This article presents a synopsis of an interdisciplinary literacy-science, cross-country, fully remote service-learning (S-L) project prompted by and executed during the first year of the COVID-19 pandemic. The article shares discussions, analyses, and evaluations from both community partners (staff of the North Carolina Museum of Natural Sciences at Whiteville) and university faculty (education studies professors from Stephen F. Austin State University in Nacogdoches, Texas) to highlight how the challenges of the COVID-19 pandemic created unique opportunities for S-L. With summary of the S-L partnership’s fully online development and comparisons to other, more traditional S-L projects completed pre–COVID-19, we offer readers logistical tips for navigating their own virtual S-L partnerships. The article concludes with student learning outcomes from pre- and postproject reflections and identification of interdisciplinary work benefits from both the professors and community partners.

Overview of how the virtual service-learning project started

As a scholar committed to the value and benefits of S-L pedagogy in her teacher education courses, Lauren Burrow (associate professor and writing methods instructor at SFA-SU) was looking forward to another fall semester of literacy-focused S-L projects with established local community partners. Indeed, S-L is a key practice in the Community Responsiveness and Engaged Advocacy in Teacher Education (C.R.E.A.T.E.) program track that Burrow co-runs with fellow SFASU faculty member Heather Olson Beal (not listed on this project). The National Service-Learning Clearinghouse (n.d.) defines S-L as an experiential “teaching and learning strategy that integrates meaningful community service with instruction and reflection to enrich the learning experience, teach civic responsibility, and strengthen communities.” While S-L is most often practiced in students’ local communities with long-term community partners, by summer 2020 it was obvious that course formats within the C.R.E.A.T.E. program track, including planned S-L projects, would have to change in response to limitations in place due to COVID-19 social distancing and quarantine guidelines, exclusively online delivery of college courses, and the fact that most students no longer resided in the community surrounding SFASU.

Shelby Gull (head of NCMNS at Whiteville) and Burrow had previously been colleagues at SFASU, and they kept in touch after Gull moved away and transitioned out of higher education. In the beginning months of quarantine, Gull encouraged Burrow and her daughter to watch the virtual story times and late-night critter hunts hosted by NCMNS staff. Inspired by
the virtual offerings, Burrow reached out about potential projects and was connected to Brian Wuertz, the museum’s community engagement educator, who was familiar with and eager to work on an S-L project. Tonya Jeffery (assistant professor and science methods instructor at SFASU) was a new hire in fall 2020, and she joined the team as a much-needed science methods partner after a brief email exchange about the potential project.

Emails and Zoom chats throughout the summer soon led to the identification of a museum need that SFASU’s PSTs would be suited to tackle. For this S-L project, small teams of PSTs applied knowledge and skills learned in their writing and science methods courses to design family-friendly activities meant to engage and guide the museum’s visitors in play-based exploration and inquiry related to natural science exhibits featured in the museum’s outdoor spaces. Additionally, the museum asked students to incorporate literacy throughout the activities in response to their community’s desire for age-appropriate literacy resources and programs, which had been disrupted during the pandemic.

**Overview of the service-learning partnership**

The mission of NCMNS at Whiteville is to “illuminate the natural world and inspire its conservation” (North Carolina Museum of Natural Sciences, n.d.) The museum serves residents of a traditionally underserved, high-poverty, rural area of southeastern North Carolina, and the building is on land that is the ancestral home of the Waccamaw Siouan tribe (North Carolina Department of Administration, n.d.). The museum is one of only four science centers in the four-county area, making it a critical resource for STEM education. The poverty rate in Columbus County (where the museum is located) is 21.3%, well above the state average of 12.9% (United States Census Bureau, n.d.). In addition, this region has suppressed literacy rates (approximately 19.5%; United States Census Bureau, n.d.), and low literacy rates (approximately 27% of adults are identified as having low literacy levels; Barbara Bush Foundation for Family Literacy, n.d.) with Columbus County. These similarities were pointed out to the PSTs as a way to initially connect them to and provide context for the new community they would be serving.

The abrupt halt of educator-led programs and required closure of indoor spaces due to COVID-19 made it necessary for the museum to think creatively about how to provide science and literacy learning opportunities for guests in the remaining

**FIGURE 1**

Azaleas from Columbus and Nacogdoches counties.

