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WHEN THE EXPERIMENTAL LAB IS ITSELF THE EXPERIMENT: MAKING SOMEONE ELSE'S DESIGN WORK

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The redesign of learning spaces has been a growing trend in education, especially higher education. The redesign of such spaces takes time and involves a variety of stakeholders, sometimes resulting in ill-defined designs. This can be exacerbated when individuals leading such efforts depart and there is not a consensus on the design, sometimes leading to vendors having a disproportionate say in final implementations. Understanding these differences and finding a way forward can fall on new stakeholders who are tasked with supporting such spaces after most of the foundational decisions have been made and/or carried out. This case explores one faculty member and designer's experiences with helping to both design for and define such an ill-defined space. Included in this case are the story of the design of the space pieced together from before the author started his employment and the story since he became a stakeholder, stumbling blocks encountered after the space was built, strategies employed in the interim, discussing a path forward, and finally sharing realizations made during the process which will help his future efforts with designing such multi-stakeholder spaces in the future.

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INTRODUCTION

Since 2002, the New Media Consortium's Horizon Report has highlighted the landscape of emerging technology in education, suggesting different timelines for adoption, overcoming barriers, and new developments (New Media Consortium, n.d.). One of their key trends, initially identified in 2015 as a short-term trend for the next one to two years, was the redesigning of learning spaces (Johnson et al., 2015). While alternating between short-term and mid-term designations, redesigning learning spaces has remained in the 2016, 2017, 2018, and 2019 reports (Alexander et al., 2019; Becker et al., 2017, 2018; Johnson et al., 2016). With the discussion of learning space redesign including considerations like problem-based learning, increases in supportive technology, and fostering group work, one potential redesign option is that of creating a studio. There is however not one set way to design a studio, though many borrow from architectural education approaches (e.g. Kuhn, 1998). Such approaches include focusing on things like "project-based work on complex and open-ended problems, very rapid iteration of design solutions," and "frequent formal and informal critique" (p. 65). How a space is designed can convey a lot about how that space can be used and what kinds of interactions can take place there (Leijon, 2016). Past evidence has also suggested that how spaces are designed and constructed can impact both instructional interactions and learning (Park & Choi, 2014), as well as impacting the practices of both students and teachers (Johnson et al., 2015; Park & Choi, 2014). An approach that can help to balance out these different factors is to involve both students and teachers in a participatory design approach, which then informs how architects and engineers proceed (e.g., Casanova et al., 2017). Having only partial participatory involvement, having people leave the process, or having decisions made with different stakeholders who will not be using the spaces can lead to concerns when such spaces are completed and available for use. This design case explores such an instance.

UNIQUE CONTEXT AND BACKGROUND

From May 2015 to December 2016, the College of Education (COE) at Ohio University was moved out of its home in

McCracken Hall during a \$32.8 million renovation. As part of the renovation, old rooms were updated and new rooms were constructed. All spaces in the building received substantial technology upgrades. One of the new spaces built within an older portion of the building became known as the Experimental Technology Lab (ETL). It is a room unlike any other in the building because of one and a half walls being constructed almost entirely out of clear glass, which allows passersby to see what is going on in this space and potentially engage with the people working inside.

It should be noted that I was not one of the initial designers or developers of the ETL, but I took on a series of increasingly more active roles with it since my arrival at the university as a new Instructional Technology faculty member. I eventually became the main demonstrator of the space to visitors, taught classes in the space, led workshops in the space, and taught others how to use the space. The design existed before my arrival, but multiple stakeholders had different perspectives on what that design was intended to be, what it ultimately was, and how it should be implemented.

Before taking on these increasing roles, I first needed to understand the history of the ETL and its development. As I pieced together the history of the space I learned that a staff member from the local PBS station had also been involved in several discussions with my predecessor regarding recommendations. Later, a preferred vendor used by the university was found to ultimately have a dominant voice in the final layout, wiring, and hardware decisions after my predecessor's departure to another university. As I was piecing the history together and some of what I had found was challenged by some stakeholders, I contacted my predecessor a few times to better understand the first seeds of ideas for the space. He shared that there were several inspirations to inform the design of the space, which included: "Greg Kessler. Of anyone there, I appreciated his vision for learning and building space for graduate work...Otherwise, I was looking at the ETC program at Carnegie Melon, RIT, MIT, and UC-Irvine (for scholarship)" (S. Dikkers, personal communication, September 6, 2016).

Since I started my appointment and investigation during the building renovation, it was not clear if I would be able to see the space before the renovation completion and I expressed these concerns to the dean. A tour of the renovation in progress was arranged, which started with being shown the blueprint of the space (see Figure 1). The ETL is located in the middle of the second floor of the building and is in a high visibility location right off the main hallway and a common space opposite the elevators. The walls of the ETL that face these spaces are almost entirely composed of clear glass. What I was shown at the time was essentially a large cement box with the aforementioned glass walls and some items like the metal array hanging from the ceiling that would ultimately be the home for the light grid. The infinity wall (see

Figure 2) in one corner had not yet been built and it was not clear if there would be additional electrical outlets or data ports setup. An infinity wall is essentially a stage, located in a portion of a room, with curved walls of a solid color that create the seamless appearance of a presenter being in an infinite white space. This allows video overlays and other digital elements to be included in productions for a presenter to interact with, as well as having a uniform background that can be used in place of a green screen. Unlike traditional green screens, you do not have to worry about wrinkles or worn fabric causing distortions in images, and infinity walls can contribute to a greater sense of depth on screen.

