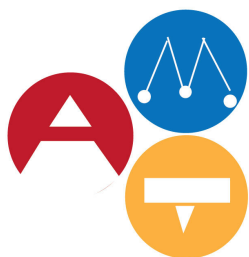


Using Artificial Intelligence for Audience Engagement in the Performing Arts

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Artificial intelligence continues to make its way into the mainstream and into multiple industry sectors. The arts are no exception. Over the past few years we have begun to see a wave of organizations use artificial intelligence as a method to enhance the audience experience. In particular, the use of artificial intelligence in the facilitation of audience engagement is an interesting trend in arts organizations. Museums and the entertainment industry have begun to embrace this technology as a way to build connections and deepen experience, yet the performing arts largely have not. This report will attempt to address the role of artificial intelligence in audience engagement and provide thoughts on how artificial intelligence could be used in performing arts organization's audience engagement today.

A FRAMEWORK FOR AUDIENCE ENGAGEMENT

Audience engagement is the process of designing specific measures and activities to deepen the experience between and audiences and the art. Audience engagement is not a new idea within the arts realm. Over the years countless organizations have been implementing audience engagement-based initiatives. Many audience engagement efforts have centered around the notions of assisting audiences in building context and creating meaning. While previously efforts may have been put together without much thought,

today there is a shift towards intentional and strategic planning for the design and implementation of audience engagement initiatives.¹

Stage 1 of the arc is the Build-Up, beginning the moment an audience member makes a commitment to attend or receives the first marketing message. It is during this stage that the organization will facilitate engagement through building context and exchanging information about the art itself. This initial exchange is what helps to set the expectations of the audience member attending and what they will see. The goal is that during this stage the audience member will reach the moment of curatorial insight. This is the moment when they realize why an artistic choice was made, for example the moment they realize why a selection of pieces were chosen for a program or why a director chose to set a certain play. This usually comes through personal statements from members of the artistic decision makers.

Stage 2 is Intense Preparation. Stage 1 and Stage 2 can sometimes blend with one another. During this stage audience members will begin to make their plans for attending. They may also be more likely to engage at this stage because the event is approaching and on their minds.² The goal here is to build the anticipation, use engagement activities to get the audience excited for what they are about to see and thus help it to deliver higher intrinsic impact.

Stage 3 or the Artistic Exchange itself, is when the audience will experience the artistic event. Engagement can take place right before, during, or right after in this stage. The focus in this stage has often been placed on providing

¹ Alan Brown and Rebecca Ratzkin, "Making Sense of Audience Engagement," *WolfBrown*, 2011, Accessed February 20, 2019,

http://wolfbrown.com/images/books_reports/documents/Making_Sense_of_Audience_Engagement.pdf.

² Ibid



audiences with layers of interpretive assistance during the exchange. In other words, helping the audience gain understanding and appreciation for what they are witnessing.

Stage 4 is the Post-processing and Meaning Making phase which follows after the artistic exchange has ended. Common tools and methods arts organizations utilize to facilitate

“impact echo” or **Stage 5**. Stage 5 recommends providing tools for remembering, like digital souvenirs, that help the audience recall later what they had seen and experienced.

With these stages in mind, the next part of understanding the arc is the realization that not all your audiences will want to engage in the same places along the arc, nor will they all want

