

Essay - Theatre and Digital Technologies

How digitalisation can transform the performing arts



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Theatre and digital technologies

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Introduction

The industry of arts and entertainment as Julian Bird, the chief executive of the Society of London Theatre and UK Theatre, said about theatres, relies on

people coming into an auditorium, paying for a ticket and watching a production.

This was made impossible when governmental decisions lead to the closure of theatres during the pandemic, explaining the fall of the industry's contribution to the UK economy by 60% in the last 2020 quarter compared with the previous year. In 2019, the industry represented 0.4% of the UK Gross Value Added, or £7.92 billion. To help the industry, the UK Government made a £1.57 billion fund available, that includes museums and libraries. This fund found its resonance with the program developed by UK Research and Innovation called Boundless Creativity, offering three project focuses:

- ✿ making digitised art collections available online,
- ✿ bringing immersive experience using live streaming and virtual reality technologies,
- ✿ inviting audience to participate to the story telling.

As the creative processes get the spotlight, it is important to address the need for digitalisation of the administrative processes present in most companies including theatres.

Industry 4.0 relates to manufacturing and is the continuation of the first, second and third industrial revolutions. The way the fourth industrial revolution is communicated in its written form as 4.0 is not without any connotation of software versioning. A part from the semantics, this connotation creates a visual link with digital technologies which when applied to the arts have a different effect: it is not about production efficiency. This essay will list the ways digital technologies can transform the arts and what it means for the future of this expressive part of humanity. The list included in this essay may not be exhaustive but hopefully it will give a broad overview of digital technologies' applications to point its limits and its benefits in the arts. The choice to exclude Artificial Intelligence technologies when applied to marketing is the result of

earlier research concluding that the limitations of existing data create a discriminatory approach to marketing when using algorithms.

This essay focuses on performing arts. The definition by the Cambridge dictionary:

forms of entertainment such as acting, dancing, and playing music

restrains the art form to entertainment as an activity to

keep a group of people interested or enjoying themselves.

One could argue that entertainment is the visible part of value of the art, a mean to elevate the spirits. Whereas the way to view performing arts should include a philanthropic approach. This essay will highlight the role digital technologies can play for the greater good of society. It will also warn about its dangers.

For the purpose of this essay, the case study redacted by Culture Hive (2015) for the new business model of the Live Theatre in Manchester will be the background of the points made below. The choice was made because:

- ✿ it is a limited company and a registered charity,
- ✿ it has a subsidiary trading company,
- ✿ its buildings' capacity limits the scope for growth,
- ✿ its innovative project of four social enterprises to bring revenue and diminish the dependence on public funding and grants, includes online playwriting classes.

This Manchester theatre will be the starting point of the conclusions for this essay regarding digital technologies.

This section should outline the topic area for your arguments. In addition to outlining the topic area, you should be aiming to provide the context for your main argument here, providing a justification for its necessity. Any constraints you are imposing should also be noted within this section.

Part 1 - The benefits of digitalisation

Optimising a theatre's activities with real-time data

For a theatre, the ability to sell tickets for a show online via an e-commerce website increases efficiency and allow the sales person to create value in more strategic tasks (Johnson, D.S. and Bharadwaj, S., 2005). , special attention must be made to create appealing promotional materials with the time freed up, a more rewarding task for employees. It allows the theatre to gather powerful reviews and attract more spectators, like a scaled up digitised version of word-of-mouth. The online booking system allows a theatre to progress towards a paperless system, increasing profitability because it reduces costs (Oliveira, J. et al., 2021). It gives a theatre a good image, and improving environmental credentials (Oliveira, J. et al., 2021) as this may become a criteria to secure public fundings, especially in Wales with the implementation of the Well-being of Future Generations Act 2015. In a more practical approach, it means no lost tickets for the customers and a limited risk for illegal ticket resale for the theatre, if the booking system is setup with a purchasing limit.