This design case explores the story of the design, building, and growing pains of an experimental technology space, from my perspective as a new faculty member who would be leading some of the activity design and execution responsibilities for the space. With an increasing number of colleges and universities developing unique work or pedagogic support spaces (i.e. maker spaces, studio spaces, active learning classrooms, learning commons), there is a greater chance that faculty members may become involved with such spaces well after some or all of the foundational decisions have been made.

STAKEHOLDERS

Past Stakeholders

My predecessor: The chief architect of the Black Box / ETL left for another faculty position.

Current Stakeholders

The Instructional Technology (IT) faculty: The IT faculty are the group most strongly associated with the ETL because of a former member, my predecessor, being the chief architect of the space and two current members having served on an advisory board that debated different planning points for the ETL such as what technology should be purchased for the space. While these two active members made recommendations for purchases and design choices, their recommendations were packaged with others' recommendations by the Curriculum and Technology Center (CTC) staff and were presented to vendors whom the CTC then worked with to complete the space. The IT program recently changed its name to Innovative Learning Design & Technology but will be referred to at the IT program since that was its name during this design case.

The author: Although I could have placed myself under the previous heading, as I am an Instructional Technology faculty member, I wanted to retain the feeling of otherness I had when I started as a new faculty member and a new designer working within the ETL to both develop it and promote its use and possibilities to both internal and external constituencies. My other roles in the college include being the chair



FIGURE 1. Architectural plan of the renovated second floor of McCracken Hall. Room 226 is the carved out space for the ETL, with 226A as the control room for the space.

of the dean's technology outreach efforts in the college as well as being the former chair of the technology assessment sub-committee, which focuses on the technology integration efforts across the curriculum that are reviewed during the Council for Accreditation of Educator Preparation (CAEP) accreditation visits and the reports which go along with those.

The Curriculum Technology Center staff and student employees: The director of the CTC was the keeper of the keys for the ETL as well as the person who put in purchase requests for the space. The CTC's IT support specialist worked with contractors to set up the space and support technologies within it. The student employees of the CTC are the ones that faculty and students see to check out a key to unlock the ETL as well as other computer labs and student workrooms. One later student hire, noted as the pioneer, in this case, has had a greater focus on the ETL since its fourth semester of existence. The CTC recently changed its name to the Data Analytics & Academic Technology Center but will be referred to as the CTC since that was its name during this design case.

The Dean's Office: The dean's office promotes the ETL as one of the showcase spaces within the college. They seek for the space to be a resource to promote teaching and student achievement across all of the departments. The office seeks to have the CTC support the IT faculty in achieving these goals.

The PCOE faculty and staff: This group is all of the other faculty and staff in the college. They have a collective curiosity about the ETL, but only a few have used it and fewer have expressed interest in using it. More interest has started to develop with seeing the dedicated student worker/pioneer being in the space regularly and some of the author's class projects being worked on by students in the space.

The PCOE students: This group is all of the undergraduate and graduate students within the COE. Outside of the IT doctoral students, few students have been in the ETL or have much knowledge of it.

PRESENTATION OF THE DESIGN CASE

Because of the segmented nature of how the ill-defined design, in this case, was addressed on and off over three years, what follows are descriptions of the series of design challenges faced. Each design challenge describes the challenge(s), notes their significance, shares alternate ideas that could have worked in retrospect, the design responses that were implemented, the relative success or failure of the responses, and finally realizations are shared based on the experiences with each challenge. After presenting the design challenges I offer an update on where the case stands at present, offer concluding thoughts, and share a table of the collected realizations from each design challenge.

DESIGN CHALLENGE 1: NAME, FUNCTION, AND EARLY STUMBLING BLOCKS

Design Challenge 1A: What do we Call this Space?

When I first interviewed for my current job, the space was called the Black Box. When I reported for duty in the fall of 2016, it was called the Black Box. When we moved into our newly renovated building in January of 2017, the nameplate on the Black Box instead identified it as being the Experimental Technology Lab (ETL). This was a discovery to members of the IT program and our larger department. In retrospect, it is a name that is somewhat clearer in helping others outside of the IT program to understand what the space is used for, as opposed to the more abstract designation of the Black Box, though it lacked something of the mystigue of the former name. Although some faculty and staff in the building use the ETL designation or reference it as the special IT lab, the IT faculty still use the Black Box moniker or a combination of the two names. Some CTC student employees only reference the ETL by its actual room number, which can be confusing to different stakeholders as nearby computer labs have similar room numbers and most in the building only ever reference those labs by their room numbers

Significance of the Challenge

Although the name of the space may not seem like a challenge in the truest sense of the word, lacking a common name can impact the identity of a space. Having different stakeholders using different designations for the ETL speaks to a basic lack of understanding of the space and is not as inviting to others, especially when the people involved with its design and implementation do not have a standard way of referencing it.