Figure 1: The Arc of Engagement

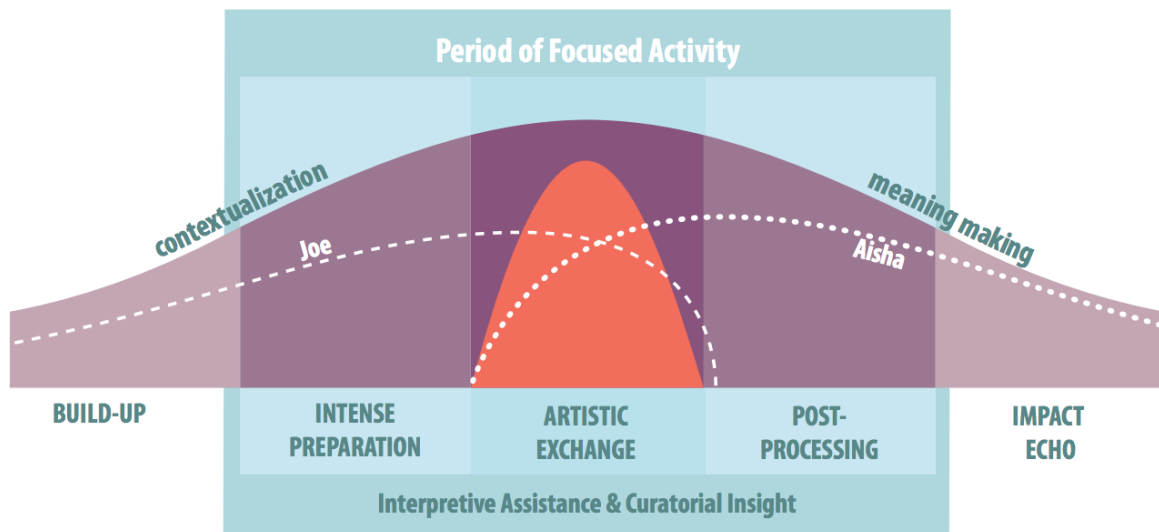


Figure 1. WolfBrown Arc of Engagement

the meaning making process include surveys and talkbacks or discussions. The engagement can either be done through active or passive facilitation that is either done personally or publicly. The purpose of meaning making and post-processing is to help audiences use critical thinking skills to reflect on what they’ve experienced in hopes that the experience resonates and leaves the audience member remembering it for days, months, or years after. This is what WolfBrown describes as the

to engage in the same way.³ This is especially true when thinking more about the integration of technology as a tool for engagement. The technology may not be able to meet the needs of every audience member, so you need to be more intentional about how it is being used to engage meaningfully with the most audience members possible. WolfBrown also provides a framework to think through the types of ways in which your audience members could possibly want to engage.

³ Ibid

Table 1. WolfBrown Audience Engagement Typologies

Type	Description	Stage
Readers	These are individuals who prefer light engagement and will engage little beyond reading something like program notes.	2 and 3
Critical Reviewers	This type will pay close attention to reviews and look for other sources of information before making their decision to attend.	1 and 2
Casual Talkers	These individuals like to discuss the artistic event with their families and friends.	1, 2, 3, 4, and 5
Technology-based Processors	Here you will see those who prefer to engage through digital avenues such as social media and blogs.	1,2, 3, and 4
Insight Seekers	An individual who need an intellectual experience and prefer to absorb as much information as they can both before and after the exchange.	1,2, and 4
Active Learners	These individuals want to be able to have choice in their engagement and get personally involved when tailor their own experiences.	1,2, 4, and 5

CURRENT USES FOR AI IN THE PERFORMING ARTS

When we look broadly at the music world, where we see the industry excel in the integration of artificial intelligence is in the generation of art itself and creative expression. In June 2016, Google created the Magenta, a project developed to use AI in the creation of new art and music. The AI generated musical piece was an 83-second long piano piece.⁴ This first project from Magenta was created by starting with four notes and using a trained

neural network to compose a piece based on those notes.⁵ The goals of the project are to create AI based tools for artists while building a community of artists creating machine-generated art.⁶

They described themselves as an “open source research project exploring the role of machine learning as a tool in the creative process”.⁷ The project features avenues for both research and demos of projects integrating machine learning and art for users to try. For example their Magic Sketchpad allows users to start a doodle and

⁴ Mandy Ding, “Putting the ‘Arts’ in ‘Artificial Intelligence.’” *AMT Lab @ CMU*, October 3, 2016, Accessed February 20, 2019, <https://amt-lab.org/blog/2016/10/putting-the-arts-in-artificial-intelligence-1>.

⁶ “Magenta,” *Google AI*, Accessed May 1, 2019, <https://ai.google/research/teams/brain/magenta/>.

⁵ Ibid

⁷ Ibid

through the use of machine learning and neural networks the program will attempt to finish your sketch.⁸ Their program NSynth or Neural synthesizer utilizes a machine learning algorithm through a deep neural network that is able to learn the characteristics of certain sounds and can then create its own new sound based on those characteristics.⁹

Using AI as a songwriting assistant has also taken off in the market. Flow Machines offers a songwriting algorithm that is being used by multiple artists as a creative assistant.¹⁰ The company has even appeared on Spotify playlists and music charts.¹¹ Other companies like Amadeus Code have also entered the field. The Japanese company released an artificial intelligence power song writing assistant. This technology uses an algorithm to scan a diverse database of music and then, based on user specifications, the app creates an instrumental harmony.¹²

AI generated material is also created in the theatre world. Take the company HumanMachine. HumanMachine is an experimental artificial intelligence improvisation company set on exploring the meanings of creativity and spontaneity.¹³ This

company developed a new production entitled Improbatics which utilizes both humans and machines running AI technology called A.L.Ex.¹⁴ A.L.Ex, or Artificial Language Experiment is a computer system capable of speech recognition, improvised dialogue, and voice synthesis all built with the use of artificial intelligence.¹⁵ This deep-learning based artificial improvising machine based on a chatbot technology was trained on movie subtitles and has been able to generate believable and contextually relevant dialogue suitable for theatrical performances.¹⁶ Though the bot has its limitations in timing and emotional delivery, it is powered by the most current algorithms used for automated speech and language translation.¹⁷