Even though digitisation of products and services catalogs on e-commerce websites may not make companies entirely paperless (Landman F., 2020), it allows to process online payments, contactless by nature. Convenience, habit and time saving are the primary reasons for shoppers to use contactless payment technologies (Karjaluoto, H. et al., 2020) and online payment technologies (Berg, N. and Kim, J.-Y., 2022), putting liabilities on a secondary plan. It is interesting to note that if cybersecurity is not a primary concern, the concept of contactless payments is becoming the new norm as the adoption of this technology has become a safety measure recommended by many governments to slowdown the spread of Covid-19. In addition to the effects of the pandemic, the next generation of consumers, the Gen Z, pushes companies to change their business model from the traditional one to a web based one (Ayuni, R.F., 2019). It implies that theatres need to offer an online booking system to attract a younger audience used to the immediacy inherent to internet.

The adoption of the cloud technology as a secure super server would allow a theatre to make their system available wherever, while touring their own productions. When touring became impossible when the pandemic hit, theatres who had the structure in place would have been in a stronger position to implement a work from home policy. However the idea of working from home revealed a double edged sword. As described by Amankwah-Amoah, J. et al. (2021), in the race to digitalisation during the pandemic, employees were left

with a feeling of surveillance, a lack of privacy and an unbalanced work-family life.

A successful digital strategy must value the data created. Indeed digitalisation is an essential tool to a business model allowing for growth and identifying potential opportunities (Milovanov, P.D., 2022). Knowing a theatre's demographics through quantitative data is an objective method to know the profile and associated expectations and needs of its audience. Gathering feedbacks from customers and analysing this qualitative data is another effective method for a theatre to improve its services. For that, natural language processing and corpus analysis used in artificial intelligence are the linguistic sciences to allow an objective view on sentiments left by the audience in reviews (Celuch, K., 2021). Without the analysis, the danger is for a business to act on every single comment regardless of its strategy, as a way to please. This approach to qualitative data is the condition for responding to customer needs at a management level, involving staff in decision making and making informed changes based on data (Milovanov, P.D., 2022) as well as keeping the theatre's values within this decision making process.

If digitalisation means a theatre will be able to respond to its community's needs and negotiate for funding because it can use data to prove its programmed activities and events are successful and needed, this theatre is in effect implementing tools for growth. It is also one of the points made by the Arts Council of England, where by a lack of data in the economic benefits of the arts and in the impact the arts have on the creative industry and innovation.

Replacing the standard billboard with a beacon connected to an application 'what's on' notifications should still be considered as a way of getting attention, even though they fell into disfavour due to high energy consumption (Nicholas, G. and Shapiro, A., 2021). It is paperless, immediate and communicates up-to-date information to the public like an anonymous ballyhoo. The digitisation of a theatre's offer can be pushed on the outside of the brick and mortar limits using what it is known as the Bluetooth proximity marketing, creating a hybrid advertising between the location and the digital world via a beacon. The newest Bluetooth Low Energy (BLE) 4.0 technology is an eco-friendly form of Bluetooth specifically designed for IoT applications which are increasingly popular in every day life and can be the renaissance of the beacon technology for proximity marketing (Muddinagiri, R. et al., 2020) despite issues regarding

limited range, data limit and accuracy. However there is still a concern for privacy which is regarded as the first obstacle to adoption (Lin, M.Y.C. et al., 2022). As the technology progresses this barrier may vanish and community theatres will have the opportunity to be part of smart eco-systems (Gretzel, U. et al., 2015).

Conserving art

After listing how digital technology can be used for the daily tasks of administrating a business with the particularities of a theatre, this essay will address the particularity of a theatre producing performances and live events.

The idea to digitise art to guarantee its posterity seems the ideal answer to the problem of conservation. It may appear like the ideal solution to art organisations when the physicality of art pieces becomes a problem in terms of archiving because of the mere volume involved. In effect, it relies on the digitised form to take only bytes instead of cubic metres. It means an institution can store digital art to save space and avoid to have to select what to keep and what to throw away when space becomes critical. Providing the digitisation occurred when the art piece was intact, it preserves it in its original form, defying the passing of time.