Alternative Ideas that May Have Worked

I was never able to discern how or why the name of the space changed or which stakeholder made that final decision. Nobody I spoke to during my investigation of the space and its history was able to identify when or who had decided on the name change, nor could they point me to any records such as meeting minutes that might document the decision. This may have been a side effect of all of the logistical considerations for the entire college and its materials having to move into a swing space (a building used when buildings are renovated) during the renovation and then move back. It could have also been a matter of my predecessor not leaving behind notes before his departure. Although it seems unlikely, the vendor that made several implementation decisions for the ETL could have also suggested the name change. Absent such details, a compromise on the name may have been the best alternative. This alternative could have been to change the nameplate to read as something like The Black Box: Experimental Technology Lab. Although

it would have incurred a cost to change the nameplate, it would have limited confusion in referencing the space. It would have also capitalized on how the IT faculty had been using the Black Box name when talking to others about the space since its conception and trying to get potential users excited about it.

Design Response 1: Verbal Shorthand

Since the discussion of the name and why it was changed never really developed into an actionable item, a verbal shorthand of Experimental Lab has been what most stakeholders have ended up using to reference the space. This has not kept some stakeholders from using a variety of the other names or other shorthand, such as the Special Lab, but it has led to some standardization. The lack of a consistent name is somewhat of a design failure, as well as not being able to find a record of when, why, and by whom the name was changed. This has led to highlighting the importance of agreeing upon a name and keeping records regarding such changes.

Realizations Based on the Experience with the Design Challenge

The development and maintenance of an easily accessible guiding document, which all stakeholders could review and comment on would have greatly changed the design experience of this project. If any of the designers of a space depart, as was the case with this project, there would have still been the guiding document that everyone had been able to see from the early planning stages and had the opportunity to comment on and contribute to. In this case, the existence of a guiding document would have eliminated the need for me to try to reconstruct the history of the lab and its name. That time could have been better used to address the other design challenges noted in this case.

Design Challenge 1B: Who is in Charge of this Space?

Beyond the challenges of the name, the functional considerations of the space remained in flux for several semesters. The ETL had been designed and advised by IT faculty members, but technology implementations within the building are carried out by another group, the Curriculum Technology Center (CTC). This meant that two different groups were involved in different stages of the ETL's design, development, and implementation. While we work well together, this led to two different understandings of the space and subsequent guestions. Was the space the special lab for the IT program or a special lab for the entire college? None of the IT faculty having a key to the lab, without checking one out from the CTC, suggested that the answer was the latter. However, with starting up in a new building, keys to many of the spaces had not been passed out at that time. When the IT faculty members did not receive keys later still, the answer to the administration of the space seemed to be further answered.



FIGURE 2. The completed Infinity Wall within the Experimental Technology Lab.

Significance of the Challenge

Although borrowing a key from the CTC was easy enough, it required planning, as keys could only be checked out when there were CTC staff or student workers present. This sometimes meant needing to request keys several days in advance to be able to complete preparation over unstaffed weekends for Monday events or needing to wait until someone was on duty to check out a key on the same day as an event. This also meant that there was seldom any spontaneous experimentation in the space, as you always needed to plan to be able to access the space during staffed hours or have previously requested a key in case you felt like you might want to spontaneously experiment soon.

Alternative Ideas that May Have Worked

An alternative that may have worked would have been the inclusion of swipe access for the room. This would have allowed access to the space to be linked to the university-issued identification cards carried by all administrators, faculty, staff, and students. Swipe access points were already in use on all main doors for the building, as well as for the main doors to each academic department's office suite. This would have allowed access to be determined down to each person or to be able to be generalized across different groups within the college. The drawback of this alternative was that each swipe access terminal was quoted as costing approximately \$18,000, not to mention how much work would have been necessary to run the wiring and re-finish the walls afterward. Had this been implemented when the building was being renovated, it may have been able to be completed at a lower cost.

Design Response: Keys and Regular Access for the IT Faculty

The design response was to request additional keys, which were eventually ordered. The rationale for this approach was that it was one of the least expensive options. It took almost a full year, but I received my key to the space and was able to work on design and function issues during off-hours when checking out a key would have previously not been possible. I started by acquainting myself better with the control room (see Figure 3) and programming the switcher board which controlled the light grid (see Figure 4). Over many hours I became better acquainted with the equipment in the space and better able to support others in using them. Since I was able to receive a key, this response was not a failure, but taking almost a year to receive it could be considered a failure. It was unclear if the delay was to allow all necessary keys across the college to be purchased at the same time or if there was still some reticence to have extra keys produced. Although four keys were requested, so that each IT faculty member could have one, only two keys were ultimately

acquired. The extra key was given to another IT colleague who is also closely linked to the space.

Realizations Based on the Experience with the Design Challenge

The development and maintenance of easily accessible materials and budget documents, which all stakeholders could review and comment on would have greatly changed the design experience of this project. This would have made it clear what had been purchased, what was being purchased, what items were not able to be purchased, and which funds were being drawn from in each instance. Additionally, the development and maintenance of an easily accessible role and structure document, which all stakeholders were able to review and comment on would have also limited the amount of time waiting for clarification during this project. Such a document would have allowed everyone involved to know who should be carrying out which duties and who the gatekeepers were while avoiding politeness paralysis, misunderstandings, hurt feelings, or delays in carrying out necessary functions. In this case, had such documents been in place already, I would not have had to investigate the history and perceived purpose of the space. Additionally, the delays in establishing leadership of the space, outfitting it with the appropriate equipment, and having it be more functional could have already been addressed by the time we returned to our renovated building or shortly thereafter. Finally, the remaining design challenges, in this case, may have been avoided outright or addressed earlier.

