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UTILIZING OFF-CAMPUS SPACES TO ENGAGE THIRD-SPACE LABOR ACROSS THE DISCIPLINES TO BUILD COMMUNITY PARTNERSHIPS

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ABSTRACT

This article examines the opportunities and challenges within academic labor of operating an off-campus space using the STEAM Factory as a case study. The STEAM Factory supports research collaborations across all disciplines and engages in community outreach that shares research outcomes and seeks to understand impact in a local context. Third-space labor makes the STEAM Factory model possible and drives collaboration, especially with community partners. The STEAM Factory has a membership made up of faculty, postdoctoral scholars, and staff supported by a program director, a faculty director, and a member-elected board of directors. As an organization, STEAM has been a detailed archiver of its own history, providing a public report annually. To better understand the perspective of STEAM Factory members, and the nature of mentorship and workplace collaborations, the membership was surveyed on three different occasions: January 2018, January 2020, and January 2021. Surveys were followed up with structured interviews that addressed the rationale for collaboration among faculty. During the interviews, we found that for those conducting community research, the space and staff support has been integral not only to their ability to engage in community research but also their enthusiasm for community engagement. Through a discussion of the organizational history of the STEAM Factory, in combination with insights from membership feedback, this paper recognizes the role of third space labor, workers whose labor blends academic and support roles, in support of third places, places to gather that are not-home and not-work.

Keywords: third space, interdisciplinarity, community partnerships

INTRODUCTION

The most pressing societal problems we face in the 21st century - e.g., climate change, the spread of infectious diseases, food insecurity, and social inequity - emerge from complex systems. Accordingly, they require that scholars think and work at the intersections of disciplines, and in collaboration with diverse knowledge production regimes (Moritz and Kawa 2022). Interdisciplinary spaces, then, can bridge this gap by enabling creative projects that transcend traditional disciplinary and curricular silos. The success of interdisciplinary programs is built on the type of "encounter" that takes place in academic third places, defined as physical locations that are not home (first place) or work (second place), but are shared informal gathering places, which provide opportunities for people to interact, build connections, develop a sense of belonging, and for civic engagement (Dolley and Bosman 2019; Oldenburg

1999). The STEAM Factory at The Ohio State University (Ohio State) is an example of such an academic third place, in that it provides a place off-campus for scholars to work and gather with each other and the larger community. Meanwhile, it also functions in conceptual third space, by which we mean a kind of liminal position that bridges a range of roles, identities, and purposes.

The STEAM Factory operates in third space by bringing together people from different disciplines, connecting scholars with the public, and providing a shared space for the discussion of norms and practices that each of these constituencies brings to places of exchange. The type of professionals who flourish in third spaces are often connectors and builders - and they are also often the staff who maintain and manage interdisciplinary centers that function as physical spaces, third places, for collaboration (Rolands et al., 2017, ARIS 2018). Due to the opportunities, they present for interdisciplinary understanding and disruption of traditional hierarchies, both third places and third space labor hold great creative potential in the work of pushing boundaries and challenging structures that do not otherwise serve us in academia, and particularly those that limit our opportunities to engage authentically across identities and experiences. For example, university-sponsored Makerspaces have the potential to bring students and faculty from different disciplines, especially art and engineering, into a shared creative semi-structured environment. The success of Makerspaces in achieving the goal of becoming an environment for innovation requires thoughtful attention to the needs of entire campuses and community partners (Farritor, 2017, Gantert et al., 2022). While in traditional campus settings, meeting in one department's space can impose discipline-specific norms or a sense of one perspective being prioritized or given the most power, gathering in a location that is no one's "home turf" can facilitate authentic encounters between disciplines and/or between academic researchers and non-academic collaborators. Accordingly, building structures (both physical and conceptual) that offer third places *and* function in third space can facilitate encounters between disciplines, enable new discoveries that can challenge the norms within disciplines, and suggest novel applications of knowledge and methods from one discipline in a different discipline.

Despite the promise of third places and third space within higher education, it can be challenging to operate in these areas due to the tension between the perceived value of research productivity, specific types of collaboration and collaborators, and actions that support community involvement. While structures within the university and external to the university (e.g., funders) tend to acknowledge the importance of community collaborations, research is seen as the highest priority. The publish-or-perish model emphasizes research output as the main modality of academic labor. Third spaces situated in higher education structures can break down some of these barriers by walking the line between serving as centers of community-oriented outreach and upholding traditional research models within academia.

In the physical third place, third-space labor – from both staff and faculty – is often necessary to maintaining an environment that can promote effective off-campus cross-disciplinary work. The nature of this labor is complex and often outside of the traditional reward structures of academic work and promotion. Furthermore, issues related to pink-collar work – labor that is placed onto female-identifying staff members that centers care – occur where organizational structures do not adequately recognize the value and necessity of this work or compensate for it appropriately. This paper will explore how off-campus spaces for interdisciplinary collaboration can become a focal point of community partnerships through collaborations between scholars who both benefit from and contribute third-space labor and professionals working in roles that consist primarily or exclusively of third-space labor. While focusing on a case study of The STEAM Factory at Ohio State, we will broadly address third-space labor at the intersection of universities and informal learning environments.