Even symphonies are getting in on the action. Earlier this year, the company Huawei used artificial intelligence technology to finish composing an incomplete symphony by Schubert.¹⁸ The project, Symphony No.8, was completed by composer Lucas Cantor with the assistance of the artificial technology inside the Mate 20 Pro smartphone.¹⁹ The entire melody for the third and fourth acts was composed by the AI.²⁰ The AI was trained specifically to make

⁸ Ibid

⁹ Ibid

¹⁰ Peter H. Diamandis, "AI Is about To Completely Change The Face of Entertainment," *SingularityHub*, May 3, 2019, Accessed May 5, 2019, <https://singularityhub.com/2019/05/03/ai-is-about-to-completely-change-the-face-of-entertainment/>.

¹¹ Ibid

¹² Carla Dobronauteanu, "Amedeus Code: Brave New World of A.I. Music Generation," *Arts Management and Technology Laboratory*, January 18, 2019, Accessed March 17, 2019, <https://amt-lab.org/blog/2019/1/jnedfjixaogfkycvthuu8bxa8tcvem8>.

¹³ "Human Machine – Artificial Intelligence Improvisation," *HumanMachine*, Accessed May 3, 2019, <https://humanmachine.live/>.

¹⁴ Ingrid Fadelli, "Improbatics: Bringing Machine Intelligence into Improvised Theatre," *Tech Xplore*, September 20, 2018, Accessed February 21, 2019, <https://techxplore.com/news/2018-09-improbatics-machine-intelligence-theatre.html>.

¹⁵ Liane Faulder, "Tech Talks: Artificial Intelligence takes on humans in a new improv show," *Edmonton Journal*, January 8, 2019, Accessed May 6, 2019, <https://edmontonjournal.com/entertainment/theatre/tech-talks-artificial-intelligence-takes-on-humans-in-new-improv-show>.

¹⁶ Ingrid Fadelli, "Improbatics: Bringing Machine Intelligence into Improvised Theatre," *Tech Xplore*, September 20, 2018, Accessed February 21, 2019, <https://techxplore.com/news/2018-09-improbatics-machine-intelligence-theatre.html>.

¹⁷ Ibid

¹⁸ Andy Boxall, "Huawei's Alhas finished Schubert's unfinished symphony and we've heard it," *Digital Trends*, February 6, 2019, Accessed May 9, 2019, <https://www.digitaltrends.com/mobile/huawei-ai-unfinished-symphony/>.

¹⁹ Ibid

²⁰ Ibid



music like Schubert, by referencing and being trained on almost 90 of Schubert's works.²¹ In order to understand and develop the music, the AI was fed the first and second movements of symphony and through analyzing pitch, timbre, and meter, it was able to generate a third and fourth movement in the style it had learned was similar to Schubert.²² To make the context of the composition more rich, further iterations of the process included the AI being trained on composers who influenced Schubert.²³ However, Cantor was essential for bringing what the AI couldn't to the composition including experience, emotion, and understanding.²⁴

But while artificial intelligence and the creation of art is an interesting direction to explore, there is also a contingency of arts organizations developing audience engagement centered around artificial intelligence technology.

ARTIFICIAL INTELLIGENCE OPPORTUNITIES FOR AUDIENCE ENGAGEMENT

As time goes on, it's clear that artificial intelligence will continue to find its place in the arts. Using AI to build connections with audiences, in particular, is an interesting and developing sector of arts and technology. Museums and the entertainment industry are leading the way in discovering the intersection between arts and audience engagement

strategies with projects like the Met x Microsoft x MIT and Iris+.

In particular, museums seem to be at the forefront of adapting AI technology as part of their exhibition strategy. Recently the Metropolitan Museum of Art announced their collaboration with MIT and Microsoft to deliver a series of projects utilizing AI to enhance global connection, access, and the audience experience.²⁵ The first in the series of projects is *Artwork of the Day* which uses AI by pulling open data from users and delivering an artwork from the collection that it believes will resonate with the user.²⁶ *Tag, That's It* utilizes crowdsourcing and AI to generate more accurate keywords, thus, enriching the collection within a more global Wiki community.²⁷ *Storyteller* takes voice recognition AI and selects an artwork in the museum that illustrates a story or conversation.²⁸ The *My Life, My Met* project uses AI technology to analyze posts from Instagram and then selects a piece from the Open Access collection that most closely matches the user's photo.²⁹ The final project will be *Gen Studio*, which uses a complex weaving of GANs to encourage users to explore the latent space under the museum's collection.³⁰