Design Challenge 1C: How could Noise and Echo Be Eliminated in the Space?

An unforeseen problem that arose almost immediately with the ETL involved the air handling system. Several large vents lined one of the walls near the ceiling and seemed to only have two settings: slow and loud or fast and louder. This background noise rendered media production in the space inviable, as all recordings included extensive airflow sounds. When it was less loud there were also indications of an echo in the room.

Significance of the Challenge

Having extensive sound contamination in a space with media production as one of its main goals severely limits its usefulness. Similarly, the presence of a notable echo in such a space is also a concern for production quality. Lastly, users who have taken the time to experiment in the space, only to find that their work is unusable, are less likely to return and experiment again.

Alternative Ideas that May Have Worked

The use of local subject matter experts could have provided a more balanced approach to the implementation of the



FIGURE 3. The ETL control room.



FIGURE 4. The switcher in the control room.

space, as opposed to a construction firm or a technology vendor making the biggest decisions. The shift in focus from completing the space versus developing a space you will be "living in" could have also addressed the ventilation and echo issues earlier on in the process. IT faculty have expertise in the development of learning spaces and related subjects such as needs assessment, usability testing, and media production. Another IT faculty member and I also have experience in the design and development of computer labs and the supporting infrastructure. While I arrived at the university with the renovation half-way completed, I could have added a valuable voice to the discussion of the continued development of the ETL before it was finished. Staff at the university-affiliated television and radio stations, as well as radio and television faculty, could have also served as consultants, as they have designed and developed numerous production studios used by both professionals and students in their programs.

Design Response 1: Foam Panels

Since the air handling system could not be immediately addressed, the vendor solution to limit the echo was the introduction of large, multi-colored foam panels that were suspended from the ceiling at different intervals (see Figure 5, a portion of the vents producing the noise can also be observed). Additional panels are available to install, but there is little ceiling space left to support any more of them.



FIGURE 5. The light grid within the ETL and the sound dampening panels are suspended above.

Some could be attached to the walls to see if they dampen the echoes, as some audio recording spaces use similar approaches to break up sound waves, but these would not make sense on the entirety of the glass walls or the space with the infinity wall. Since the foam panels, as currently installed, do little to limit the echoes, this solution was a failure. The interim solution became having speakers not speak as loudly, which then limited the presence of the echoes. It may be that over time the echoes can be further reduced through the covering of additional surfaces, possibly with the remaining foam panels instead of suspending them from the ceiling. Consulting colleagues in radio and television may also yield additional fixes that could be applied without fundamentally needing to change the physical layout of the space.

Design Response 2: Muting the Air Handling

Addressing the air handling issue involved a work order to the physical plant with the request to either implement a kill switch that could be used to shut down the system while recordings were being produced or a general muting of the system. It took almost a full year, but the system was finally muted and productions could be undertaken without fear of airflow sounds overpowering the audio. As noted earlier, the reduced noise level revealed that the foam panels did little to counteract the echo in the room. The reduced airflow can also lead to the room getting rather warm when there are larger numbers of people present and the light grid is in use. This solution did alleviate the noise problem, so it was a partial success.

Realizations Based on the Experience with the Design Challenge

Better and consistent use of local subject matter experts could have been used in the further development of this space through the selection of appropriate structural developments, as well as the purchasing of equipment and furniture. This would allow the voices of faculty and staff who have expertise in these areas to provide as much guidance as possible to best inform the use and diminish the influence of vendors who have a primarily financial motivation. Subject matter experts could be informed via direct communication or through the guiding documents, described in earlier realization sections, of decisions made or not made based on their feedback. In this case, consulting the IT faculty more regularly when designing the ETL would have helped communicate the potential problems of airflow noise and echoes for video recording so that the room could have been designed with that intent in mind.

DESIGN CHALLENGE 2: WHAT TYPES OF USE ARE EXPERIMENTAL AND WHAT TYPES ARE NOT? WHICH USES TAKE PRIORITY?

Design Challenge 2A: What Denotes Experimental Use?

One of the challenges with a space like the ETL, when theoretically open to any students who request to use it, is what uses fall under the designation of experimental, or perhaps reasonable experimentation, versus unnecessary, risky, redundant, or even frivolous use? On one occasion I observed two young ladies closing the curtains to the lab so that nobody could see into the space via the glass walls, but through the spaces in-between curtain panels, it was clear that the lights were being flickered on and off at different intervals. At first glance, it looked like students were just playing around and trying not to be seen, but I did know that some of the lights had been acting up during the week or two before this occurrence and it could be that they were not students, but instead technicians testing them. Upon walking into the ETL both young ladies seemed somewhat startled as I asked if they were testing the light grid. They replied that they were doing a fashion shoot and that they had been able to do so on another occasion. Our college does have a Fashion Product Development program in our Human and Consumer Science department so that certainly could have been related to a school activity. However, as I left them to their light flickering fashion shoot, I wondered if this was an appropriate use of the ETL and if they damaged the lights in this use, who would be responsible?