However as Diprose, G. and Seaborne, M. (2011) demonstrated the physical piece will outlive the digitised form. As an example how many places still have a VHS player? Where as, a source of light with something to rotate the bobbin will always show the images on a super 8mm film. The same can be said about a printed book. These objects just exist and do not rely on an interpreter, otherwise a machine, to communicate its message or its aesthetic. There is an immediacy that is lost when the need of a computer with the adequate software is felt and becomes an obstacle to unexpected encounter with an art piece.

This point can be illustrated by the V&A's plans to open its V&A East Storehouse in 2024 displaying rows of behind the scene objects including a Theatre and Performance Archive collection. This project manifests the limit of digitisation and the preference to the tactile art pieces to create a connection with its viewer.

What can be said of an actual performance? It is an event, a unique creation of the moment. Like music, a dance production, a playwright or a circus show can

have a tangible support to time proof the piece, it is the script and storyboard, like a partition, that must be kept concretely as well as digitally, and not necessarily the performance. With the example of dance, a partition would take the form of “Labanotation” otherwise called Laban Movement Analysis (LMA) system which is a system to record motion using symbols that can be interpreted. Invented by Rudolf von Laban as “kinetographie”, to write dance movements and developed in the 20th century, “Labanotation” is now used to analyse movements in sports and zoology. The perfect example applied to dance is the mission of the not-for-profit organisation Dance Notation Bureau to apply a written language to dance and contribute to preservation (Laemmli W.E., 2017). However the experiment lead by Bernardet, U. et al. (2019) emphasised the fact that the perceived objectiveness of the “Labanotation” actually made room for interpretation when tested between a "neutral" movement and variations of them when kept within the parameter space. It is also a time consuming manual exercise. In the research conducted by Yao J., Chen, Y. and Ning X. (2022), the CNN (convolutional neural network) algorithm learns the action space information of human bodies in motion and transforms data into symbols creating an automatic “Labanotation”. This digital technology using algorithms allows to write, communicate and preserve dance movements with a calculated 94% accuracy. Even though this digital technology remains out of reach to a community theatre to create and preserve performing arts in a written form, the “Labanotation” system can be the object of educational programs like playwriting.

Part 2 - The limits to digitalisation in performing arts

Living art

The argument against digitalisation of performing arts, that to be theatre, music, puppetry or dance, is the fact that it is the art of the moment. In French it is called “les arts vivants” i.e. living arts, the arts that live. It is indeed something that lives and should be lived. The magic operates in the being there and capturing the little things that makes the artist human: being part of the event, even with the noise pollution the sound engineer employs his/her expertise masking.

It is exactly what He, Z., Wu, L. and Li, X. (Robert) (2018) point out when a performance is presented from a camera view point. It restricts the global vision

and forces the viewer to watch an art piece from the edited subjective vision of the director. It doesn't matter how many cameras are installed to capture the moment. Even if the event is presented on a screen, losing its third dimension with all the images from all the cameras simultaneously, the viewer would still not see a global view but a juxtaposition of images, denying the viewer from their own mental imagery dismissing pleasure and experience.

The case study conducted in 2017 by live streaming specialists The Space highlighted a number of points regarding the technology. The project shouldn't be an afterthought and nor only designed with live streaming in mind but be at the origin of the project for what the technology can offer. The success of using this technology depends on the collaboration between the creative team and the technical team. It is the perfect match when the project's aim is to bring the spectator into an immersive experience. The study showed that a complex nature of an innovative project like this attracts more funding, which is in contradiction with the notes made by Bakhshi, H. and Throsby, D. in 2012 when they state that funders for the arts need to be willing to take some degree of risks when financing a project involving digital technologies which should be seen as research and development. They also appeal for funders to accept the fact that different art forms can be mixed. In the first part of this essay, the digitisation and digitalisation of administrative processes can improve the delivery and the management of these tasks and processes. But when digitalisation is extended to the actual art form, the technology has a different impact, it changes the nature of the art form. That is why Bakhshi, H. and Throsby, D. (2012) ask for funders to embrace innovation within cultural institutions, including new business models which have the potential to increase audience reach as well as creating value. The attraction to live streaming as opposed to the prerecorded version is that it is of the moment as it still is a live performance. Marketing was essential to promote the event; with no viewers the performance does not exist but only from the experience of the people involved in the project.

