

Modern Theatres – New Technology and Performance

By Raj Patel

Dance, music, singing and theatre is fundamental to human communication, exploration, cohesion, storytelling, and history. Technology, in one form or another, has been used in performance from the beginning. Our earliest ancestors' paintings in the famous caves in Lascaux are brought to life by firelight and rhythmic clapping in the reverberant caves – with locations carefully selected for acoustics that mimic the animals depicted. Theatres of Greek antiquity introduced the deus ex machina (“god from the machine”) hand cranked cranes of wood, pulleys and ropes – to lower actors or scenery from above to create more impactful stories. It was received with both excitement and criticism. Storytellers argued it provided audiences an immediate emotional response of awe and wonder. Critics argued it was a lazy way to deal with over complicated plot resolution. The technology remained and is a mainstay of performance spaces today – because it enabled excitement in audiences. The challenge remains today – the appropriate use of technology is generally assessed based on whether it enriches or enhances the production.

Today's performance can encapsulate the widest spectrum of experience from real to virtual, live to pre-recorded or digital, or any combination thereof. It becomes a challenge in modern performances to view technology use impartially: for digital natives (born after 1980) “technology” is almost an irrelevant term – there is little or no separation between the digital and physical worlds – while for other generations, the distinction is clearer. As the years pass, will the boundary between physical and digital blur to the point of irrelevance?

In his book “The Secret Knowledge” (2001), David Hockney explores the use of technology

in painting beginning in the fifteenth century, identifying the use of the camera obscura and lenses as crucial in major breakthroughs of masterworks in fine art. Technology has been integral to the working practices of fine artists and visual artists for centuries. Without modern technology or industrial practice many works conceived by artists today could simply not be realised.

Audiences and critics are generally less compelled to focus on the technology when reviewing these works than they are on the meaning or impact the works have. Perhaps this is simply a result of the technology being seamlessly embedded in the creation of the artwork, than in the experience of it. Yet in performance is less commonly viewed the same way.

The symbiotic relationship between the arts and technology has existed through the ages. Creators have for centuries been at the forefront of technology adoption. Quick to appropriate, adapt, develop and push technology in pursuit of artistic goals, the role of the artist has been to say “How can I use this to tell my story better, or with more impact? How far can I push it before it breaks?” These experiments cause technology to adapt, in response to how it is used.

Integration of New Technology in Performance

In the context of the design of modern performance spaces the period from 1950 to 1980 was one of relative technological calm. Technology improved, became seamlessly integrated into performances, used with more complexity, and became an accepted part of the art.

From the early 1980s to the early 2000s developments in home and office computing, and personal digital devices accelerated and developed to a point where the impact on design of venues and performances will be felt for years to come, 3D visualization software is increasingly prevalent and sophisticated and deployed for the design of buildings, sets, and lighting. For sound and acoustics, a shift change in computer modelling, allowed the design of a new venue to be “auralized” to hear a building before it was built. Processes and environments previously reserved for research institutions found their way into the design world.

Some of the key spatial sound recording and capture techniques, underpinning the auralisation process were developed in the 1960's and 1970's and became enabled by

Hubble Cantata – World premiere at BRIC's Celebrate Brooklyn Festival, August 2016 © Jill Steinberg, Courtesy National Sawdust



computers, high quality audio cards, and high capacity portable hard drives. These have been used to great theatrical effect: ambisonics in 2013's "To Sleep To Dream"; the binaural dummy head in 2015's The Encounter by Simon McBurney. In both performances the audience were blindfolded. Performances focused on hearing alone (The Encounter also required the audience to wear a headphones) and in both cases the imagination created a visual environment. A few years later Dolby would launch their full 3D spatial audio system as Atmos. Performance sound systems manufacturers also began creating proprietary spatial audio systems for deployment in venues and outdoor performances.

Increased projection image brightness and quality (LED and LCD projection) coupled with real time "projection mapping" by digitally altering an image to map to any surface, has radically changed how projection can be used. Significant examples of the power of such dynamic scenery was seen in the Olympics openings in Beijing, London, and Rio (2008, 2012, 2016) and the staging of "The Curious Incident of the Dog in the Night-time" (2012).

There are many fascinating examples where a range of technologies have been combined to create productions that would otherwise not have been possible, or conceived around the technologies themselves that have received critical acclaim, including:

- Robots, AI and spatial audio – Death and the Powers
- Video, animation, projection – 1927 company Magic Flute
- Sets, video, film – 59 Productions "Forbidden Zone"
- AI in composition – "Beyond the Fence"

Institutions specialising in the use of technology in performance, as well as investigating the integration, overlap, and collaboration between physical and digital have existed since the 1970s but continue to expand. Ars Electronic (Linz), ZKM (Karlsruhe), IRCAM (Paris), Sonic Arts Center (Belfast), Create Cube (Virginia) all have hybrid programs and spaces for exploration. Performance spaces that put the audience in the centre of fully enveloping experiences both audio and visual have already been realised (The Sage Gateshead Hall 2) and are increasingly being planned (Salle Modulable, Lucerne).

Emerging Technology and the digital future.

Perhaps the technologies received with the



Arup SoundLab – a place to view and listen to buildings, performance environments, and performance sets before they are built physically, or from measurements of real spaces © Andre Costantini

greatest suspicion or fear amongst venue designers and content creators for performing arts spaces are Virtual Reality (VR) and Augmented Reality (AR). This is not a surprise in the context of the image it stirs in the imagination. For – VR a room full of people in a theatre, watching a live performance, with a device strapped to their heads and covering their eyes. With AR the idea of a sea of people holding up their phones, with bright screens, either looking at a stage through it, or trying to look at both screen and stage at the same time. But these mental images fail to tell the whole story.

