and the plummeting cost of technology.

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**Written by Gaynor Aaltonen,
a specialist in design and
wellbeing.**
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One in six of us is deaf or hard of hearing, and with the demographic time bomb ticking, the problem is not going to go away. Yet when it comes to arts events, deaf people are largely excluded from the hearing world. This effect gets worse the more complex the disability.

Roger Graham, Technical Consultant at Stagertext, a charity providing captioning and live subtitling for the arts, once went to a theatre production with 'disabled access'. As usual, the theatre had a single set space for a wheelchair. Yet the man in question was both deaf and paraplegic. Says Graham: "From where he sat—and of course he couldn't do anything about that, because he couldn't move—he couldn't see the LED screen with the subtitles at all. It was pointless. This was not on."

Graham is an advocate of 'thinking sideways.' What if a phone or an iPad could be put right in front of that man—a small device, that wouldn't disturb the rest of the audience? Could subtitling systems become more flexible, more personalised and therefore adaptable? Stagertext applied for, and received, a Digital R&D Fund for the Arts grant to help develop these ideas further. The team realised that this was an opportunity in more ways than one. By making captioning more flexible and more intuitive when it came to audio quality, picking up and interpreting nuance, they could also be opening up a wider market and encouraging theatres to make more productions accessible.

The team decided it would be better to piggyback off other technologies than to develop new programming from 'ground zero'. Graham started looking into the subtitling services developed for news services like the BBC. Working alongside Andrew Langbourne of Sound Systems, the team started adapting and combining existing softwares, sewing them together by writing new programs. Help with microphone technology and sound quality came from the National Theatre and audio expert Tim Middleton.



Live & Kicking

The end result is *CaptionCue*, an automated captioning system that, by bringing cost down, could in future give deaf and hard of hearing people much improved access to theatre, musicals and possibly much more. Eventually, lectures, speeches and cultural events might also be candidates.

Audio recognition technology has so far been foxed by subtlety. Any layering of sound is a problem. While human listeners can pick out the key person of interest when multiple speakers are talking, machines are unreliable at tuning 'stuff' out. They also have difficulty recognizing speech in the presence of any other noises.

The first step with *CaptionCue* is to feed the basic script into the system. Using Shakespeare's *Henry V* as one of the key texts, the team 'taught' the system over 3,500 cues. Yet Stagertext's approach is multi-dimensional, recognising that in a stage production, voice is only part of the picture. *CaptionCue* can be pre-programmed to keep to time by recognising complex 'tech' cues like a change of lighting state—now of course digitised, and therefore syncable.