Significance of the Challenge

The significance of the challenge was fundamental to the purpose of the space, specifically who could use it and for what reasons. Did anything related to a class allow carte blanche use of the lab? The liability side of this consideration is later addressed in Design Challenge Three.

Alternative Ideas that May Have Worked

An alternative option could have been limiting the use of the space to only IT students, those in IT classes with specific project needs, or those faculty or students who had contacted IT faculty members to consult about the use of the space and how it might support class activities or projects. This alternative idea was not implemented because it would have been under the original concept of the space as being the special production lab of the IT program. In staying with the space being open to everyone in the college, the development and publication of an acceptable use policy for the space would have immediately weeded out any questionable uses as well as guiding all potential users of the space regarding the kinds of activities that were possible in the space and were actively encouraged. Such a policy could have also led to more people using the space much earlier in its existence.

Design Response: Only Class-related Reservations Being Allowed

Like any other technology space in the college, the reservation of the ETL and checking out of keys to it was handled by the CTC. The director of the CTC served as a gatekeeper for ETL reservations and only class-related requests were approved. The failure, or perceived failure of this solution, was that not all class-related uses of the space will look very academic (such as the flickering light component to the fashion shoot) and students in search of private workspaces may stretch how class-related a specific use might be. The lesson learned here was that there needed to be additional scrutiny regarding class-related needs and if other spaces in the college or on-campus might be a better fit for student needs.

Realization Based on the Experience with the Design Challenge

The development and maintenance of an easily accessible space use and liability policy document, which all stakeholders could review and comment on would have greatly changed the design experience of this project. This way inappropriate use requests could have been curtailed, appropriate uses could have been encouraged, which elements of the space were allowed to be modified could have been made clear, and if something was damaged it would be clear who would be responsible for it. In this case, had such documents been in place already, I would not have had to investigate the history and perceived purpose of the space. Additionally, having these policies clearly articulated may have encouraged earlier and sustained use by faculty, staff, and students, as they would have had a better understanding of how they could use the space and the guidelines for doing so.

Design Challenge 2B: Which Uses Take Priority Over Others?

On one occasion I was setting up the space with some of my colleagues and our students ahead of an afternoon of demonstrations as part of our newly renovated building's ribbon-cutting ceremony and grand opening. During this setup and up until approximately fifteen minutes before the first guests visiting, a student photographer kept coming into the ETL and moving a photography backdrop away from where I had placed it, moving a stool in front of it and taking headshots of students for some purpose that I had not been informed of when I had been tasked with organizing the ETL for demonstrations during the event and had gone through the formal reservation process. Each time I would have to reset that portion of the room (see Figure 6). Although everything ultimately worked out, I found myself



FIGURE 6. The moveable photo and green screen backdrops within their usual corner in the ETL.

wondering which group or function took priority in the ETL when it was needed at the same time, especially when it was already clearly in use. Although this design challenge addresses priority, it also another example of questioning what constitutes a reasonable experimental use?

Significance of the Challenge

Although there are no shortages of examples of collaborative workspaces in education and industry, there are also schedules and policies which dictate how those spaces should be used and when those spaces may not be shared. By allowing another user to overlap, interfere with, and setback efforts being made by a user who has gone through the approval process, it calls into question the legitimacy of the space and its policies.

Alternative Ideas that May Have Worked

As part of the acceptable use policy suggested above in the alternative ideas section for Design Challenge 2A, a policy regarding scheduling the space and overlapping of use could eliminate instances such as the interference by the previously described student photographer. To limit the burden on one gatekeeper to keep track of all of the logistics, the introduction of a digital scheduling application would allow all reserved users to be aware of each other and for those still seeking the use of the space a point of reference for when they might want to schedule a time for their uses. The implementation of such a system could also allow for resources from the ETL to be checked out individually. In the case of the student photographer, I would have happily moved the photo backdrop to another location where he could have used it freely and I would have not had interference in my preparation of the ETL itself.

Design Response: A Single Gatekeeper

With the reservation of the ETL and checking out of keys being handled by the CTC, the director of the CTC served as a gatekeeper for ETL reservations and thus also needed to be cognizant of overlapping use. Although the director may have been keeping all of these details clear, other staff or student employees may not have been aware of who was using the space at given times and sent people over to use it. Although this only failed on a few occasions, having this happen during events such as the building's grand opening was a larger concern than it might have been on other occasions. The lesson learned here was that there needed to be additional documentation of who was using the space when, how the space was being used, and contacting everyone who might be impacted by this use or able to share the space. Furthermore, the sharing of this information with others who could allow access to the space was also important to limit the chance for overlapping of use and, in the event overlap is necessary, to limit the impact by determining who needed greater access to the space versus only portions of the resources within it.

Realizations Based on the Experience with the Design Challenge

The use of a central scheduling officer, possibly a full or part-time director of the space, or a scheduling system could limit the possibility of two parties trying to use the space at the same time. Having known blocks of time being used would also allow those using the space to safely leave the room set up as they might need it over an extended time. In this case, there was a single gatekeeper in the form of the CTC director, but the staff and student employees, as well as administrative staff from other offices in the college, would not always be aware of who was in the space at a given time or who had plans to be there in the future. There were also instances where I was approached directly with different requests related to the ETL because of my association with it, and I was the one who notified the CTC director to help with planning. Having a dedicated, and recognized, person to run the scheduling of the space or a public system to do so, could have prevented some of the occasions where uses overlapped.