Another great example of museums utilizing AI technology to increase audience engagement is the Museu do Amanha located in Rio de Janeiro, Brazil. Here, the museum uses an AI system powered by IBM Watson named Iris+ that was designed by the company 32Bits.³¹ Iris+ was designed to help users better

²¹ Ibid

²² Ibid

²³ Ibid

²⁴ Ibid

²⁵ Chuck Leddy, "New Collaboration Sparks Global Connections to Art through Artificial Intelligence," *MIT News*, February 5, 2019, Accessed February 22, 2019, <http://news.mit.edu/2019/mit-collaboration-sparks-global-connections-art-artificial-intelligence-0205>.

²⁶ Ibid

²⁷ Ibid

²⁸ Ibid

²⁹ Ibid

³⁰ Ibid

³¹ Daniel Morena, "IRIS+ Part One: Designing + Coding a Museum AI – American Alliance of Museums," *American Alliance of Museums*, June 12, 2018, Accessed February 20, 2019, <https://www.aam-us.org/2018/06/12/iris-part-one-designing-coding-a-museum-ai/>.



understand and contextualize the exhibit and experience by engaging in open ended questions with audiences and showing how their thoughts, concerns, and experiences relate to other patrons.³² In an AMT-Lab interview with Daniel Morena from 32Bits, he described that Iris+ is a way for people to experience a new technology.³³ Using an RFID card, users can explore the museum and at the end of the exhibit can summon the AI interface and actively converse with it based on its provocations.³⁴

The AI system is continuously being fed data to expand the range of knowledge and topics it can discuss through these open ended questions and conversations with users.³⁵ The audience engagement tactics through Iris+'s data visualization allow users to see themselves in the greater context of other visitors.³⁶ It is not meant to be passive, Iris+ has been designed to invite you to engage and interact. This is one hallmark of successful AI integration as an audience engagement tactic, making sure there is a clear invitation for audience members to engage with the technology that moves beyond passively consuming information about art.

The use of artificial intelligence in the entertainment industry is also expanding. The Canvs company has developed a survey for viewers that utilizes AI to collect data on

audiences emotional response to programming.³⁷ The company believes that the insights gathered are a key component to making business decisions.³⁸ For example, if findings show a positive emotional response to a specific character, the creative executives may decide to focus their efforts on developing that character's storyline.³⁹ The AI system has the ability to crunch data from thousands of surveys and allows for the fielding of more open-ended questions.⁴⁰ It then takes these responses and measures and categorizes them using a standardized set of emotional tags.⁴¹

Another entertainment giant has also tried to enhance engagement through the use of artificial intelligence. Netflix employs AI algorithms to create your personalized list of movie recommendations.⁴² By establishing that users who watch A are likely to watch B, they make suggestions which keep you viewing content and keep you subscribing to their streaming service.⁴³ In addition to your history, they use the viewing history of others with similar tastes to recommend what you should watch next.⁴⁴ In addition they use machine learning to generate the most clickable thumbnails for their programming.⁴⁵ There are constant A/B tests being run to generate the high-probability click-thru images, all in an effort to increase the chance that you will select something and watch.⁴⁶

³² Ibid

³³ Jenee Iyer, "Podcast: Daniel Morena Discusses Powering Audience Engagement with Artificial Intelligence," *AMT Lab @ CMU*, December 3, 2018, Accessed February 20, 2019, <https://amt-lab.org/blog/2018/12/podcast-daniel-morena-discusses-powering-audience-engagement-with-artificial-intelligence>.

³⁴ Ibid

³⁵ Ibid

³⁶ Ibid

³⁷ Todd Spangler, "CBS Turns to Artificial Intelligence to Glean Viewers' Emotional Responses to TV Shows," *Variety*, February 20, 2019, <https://variety.com/2019/digital/news/cbs-canvs-artificial-intelligence-tv-emotional-response-1203142779/>.

³⁸ Ibid

³⁹ Ibid

⁴⁰ Ibid

⁴¹ Ibid

⁴² Allen Yu, "How Netflix Uses AI, Data Science, and Machine Learning – From A Product Perspective," *Medium*, February 27, 2019, Accessed March 6, 2019, <https://becominghuman.ai/how-netflix-uses-ai-and-machine-learning-a087614630fe>.

⁴³ Ibid

⁴⁴ Ibid

⁴⁵ Ibid

⁴⁶ Ibid



AUDIENCE ENGAGEMENT: CHATBOTS

While museums and the entertainment industry are growing their investment in AI technology for the user experience, performing arts organizations are less active in using this technology. Initial research turned up very few instances of AI being used as a tool for engagement in performing arts organizations beyond some organizations beginning to implement chatbots to help answer standard FAQ's.

