Catenate: Creating an Interdisciplinary Art Project

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Abstract— **This paper will present the rationale for, the challenges of, and successes encountered in the formation process of an interdisciplinary Visual & Performing Arts Project, *Catenate*, at Ohio Northern University's School of Visual & Performing Arts.**

Keywords—up to 4 key word/word combos

I.   INTRODUCTION

What if we created a safe space to explore, and fail, without fear?
What if we had a framework to create interdisciplinary works of art?
What if we could use technology to fascinate the eyes
and enthrall the ears?
What if we had a project that allowed you to ask, "What if?"
Catenate is a project housed within the Ohio Northern University School of Visual and Performing Arts with a mission to allow the ONU community to create and explore the connections between performance, technology, the visual arts, and the human spirit. By supplying access to space, equipment, and mentorship, the participants (students and faculty) can explore the interrelations of sight, sound, and movement to develop new experiences outside the confines of traditional assessment models (concerts, shows, productions, etc.).

The stated goal of *Catenate* is to develop an environment within which the process, the collaborative journey, is the focus.
The *Catenate* space encourages cross-collaboration between the areas that make up the School of Visual & Performing Arts and acts as a path for students to create larger collaborative communities to enhance the scope of their practice. It also supplies an avenue to involve students and faculty from the Technological Studies program and the T.J. Smull College of Engineering to interact and take part in the visual and performing arts. After the successes of this first year, the participants are excited to continue the project and expand their efforts to include a broader range of disciplines.

Catenate focuses on interdisciplinary practices and the continual inquiring of what art is and can be.

The *Catenate* project was created to answer three main questions:

1) Can an institution's historic departmental silos be dismantled by engaging in a collaborative project?
2) Is it possible to create an artistic outlet in response to the workshops, concerts, and production canceled or significantly changed due to the Covid-19 Pandemic?
3) How do we explore the interrelations of sight, sound, and movement while developing new experiences outside the confines of traditional assessment models (course grades and credit hours)?

II.   HISTORY

In the fall of 2019, the School of Visual and Performing Arts (SVPA) was created due to the Getty College of Arts and Sciences restructurings, merging the once separate Art, Music, and Theatre departments. A stated goal of the merger was to help a more robust collaborative artistic campus community. The reality of COVID -19 hit the campus in early March 2020, making online delivery the essential modality to complete the academic year.

On May 7th, ONU announced the intent to resume in-person residential education on campus in the fall of 2020. While the SVPA faculty were excited to return to campus with the students, many were unsure how different our programs would look and how that would affect the student experience. How would we offer quality academic programming in our fields under the new COVID-19 restrictions?

Prof. Brian Phillips, Dr. Dave Kosmyna, and Prof. Melissa Eddings created the *Catenate* project in 2020. This project was driven by three main questions: First, is it possible to reduce the institution's historic silos created under the former department model? Second, is there a way to create an artistic outlet in response to the many workshops, concerts, and productions canceled or significantly changed due to the COVID-19 Pandemic. Third, is there a way for students to explore the interrelations of sight, sound, and movement while developing new experiences outside the confines of traditional assessment models such as the standard 3.0 credit hour course with a letter grading system?

To this end, in the Fall of 2020, *Catenate* secured funding, named student participants, and allocated space and equipment to allow students and faculty the opportunity to create and explore the connections between performance, technology, the visual arts, and the human spirit.

III. METHODS

The faculty intermediaries of the project identified eight students from each of the SVPA disciplines. It was vital to the project that all areas of the school (art, music, theatre) be represented in the student group. An informational meeting took place in early June 2020 via Zoom to introduce one another and outline details of the project. Zoom served as the primary platform for meeting and eventually migrated to Discord. The group used other media outlets to facilitate discussion, imagination, and visuals via videos and images on designated Pinterest boards, YouTube, and Vimeo channels. The faculty suggested that a shared theme or concept act as a focal point for the project and to overcome inertia. The students decided upon *Frustration Moving to Hope* as the conceptual framework. As chance would have it, the theme aligned with one of *Catenate's* initial goals as a creative outlet during a global pandemic and was apropos with how the students were currently feeling.

IV. PHASE 1 – ORGANIZATION

The next challenge was how the group would represent this theme and allow viewers to interact with the final product. The group liked the concept of creating a game or challenge for the viewer that would allow them to work individually or as a group. Would the final product be an interchangeable, automated form? Would programmable sound loops help motivate the process? How would light and shadow play a role in this interactive process? How would the final project be documented as it transforms? These questions were at the forefront of the initial planning stage.