DESIGN CHALLENGE 3: POLITENESS PARALYSIS

With two, well-intentioned groups being involved with the ETL it was not always clear who should be taking the lead. To not overstep each other, neither group did very much with the space. Instead, both groups asked questions of each other and the dean's office, waiting for guidance on how to proceed. During this time of uncertainty, limited purchasing was completed for the space since it was not clear which budget such purchases should be drawn from or which purchases might be the most reflective of the ETL's purpose. Additionally, if any students, staff, or faculty could use the space, it was not certain that materials or resources could reliably be left in the space between uses or if the ETL would be in the same configuration in which it had been left.

Design Challenge 3A: Who Should Pay for Things and When?

Over time the message from the dean's office was that the IT faculty would take the lead with the space to support student learning and the CTC would take care of the technology old and new in the lab, but that the ETL would be used to support all faculty and students in the college. This partially helped to address how we might proceed moving forward with the ETL, but with the space being shared, one of the greatest concerns that remained was one of permanence. If anyone can use the space, is there any certainly they will preserve an existing layout or return it to that layout when they were done using the ETL? Could staging materials be left in place? Would the last people that used the space be

certain to lock it? If someone broke something or something was stolen, who was responsible?

Significance of the Challenge

By not having a clear process for purchasing new materials and equipment, it was a challenge to have the fundamental resources to make the ETL more than a mostly empty room that remained full of possibilities. Without standardized purchasing, equipment might be deemed important by some stakeholders, but not by others. This could result in mismatched components or missing components leading to others not being able to be used. Without a clear liability policy, there was also uncertainty about what repercussions there may be for when components broke during use.

Alternative Ideas that May Have Worked

Having a policy document in place from the opening of the ETL could have articulated who was in charge of the space, how monies could be spent, what the process was for spending such monies, what liability individual users, programs, or departments might have for use of the space. Clear purchasing guidelines could have made it clear what kinds of purchases were acceptable, who would "own" purchased components, allowed purchase requests to be fulfilled quicker, and make purchase request rejections a speedier and more open process. Clear liability policies could have also put potential users at ease, as fear of breaking components may have kept them from making use of the space.

Design Response: All Purchasing goes through Building Technology Services (i.e. the CTC)

With the CTC being in charge of supporting the different technology spaces and purchasing equipment for them, IT faculty members began submitting purchasing requests to the CTC director with a rationale for the items to be purchased. Some requests were aspirational based on what IT faculty thought the space could become, while others were necessities for the space to continue to develop basic functionality levels for different types of production. This design was mostly a failure because the majority of the requests were not fulfilled. Without an explanation of how purchasing decisions were being made, it was unclear why some requests were successful and others were not. When new resources would appear in the ETL, it was not always clear who had requested them, why they were requested, and why those requests were fulfilled. With limited resources being added to the ETL, the discussion regarding liability was postponed several times and has not yet been fully addressed. It is currently believed that if the space is used for class-related functions, then warranties and insurance policies for the infrastructure and limited equipment will be honored and address repair and replacement needs and costs.

Realizations Based on the Experience with the Design Challenge

The development and maintenance of an easily accessible guiding document, which all stakeholders could review and comment on would have greatly changed the design experience of this project. This would have mitigated the impact of my predecessor's departure and the loss of institutional knowledge. The guiding document would have remained and everyone involved would have been able to see all of the decisions from the early planning stages and have had the opportunity to comment on and contribute to the document. The development and maintenance of easily accessible materials and budget documents, which all stakeholders could review and comment on would have also greatly changed the design experience of this project. Such documents would make it clear what has been purchased, what is being purchased, what items are not able to be purchased, and which funds are being drawn from in each instance. In this case, had such documents been in place already, I would not have had to investigate the history and perceived purpose of the space. Additionally, the delays in establishing leadership of the space, outfitting it with the appropriate equipment, and having it be more functional could have already been addressed by the time we returned to our renovated building or shortly thereafter. Finally, the remaining design challenges, in this case, may have been avoided outright or addressed earlier.

Design Challenge 3B: Is it Safe to Leave Materials Behind in the Space?

With the concerns over liability not being fully addressed, and the lack of equipment in the space necessitating the need to bring in personal devices and materials, more day to day concerns such as if faculty, staff, and students could reliably leave such things in the lab became a more pressing issue. A related issue was how certain faculty, staff, and students could be in knowing that the lab would remain in the same setup they had left it in when they were done for the day.

Significance of the Challenge

With limited resources in the lab, it became important for faculty, staff, and students to bring in many of their resources or to check out other items from the CTC that might work temporarily. Depending on the number of resources being brought in, and the duration of time necessary, being able to safely leave resources behind would become an increasingly greater necessity. Without an acceptable use or liability policy in place, it was unclear if faculty, staff, or student would be comfortable in leaving anything behind.