A study conducted by Martinez C., Euzéby F. and Lallement J. (2018) highlighted the importance of the venue. The motivation is not limited to the show itself but encompasses the social and emotional aspects of the experience. The venue is seen as a reflection of the performance. It needs to have a strong identity and be representative of the show. The importance of the venue is

demonstrated in the popularity of event cinema where streaming shows are programmed.

When the first CGI animations come out, they were quite flat compare to hand-drawn animations, stop motion films or even shadow puppetry, lacking texture. The hand of the maker, the irregularities, all celebrate the skills involved in a craft mastered by the Homo Faber (Parraman C., 2021). To reconcile what computer generated images had lost, the 3D scanning technology allows to replicate a handmade object into a digital format: for example Wallace and Gromit latest stop motion films are actually a scanned version of the clay model.

The advent of holographic CGI technology allowing to create avatars of artists after their death bring the question of cultural acceptance and our societies' relationship with mortality: for instance ABBA's Voyage tour using avatars version of their younger selves stopped the idea of time, overtaking life.

Shows require unique objects made especially for it, whether a prop or a costume. Using 3D printing technology as a tool to allow for personalisation for what would be a mass-produced item or a time consuming crafted object, allows to create one-offs in a cost effective way. Coupled with 3D scanning technology, any antique can be copied. The technology is not necessarily applicable for all types of props when the original material properties are essential and cannot be swapped with coloured plastic, the most common material used. Unique objects can be created digitally and incorporated into a digital production for example pushing digital fashion to digital costume. These digital pieces can be transformed into digital assets for a production to create a novel revenue stream with NFTs (Non Fungible Tokens). In theory a Cats production (the musical) could sell digital versions of the identifiable costumes whereby the buyer could treat as a collectible or wear in the metaverse, by their digital avatars.

Health and well-being

During the lockdowns, artists had to improvise to keep the connection with their audience and have fun. This meant that filmed gigs with no audience or in living rooms flourished and showed that the digital response was not a heavily produced event but more of a ad-hoc promotional thing. Even though artists felt that receiving messages live from the viewers was building a community, the novelty effects started to wear off as the months passed and some concerts happened with no viewers. The buzz was gone and for Hylland, O.M. (2022) it

demonstrated that people were craving the in situ live concerts, but it may have been because people were allowed out of their home again in some ways. The point here is that people would rather be out and do something than staying home to watch a show. Humans are social animals and there is no headlines commenting on Glastonbury tickets not selling this year. It may not be entirely due to the live nature of the event but to do with being part of a crowd physically with a common interest which would also explain why people go to pubs to watch live football matches. During the restrictions it was more of a case of faking it until making it in terms of prerecorded public clamours during matches, showing that live events are a physical human exchange no digital format can replace.

At first glance live streaming an event or uploading a digital performance may seem like the perfect solution to pollution when touring because:

A UK small-scale subsidised theatre 12-performance date tour with a touring party of 3 people resulted in 1.4 t CO₂e. Anable J. et al. (2010).

But actually in the 2020 Environmental report from the Arts Council of England, the figures show that touring represents the smallest fraction of the CO₂ emissions of the organisations included in the data. The European Framework Initiative for Energy & Environmental Efficiency in the ICT Sector was already showing in 2016 that ICTs consumed 8-10% of the electricity in Europe and released 4% of its CO₂ emissions. The consumption figure will keep raising as more theatres adopt digital technologies but on the other hand the carbon emissions need to be reduced otherwise the offsetting for the carbon neutral 2050 target will be too great and difficult to attain. Also, keeping digitised art in the cloud, with no time limit, for everyone to use poses a problem of content management, copyright and ownership as well (Enhuber M., 2015).

In its 2014 review, the Arts Council of England referred to research that demonstrated that a society engaged with arts and culture is perceived as achieving a superior wellbeing.