Case study: The STEAM Factory

The STEAM Factory (STEAM) is a diverse, grassroots community of over 200 scholars at Ohio State that fosters academic innovation and interdisciplinary collaboration that creates and nourishes space for self-organizing, convergent research, creative expression, and engagement around complex problems that matter to our community. STEAM has three goals: (i) to provide opportunities for collaboration that enhance and drive innovation within all research disciplines; (ii) to provide interdisciplinary interactions that connect scholars across departments and colleges; (iii) and to increase the public awareness, understanding, and impact of research through a variety of outreach initiatives (STEAM, 2023).

Six miles away from the Ohio State main campus in the Franklinton neighborhood of Columbus, STEAM functions as a physical third place. The place itself is a rented studio in a building owned by an artist collective, and it serves as a co-working space for STEAM members. Franklinton is one of the most economically depressed neighborhoods in the state, with a median household income (\$25,900) less than half the median household income of the city, making

it a space that deserves attention and authentic collaboration by the city, business, and other local stakeholders. Located among emerging arts and technology innovators in the urban Franklinton neighborhood, and within blocks of a nationally esteemed science center, the Center of Industry and Science (COSI), the STEAM Factory provides a space for scholars to engage with the creative community in downtown Columbus. Due to the location, STEAM members and leadership have also been active participants on the Franklinton Development board. The co-working space away from campus has fostered a sense of belonging and a new community for scholars across Ohio State's six campuses giving them a shared space within the community. The creation and growth of the STEAM Factory have relied heavily on third space academic labor, from both faculty and staff, in developing and supporting programs that foster community partnerships. As such, tensions between the perceived value of service and outreach work in comparison to research productivity, which is a common theme in academia, play out both for the STEAM Factory as an organization and for individual STEAM members engaging in third-space labor.

As of 2022, STEAM has 227 members representing 66 departments across 13 colleges. Eighty-four percent (191) of members identified their primary appointment as faculty at Ohio State, including tenure-track faculty, lecturers, research faculty, and clinical faculty, across the main campus and five regional campuses. Fifteen percent (33) of STEAM members are staff, including program managers, outreach coordinators, curriculum specialists, and program directors with primary affiliations in institutes/centers across campus. The remaining one percent (3) of members are postdoctoral scholars. Each of these groups have different job expectations, pathways to promotion, and access to resources on campus.

METHODS

We use a mixed methods approach to document the growth and impact of the STEAM Factory using information from three membership surveys (2017, 2019, and 2020), qualitative interviews, and an account of the creation and development of the space.

Surveys

Information about the STEAM Factory scholars was collected via a Qualtrics survey distributed using the STEAM Factory members listserv in January of 2018 (N=121; response rate =71%), January 2020 (N=160; response rate =72%), and January 2021 (N= 172: response rate = 76%; IRB 2019E0935). The survey was open for four weeks with reminders in week two and the day before the survey closed. The 2018 survey asked questions relating to member activity from the prior year including space use, job support, and collaborations. The survey instrument was expanded in 2020 to gather more detailed information about academic identity, mentorship, and collaborative activity (research, outreach, and/or teaching). Other demographic information including home discipline, the year each member joined the STEAM Factory, and the academic title were collected through the STEAM membership list. All means and comparisons were calculated using the dplyr package in R (Wickham et al., 2023)

Semi-structured Interviews

We conducted 30-minute semi-structured interviews in December of 2021 with a small subset of eight faculty members who responded to the member survey to better understand factors that affected their level of engagement in the STEAM Factory scholar network, including attitudes toward interdisciplinary collaboration and use of the off-campus physical space (IRB 2021E1183). To understand the role of the physical third place in supporting interdisciplinary collaboration and community-engaged work, we interviewed two members who identified as highly collaborative (with 4+ collaborators within STEAM), four members who have developed few (1-3) collaborative relationships, and two members who had not developed collaborations within STEAM at the time of the interviews. Interviews were conducted over Zoom using either the live transcript feature or a notetaker from the project team.

Preliminary coding was used to generate a list of themes using holistic coding (Saldaña, 2013). Codes were normed between three researchers to generate the final set of 31 discrete codes across four major themes. The four major themes were (i) self-awareness of location in the network, (ii) collaborative activities and outcomes, (iii) behaviors for seeking collaborations, and (iv) use of the STEAM space and events. Within each theme, we looked at storytelling, especially in regard to how the STEAM Factory was used to enhance collaboration.