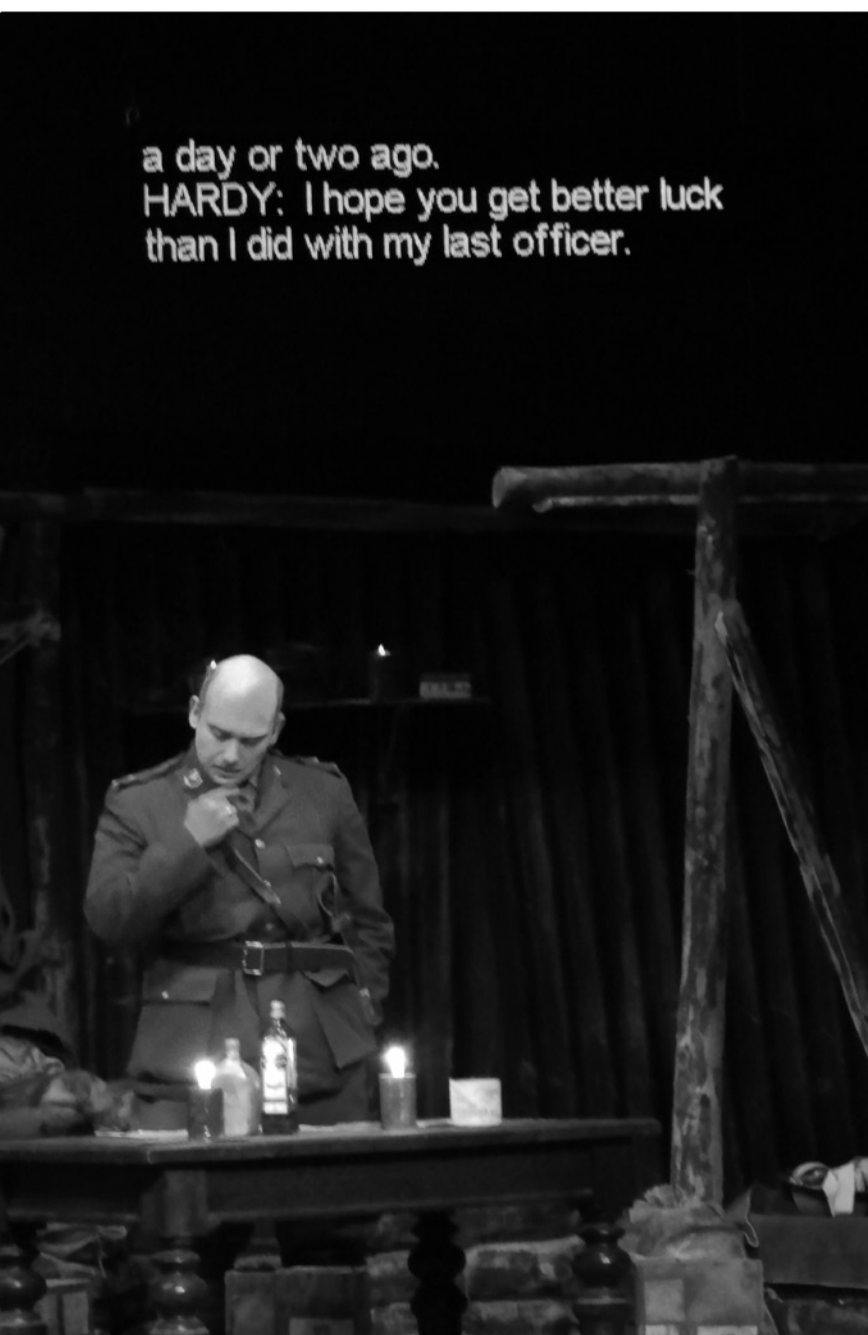
With Stagertext's multi-layered approach, in future even unpredictable events like laughing, strange bursts of song or actors fluffing lines should not 'break' the system. Particularly for touring or shows with long runs, this will be an affordable investment in accessibility. Those who are deaf and hard of hearing will know what's happening on stage—whether it's being sung, shouted or whispered. None of the usual time delays you get with automated audio; and no gibberish.

The computational challenges of speech separation are legend, so the new system also has enormous commercial potential. Think simultaneous translation services, or even automated documentation of debates in Parliament. "It's a system with scale and breadth. It's ambitious," says Graham, "and so it should be. It should be an absolute right for people who are deaf to have genuine access to culture."

While this sort of innovation is helping those with hearing impairment, digital is making a whole range of interventions available for other types of disability. With the right tools, technological utopians have argued, physical disability and its barriers can dissolve: in cyberspace it becomes a non-issue. These advances are genuinely exciting. Yet there is a 'but'. One look at the statistics shows that people with disabilities are far more likely to be poor and unemployed. The commercial reality is that currently, not everyone who needs digital devices can afford to have them. In a very real sense, this is where intervention needs to begin. ▲



“It should be an absolute right for people who are deaf to have genuine access to culture.”



a day or two ago.
HARDY: I hope you get better luck
than I did with my last officer.

Games Without Frontiers

Sophisticated use of sound can bring a new level of drama to gaming. In *Papa Sangre*, players navigate the monstrous world of the dead through palaces that are all identified with a sound type: brass, strings, wind and bone.

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Written by Gaynor Aaltonen,
a specialist in design and
wellbeing.

Your mission is to gather musical notes. How does one play? Tap left and right on the screen to move step by step; swipe the top of the screen to change direction. And there you have it: the reason that *Papa Sangre* is so accessible for the blind.

Audio games have been around for a while—*GMA Tank Commander* and *Shades of Doom* are more than ten years old—but thanks to the mobile phone and the iPad they are getting better and better. Apple's gesture-based screen reader VoiceOver was the breakthrough technology that allowed games studio Somethin' Else to think of creative ways to make *Papa Sangre* accessible for blind users. Eventually, the Royal National Institute for the Blind was recruited to help develop and design *Papa Sangre 1*, along with unsighted testers.

Papa Sangre took hold of an unexploited sense, and in doing so made the game work for both sighted and unsighted players. This is good on both an economic and social level: in the UK alone an estimated two million people are living with sight loss, and a huge increase is anticipated as the population ages. Antoine Pastor, who worked on *Papa* and another sound-based success, *Audio Defence*, is a convert to designing for accessibility.

"At first, as a sighted person," Pastor explains, "I thought it was a bit bothersome to think things through for accessibility. Slowly, I realized how important it was. It's not just that, though. In finding the best solutions for blind people I am often making the game better, anyway."

“The right time to begin thinking about accessibility is at the very start—before you even write a single line of code.”