This idea is confirmed by the WHO (Fancourt D. and Finn S., 2019) in its reports on the benefits of the arts for health, while relying upon the physicality of it, taking part. Another problem is brought to light: not much effort in investing in the arts is part of healthcare is made which reinforces the idea of the need for data as the Arts Council of England pointed to bring evidence and

convince public authorities in the arts value as a preventive and curative solution to healthcare and wellbeing. The perfect illustration is that during lockdown a lot of people started a craft like knitting or sewing. It shows that making something with the hands and improving a skill and a aesthetic as a therapeutic effect when the body is involved in a creative activity. So why would humans want machines to create? From the postulation that human creativity is an exploratory process, a combination of differences and a transformational shift (Boden, M.A, 2004), artificial intelligence can recreate these complex ‘thought’ processes with codes (Du Sautoy M., 2019). From the perspective of the creator, digital creativity does not respond to a need for health reasons because artificial intelligence does not need to create for its well being.

Would the performing arts use digitalisation as a vector of artistic participation amongst communities? Data shows (see Appendices 1 and 2) that the number of young people taking part in theatrical activities keeps diminishing and a report redacted by Stevenson (2021) for Scotland explains the figures by having less theatres and less volunteers. Because of the value of community theatres to deal with mental health especially with young people as a participative and engaging method to improve mental health like the example presented in the case study from Right Here, reaching more young people to participate in performing arts like theatre thanks to digital technologies would be a valuable tool to compensate the drop in the numbers of venues and volunteers.

Part 3 - The opportunities for inclusive arts

Opening barriers and reaching wider audience

The National Theatre with the help of fundings from the Sidney E Frank Foundation managed to create a streaming platform for schools featuring international productions as well as behind the scene footages from the Theatre’s archives. They extended the reach by making the content available to students from their homes when the pandemic forced the schools to close.

The digital technologies make art accessible without the need to take the time to travel to a venue to buy tickets. However digitisation alone does not offer the democratisation of art as Enhuber M. (2015) explains it. The limits of democratisation was highlighted in the data showing that the digitised version of the Tate museum was accessed majorly by westerners. With the problem of

access to computers highlighted during the first lockdown in March 2020, when school classes became online classes, the inequality became apparent within the western societies. In the 2016 report by AEA Consulting, the data shows that:

- ✿ Streaming shows have a younger and more diverse audience than live shows;
- ✿ Streaming and events cinema attracts audience from poorer households than live shows.

With the importance of reaching poorer communities as stated in the 2014 study by the Arts Council of England where it was found that children from poorer communities have 3 times more chance of getting a degree when they participate in artistic activities at school.

In numerous reports, the emphasis is made on people's participation in the arts or at least the immersive experience of an artistic performance. As streaming and event cinema reach a wider audience, the next stage would be for digital technologies to allow audience to participate without any discrimination.

From entertainment to assistance

Defining the technology behind the term Augmented Reality (AR), is not limited to indeed augmented as in greater like Steve Mann's inventions could be described as. The definition of Augmented Reality by Milgram and Kishinev (1994) whereby the technology can either show physical objects into a digital setting or add digital objects into the real world: which would be assisting the audience and the other which project the participant into a virtual world. The virtual concert of the rap group JVG on the Helsinki's square, where avatars of the audience watched the concert of real human artists in a virtual rendered setting of an existing place. It superimposes the real environment with an added virtual digital layer in an immersive way which could be: entertaining, assisting and interactive.

Entertaining like the JVG concert or the 'Wallace & Gromit: The Big Fix Up' application where AR inhabits the user's environment where a back garden is virtually transformed into Bristol's square and the props become interactive.

Assisting, when spectators watching the show through their phone can see superimposed subtitles or even performers using sign language. Audio description can also be offered as part of the assistance. With the addition of

ever improving artificial intelligence with the creation of Neural Machine Translation (NMT), real time translation in a selected language would open up the reach and potentially value local languages. Even though it would be miss idioms, play on words, etc, it would give the spectators clues on what is happening. Wasson B.D. (2015) predicts that AR will become a must have for public spaces as part of the equivalent of the British Equality Act because the technology would assist deaf, blind and mentally disabled people.

Participating is possible through interactive application, but the haptic technology (touch based robotics) has the potential to assist visually impaired people to virtually touch an art piece, learn and interact.