Chatbots are defined as computer programs that are designed and programmed to imitate conversation. By using artificial intelligence in the form of natural-language processing, machine learning, and deep learning chatbots can "learn" by finding patterns in data.⁴⁷ Thus, they can learn to perform tasks, answer questions, manage information, and solve problems.⁴⁸ The three primary types of chatbots in use today are menu/button based, keyword recognition based, and contextual.

The menu/button based chatbots are the most basic form.⁴⁹ These bots are based on decision tree hierarchy presented to the user as buttons.⁵⁰ Users must make several selections in order to work towards their desired answer.⁵¹ These are similar to what you would find in an automated phone menu.⁵² A keyword recognition based chatbot is programmed with customizable keywords and then uses artificial intelligence to determine the best way to

answer a user's question.⁵³ They essentially listen, identify keywords, and respond. For example, if you were to ask the chatbot "Who composed the opera Le Nozze di Figaro?" then the bot could use keyword's like "composed", "opera", and "Figaro" to find the best answer to respond with. Finally, there are contextual chatbots. These are the most complex bots and use machine learning and artificial intelligence to remember conversations they've had with users before and learn from repeated use over time.⁵⁴ Unlike keyword recognition bots, contextual bots are able to self-improve based on what and how users are asking for something.⁵⁵

Chatbots are great tools during the contextualization stage in the arc of engagement. They are good tools for being able to provide more information both about the art people will see and about how they can plan their attendance. Chatbots can answer questions about the show itself while also assisting audience members with frequently asked questions such as how to find the theater, how long the performance will be, and where there is available parking. It also helps organizations redirect human resources from managing audience questions to other areas of work.

AUDIENCE ENGAGEMENT WITH TECHNOLOGY

As stated before, organizations must always keep in mind that not all audiences will want to

⁴⁷ Casey Phillips, "The 3 Types of Chatbots & How To Determine The Right One For Your Needs," Chatbots Magazine, April 30, 2018, Accessed May 9, 2019, <https://chatbotsmagazine.com/the-3-types-of-chatbots-how-to-determine-the-right-one-for-your-needs-a4df8c69ec4c>.

⁴⁸ Ibid
⁴⁹ Ibid

⁵⁰ Ibid
⁵¹ Ibid
⁵² Ibid
⁵³ Ibid
⁵⁴ Ibid
⁵⁵ Ibid



engage the same way. Which is why designing for multiple specific engagement preferences in could help organizations capture a larger audience segment. This is one issue that seem to impact performing arts organization in particular. Oftentimes the performing arts use a specific set of engagement activities including program notes combined with pre-talks and or post talks. This standard format, while working for some, does not capture all types of individuals who want to engage further. It also ignores the technology-processors all together. As technology continues to advance and infiltrate our lives, it is important for performing arts organizations to assess how technology can be used to facilitate meaningful engagement experiences.

But the integration of technology as a tool for engagement, like any initiative should be done strategically. Taking into account not only how your audiences want to engage but more specifically how audiences want to engage technologically and digitally. On the whole, audiences engage with culture for the primary reasons of having fun, experiencing something new, and learning something new. Thus, the integration of technology should always keep this in mind, how can we use technology to engage audiences that enhances their learning and provides new experiences and enjoyment. In general, audiences are interested in the integration of digital technology for a variety of performing arts.⁵⁶ Looking at the figure below we can see that audiences do want digital experiences when they attend a variety of arts and culture activities.

Desire for Digital Experiences in Cultural Activities

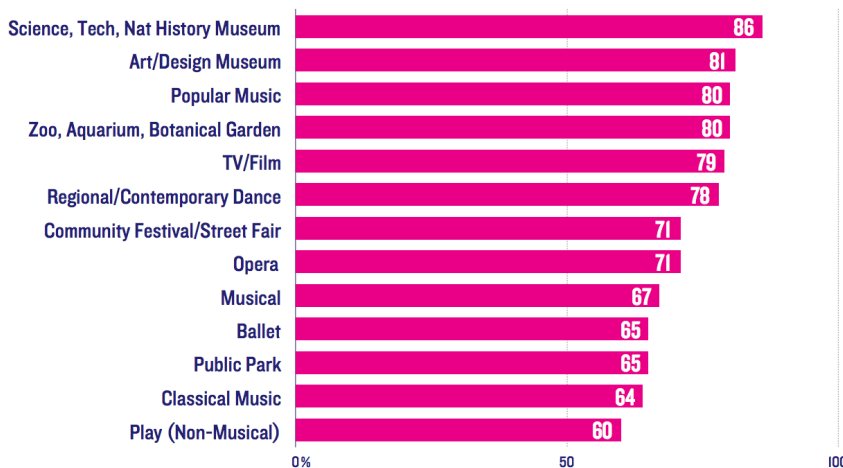


Figure 2. La Placa Cohen, Culture Track 2017 Study

⁵⁶ “Culture Track ’17,” La Placa Cohen, 2017, Accessed May 6, 2019, <https://s28475.pcdn.co/wp-content/uploads/2017/02/CT2017-Topline-Deck-1.pdf>.