VR has in a few short years proven itself an incredibly useful tool in the design process. Communicating the complexities of the design of a venue performance space, or the experience through a building by either an audience member, or the performer is hard to capture in renderings or walk-throughs presented on a flat screen. But in VR these come to life, and the ability to discuss design nuances, and develop design consensus are quickly realised. It is a powerful engagement tool. Many are still concerned about its use within a performance itself, yet there are good examples that indicate that there are hybrid engaging opportunities to be explored. "The Hubble Cantata" a work by Paola Prestini is ostensibly a traditional opera, with live orchestras, singers and a projected set of visual images on a screen. The hybrid element is that the final act also has an immersive component using both VR and spatial audio. It's full scale premier at Prospect Park in Brooklyn New York in August 2016 was the largest immersive VR experience conducted anywhere in the world with six thousand attendees. Cardboard VR headsets were handed to visitors when they

Ear Films © Earfilms



arrived, and an app was downloadable on the site. Your phone was placed into the cardboard and a seamless introduction as part of the performance told you when to put it on. As six thousand people all took a sharp intake of breath at the first images, while the soloist sang her aria and the musicians played, there was a palpable sense that something special was happening. As the performance continued, the audience stood up, moved around, and were engaged with VR as part of the story – and that was felt equally by the performers on stage.

The National Theatre in London, recognising the importance of VR as an impactful medium, formally created its Immersive Storytelling Studio in July 2016 “...to examine how virtual reality, 360 degree film, augmented reality, and other emerging technologies can widen and enhance the NT’s remit to be a pioneer of dramatic storytelling and enable audiences to stand in other people’s shoes...to allow creative teams to do things that otherwise might be difficult or impossible...”. Earlier that year in conjunction with Play Nicely and 59 Productions, staged “wonder.land” a new performance of “Alice in Wonderland” using digital media extensively and VR in pre-theatre and lobby experience.

This raises the next potential challenge for the modern performance space, the accommodation of the staff with the skills, and the associated spaces, for the creation and development of these new media into productions. The creative process itself has already changed to

accommodate technology, and that will continue and include evolving production dynamics, timelines and budgets along with it.

We are still only seeing the tip of the iceberg. VR is largely used as a visual experience, and in a live setting usually incorporating other things happening in real-time around it. The promise of full VR is the ability to control the entire sensory experience. Environments and technologies to activate those senses are still in their nascent stages, but they are developing rapidly. Will we see performance spaces that incorporate the full sensory experience? We have already seen these sensory activities added in more “traditional” contexts e.g. gaming environments, theme parks, science and history museum, 4D movie theatres etc. so one can expect it will happen in time. Will that stop people coming to the auditorium to experience it collectively? To gather together, talk about it on the way there, experience it side by side, and then talk about it afterwards? The question of whether full VR will allow effective storytelling, especially if self-generated or not told conveyed by performer(s), and/or physically or virtually isolated remains in question.

AR presents major possibilities inside and outside the performance space. The technology offers real world interactions that VR struggles to provide. In the most basic form, the ability to deliver translations of speech to the ears of an audience member, text for the hearing impaired, improve the ability to understand what you are seeing and hearing through additional support material, close up visuals,



The Cube, Moss Arts Center, Virginia Tech, Virginia, USA © Virginia Tech

provide myriad possibilities (and a natural next step to seat back subtitle systems). Enhancing performances by creating additional virtual characters accessible via your own device provide expanded possibilities for young audience engagement. The development and integration of technology in performance contexts not only enhances the content but can broaden audience demographics and expand access to these art forms. Extending the performance space out to the immediate environments, the street, the city, transportation system, and in the home, offer the ability to extend storytelling and engagement to outside the performance space alone, expanding the opportunities for engagement of audiences who want it. This can be discrete, easily delivered to the audience as no special hardware is required except the ubiquitous device that most people are carrying in their pockets. Couple this with emerging hybrid sound technologies that allow you to tailor the sound you hear from the space, with that of the device, doesn't create the barrier between one world and the other.

As these technologies continue to develop and refine, and more importantly audio, visual, VR and AR, vibration, movement, and touch come together, the possibilities remain myriad. These tools, or the next generation of them, will continue to find a place in performance, because artists will want to continue to experiment with them if users are engaged. This latter point is an important distinction, as artists are no longer just producing work to wow audiences with the technology that is there,

they must engage with the technologies their audiences have or expect, in order to continue to develop those audiences over the long term. Likewise given technology is now so embedded in our culture, performance without technology in, or without technology as part of or central to stories, may soon be difficult to imagine. This too will have a knock-on effect on the design of spaces. Should technology become increasingly prevalent, further hybrid spaces will be developed to respond to it. However, this will not replace "low-tech" storytelling, in fact it will likely take it to new heights. Immersive theatre such as Punch Drunk's "Sleep No More", dynamic performances such as Park Avenue Armory's production of "Die Soldaten" (2008), "Everything That Happened Would Happen" (Manchester International Festival 2018), dynamic use of theatre and adjacent buildings e.g. Constantin Chiriac Faust (Sibiu Festival 2018), all show there is still much to be discovered, explored, created, in delivering highly emotionally engaging theatre, with limited or no significant technology, or strategic use of limited well known technology.

The creators' artistic imperative will remain as it has always been – How do I best tell my story? How do I want people to feel? How do I get them to feel it? If the answer is effective, strategic, intentional deployment of technology, then it will be used. Artists will continue to seize the opportunity to take technology and use it to serve their needs in turn forcing technology, our culture, and our stories to new places.