The early adoption of Internet of Things (IoT) technology by the utilities sector gives cities the ability to improve efficiencies and management of natural resources, transforming them into Smart cities. A community theatre can be part of this system as a Smart building if it adopts sensors to communicate room occupancy (Fulton A., 2022). With this data available to the public, a community theatre showing a vacant space invites for more enquiries and becomes the instigator of improvised community creative projects. Although it would require a high standard of logistics and a business model suitable for fit for last minute events. It would accelerate the sense of cohesion amongst the community it serves. It would play an essential role in The European Capital of Smart Tourism initiative assessing towns in four categories: sustainability, accessibility, digitalisation, cultural heritage and creativity, while improving spatial exploration (Boukhechba, M. et al., 2017).

Conclusion

Funding and expertise

Beside the use of real-time data to make administrative tasks more efficient and in synch with the contemporary society, it allows theatre to demonstrate the value of its offering and apply for public fundings and attract partnerships. The more a theatre can secure funding the more likely it is to invest in innovative solutions for communication, audience engagement, augmented reality performance and inclusive shows (SDA Bocconi School of Management, 2020).

When a theatre innovates within the limits of its internal know-how and markets this innovation, it attracts experts generating more innovation. This is

particularly true regarding Industry 4.0 technologies. The more novel a performance is the more success it will receive, the greater its audience will become in numbers and in reach.

Performing arts as a fabric of society

Performing arts enter a vision for a healthier society through the participation in creative projects. The first step thanks to the digitisation of art pieces, is the popularisation. When art is made available and accessible, it reaches a younger audience and poorer communities.

When the digitisation of art from the past is achieved, digitalisation goes further and creates original art. The beauty of Industry 4.0 technologies takes the form of augmented reality when virtual and real environments are mixed and offer an immersive experience even greater than live shows because it projects the spectators into the position of actors; the audience interacts with the performance and the engagement invites a personalisation of the performance like an exclusive and individual exchange between the artists and the “audience” in whatever form it can take.

The evolving project, Motion Bank, has started as a way to make a dance choreography visible as an organisation of movements and record the performance as a script. It is digitisation. It became an educational tool (Monda, L.G., 2021) to understand human consciousness, pushing digital performing arts into what it is to be human: the result of a movement of the past and the reason of a movement of the future.

Implication for the environment

Digital technologies contributed to facilitate economic development but they are also the cause of serious damages to the environment (Arias, R., Knud Lasse Lueth and Abhay Rastogi, 2018):

- ✿ CO2 emissions
- ✿ Water pollution
- ✿ Destruction of ecosystems

The digitalisation of performing arts add to the problem of energy consumption, mining for precious metals and polluting waste. The question is:

are the immediate societal benefits of digitalisation outweighing the impact on the environment? Can a theatre's environmental policy evolve as it adopts more digital technologies to reduce its impact and participate to the country Net Zero target?

Towards the Sustainable Development goals

In September 2015, the UN 2030 Sustainable Development Agenda was signed by 194 countries. Out of the 17 sustainable development goals, 6 can benefit from performing arts and digitalisation:

#3 Good health and well-being

#4 Quality education

#5 Gender Equality

#10 Reduced Inequalities

#11 Sustainable Cities and Communities

#12 Climate Action

It demonstrates that supporting performing arts is in direct relation with giving societies the capability to create a sustainable, inclusive environment. Innovation and creativity are the core activities of a theatre and in that respect it participates to the SDGs when it is given the means to make the most of digital technologies.