Documents

As a public institution, data on Ohio State employee demographics are publicly available. We used the 2019 summary report provided by The Women's Place at Ohio State to report the gender breakdown of tenure track faculty (WPOSU, 2020) and The Ohio State University Human Resources 2019 report (HROSU, 2019) on the gender breakdown of associated faculty and staff. All of the documentation discussed in this article is available to the public on the STEAM Factory website (<https://steamfactory.osu.edu/>) or publicly available from The Ohio State University Human Resources (<https://apps.hr.osu.edu/salaries/>). The STEAM Factory has transparent reporting and compiles annual reports on activities, membership, and grant awards. We used these institutional demographic data to inform our assertions of salary differences, and university structures to inform our discussion of the history of the STEAM Factory as an organization within Ohio State.

RESULTS AND DISCUSSION

To foreground the discussion of STEAM as a third space, it bears restating that our third space model has two components, the physical facility (third place) and the labor dynamics (third space labor). Both are important to understanding how STEAM Factory functions as a third space within the university environment. Third-place and third-space labor, in our case, are entangled, where each uplifts the work of the other. As discussed below, third-space labor is a driving force in designing and administering the space.

First, we discuss how this third place has created an environment that supports third-space labor, starting with a brief history of the development of the STEAM Factory. Points of interest include changes in university support and tensions between the value of “service and outreach” vs. “research productivity” within a university. We will highlight the role the STEAM third place plays in building and supporting community collaborations through research and evidence-based engagement with communities across Ohio.

History of STEAM

To understand the role of third-space academic labor in the development and growth of STEAM, we begin with a historical account of its creation. STEAM was founded in 2012 by a group of 12 early-career scholars (assistant professors and postdoctoral scholars) and has organically grown into one of the most diverse academic networks in the University. Historically, STEAM has been supported through a memorandum of understanding and a coalition funding model. STEAM's first five-year MOU included four colleges and three university offices. STEAM is currently funded through an MOU between two central university offices (Office of Research and Office of Academic Affairs), with administrative oversight from the Office of Knowledge Enterprise. Over the past 10 years, STEAM has grown significantly, adding over 200 members, while maintaining a flat organizational structure and culture with programming driven by scholarly interest and initiative. Membership is open to faculty, postdoctoral scholars, and staff at Ohio State, following a simple application process to determine alignment with the overall mission and vision of the organization. A board of directors, comprised of elected STEAM Factory members and led by an elected Faculty Director and the Program Director, oversees and supports all STEAM programs and initiatives. The growth trajectory of STEAM Factory is important in understanding how third places are created but also in highlighting the role that faculty and staff play in advocating for third spaces within the context of academic institutions.

The physical space was intentionally designed to support a diverse array of academic activities including research, teaching, and community engagements. Specifically, the STEAM space supports member co-working, conferences, research symposia, student-facing course activities, music, dance, theater, and art exhibitions/performances, public outreach presentations, and community partner activities. The physical location of the STEAM Factory grew out of a collaboration with the Saturday Farmer's Market, where the founding members began to share their research with the public. The Saturday Farmer's Market was started in 2013 by artists and makers to showcase the Franklinton neighborhood and their work. At these events, early-career STEAM faculty members set up tables, shared their research, and interacted with the public in this informal gathering space. This grassroots effort provided faculty with a connection to the community at a time when university infrastructure and formal support for outreach activities were often lacking. Informal connections made through these efforts paved the way for the future STEAM space at 400 West Rich in Franklinton. In 2014, after a year and a half of conversations, and 16 rounds of lease negotiations with the university and community stakeholders, a space in the Franklinton neighborhood near downtown Columbus was secured. The empty suite of rooms was unfurnished, and literally unfloored, as it had been used for storage of heavy

materials. To facilitate the transition off-campus and in recognition of the extra administrative tasks, STEAM hired a staff member to coordinate the space in 2014. To create a third place, STEAM members, led and supported by a design faculty member and graduate student, developed an ad hoc space-design working group that met regularly, and held several all-STEAM member co-design workshops to envision how they wanted to use the space as well as discuss shared values for the STEAM Factory going forward. Under the supervision of the STEAM design faculty member, the design process was documented, and research data were collected under a university-approved IRB. Throughout the design processes, values such as flexibility and usability were centered in the choice of mobile furniture, nooks that allowed for informal conversation, and two offices for focus work. The collaborative process of designing the physical space to reflect the needs and shared values of its members required third-space academic labor and was instrumental in creating a sense of belonging for the STEAM community. This has coincided with general attention to development in this area since the 2004 creation of a flood wall which lowers the risk of historic flooding events including attention from the city and Franklinton Board of Trade. The area surrounding the STEAM Factory has continued to change into an increasingly gentrified arts and maker-focused neighborhood with several adjacent facilities built into what was once factory space.