According to the La Placa Cohen Culture Track study from 2017, audiences do appreciate the role of technology in their ability to deepen experiences by providing curatorial information and increased understanding.⁵⁷ They also like the digital element of being able to share their experience with others.⁵⁸ However, some audiences have raised the issue that the incorporation of technology can make an experience feel less authentic and feel more complicated.⁵⁹ The key is identifying how digital technology can enhance and deepen a cultural experience in ways that nothing else can.⁶⁰

In addition to analyzing WolfBrown and Culture Track, it is worth exploring another framework that focuses on social meaning making. Creating Connection is a national movement to make arts and culture a valuable part of everyday life. In doing so they utilize a framework of building public will for arts and culture.⁶¹ Building public will centers on “creating new assumptions about what we expect from our communities, how we behave as a society, and why we should build support for lasting policy and systems change”.⁶² Through a combination of research and framing perspectives they have found that achieving public will requires effective messages and strategies.⁶³

An effective strategy will include showing that creative expression in all forms can help people connect with others and themselves and will engage a broad and diverse set of audiences and stakeholders.⁶⁴ Connection is what motivates audiences who believe it is best

served by authentic arts and culture engagement experiences.⁶⁵ The idea of connection is incredibly important and is echoed throughout the frameworks of WolfBrown, Culture Track, and Creating Connection. The way we view audience engagement opportunities should be rooted in how it can build connections between artist, institution, and audiences. Therefore, if we are to introduce technology to the equation we must still keep in mind how that technology can be used to foster those connections. As organizations we should not be introducing artificial intelligence just because we can. It must be based in a reasoning that it will meet the practices for technology and audience engagement as defined by the three frameworks discussed.

There are also more expectations now for interactivity and interconnectivity to be the

normal for culture experiences.⁶⁶ Audience engagement solutions should try and reflect this paradigm shift as more people require multi-sensory and customizable experiences.⁶⁷ This may also suggest a rise in the active learner type, those who want more control over their experience and how it can be personalized to them. However, this also means it can be more difficult to satisfy everyone with a single audience engagement experience. Therefore, it is even more important for organization to be intentional about the strategy behind their engagement. There needs to be a strong

⁵⁷ Ibid

⁵⁸ Ibid

⁵⁹ Ibid

⁶⁰ Ibid

⁶¹ “Building Public Will for Arts + Culture,” Creating Connection, April 2015, Accessed May 8, 2019, <https://static1.squarespace.com/static/56e347ee0442621615c31e5e/t/5715598b27d4dbf70c7115b/1493738754943/Creating+Connection+Report.pdf>

⁶² Ibid

⁶³ Ibid

⁶⁴ Ibid

⁶⁵ Ibid

⁶⁶ “Culture Track ’17,” *La Placa Cohen*, 2017, Accessed May 6, 2019, <https://s28475.pcdn.co/wp-content/uploads/2017/02/CT2017-Topline-Deck-1.pdf>

⁶⁷ Ibid



understanding of who this is for and what they are trying to accomplish.

BEST PRACTICES

- ***Authentic exchange***
- ***Easy to use***
- ***Builds Connections***
- ***Teaches Something New***
- ***Provides a New & Unique Experience***
- ***Meets the Needs of a Broad and Diverse Range of Audiences***
- ***Social and Interactive***
- ***Sharable***

The short list provided above offers best practices for the integration of artificial intelligence, technology, and audience engagement based on the data and frameworks discussed throughout this report. However, the integration of AI technology must be done in a way that allows audience members to think about what they have seen and provide not only a feedback mechanism for the organization but a tool for active engagement that provides the correct conditions for an impact echo to occur.⁶⁸ For true engagement there must be more than a one way conversation during a technological experience.⁶⁹

It is also important to remember that AI always has a human behind it and thus, engagement via artificial intelligence is merely an extension of the human itself. Technology and artificial intelligence shouldn't be used to replace humans in audience engagement experience but be there when a human cannot. Not only can AI engage, but it can also help organizations

place resources where they are most needed. The AI can help push an organization's plan for audience engagement forward and help contextualize why certain audience engagement is necessary. AI has a role to play across the arc of engagement and it's already in other pieces of technology like a CRM. Thus, it is not something for organizations to be afraid of but embrace.