Alternative Ideas that May Have Worked

As noted earlier, having policies in place that foresaw such concerns may have been able to address concerns of this

nature. Some discussion with the CTC led to the idea of purchasing shelving for materials that were unlikely to be stolen or damaged and lockable cabinets for those items that were more likely to be lost or damaged. After it was agreed that this would be a viable option to pursue, none of these items ever appeared. It is unclear if this was a result of a formal purchasing request not being made or if the purchase was ultimately deemed as unnecessary based on suggested scheduling designs noted in the next section. To address the concern of the layout of the ETL being modified between uses, the CTC suggestion was the use of gaffer tape to be able to note multiple locations of items on the floor. Much likes set pieces on a theater stage, the tape would allow cameras, tables, and backdrops to be moved back to their exact locations if other users moved them. Although a variety of tape colors were purchased, allowing for many users to identify their locations easily, no users have made use of the tape yet for this purpose.

Design Response 1: Block Scheduling

To address the concern of the ETL layout being modified between uses, the dean's office suggested the use of extended block scheduling for the lab. Under this approach faculty, staff, or students who needed to use the ETL would schedule it for as many full days as would be necessary to complete their activity. Such requests would not be allowed to overlap, which would allow users to comfortably leave materials in the space until they were done. This design response never succeeded or failed because few people requested use of the space, as it was still largely an empty room during this time. Except for a professional, broadcast-quality video camera, the light grid, the infinity wall, the backdrops (photo and green screen), and a high-end video editing bay in the control room, there was little else in the ETL other than power adapters and cords due to limited purchasing and the previously described politeness paralysis. What we learned from this lack of reservations was both that potential users of the space had limited understanding of how the space could be used and that the lack of resources in the ETL limited the possibility of potential users seeing examples that could inspire them.

Design Response 2: Guerilla Staging

With the IT program already having had a 3D printer disappear during our move back to the renovated building and the lack of a liability policy being developed, I was not comfortable leaving my program's, my colleagues', or my resources in the ETL for an extended time. The IT faculty members still wanted to show others how the space could be used and I was always asked to be the one to demonstrate the ETL to visitors and show them the possibilities of the space. To honor my concerns, while still wanting to show what could be done in the ETL, my answer was to adopt an approach of having a very small footprint and something of a "guerilla" staging approach where different configurations and equipment were brought in, assembled, and then disassembled and removed for different demonstrations and tours. The first and largest of these demonstrations was during the Grand Opening/Ribbon Cutting day for the new building (see Figure 7). We had approximately seven stations set up showing off different possibilities. These ranged from things like podcasting and video production to the use of low-cost, single board computers as both servers and desktops to 3D printing and virtual reality stations. Demonstrations or technology open houses have also been carried out as part of our annual Student Educational Technology conference and our annual Summer Technology Institute for regional teachers.

This design has mostly been a success, as the guerilla approach has served us well in helping visitors to better understand the possibilities of the space and been an effective approach to make sure no components are misplaced or stolen. However, it has also been taxing. Setting up one of these sessions can take anywhere from one to three hours depending on the number of technologies being demonstrated and a similar amount of time to disassemble and removed everything. Such events may last for as long as six hours or as little as ten minutes. This diminishing return on time investment and inconsistent presentation times showed that we still needed to have more talks about how to best address the use of the space and how to help fill the emptiness of the space when such events were not occurring. This was further reinforced on one occasion when a current student was giving a tour of the building to a prospective student and she kept naming off different rooms and spaces, pointing them out as she called out their names and details. When she neared the ETL she clearly said, "this is... some media room," before waving her hand somewhat dismissively and continuing her tour without a second glance toward the space or the visitor asking any questions.

Realizations Based on the Experience with the Design Challenge

The development of easily accessible use, liability, and scheduling policies that could have been accessible and commented on by stakeholders would have greatly changed the design experience of this project. Having these in place could have led users of the space to have a reasonable sense of security in knowing that what they left in the space would reliably be there when they returned. Options could have included the addition of lockable drawers, lockers, or cabinets where materials could be safely stored between uses. The development of unsecured (i.e., non-lockable) options for users to leave materials in the space for later use when the space would be used over multiple days could have encouraged users to store things there when there was little fear of materials being stolen. Although gaffer tape could be used to address the positioning of equipment such as cameras and lighting, it would not address all digital technologies that could be left behind. For computers or other digital devices, persistent password protected local or network folders or unique user profiles may suffice when technologies have



FIGURE 7. Demonstration of the ETL during the grand opening celebration. An example of a guerilla demonstration.

those options. In this case, had there been storage spaces in place, there may have been a greater chance of the ETL staying populated with materials and equipment (from the Guerilla Staging) that would otherwise not be present due to the lack of purchasing noted previously. It may have also encouraged more faculty, staff, and students to use the space if they knew that they would not need to always be moving their materials in and out of the space every time they used it. Finally, the Guerilla Staging may not have been necessary or at least the amount of time and effort needed to carry them out would have been significantly reduced.

DESIGN CHALLENGE 4: HOW DO WE GET PEOPLE TO USE THE SPACE?