Figure 1. (a) *The STEAM Factory space before design and build-out; (b) Outreach Presentation by Undergraduate Students in an interdisciplinary course on HIV: From Microbiology to Macrohistory; (c) Discussion at Summer Conference on 'Academia', May 2016*

Fundamentally, the STEAM Factory has been a co-working space for members to work collaboratively and conduct meetings in a third place (Figure 2). STEAM is often used as a meeting space for courses in art management, summer programming, and space for community planning. Research groups have used the space to host outside collaborators for multi-day summits. As a member of the Franklinton community, STEAM Factory also participates in Franklinton Fridays, the monthly neighborhood art hop. The intentional flexibility of the space and its furniture has reflected the shared values of the STEAM Factory membership to have a space to conduct creative and collaborative work, often including community stakeholders.

Regular STEAM Factory activities were disrupted by the pandemic. Though our 2021 survey captures a continued commitment to engaging in STEAM Factory activities and collaborations in virtual environments, co-working hours became virtual coffee meetups, writing groups moved online, and STEAM Factory members hosted virtual happy hours, all in an effort to continue to connect in the absence of their third place. These events were made possible by the deep involvement of the STEAM administrative team. Evaluations to understand audience reaction to different models of science communication (discussed in greater detail in *Gathering research data* below), which were previously conducted at in-person Franklinton Friday events, were moved to the Columbus Science Pub, which was offering bi-weekly Zoom programs on a variety of topics throughout 2020. STEAM's transition back to pre-pandemic levels of activity is a testament to the ability of third places, as a community of practitioners and academics, to endure outside of their physical locations.

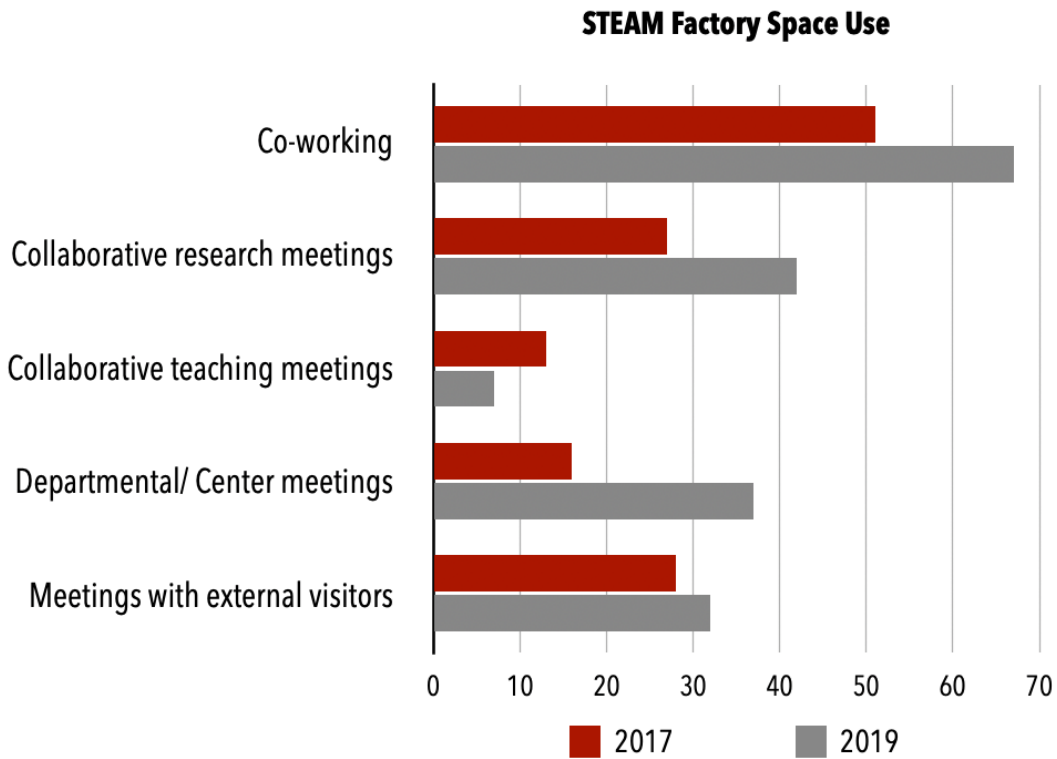


Figure 2: Number of STEAM members who reported that they used STEAM Factory space in 2017 (total respondents = 118) and 2019 (total respondents = 105). Note that 2020 space use is excluded from this figure due to closures from the COVID-19 pandemic.