CONSIDERATIONS

The performing arts, while having developed AI for the creation and expression of art, are not yet at the forefront of AI for engagement. However, the current arts and technology landscape is ripe for investigating new opportunities for the performing arts to utilize AI as a tool for audience engagement. So then how can we use AI as a tool to engage with our performing arts audiences across the arc of engagement? How do we use AI to deepen and enhance the audience experience in an authentic way that embraces a variety of potential methods in which an audience member wants to engage?

Contextualization

Beyond building a robust chatbot that can aide your audience members through the intense preparation phase, there are other potential applications for AI in the contextualization phase. For example, the introduction of a cross

⁶⁸ Alan Brown and Rebecca Ratzkin, "Making Sense of Audience Engagement," *WolfBrown*, 2011, Accessed February 20, 2019,

http://wolfbrown.com/images/books_reports/documents/Making_Sense_of_Audience_Engagement.pdf.

⁶⁹ Ibid



organizational recommendation and personalization platform.

If a collection of arts organizations came together and pulled all their performances on a singular platform for audience members; they could use AI to build a system which generates personalized recommendations for what audience members should see. These recommendations can be based first on given preferences, but as each audience member continues to attend performances, the AI could essentially learn what they would like based on theirs and other audience member data. Built on similar technology to Netflix, this would help audience members weed through the decision-making process of what they would like to see, while giving them access to multiple touchpoints at once. Users could select the performance recommended to them and the AI system could pull trailers, artistic statements, articles, and reviews as well as the organization's marketing materials. This would engage not only your technology processors but perhaps your critical reviewers as well.

By having everything together on one platform you also have more opportunity to introduce audiences to a variety of genres and organizations they may not have seen otherwise. Overtime as audience members continue to purchase from the platform, the AI can learn your preferences and incorporate that into your recommendations. For example, the AI could begin to recommend certain seats at a certain price based on what you have purchased before. This eliminates the need to click thru ticketing sites and encourages audiences to potentially purchase with more spontaneity because it has been tailored to that specific audience member. In a similar way to Netflix, perhaps we could leverage this technology to try and improve audience retention as well in the arts and culture sector.

The recommendation platform would be a reminder to audience members, and it takes the guess work out of having to search for what you might like. Plus, it could recommend performances an audience member didn't even know about. The ease of use and personalization could potentially entice audience members to see multiple performances at either one organization or perhaps across multiple organizations.

Artistic Exchange

While we've seen AI used as a creative part of the artistic exchange, it is also interesting to think about the application of AI as an engagement tool during the artistic exchange as well. A recent trend I've seen in performing arts organizations is the use of digital program notes. They are synced to the live performance and provide real-time context for audience members which helps deepen understanding of what they are watching. There is a clear opportunity, thus, to use AI as a way to enhance these digital program notes. For instance, AI could be built into the digital program app as a performance assistance feature. Built on keyword recognition technology. A chat bot could be implemented for audiences to directly ask questions to while the performance is happening. Sometimes the program notes don't always include the information you are looking for and this would give audiences the chance to add either additional context to what is provided or only gather the information that they are truly interested in.

If built on a contextual chatbot, the program notes application could learn what that audience member typically wants to know when they attend a performance. Overtime it can use this data to produce personalized program notes based specifically on what they frequently ask. This way the program notes are



not one size fits all. Users have two ways to get the information that is most relevant and important for them in order to have a pleasant engagement experience during the performance. It helps make the experience personalized while helping to contextualize the performance for audience members. Due to the personalized nature you will be able to engage not only those technology-based processors but also your active learners who want to shape their own experience. In addition, you could engage some readers for whom the program notes would normally be sufficient.

Post Processing and Meaning Making

With this in mind, imagine if we could bring the characters, composers, or other figures associated with the artistic exchange to life through technology. To engage audiences during the post-processing phase, one could theoretically create a digital engagement booth that allows you to actively converse with a character built on artificial intelligence. By having an active conversation with a “character” audience members are able to talk through what they just saw in order to gain better understanding, reflect, and find meaning in the performance. It allows them to actively share their thoughts with the added dimension of speaking with a sentient-feeling form of a character.

These character bots could be designed to respond as the character based on contextual or key word recognition chatbot technology. Audience members can ask the characters questions about the performance or discuss their thoughts based on the AI’s own provocations. The bot can thus respond accordingly as though they were the character themselves. As AI technology continues to grow there will likely be more avenues to introduce personality to AI. For example, if you could

leverage technology like A.L.Ex and feed an AI bot thousands of lines from Shakespeare. Theoretically, it could converse as though it was a Shakespearean character by producing improvised lines. Perhaps this could then be streamlined through the use of keyword recognition chatbot technology. Instead of improvising it can answer audience questions and converse with them using the language that makes the character feel Shakespearean.