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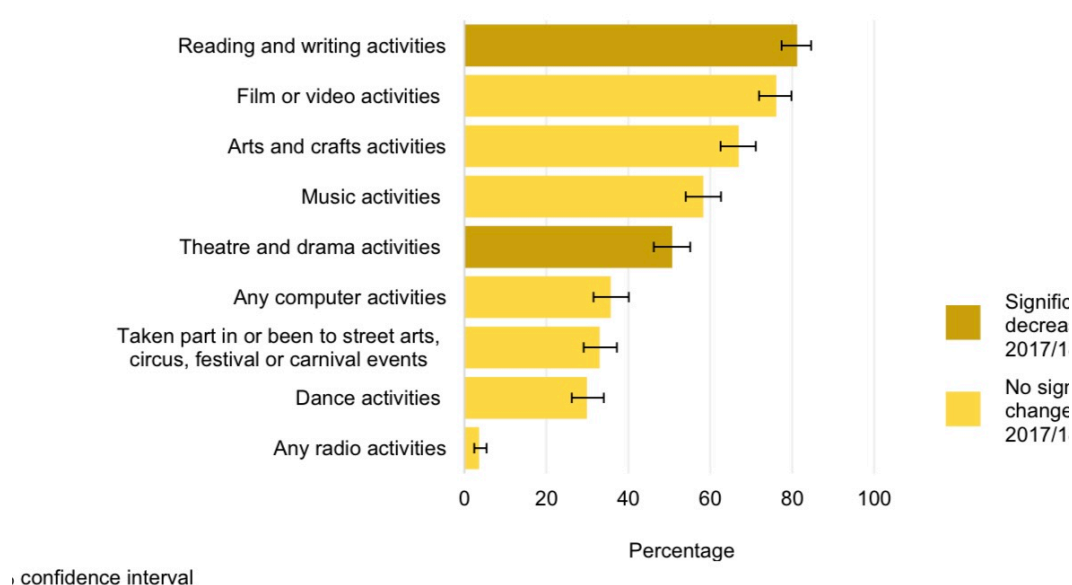
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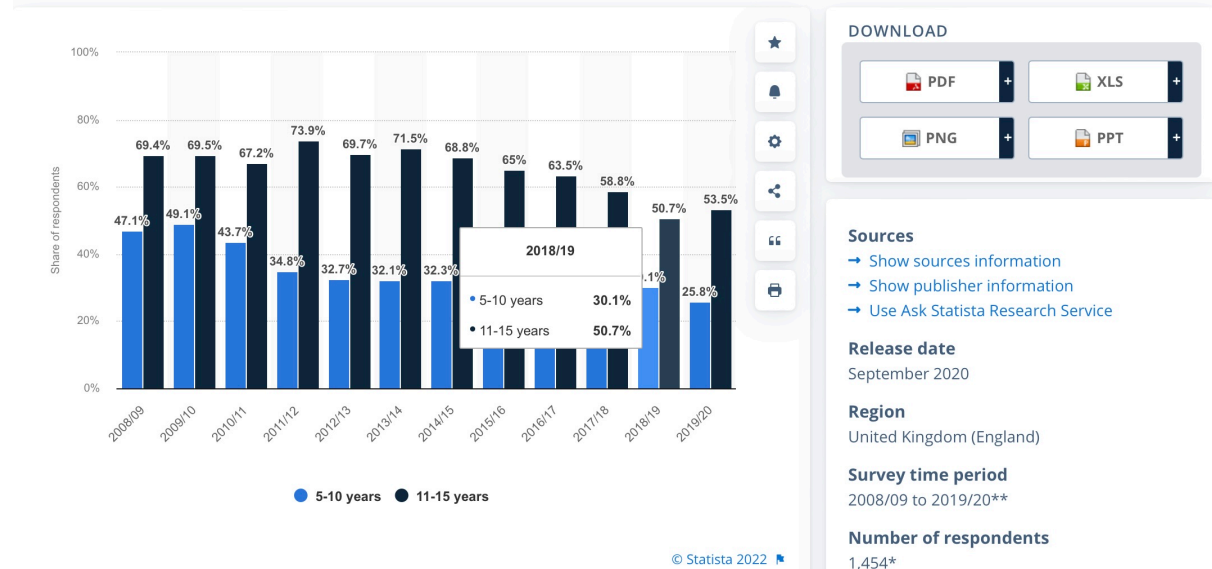
Appendices

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1.3: Proportion of children aged 11-15 years old who had engaged with selected art forms or outside school in the last 12 months, 2018/19².



Share of children who participated in theatre and drama activities in the last year in England from 2008/09 to 2019/20, by age



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