V. PHASE II – STAGE AUOMATION LAB

As the College of Arts & Sciences implemented its restructuring plan in 2019, the Theatre program acquired space in the former home of the Technological Studies department in Taft Memorial. The Taft building was erected in 1929 and served as the university's gymnasium until 1972. As Theatre relocated into the first floor of Taft, room 114 was designated the stage automation lab and served as host to the *Catenate Project.* The 1600 sq ft lab has many benefits, namely, the abundance of power and a variety of smaller, unique rooms within the larger area. The one substantial drawback is that the lab is below ground level and only accessible by stairs.

The lab provides a location for installing a newly acquired stage automation system for training when not used for theatrical productions. This fact made it a healthy choice to share the space with the *Catenate* project. The group borrowed additional equipment from the areas of the SVPA to allow as much creative freedom and experimentations as possible (refer to the Appendix for a complete list of materials).

A. Implementation

After classes resumed in January, the group made plans to create a regular weekly meetup for the project where students can come and go as their schedules allow. The first few meetings in the lab served to develop familiarity with the room and the myriad of tools and processes available to the group.

While the group did not achieve the goal of creating a sharable "product," the project successfully exposed the participating students to a wide range of equipment and techniques they would have not otherwise had the opportunity to use. We started the physical aspect of this project by installing a decking system containing a basic theatrical deck track and a guide system that allows objects to move horizontally across the stage floor. The students installed a tracking system in conjunction with a deck winch run via Spikemark, the stage automation control software. They then hung several LED Source 4 lighting fixtures. We also experimented with the Mi-Light LED light bulb; with wireless-DMX controlled LED fixture with a standard/E26 base that allows you to install it into a standard lamp. We installed 16 of these in a single circuit festoon along the wall behind the platforming system. The lighting units were all connected via DMX or Wireless- DMX to the ETC Nomad, a computer-based light control program running the ECT Eos software.

We built a small rolling platform or "wagon" to use in conjunction with the deck track. Both control systems were networked together via the Labs Local Area Network (LAN). The students then experimented with controlling the lightboard with Open Sound Control Commands (OSC) sent from the stage automation software. This program allowed them to create both time and position-based queuing sequences. To further explore the ability to integrate the various unique control systems, QLab, a sound, video, and lighting controller for macOS, was brought in and added to the LAN. QLab allowed the participants to continue exploring using OSC protocol to control the installation adding the ability to interconnect. At this point, we invited a faculty member from the technology area over to discuss how we might work together and how we would utilize the Modbus communication features in the Spikemark software. In addition to this, Brian had been working on how we might incorporate patron I/O with the experience using the POE Arduino board and OSC.

Next, the group incorporated some simple pneumatics into the lab. A large rack and pinion achieved 'secondary movement' on an object traveling the track. The initial idea was to create a 'secondary movement' on an object that traveled along the track. A large rack and pinion were designed and cut using the theatre area's CNC router. The pinion and a small decorative screen were then attached to the Wagon with a slew ring for rotation. We then attached the rack to 3 pancake cylinder controls with a solenoid valve. The frame could now be raised and engage the pinion on the wagon, causing the screen to rotate as the wagon traversed the stage. At first, it was done by activating the valve manually but was soon wired in the Stagehand FX and controlled via Spikemark.

The video would be the next element added to the lab. Two standard projectors were acquired from the university surplus, installed, and connected to the QLab computer. The projectors allowed the students to explore how to map and track video in conjunction with the system. The final element that we added to the lab was MIDI hardware. We borrowed a MIDI interface and controller from the theatre area and purchased a MIDI-to-DMX interface. Further exploration of the two MIDI interfaces would have to wait as the semester ended.

As the semester progressed, the number of students working on the project at any one time during scheduled hours would ebb and flow. Students were most productive *actively* doing something (building, assembling, dismantling, etc.). Towards the end of the 15-week term, it was apparent that the student's attention was elsewhere. Of the initial group of eight students, 2-3 consistently showed up to work during the entire semester.

During the 14th week of the 16-week semester, the faculty met with the student group to get their feedback on the process and the project. The discussion at the meeting centered on the buy-in and motivation of the student group. Although one of the project's goals was to eliminate the concept of working toward a passing grade or obtaining credit hours, the external motivators were lacking. This issue becomes a 'goal vs. catalyst' problem.