*Note.* The similar flora and fauna of the S-L partnering counties presented an initial connection for the participating PSTs. Left photo courtesy of the North Carolina Museum of Natural Sciences at Whiteville’s Facebook post on June 9, 2021; right photo courtesy of Lauren Burrow, taken in SFASU’s Mast Arboretum on March 27, 2021.
accessible outdoor space. Families were looking for ways to engage their young children, but they needed activities and prompts for how to utilize the space without staff guidance. This is where the PSTs came in. Staff devoted a majority of their time to providing virtual programs for groups and the public, but there was a real need for on-site enrichment resources for guests who could not rely on interactions with staff. Within this context, museum staff presented their existing assets and a current needs assessment (see Table 1) to determine goals for the short-term S-L project.

**Project overview**

The S-L project was introduced, housed, and primarily executed as part of the PSTs’ writing methods course over a 4-week period. PSTs used class time to meet virtually with museum staff, tour the outdoor space, and discuss potential project categories for students to address. The primary objectives for the project were for each PST small group to design an S-L project that (1) shared accurate scientific knowledge relevant to the museum’s physical location and assets; (2) engaged museum visitors in exploration and inquiry-based learning related to the natural sciences; (3) responded to the museum’s expressed needs and requests; and (4) adhered to the course assignment requirements. Additionally, the final S-L artifacts had to demonstrate PSTs’ abilities to link science with the literacy knowledge and skills learned in their methods courses.

PSTs self-selected into teams based on their interest in the following museum topics and themes: wetlands, butterflies, fossils, and inquiry in the nature play space. Each small group worked exclusively in virtual spaces to craft four activities related to their topics, including writing short, interactive stories designed to educate visitors about, invite inquiry into, and prompt engagement with the museum’s natural spaces (see Figure 2); designing printed guides with suggestions for guardian-child learning through inquiry and play (see

| TABLE 1 |

| Overview of North Carolina Museum of Natural Sciences at Whiteville’s assets, needs, and goals in fall 2020. |

<table>
<thead>
<tr>
<th>Assets during COVID-19</th>
<th>Needs during COVID-19</th>
<th>Goals for the service-learning project</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Outdoor areas for nature play and exploration</td>
<td>• To engage guests with the same physical space on multiple visits</td>
<td>• Develop site-specific, self-guided activities for families with children ages 3 to 12 that incorporate literacy-learning objectives.</td>
</tr>
<tr>
<td>• New outdoor art installation</td>
<td>• To connect guests with nature without staff-led programming</td>
<td>• Practice connecting out-of-school supplemental activities to their own standards-based classroom goals.</td>
</tr>
<tr>
<td>• Established community of family visitors</td>
<td>• To replace previous early childhood science and literacy programming</td>
<td>• Become aware of museum resources and partnerships available to them as future teachers.</td>
</tr>
<tr>
<td>• History of providing literacy programming</td>
<td></td>
<td>• Learn science content relevant to the common ecosystems of North Carolina and Texas and become familiar with environmental education pedagogies.</td>
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</tbody>
</table>
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Figures 3 and 4); and creating simple, take-home handouts that highlighted connections for future learning extensions. PSTs were responsible for meeting with museum staff to get pre-approval for ideas and feedback on first drafts, presenting a 10-minute final project overview to both Wuertz and Gull, and transmitting digital folders of the ready-to-use final projects for the museum to distribute to guests.

Connections to science methods course

When taking the university’s elementary science methods course, PSTs were required to create innovative lesson plans that used BSCS Science Learning’s inquiry-based 5E Instructional Model: engage, explore, explain, elaborate, and evaluate (Bybee et al., 2006). Each phase of the 5E Model has specific goals that support science learning as well as allow students to construct their own understandings about the science concept or phenomena being studied through questioning and discussions with peers. In addition to implementing inquiry-based instruction, teachers should know how cultures aid or hinder their science learning (Contant et al., 2018). During the science methods course, Jeffrey encourages her PSTs to see their future students as partners in learning because students are experts on their cultures and communities.