Tensions and achievements in the third space model

By 2018, STEAM Factory’s membership stabilized with over 200 members and the mission of the membership and leaders became increasingly focused on how best to maintain the third space that was created. As the membership has grown it has diversified, moving away from the model of relying on early-career faculty to include staff and more senior faculty. Founders and early members of the STEAM Factory have moved up the ranks through promotion and tenure and through leadership opportunities in other areas of the university, giving a deeper perspective to the role a third space plays in facilitating connections that broaden collaborative networks. Maintaining the third space identity of STEAM Factory, relied on maintaining three factors that were identified as crucial to supporting the work of the membership. With the addition of the third place, the suite in 400 West Rich, having an off-campus meeting space became an important part of what made STEAM Factory appealing to a diverse membership. To support the space required infrastructure from Ohio State, including having the space wired for Ohio State broadband internet, and having a formal staff line in the position of the STEAM Factory program director. Third places are important, but they are also costly to maintain, so agreements with stakeholders at Ohio State were needed to attach a budget to the STEAM Factory. Finding a reportage line within the university that fits the needs and mission of STEAM Factory has been and continues to be a co-created endeavor between stakeholders at the university, the STEAM director, the STEAM board, and the STEAM program director. There are opportunities, but also the potential for tensions, as much of the work being done to maintain the STEAM Factory falls outside the assigned job duties of those who lead and participate in STEAM Factory programs.

“Service and outreach” vs. “research productivity”

College and university mission statements often aspire to create and maintain strong ties with the communities they serve. In the context of research, the National Science Foundation (NSF) recognizes the importance of scientific discovery that tangibly benefits society and emphasizes broader impacts as an essential evaluative criterion for research funding (ARIS, 2018). In addition to the Broader Impacts requirement for all grants, the NSF also sponsors the Advancing Informal STEM Learning (AISL) program, which prioritizes organizations that support informal learning and programmatic efforts that actively include historically marginalized groups (NSF, 2023). While there is increasing acknowledgment that academics cannot remain content sharing research findings only with each other, faculty struggle to make connections with the public due to the perception of public audiences as “others” (Simis et al. 2016) and structural barriers in the academy (Oaks et al., 2019). Despite colleges and universities espousing the value of public engagement, institutional structures often create obstacles to working with community partners. For example, community-engaged work is not valued equally in promotion and tenure processes (Jordan et al. 2009; Frank et al., 2010). Meanwhile, there are challenges to aligning the work schedules, outputs, and motivations of academic and community partners (outlined in Hollands, 2005). Some challenges are as fundamental as uneven levels of work-time flexibility can make aligning schedules with community partners challenging, and short-term time frames in the academic calendar impair the development of sustained relationships with community partners.

While third spaces can increase productivity and creative inquiry, we examine the role of collaborative spaces in fostering a sense of belonging and an inclusive environment for creative engagement. One of the participants notes that they view “collaborations as building relationships that extend beyond a specific project outcome or output”. They note that:

the STEAM Factory is different from any other academic (professional) network as it is not about formal projects that are expected to lead to publications or other recognized outputs but pushes boundaries in how great ideas come together.

University faculty and staff shared a similar sense of community affiliation with STEAM, the city, and the university. However, University staff who are member of STEAM are more likely to view activism and support as part of their identity whereas faculty more strongly identify with research. In our surveys, staff members were less likely (16/36; 44%) than faculty (114/163; 70%) to self-identify recognition for their work in the form of awards, promotions, or grants over a 2-year period. Given the reward structures in most universities, this is not surprising with more awards tied to research output than community engagement or support. In addition to workplace recognition in the form of awards or promotions, there is also the labor that goes into justifying the continued existence of a third space site in a research-focused institution. The emotional labor of having to validate why the third place should exist takes energy and momentum away from the mission of the program.

The grassroots leadership of STEAM Factory is reflected in the organizational structure which consists of a faculty director that serves a 2-year term, a dedicated program director as full-time staff, and a board of directors with elections held yearly. The first board of directors was elected in 2014, and they work with the directors to drive incentives, hold working groups, and compile yearly reports. While simultaneously working within the academic hierarchy, there is an intentional effort to ensure that the space models core values of respect for all disciplines and all forms of labor through a horizontal organizational structure. The organization welcomes faculty, staff, and postdoctoral scholars as equal member with no difference membership levels, all members may hold leadership roles or facilitate initiatives, you do not need to have certain credentials to join or have a leadership role within STEAM working groups. As the STEAM Factory membership grew and diversified the leadership became more diverse to reflect and represent the identities of the membership. This diversification of leadership is typical of grassroots incentives, standing out in contrast to leadership models that are more top-down. During the 2019 board elections, the first two staff members and the first regional faculty member were elected to serve on the leadership board. There was some pushback from the university administration that having an elected board that included staff was atypical among the centers at the university. The STEAM leadership advocated keeping the election-based model, as representation and feelings of belonging are important for growth initiatives among the membership.

Growing outside the University

Third spaces are uniquely positioned within the university hierarchy to engage in community partnership. Off-campus spaces are more approachable to community partners than on-campus spaces (Bromley, 2006). Similarly, third places

allow scholars to enter third space models, letting go of hierarchies to engage as both an expert and a learner. Being in a third place can recenter community in its various forms while deemphasizing the structures of the tenure system. For STEAM members, having a space that is not a traditional workplace or home gives them the ability to engage community partners outside of the university structure.