VI. REFLECTION / ASSESSMENT
A. Successes

The stated goal of Catenate is to develop an environment within which the process, the collaborative journey, is the focus. By reflecting on the three main reasons this project was conceived, we were able to recognize the following successes.

1 - The desire to break down the historic silos.

The most tangible of our successes was the ability of the project to provide a forum for the participants to interact with people outside their academic programs yet within the School of Visual & Performing Arts. This helped establish the viability of the Catenate project as the one tool to be used in the process of breaking down the former department silos. Students and faculty were in an environment working together in ways that would not have happened otherwise. As a direct result of the interaction brought about by this project, students reported that their interpersonal interaction continued outside the lab. At the most basic level, it increased the number of hellos and smiles students received when walking across campus. This increase in familiarity was not limited to the student-to-student relationship. Professor Phillips noted that, when offered the opportunity to speak and both the Art & Music area student meetings at the start of the 2021-22 academic year, the ability to strike up a casual conversation with student participants of the project made him feel like a part of meeting not an interloper. The faculty members involved with the project also reported in

increased ability to freely communicate with each other. This was in large part because relationships, that had once been collegial and professional, became friendships because of their collaborative work towards a shared goal.

These evolving relationships caused Catenate to become an opportunity for thinking about a larger creative community, the School of Visual and Performing Arts, and brought awareness to the variety of programs within the school. Students and faculty looking for ways to engage with other members of the SVPA can now do so through the Catenate project

2 - To create an artistic outlet in response to the many workshops, concerts, and production canceled or significantly modified due the Covid-19 Pandemic.

The participants were offered many opportunities to create, share and learn. While a "finished" project is still a way off, both students and faculty were allowed to expand their experience with new techniques, technologies, and areas of study. Some of these opportunities included:
~ An introduction to and practical experience with theatrical stage automation equipment and software.
~The use of paper and paper manipulation to create works of art.
~Practical experience with syncing video, lighting, and automation equipment to achieve an artistic event.
~The use of Arduino micro controllers to explore how the "internet of things" might be applied to an artistic installation.

3 - To explore the interrelations of sight, sound, and movement while developing new experiences outside the confines of traditional assessment models

Because there was no hard deadline, students could expand on skills and concepts learned in class that would not have been possible during the regular academic setting. The students were allowed to determine the rate of progression. Their understanding of a process set the pace, not a syllabus, gallery opening, or performance schedule. This enabled the students to dwell on interesting discoveries for as long as they like, setting the pace for learning new material. As one participant stated "it felt like it didn't matter how far we got that day and that as long as something got accomplished the day was successful. The meetings became my relaxation time. Everything in school and the shows I was working on were so high pressure the automation lab became the place where all pressure was off. It was a space where the time could be taken to explain things where in other situations that would not be possible or would take too much time."

We were also fortunate to experience a little serendipity while working on Catenate. One such success was in the utilization of the inherited space of Taft 114. The age of the building allowed for a carefree and inventive approach to how the project evolved and helped create a workshop vibe that would have been hard to replicate in a newly constructed lab. The physical location of the

lab was a boon as well. The proximity to the art and music

buildings facilitated easy interaction and helped further break down perceived silos.

A. Challenges

An issue that looms large in the minds of the faculty was the student selection process. Individually, each faculty member hand-picked students from their respective areas based on their performance in those areas. There was little to no consideration given whether these students would work well as a group, let alone feel comfortable doing so. The group dynamic could have played a large part in the lack of engagement as the semester progressed. Buy-in at the student level is crucial for a project of this kind to be successful. As mentioned above, the project purposely was without external motivation (grade, credit), assuming students would be relieved by this fact. However, based on students' feedback at the end of the term, the Catenate project was too open-ended and vague. Mourtos [1] states that engagement is attention, which comes because of a perceived need or purpose in the first place. There was not an established need or purpose, at least on the part of the students. The faculty intermediaries felt an ardent desire to instigate this project but failed to get total buy-in from the students who were "chosen" by the faculty. Students wanted tighter parameters and clarity of focus. They desired more structure and a set problem to solve. Cambourne [2] lists engagement as one of the seven conditions that must be satisfied for true learning to occur. The ideal environment for engagement is immersion and demonstration. The Catenate lab was immersive with a variety of technology, tools, and materials available to students to use at will. What the project lacked was a distinct demonstration process regarding the technology, tools, and materials. Although Professors Phillips and Eddings were available in the lab during open hours, a formal demonstration process was not implemented.

