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Engagement in Practice: Connecting Undergraduate Students to Community Organization through Design and Construction Experience

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Abstract

This paper discusses an engagement project that brought together students from the Kansas State University Architectural Engineering and Construction Science and Management programs with the volunteers and staff of the Families in Transition Clothing Closet (FIT Closet). This project was developed in conjunction with the design and renovation of an existing building to be partially used as the new FIT Closet facility. The students were tasked with gathering information from the project stakeholders and developing multiple design concepts for the future facility. The designs were presented to stakeholders for feedback through a design presentation and open discussion meeting. A finalized design proposal and project budget were developed. From the developed budget, project priorities were established. The students identified the portions of the project that needed to be implemented initially to facilitate the function of the new facility and created a future projects list. This list was used by the FIT Closet staff to pursue additional fundraising. The project allowed the students to connect with the stakeholders and understand the challenges of communicating design and construction information with individuals with no background knowledge in design or construction. Due to the timeline of the project, only one stakeholder meeting was able to be arranged. For future projects of this kind, additional stakeholder meetings would be valuable to facilitate project progress. The design and budgeting of the facility was phase one. The second phase of the project will include engaging students in the physical construction of the new spaces for the facility. Similar projects are being pursued with local organizations that are evaluating their facility space needs.

Introduction/Literature Review

Creating opportunities for students to engage with their community within the framework of a design challenge can be an effective teaching tool. Existing literature demonstrates that community engagement or service-learning benefits students, staff, and the community. Students demonstrated higher academic performance, improved critical thinking skills, and a great ability to apply knowledge from coursework to real-world challenges [1], [2]. Community engagement has also been shown to improve professional skills, such as teamwork and leadership [3]. In addition to the benefits to students involved in community engagement projects, the community also benefits from increased social capital, sharing of resources and knowledge, and connecting high education to community interests [4].

The implementation of community engagement programs within engineering programs can take different forms. University programs can be implemented at a large scale, similar to the Engineering Projects in Community Service (EPICS) program that originated at Purdue University and has expanded to a large network of universities. EPICS programs provide opportunities to hundreds of students and community organizations at multiple universities [5]. Another implementation method universities use to implement community service-based design is in conjunction with the student senior design projects, as can be seen at Colorado State University [6] and the University of Illinois – Chicago [7].

Partnership

The community engagement project undertaken for this paper was initiated through a relationship developed between students and faculty in the Kansas State University G.E. Johnson Department of Architectural Engineering and Construction Science and the Manhattan-Ogden Unified School District's Families in Transition Clothing Closet (FIT Closet). The FIT Closet is a free clothing distribution center that is available to all students and families in the school district who are experiencing homelessness or housing insecurity. The initial relationship between the university and the FIT Closet was built on volunteers who worked at the FIT Closet. The existing distribution center was housed in a small ranch house that previously served as the preschool on the property of a local church. During a recent bond project, the school district designated a portion of an existing high school building for community-based services, including the FIT Closet. The FIT Closet was provided the space previously occupied as art classrooms in the building. Because several faculty and students in the architectural engineering and construction science programs currently served as volunteers at the FIT Closet, they were approached to develop a design for the new clothing distribution center.

Project Execution

This project was funded through the College of Engineering Undergraduate Research Program. This program intends to connect students with faculty on small research projects. After being contacted by the FIT Closet, the faculty began recruiting students to work on the project. Two students were selected, one senior in construction management and one junior in architectural engineering. The students worked directly with a faculty member throughout the project. The team met bi-weekly to discuss progress and collaborate on ideas.

Information Gathering

The initial start of this project involved a meeting with the current director of the FIT Closet and the undergraduate researcher team. This was an opportunity for the students and faculty to learn how the FIT Closet operates, the current challenges, the goals for the new clothing distribution center, and the budget for the project. From that meeting, it was decided that a tour of the existing spaces was needed. The team was provided a tour of the existing facility by FIT Closet volunteers and documented how the space was currently used. This also provided an opportunity to hear from volunteers about the needs of the new distribution center.

After these initial meetings, the students determined that two additional pieces of information were necessary for the success of the project. The first was an inventory of all of the items currently housed in the FIT Closet. This included furniture, clothing, storage spaces, offices, and retail fixtures. This was deemed necessary to adequately plan for the space usage in the new design. This information was gathered by the student researchers by conducting a detailed inventory of the existing FIT Closet facility. Once the inventory was completed, the students requested to gather additional information from current volunteers and shoppers. To this point, the information gathered was focused on how the current facility operated. The students wanted to learn from those individuals who regularly use the FIT Closet how it could function better.

Volunteers and shoppers were asked to provide feedback regarding their experiences at the FIT Closet, including any challenges, suggestions for improvement, or ideas for change.