Each lesson plan incorporated and aligned with the Next Generation Science Standards (NGSS Lead States, 2013) and three-dimensional learning. The lesson plans were innovative and creatively written, incorporating strategies and methods from the course, elements of culturally responsive teaching, support for English-language learners, social justice standards (Learning for Justice) for integrating social justice elements, and the National Science Teaching Association’s recommended children’s science trade books and picture books. Additionally, PSTs were intentional about including the history and impact of female scientists and scientists of color, as well as sociocultural issues that influence the nature of science and science in the real world, as encouraged by the NGSS (2013, Appendix H, p. 6). With each component of the lesson plans and activities crafted, the PSTs learned how to make literacy and science connections clearer for students and connect to their culture and community, while also increasing students’ passion for scientific inquiry practices rooted in diversity, equity, and inclusion.

Exploring the life cycle of a butterfly (each student completed an inquiry investigation using a butterfly kit) and using children’s literature in the science methods course were additional components that connected PSTs’ work across the two courses. During the life cycle of a butterfly inquiry investigation, PSTs observed caterpillars transform into Painted Lady butterflies and studied their life cycle, behavior, and biology. PSTs also utilized children’s picture and trade books in their interdisciplinary lessons. According to Ansberry and Morgan (2010), children’s trade books and picture books are effective for engaging students, guiding scientific inquiry, sense-making, and teaching comprehension strategies to students. Ansberry and Morgan also share that using picture books helps increase science understanding among diverse learners. This in turn enhances students’ scientific literacy and helps connect the concepts being taught to students’ real-world experiences. Creating interdisciplinary science lessons allowed the PSTs to explore their creativity and show how one can teach science content while using comprehension strategies from their literacy and writing methods course, as well as incorporate math and social studies standards. Learning these skills in the science methods course enhanced the PSTs’ understanding of the importance of linking science and literacy concepts when teaching and supported the subject-matter learning, planning, and implementation of their interdisciplinary S-L projects during the museum-university partnership.

Note. The group focusing on butterflies designed a handout that encouraged museum visitors to explore the outdoor exhibits to locate answers. This activity was created by SFASU PSTs for use at the NCMNS at Whiteville.
Project outcomes for students
Generally, reported benefits of S-L for students include opportunities for meaningful involvement with the local community and hands-on use of skills and knowledge, which increases the relevance of academic skills and deepens students’ understanding of core academic concepts and theories (Institute for Learning and Teaching, 2007). Students completed pre- and postproject reflections documenting their attitudes and beliefs about community work and their overall evaluation of S-L pedagogy for subject-matter learning.

When asked to discuss the benefits of an ever-expanding teaching community and identify who and what they would include in their “teaching community” (especially given the nontraditional fall 2020 semester they had experienced), one student shared the following:

My teaching community ranged anywhere from the Nacogdoches area, to the Lufkin area, and even to the state of North Carolina. When going into the project I didn’t understand why we were working with a museum out of state. When I received the picture of visitors utilizing the activities we gave, my heart was filled with warmth. I then realized that we don’t just show up for local communities. What we do as educators can and will impact communities other than local ones.

Students were also asked to briefly discuss the knowledge and skills they drew upon to solve the problems in the S-L project. One student explained:

I was lucky because my group focused on butterflies and in science, we raised butterflies. I used my what I learned in science to drive my lesson ideas. I also was very honest with Brian [Wuertz] in not knowing the area the museum is in. I relied on his expertise to learn from so I could adapt it to my activity.

Another student detailed the multiple areas of learning they experienced as a direct result of the S-L project:

Well I learned so much! It broadened my science library ideas; these are ideas I can definitely use in my future classroom as well. I also learned how reaching out and building a community is possible even though we are states away!

Finally, students were asked to consider the likelihood that they would use S-L in their own future classrooms, and most students offered responses like this one:

Yes, I would so that students can

![FIGURE 4](image-url)

Excerpt from 5 Senses Scavenger Hunt.

Note. The group focusing on wetlands designed an interactive scavenger hunt that encouraged museum visitors to explore the outdoor exhibits using their five senses. Precautions were included to promote safe outdoor play and learning. This activity was created by SFASU PSTs for use at the NCMNS at Whiteville.
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help and learn from partners in the community. A lot of students rely on the community partners outside of school hours, so to include them in teaching would be amazing.