In our interviews, faculty identified the off-campus location as critical to their work with community programs. For example, when inviting community partners to participate in programs, K-12 teachers were more comfortable in the co-working space than attending meetings on the main campus. Faculty also noted that STEAM was a neutral space for meetings that does not recapitulate hierarchies which make it difficult to form close collaborations with a diversity of partners across the university. Tenured faculty may prefer to meet junior colleagues at the STEAM Factory rather than engage in the politics of whose office will serve as meeting space. STEAM was a “safe space” to do academic and community work, in other words. This feature of the space – and the ways in which it supports community work through both faculty and staff engagement - has led to STEAM being closely associated with many grassroots community outreach programs. These programs have ranged from partnerships with K-12 education systems to STEM coding programs to dance performances. Though not an exhaustive list, each of these examples demonstrates how the explicit inclusion of third space professionals has allowed for deep community connections that facilitate the critical mission of community partnerships. The space’s proximity to downtown Columbus, with abundant no-cost parking, makes it a convenient place to gather with members of local non-profits, government agencies, and businesses.

Storying was often used to highlight reasons for the enjoyment of collaboration, for example, when asked, “How do you go about seeking new collaborations” or “Do you utilize the STEAM Factory space?” participants volunteered specific feelings with examples of their experiences. A professor in mathematics education noted that:

it is difficult, and increasingly so since the COVID-19 pandemic, to bring collaborators, math teachers and students in local schools, to campus and the STEAM Factory is a space that helps me invite collaborators into my work. It provides space that breaks down the feeling of me as a professor going to their school to observe or evaluate them and the challenges of parking and navigating a big campus to get to my department.

A similar sentiment was expressed by a professor in psychology who noted that she regularly meets with her collaborators, “who are from diverse communities and disciplines at the STEAM Factory because it is a neutral space that promotes equality in collaboration relationships”. A lecturer in the school of communication noted that “the physical [third] space allows us to be out in the community and with other people showing a lot of different work that others might not be aware of. It puts everybody in the same level of the hierarchy.” We identified these as small stories or narratives about their work. In particular, two of our participants had used the space extensively to engage in community programming that was related to their research.

STEM Impact Collaborative

The STEM Impact Collaborative (SIC) is an initiative born out of existing relationships between STEAM members during the COVID-19 pandemic. The relationships were long-standing, including a number of members who served on the STEAM Factory Outreach Advisory Committee in previous years. Founded by staff members, the leadership of SIC is itself a mix of staff and faculty who are also active in the STEAM Factory network. At present, the leadership consists of two staff members, a faculty member, and a member who holds a dual appointment. SIC, which operates outside of but in collaboration with the STEAM Factory, self-organized to provide support to Ohio State outreach and education professionals during the first three months of the COVID-19 pandemic, a time when traditional means of reaching audiences were no longer available. This was a natural extension of work done within the STEAM Factory that supported ongoing programming such as Franklinton Fridays. SIC maintained a suite of virtual programs throughout the pandemic and remains active with a mix of in-person and hybrid events as the need for purely virtual events has receded.

The Scientist Next Door

Similar to the STEM Impact Collaborative, the Scientist Next Door is a project that was a direct extension of existing STEAM factory relationships. This program was funded through a Battelle Engineering, Technology, and Human Affairs (BETHA) grant, an internal funding mechanism supported by a collaboration between Battelle and the Office

of Research at The Ohio State University. The BETHA program aims to fund projects that consider the relationship between STEM and cultural issues. The funders prioritize interdisciplinary teams that demonstrate an understanding of how the project will impact faculty, students, and the Columbus community. This funding opportunity is only available to teams led by tenure-track faculty. For The Scientist Next Door, the PI was the current STEAM Factory director and the project team consisted of STEAM staff members. The project centered humanity at the forefront of science communication, prioritizing storytelling in programs across venues and modalities. The project had three main components: storytelling workshops and a virtual show with the Story Collider, improv training and an in-person show in collaboration with a local comedy theater, and web-based 360° virtual tours of research facilities.

Closest to a traditional campus was the virtual lab tours that allowed faculty and curators to engage with the public by inviting them into campus space with limited access. In collaboration with staff at the Byrd Polar and Climate Research Center, faculty and curators developed a set of stops in their lab spaces that highlighted current research. Staff members and undergraduates guided participants through a scripting process and provided technical support in the use of 360° camera photography. Virtual lab tours addressed the issue by accommodating people on campus spaces that are work areas, hold sensitive material, are spread across several physical locations, or are too small to effectively allow members of the public to navigate. This need for virtual engagement became even more important during the COVID-19 pandemic as a way to safely engage with communities in experiencing the daily work of science. Tours could be explored by users individually and asynchronously, and also serve as backdrops for live, virtual events held over Zoom. Tours are available at <https://virtualice.byrd.osu.edu/osu-tours.html>.