Initial Design

The initial design phase involved several meetings with the team to organize the information collected. The team was presented with a budget of $50,000 and the potential for additional funds to be raised. Using this information, the team spent several weeks collecting data on different components they wanted to include in the design. This included permanent construction, mobile furniture items, MEP system upgrades, and technology. Once the components necessary for the functional use of the space were identified, multiple design concepts were developed. The initial design concepts were created using hand sketches overlayed on the existing building documents. Each team member developed several concepts on their own. The team then compiled the concepts, identified overlaps in design, and created 3 proposals that were drafted in AutoCAD.

Once the design proposals were completed, the team created digital idea boards that incorporated the design proposal drawings (Figure 1) and the proposed components (Figure 2).

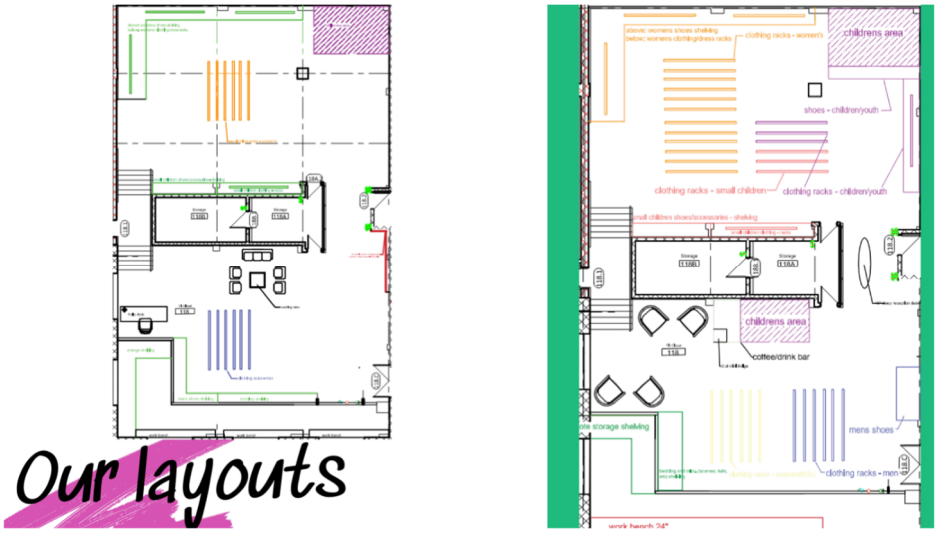

Fig. 1. Design proposal drawings.

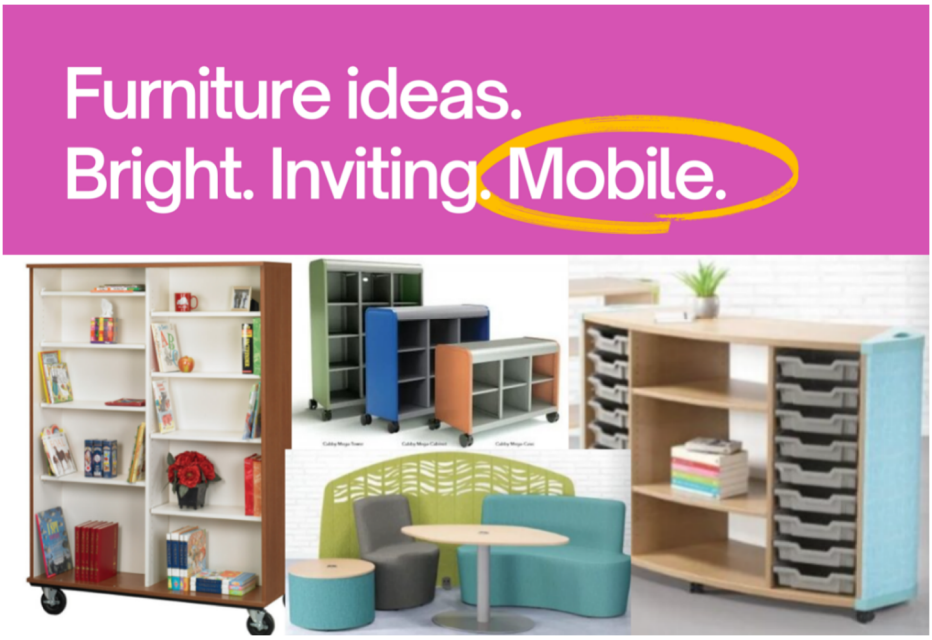

Fig. 2. Proposed components.

Presentation/Feedback

The team scheduled a presentation with the stakeholders of the FIT Closet after the design proposal drawings were completed. This meeting included the FIT Closet staff, volunteers, and some of the more engaged shopping guests. During the presentation, the team shared the process they had used to develop their proposal, presented the design concepts and components, and allowed time for discussion. This meeting proved to be very beneficial to all in attendance. Suggestions from the volunteers that were not presented in the initial information gathering were provided. Additionally, there was a good discussion about how the proposed designs would impact the operational procedures of the FIT Closet. All of the comments were collected for implementation in the final design proposal.