**Project outcomes for community partners**

For community partners, the many reported benefits of S-L for students often include access to university resources, opportunities for contributing to the educational process, and short- and long-term solutions to pressing community needs (Institute for Learning and Teaching, 2007). For the museum, the benefits of this S-L project were immediate (see Figure 5), practical, and future-oriented. Working with the PSTs resulted in participating staff developing a more in-depth understanding of the types of support the museum sector can offer to teachers who may be uncomfortable teaching science; meanwhile, the museum helped future teachers gain knowledge about resources such as museums and parks that they could partner with in the future.

Logistically, the S-L experience enabled project completion with much less staff time than would have normally been needed, and the museum credits the creative university colleagues for expanding the capacity of their small staff and enhancing the diversity of thinking when working through the project. Finally, this project served as an example of S-L possibilities for working with other university faculty and researchers, and it even became a starting point for two additional projects in 2021.

**Project benefits for professors**

For professors, the many reported benefits of S-L for students include connecting the community with curriculum and becoming more aware of current societal issues as they relate to academic areas of interest and opportunities to tap into the expertise of community agencies as co-teachers (Institute for Learning and Teaching, 2007). For this S-L project, Burrow and Jeffery wholeheartedly agree that this interdisciplinary work was a great way to introduce themselves to each other (given COVID-19, they still have not met in person despite working in the same department) and initiate a positive, professional partnership for future projects. For Burrow, knowing there was an on-call science subject-matter expert to whom she could refer students throughout the crafting of the literacy-intensive activities offered reassurance that students’ work would be accurate and aligned to the museum’s natural sciences content—more so than if she had tried to complete the project with just her own limited scientific knowledge.

**Considerations for future virtual service-learning projects**

Burrow, Wuertz, and Gull all have extensive previous experience and expertise in S-L, but an all-virtual S-L project was a first for all three. For Burrow, the biggest shift was not being able to take students to physically visit and get to know a local community before offering educational assistance. However, working with partners who understood the values, goals, and logistics of S-L work decreased the time usually needed to build “partner trust” and helped ensure the project ran smoothly. For those considering virtual S-L projects, we advise that community partners’ needs be communicated explicitly to students completing the services, as the needs can seem more abstract from a distance. Additionally, the community partner must reflect carefully on their objectives, making sure to pick attainable goals that do not rely on students’ under-

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**FIGURE 5**

Students playing an interactive game.

Note. Museum visitors draw butterflies using an interactive roll-the-dice, build-a-butterfly game. This activity was created by SFASU students for use at the NCMNS at Whiteville. Photo courtesy of NCMNS at Whiteville.
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standing of intangibles such as the style or feel of a space.

Burrow is committed to encouraging PSTs to get to know the communities in which they will be teaching, but this experience served as a reminder that local areas are part of an interconnected global community and that expanding PSTs’ knowledge bases beyond their own backyards can prepare PSTs for the culturally diverse students they will connect with in their future classrooms. Additionally, as museums across the globe have recognized the importance of providing distance education, engaging PSTs with a distance-learning partner prepares them to take advantage of resources newly available to modern classrooms.

Compared to previous S-L projects, Burrow did not notice an increase in instructor-related responsibilities with regard to project setup; in fact, having a “virtual locker” (e.g., Google Drive) to keep all paperwork related to project directions, progress check-ins, and final products improved project organization and guaranteed future accessibility to the project activities by both the community partner and professor. Museum staff will also incorporate virtual check-ins with students in future local S-L projects because the virtual format actually means that staff can have more direct contact with students than in the typical site visit format, resulting in more relevant student products and stronger personal relationships between students and museum staff.

Conclusion

In this article, we aimed to offer insights about the potential for establishing and building new partnerships that are not limited by space and place and to encourage reflection on how to maximize virtual platforms to seek out new partners. We encourage the continued re-imagining of interdisciplinary S-L projects that lean into the virtual connections forced on so many of us as a result of the COVID-19 pandemic, even as we may return to more traditional face-to-face, experience-based learning opportunities.

References


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