Stepping out of campus spaces, faculty and staff from across the university were invited to attend a workshop hosted by the Story Collider. Story Collider is an organization that supports storytelling as a way for scientists to connect with public audiences through hosted shows, weekly podcasts, and facilitated workshops. The grant allowed the Scientist Next Door team to bring Story Collider in for two workshops on Zoom. This program was attended by 55 members of the university community with an even split between staff and faculty (19 staff; 23 faculty) with the remaining participants being graduate students and postdoctoral scholars. The Story Collider workshop shared lessons in storytelling, advice for connecting with public audiences through centering personal experiences, and shared resources on the effectiveness of storytelling in science communication. After the workshops participants were encouraged to submit stories for a spot at a Story Collider show hosted by STEAM. The show occurred over crowd cast in November 2020 and featured stories on science and education from two faculty members and one staff member. The program exemplified how moving into a third space allowed faculty especially to reflect on the reasons they conduct research and to share that enthusiasm in an approachable and story-centered talk (<https://steamfactory.osu.edu/research/collaborations-complete-and-ongoing/scientist-next-door-betha-2020>). The workshop was repeated in the fall of 2022 because of popular demand, but there were not sufficient resources to host a second show.

Collaborating with Shadowbox Live, an independent theater company located just south of downtown Columbus, the Scientist Next Door held improv training. Similar to the Story Collider program, the model of engagement was two workshops, one virtual and one in-person, with improv experts from Shadowbox Live culminating in a show hosted at Up Front, the comedy stage on location at the Shadowbox Live theater. The workshops were capped at 30 participants to accommodate the ability for everyone to engage in improv training, but 69 people showed interest in participating. Of those who expressed interest, there was again an even split between staff and faculty interest (29 staff; 26 faculty) with graduate students and postdoctoral scholars filling the final roles. The improv training centered on the history of improv as a tool for education and discussed the work of Viola Spolin who used improv as a tool for self-expression before founding Second City. Participants then engaged in improv games to see how self-expression and improvisation allow us to connect with each other. These workshops were received with a large amount of fun. Those who participated in the in-person workshop in the STEAM factory space, which was held in March 2022 were particularly grateful for the chance to reconnect with colleagues outside of the traditional academic workshop style. In May of 2022, the Shadowbox Live hosted a live improv show which gave participants the opportunity to try out their improv skills in front of a live audience of family, friends, and members of the community.

This program again emphasizes how initiatives grown out of collaborations in a third place and spearheaded by third space labor, blur the roles that traditionally separate staff, faculty, and community. In the improv training, we saw community members taking the role of educators with university colleagues working together in their role as students. Training from the Story Collider emphasized belonging and storying to help faculty and staff connect their work to the communities in which they live. The 360° tours, though in some ways following traditional tour models, acknowledged the role of technology in making tours more accessible to communities that face barriers entering

campus. Issues of access, either physical or systemic, are lessened when the community is invited to engage in not only being the learners but actively recruited to become teachers.

Gathering research data

Third-space labor has also enabled and enriched research opportunities available through the STEAM Factory. The STEAM Factory Franklinton Friday Open Houses, held during the neighborhood's monthly art hop, host an ever-evolving array of Ohio State faculty, staff and student research, seminars, installations, performances, and exhibitions that draw between 100 - 300 visitors to the space each month. These have taken several forms including research on collaboration, focus groups for computer science education in Ohio, and gathering audience data to understand the impact of science communication.

Staff researchers from Byrd Polar and Climate Research Center used Franklinton Fridays as a means to gather feedback on the usability of Fluid Earth (FE), an interactive web application that allows users to visualize current and past conditions of Earth's atmosphere and oceans. With support from the *Enhancing Weather and Climate Learning with Fluid Earth Viewer (FEVer)* project (NSF AISL# 1612741), researchers' goal was to build a tool that was accessible to non-experts to easily explore Earth's past and present (Fluid Earth, 2022). STEAM Factory presented the opportunity to engage in public user testing with a diverse audience. Researchers from Byrd Polar and Climate Research Center brought computers and student researchers to the space to engage with members of the public and observe how people navigated FE. User testing with youth, families, and the public allowed the interface to be designed for intuitive navigation, ease of use, and weather comprehension. The third place that STEAM Factory creates is critical to having a space where members of the public feel excited to engage with university staff and faculty but also a space that is accessible to researchers. By providing this third place, STEAM Factory lowers the logistical barriers to setting up a program to gather public feedback on education tools and practices.