Final Design

Using the comments collected from the presentation to stakeholders, the team merged the proposed designs into one final design concept. One of the challenges observed during the presentation of the designs was the stakeholder's inability to visualize the space from 2-dimensional drawings. Understanding this challenge, the team opted to create a 3D model for the final design proposal (Figure 3).

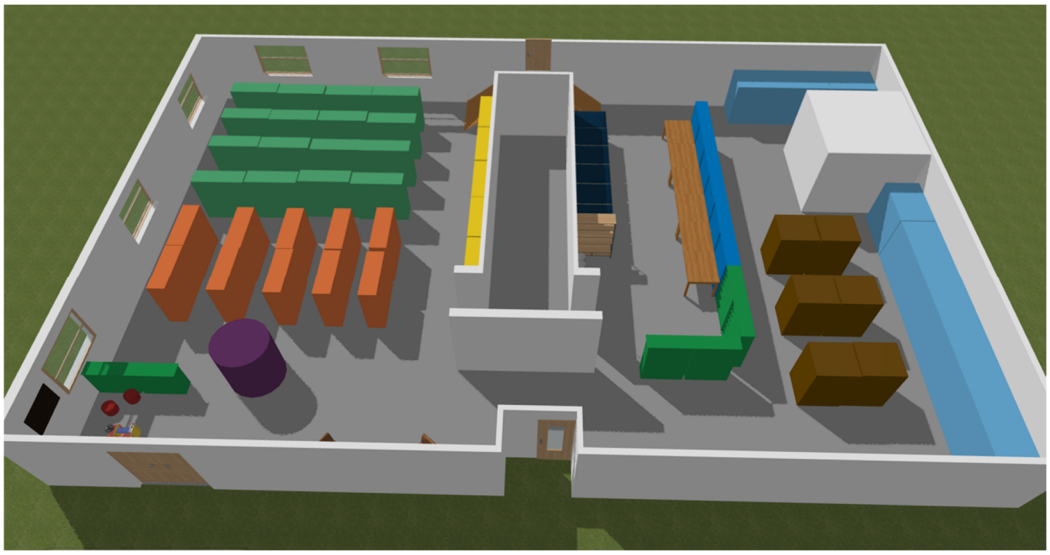

Fig. 3. Final design presented as a 3-D model.

Budget Considerations

Throughout the project, the team was conscious of the budget limitations of the project. The original committed budget of $50,000 was reduced to $20,000 shortly after the presentation of the design concepts. With this change, the team decided to take a layered approach to the development of the project budget. The first step was to identify what materials, furniture, fixtures, and equipment could be reused from the existing facility or other departments in the school district. The second step was to identify the immediate needs of the space and develop a budget for the purchase of those items. Once that initial budget was developed, the team created two additional budgets focused on the wants and the big dreams for the facility. These two budgets were developed to allow the FIT Closet to effectively fundraise additional funds.

Discussion

Throughout this project, the student researchers led the progress. Each week during the team meeting, they provided updates on their progress and set deadlines for themselves. They also were given the latitude to extend their research and design process in different directions. This proved to be an excellent example of self-directed learning. The other aspect of the process that proved beneficial to the students, was the engagement with the community. As the students were working on the project, discussions about the FIT Closet and the need for this service in the community occurred; both in team meetings and through informal conversations with their classmates. This project provided an opportunity to connect students to a service organization beyond the formal research experience.

For future projects of this nature, two aspects could be improved. The first is the incorporation of more interactions with the project stakeholders. After completing the design proposal and final budgets, the team discussed the value of meeting directly with the volunteers and staff. Having additional meetings to share ideas and evaluate the designs would have provided a more thorough evaluation of the initial designs. The second change that the team identified was the incorporation of 3-D models and walk-throughs of the new spaces earlier in the process.

Working with stakeholders who do not have a background in design or construction meant that the approach to communicating the designs needed to be done differently. By incorporating the 3-D designs earlier, the team felt that some of the challenges in communicating the design with stakeholders could have been resolved.

Several organizations connected to the Kansas State University campus are fundraising for new facilities or renovating existing facilities. This presents an opportunity to continue this type of engagement project with undergraduate students in the future. Every community has organizations that need special skill sets that engineering students are developing. Finding ways to connect those needs to students is an impactful way of showing students how their field impacts the wider community. For universities that cannot implement a large-scale program similar to the EPICS [5], identifying a community need paired with a course, independent study, or undergraduate research experience can be a starting point for building a larger community engagement program within a department or college.

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