The comfort level of the immersive studio varied with each student group. Technical theatre students were comfortable with much of the software while lacking knowledge of the use of traditional studio art materials. The reverse was evident in the attitudes of the art students regarding technology and automation. Once engagement occurs, Cambourne explains, students can try to emulate without fear if their attempts are not "correct." While the students were excited to participant, they needed the "first link" to connect their ideas. Reframing the opportunity inherent in this type of project and clearly demonstrating the software, the technology and lab materials may engage more students. The most cumbersome aspect of the whole project was the scheduling. There is a myriad of ways to do this differently. Although a weekly schedule was established through numerous Doodle polls sent out throughout the semester, this tactic proved ineffective in getting a more substantial number of students involved.

VII. SUMARY: MOVING FOWARD

As the project moves forward, several improvements and adaptions will be pursued to improve the project's reach and outcomes. Firstly, we will reevaluate how participants are being recruited and develop a methodology to prevent unintentional exclusion. Secondly, we will create regular scheduled meeting times to help encourage student comments and schedule the project into their busy lives. Lastly, we will look at ways for the faculty to provide the missing first link. This can be accomplished by starting the school year with a faculty drive project that the students could build from. This will be the demonstration model that will encourage engagement and therefore the potential for deeper, more committed collaboration.

In all, the Catenate Project was viewed as a success by those who participated. That students were able to get first-hand experience in the creation of a collaborative project was worthwhile. While it did have its obstacles, there are plans in place to mitigate those in future iterations. This project has cultivated additional ideas, such as engaging a guest artist to lead our students through the process of creating an inter-arts installation within a gallery on campus. This example illustrates to us how one idea begets another, linking to the one before it, creating a continual chain of creative expression representative of all disciplines within the School of Visual & Performing Arts.

Appendix 1 – Equipment Used
    Lighting
- ETCNomad
- ETC Gadget II
- ETC Source Four LED Series 2 Lustr
- Mi-Light Wireless DMX Light Bulb

    Sound
- QLab 4 (also used for Video)
- Focusrite MIDI Interface
- Akia MPK mini–MIDI Controller

    Automation
- Creative Conners Stage Automation
  - Spikemark Pro
  - Pushstick Mini
  - Spotline Mini
  - Spotline
  - Stagehand FX

    Other
- DecaBox Midi to DMX Controller
- Assorted Arduino Boards
- Assorted Hand and cordless power tools
- Video Projectors

Appendix 2 – Glossary

- **Arduino.** An open-source hardware and software company. They design and manufactures single-board microcontrollers and microcontroller kits.
- **CNC.** Stands for Computer Numerical Control. An automated means of controlling machining tools via computer.
- **DMX.** Stands for Digital Multiplex. The standard communication protocol for lighting controllers and equipment. For more information see ANSI E1.11-2008(R2018) available for free at https://tsp.esta.org/tsp/documents/published_docs.php

- **ETC.** Stands for Electronic Theatre Controls. An international leader in events lighting technology. More information can be found at https://www.etcconnect.com/
- **ETCnomad.** Lighting control software by ECT that is installed on a computer and enabled by a USB dongle. This dongle is compatible with Eos, Cobalt, and Hog 4 family software and allows a computer to be a lighting controller.
- **I/O.** Stands for Input/Output. Allows for switches and sensors to be connect to various control devices.
- **LAN.** Stands for Local Area Network. A collection networked devices connected within a limited area.
- **LED.** Light-emitting diode
- **OSC.** Stands for Open Sound Control. a music-oriented electronic communications protocol used in computers and multimedia devices. More information can be found at http://opensoundcontrol.org/
- **PoE.** Stands of Power Over Ethernet. Allow for the distribution of both power and data over standard ethernet cabling.

- **QLab.** Is a sound, video, and lighting control software for macOS by Figure 53. More information can be found at https://figure53.com/
- **Spikemark.** Scenic automation control software by Creative Conners, Inc. Used to program, cue and run Creative Conners scenic automation. Available for free at https://creativeconners.com/products/software/
- **Source 4 LED.** A theatrical lighting instrument manufactured by Electronic Theatre Controls (ETC) using an LED light engine.
- **Stagehand FX.** An I/O controller by Creative Conners designed to work with their stage automation system.

References

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