Even further, if you could collect enough data inputs from other users’ reactions and feelings to the performance, the AI Character Bot could respond intelligently to your thoughts and stimulate an active conversation with the audience member about what they have just seen. Doing so by leveraging the Natural Language Processing to help put audience reaction and comment into context. The bot in this case would thus feel more sentient in its analysis and response the audience conversation about the performance.

There is also the opportunity to add more dimension to the engagement experience by giving the character bot a face. Using the same motion capture and artificial intelligence technology as deep fakes. One could reasonably generate a realistic depiction of either the actor who played the character or an artistic rendering of what a character could look like. For music performance being able to speak with the composer is another way to leverage this technology and help audience members engage further with the art itself. This would also make audiences feel more like they were actually talking to a real character and not just a bot who appears to think like a specific character. The idea would also help engage your technology-based processors, casual talkers, active learners, and perhaps your insight seekers. Additionally, these character bots could even be used during the contextualization



phase. If they were used as the FAQ, bots can provide audiences greater context about what they are about to see while answering their questions for intense preparation.

Another approach for performing arts organizations to utilize AI technology in facilitating the post-processing phase of engagement is to create an AI system like Iris+ and the Canvs survey which has the ability to converse with audience members through the asking of open ended questions. The technology could be used as a freestanding booth in the lobby of the venue or through a mobile chat device which audience members could access following the performance. There is also the potential for hosting a more sophisticated online chatbot that replaces a traditional audience survey. The AI system could be programmed to ask audience members about not only how they felt about the performance itself but also collect feedback on the audience members overall arts-going experience. Looking at asking audiences open-ended questions like:

“After seeing this performance how has the experience made you feel?”

“What was your favorite moment in the performance and how did it make you feel?”

“What is something you learned or took away from this performance regarding (insert theme of piece)?”

The component from Canvs that measure audience data and demographics as well as audience emotional responses to the performance and overall experience could be an excellent tool to help arts managers make informed decisions regarding future seasonal programming or changes that should be made to improve the user experience. However, an AI system like Iris+ would give performing arts audiences the chance to discuss and process

what they have experienced as well. Having a form of data visualization is also important for audience members to feel a sense of connectivity to others who also experienced the performance. The organization could display a data visualization screen that shows audience members how they felt based on the emotional tags assigned in their response in comparison to others who engage with the AI technology.

To keep audiences engaged across a season, the same survey could be given after every performance. Through a specific user pin created by the audience members, they could enter multiple for points of data for each show they attend. This way they can see their answers in context, not just for one but for all shows within a given season within the data visualization. It’s as though you are creating a social map from a survey to help audience members feel more connected to one another showing them where they lie in comparison to others. If performing arts organizations are going to be surveying audiences anyways, this is one way to perhaps make it a tool that further engages our audiences and makes them reflect on their experience. It will engage both your technology-based processors and your casual talkers while allowing audience members to be more meaningful in their answers.

In addition, this would allow you to utilize human resources elsewhere rather than crunching survey data. The AI is able to handle that information so organizations can use the data for informed decision making. Perhaps about how the show was received and maybe even further as a tool and dataset for how they would plan a future season based on their audience’s emotional responses.

With these possibilities however, there is an understanding of certain barriers and limitations. Iris+ was built specifically for one



exhibit, leading to questions about monetary investment and sustainability strategies in regards to this AI technology and future advancements. Performing arts organizations would also need the technology to be able to discuss a variety of topics on all performances without too many specifics, or new data would constantly need to be added based on the season programmed. The exhibit is more static in comparison to a traditional performing arts organization.

CONCLUSION

As time goes on, it's clear that artificial intelligence will continue to find its place in the arts. Using AI to build connections with audiences, in particular, is an interesting and developing sector of arts and technology.

Museums are leading the way in discovering the intersection between arts and audience engagement strategies with projects like the Met and Iris+. The performing arts, while having developed AI for the creation and expression of art, are not yet at the forefront of AI for engagement. However, the performing arts are overdue for a technology jumpstart and a reassessment of audience engagement tactics. Organizations should take time to actively consider whether or not artificial intelligence as a tool for engagement is right for them. Artificial Intelligence has the capability to be an extension of the human and engage audiences in a new way that provides a new experience. Now, more than ever, the opportunities for the integration of artificial intelligence and audience engagement in the performing arts are ripe for exploration.



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