Under the *Convergent Learning from Divergent Perspectives* grant (NSF AISL # 1811119), STEAM staff members and collaborators played an important role in the study of collaboration among faculty cohorts and in the study of outcomes among public audiences who attended the cohorts' outreach events at STEAM. As part of their participation in the project, faculty cohorts were brought together around specific topical themes. Within each cohort, faculty members were tasked with presenting individually to public audiences on their own research, collaboratively developing a hackathon challenge for high school students related to their cohort theme, and collaboratively developing a "convergent" presentation about the same theme that reflected the expertise of each cohort member.

As the project evolved, it became clear that support from the STEAM program director along with members of the grant team, from both COSI and Ohio State, were critical to the successful implementation of outreach activities for faculty members balancing this unfamiliar process of collaboration with their other responsibilities. This support reflected a combination of infrastructural activities (e.g., scheduling, room reservations, purchasing), facilitation activities (e.g., framing questions to help prompt conversation, helping document discussions, listening and summarizing key ideas), and providing specific forms of expertise (i.e., content knowledge and what to expect in working with different contexts and audiences). For example, in the case of the hackathon challenges, cohorts depended on the experiences and recommendations of program coordinators and the project evaluation team to develop and refine their work products. Furthermore, they did so in the context of unstructured time to get to know one another's work – which was enabled by substantial administrative efforts from the STEAM staff (Wallwey et al., 2022). Notably, these same support structures enabled the project research team to identify what cohort members found helpful about the process and to draw conclusions about what necessary elements of collaboration might look like.

Another research component of the project explored what effect cohort members' convergent group presentations had on public audiences' understanding and interest in their research topics, in comparison to the researchers' individual presentations. These presentations took place at different types of informal learning events, including community arts nights at the STEAM Factory. In general, a challenge for the project team working on this research was to systematically collect consistent data across contexts while not disrupting the social dimensions that characterized the intent and experience of each event (Hayde et al., 2021; Weiss et al., 2022). A standard closed-ended exit questionnaire administered on electronic tablets worked well in physically large contexts in which experiences depended a lot on audiences' choice-making and flexible time inputs (i.e., electing to stop at a cohort member's booth). However, the STEAM Factory outreach activities involved the same cohort members giving micro-lectures within a structured program in a small event space and a cocktail party atmosphere. In this context, the questionnaire that worked well

elsewhere under sampled participants who had participated most deeply and, importantly, did not match the tone of the event.

With help from STEAM Factory staff and the community partners who put on the event, the research team was able to come up with an adaptive solution for events held at the STEAM Factory, which reframed core questionnaire elements as an interactive facilitated activity completed as part of the structured program, rather than as a secondary ask to people who were trying to leave. When the project's in-person events were forced to suspend in-person events in early 2020 due to the COVID-19 pandemic, the same third-space workers were instrumental in leveraging partnerships (e.g., the coordination team of a local Science Pub event), resources (e.g., Zoom licenses, ticketing platforms, and scheduling tools), and skills (e.g., live facilitation for accessible online presentations) so that both the events themselves and the associated research could be adapted for remote platforms. Simply put, the research conducted through the grant would not have been nearly as productive or as welcoming to participants without substantial contributions from those working in third-space roles; ultimately, these personnel were the people on the team who could help make connections, provide expertise, and help mitigate real barriers to participation among both faculty members and public audiences. In addition, as people with direct experience of project processes and participants' affective responses, third-space professionals who contributed to the project became key sources of data and meaning-making for project dissemination, including the present paper.

CONCLUSIONS

Having a space that is located away from campus but close to other cultural landmarks has helped the STEAM Factory flourish. STEAM is a hub for community partnerships and a space to gather audience research data. Though we highlighted just a few programs, the STEAM Factory is continuously engaging in the creation of new incentives that highlight the interests of the membership. We have evidence that third places are valuable to the kinds of faculty collaborations inherent to the mission of STEAM Factory. As described above, third places can improve accessibility and disrupt power dynamics associated with rank and particular forms of expertise. It is interesting to note the interaction between third spaces (as a concept and programs and activities), third places, and third-space labor all contribute to the success of STEAM Factory. Through this grassroots model, third-space labor can encourage and beget more interest in working with a third-space both as a physical location but also as an identity an individual may continue to develop. Members are engaged to use the STEAM Factory co-working space, along with the network of peer support that STEAM provides to explore their own creative projects. Along with the administrative infrastructure support of STEAM staff and leadership, co-working and peer support can enable the kind of community building and bridging that we would then classify as third-space labor. For instance, without official third space labor, it is unlikely that the STEAM Factory space would be maintained, organized, and stocked for basic operations, let alone be able to host the many events that happen there. While it is easy to articulate them as distinct facets, they interact in ways that are more difficult to disentangle. The third place supporting third space labor becomes more than just a sum of two theories but a self-replicating ecosystem that gives space and support for creative endeavors that do not fit neatly into job duties but benefit the membership, university, and wider community.

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