The right time to begin thinking about accessibility is at the very start, he says—before you even write a single line of code. Take text size. Deciding to use a large high contrast font from the outset is a simple design decision that involves no time, no cost and no difficulty.

Papa has been swiftly followed by other exciting and immersive audio-only games, such as the terrifying *BlindSide*. Apple’s games category in its *applevis* directory is expanding fast. Useful calorie counting, ‘calming’, and even First Aid apps for the blind are now available as well.

Even if the games and apps are sometimes flawed, the explosion in availability and quality gets a huge thumbs-up from the punters. To quote one enthusiastic post: “Now we [the blind community] are open to the world!” Android too is on the point of making huge strides forward, despite Apple’s lead.

There are resources around to help. Games expert and campaigner Ian Hamilton was involved in developing *gameaccessibilityguidelines.com*, which covers all types of impairment, from colour-blindness to autism, and deafness to cerebral palsy.

“The guidelines are a great tool,” he says, “but not a silver bullet.”

Hamilton’s wish list to improve life for the disabled gamer is long, but well focused. It includes Government tax breaks and grants to those who consider accessibility, and non-legislative support for best practice guidelines. Even simple measures, he says, would help to increase awareness—like including accessibility criteria in mainstream game reviews.

Unlike mobile phones, the accessibility features in consoles have until now been in a pretty bad state. This is about to change. Sony has taken the lead with the PS4 and Vita, adding high contrast mode, magnification, button configuration, text to speech and so on. “It’s not perfect,” says Hamilton, “but it has opened the door.” Hamilton also thinks the teaching of essential life skills to young children who are motor-impaired or PMLD (profound and multiple learning disabilities) could be a development of this gaming technology: “Learning for some children is difficult, and even painful,” he says, citing technology-assisted pushing of buttons. “Trying to explain to any four-year-old why they should go through that is not easy.”

So what will it take for game designers to all start considering accessibility and not just for the blind? Says Hamilton: “The biggest barrier at the moment is still just a simple lack of awareness. Developers just never having heard of accessibility, or having no idea that people with impairment would be interested in buying what they’re producing. That’s something that anyone can help out with, just by keeping the conversation going.”

Making Digital Work

Visit the Digital R&D Fund for the Arts website at artsdigitalrnd.org.uk for a wide range of resources to help organisations of different sizes and types on their own digital innovation projects.



Theme Films

Engaging short films on the four learning themes of mobile, accessibility, data & business models.



Product Toolkit

The processes and tools you need to take an idea through to a successful product.



Print Magazine

Limited edition publication full of inspiration and opinion, also available as a PDF.



Research Reports

Fascinating accounts from the R&D Fund projects from England, Scotland and Wales on the successes and challenges of their work.



Digital Culture

Results from this major 3-year study tracking how arts and cultural organisations in England use technology.



Magazine Features

Interviews, profiles and guides from a range of people and organisations working in arts, technology, research and beyond.

The Digital R&D Fund for the Arts is a £7 million fund to support collaboration between organisations with arts projects, technology providers, and researchers. It is a partnership between Arts Council England, Arts and Humanities Research Council and Nesta.

Thank you to all the contributors and project teams who have made this guide possible.

Editor
Jane Audas

Design
Ryan R Thompson / Rydo

Special thanks

Jo Verrent
Anna Dinnen
Rohan Gunatillake
Clara McMenamin
Tim Plyming
Emma Quinn

Further Resources

Unlimited

Unlimited commissions and celebrates work by disabled artists.

www.weareunlimited.org.uk

Disability Equality Scheme

The Disability Equality Scheme from Arts Council England.

www.artscouncil.org.uk/advice-and-guidance

Gari

Directory of accessible mobile technologies.

www.gari.info

Devoted & Disgruntled

Reports on integrating disability into the creative process.

www.devotedanddisgruntled.com

Game Accessibility Guidelines

Online reference for inclusive computer game design.

www.gameaccessibilityguidelines.com

Gov.uk Accessibility

Guidance and sensible advice on UX.

www.gov.uk/service-manual/user-centred-design/accessibility

Using Technology For Accessibility

Disability Horizons' guide to new ideas and great gadgets that make life easier and a lot more fun.

www.disabilityhorizons.com/2015/01/disability-gadgets-using-technology-accessibility/

**Related Digital R&D Fund
for the Arts projects**

Art Forms

Arts Depot Trust

Cambridge Junction

Circus Starr

Coney

Dance Digital

Extant

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Heart n Soul

Hijack

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STAGETEXT

The Spark Arts for Children

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