Although the introduction of the guerilla staging had temporarily added equipment to the ETL at different times, given ideas to potential users of how the space could be used, and had excited potential users to use the space, we just were not getting many more people interested in using the space or equipment requests fulfilled to get more permanent equipment placed into the lab. This lack of progress did little to address the emptiness of the space in-between larger guerilla events. I decided to change tactics through the use of class meetings, projects, and cultivating an individual user as an aspirational pioneer.

Design Challenge 4A: Why are Faculty Not Teaching Classes in the Lab?

I posited that one of the reasons none of my colleagues had requested time for their classes in the ETL, was that they had only seen demonstrations and other similar events held there and never a class meeting.

Significance of the Challenge

If faculty members perceived that the ETL was off-limits for classes to meet, then it was unlikely that any of them would ever request the space to be used for class meetings or to help in fulfilling class projects. Although the earlier design challenges of appropriate experimental use and the function of the lab would need to be kept in mind, absent an acceptable use policy, examples of classes using the space could inspire others to do so as well.

Alternative Ideas that May Have Worked

At least one other IT faculty member and I discussed holding our office hours in the ETL. That would have meant that two IT faculty members, the ones most closely viewed by other faculty members as being connected to the ETL, would be seen there weekly for extended periods. This could have encouraged potential users to visit with us to talk about potential uses and receive guidance on how to use the limited equipment that was present. We ultimately only did this on a few occasions because of logistical concerns. Access to our office phones was an important aspect of our office hours, especially for interacting with remote students who would call in for support instead of using video-conferencing applications. Additionally, while students might be interested in working on projects in the space, having passersby stare into the lab, or possibly interrupt meetings when advisees or prospective students were seeking support did not lend a sense of privacy or dedicated attention to them.

Design Response: Class Meetings

To show others that classes could meet in the ETL, it was a simple matter to have some class meetings in the ETL. By having partial or full class meetings, others in the college could see additional activity taking place in the space and that it could be used for less experimental/aspirational offerings, in case that had been what was keeping others from requesting to use the space. To still keep an emphasis on the experimental technology aspect of the space, I assisted a workshop from a colleague on how to program Arduino microcontrollers. While he ran the workshop, I was able to move around the space and help students (see Figures 8 and 9). While class meetings like this did succeed in drawing some additional attention to the ETL, it was still more of a limited event. One of my colleagues wanted to bring in some of his undergraduate classes into the space, but with 30 students in each section, there was not enough room to accommodate them. My class of 17 fit comfortably in the ETL for the workshop, but we could have only been able to comfortably accommodate up to 20. We learned from this experience that the space would only be viable for certain sizes of class, removing some from consideration unless they are divided into smaller groupings for class meetings.

Realizations Based on the Experience with the Design Challenge

While we had events that were meant to inspire and draw people into the space, a more direct effort to educate faculty, staff, and students on what the space was, what equipment was available in the space, what acceptable use looked like, and how they could make use of the space could have greatly improved the design experience of this project. One such workshop offering could have been to simply train faculty, staff, and students on the basic functions of the space and how equipment can be properly used. This would have both demystified the space as well as encourage further exploration. In this case, I relied on trying to model how a class might be held in the ETL and hoped to lead by example. Without policies in place regarding the lab or consistent technology present, faculty, students, and staff may not have been certain what was possible. Although some may have been encouraged by my class examples, there were likely still too many unknowns for them to be comfortable enough to use the space themselves.



Design Challenge 4B: Can Projects be Accessible on their own in the Space?

When the limited reserved times by users, my guerilla staging events, or the more recent presence of some class sessions were not occurring in the ETL, it was empty with its lights off. Even when the space was empty, I wanted to find a way to encourage the use of the space, interest in the space, or even to just get potential users interested in talking about the possibility of experimental technology projects. To accomplish this, there would need to be a way to have faculty, staff, and students still consider, and ideally, engage with the space when neither I nor others, were available.

Significance of the Challenge

At this point, I and my IT colleagues had limited success in getting the ETL up and running into the space we knew it could be or getting many users interested in using it. General signs from the CTC advertising the space and encouraging potential users to contact them to find out more were also met with limited reactions. I needed a way to continue my efforts without taking up so much of the time, as I needed to be focusing more on my research agenda and supporting my students. Having both talked with and shown people the space, it was clear that there needed to be something else that might draw them in.



FIGURES 8 AND 9. A combination class and programing workshop being carried out in the ETL.

Alternative Ideas that May Have Worked

The formation of a technology committee for the ETL, or the college as a whole, could have been an option that would have brought all of the stakeholders together. Through such a body, a greater level of communication could be achieved and lingering questions could have been addressed. Additionally, meetings could have been a great way to regularly spread the word to more of the college and encourage the use of the space, and highlight projects developed in the ETL.

Design Response: The Interactive Kiosk

Having demonstrated the possibilities of single board computers (SBCs) at almost every guerilla staging and open house, I wanted a way to reinforce the basic concept of experimental use as well as show off more advanced technology functionality, even when the lab was not in use by anyone. To address this, I developed the first ETL interactive display/kiosk, which consisted of a large LCD panel, two SBCs, accompanying sheets of paper, and a single spotlight I had suspended over it from the light grid. The whole setup sat inside the locked and otherwise dark ETL, but faced outward and was visible to anyone who would pass by the space (see Figure 10). One SBC (a Raspberry Pi zero model) was used to run a looped slideshow that explained what it was and how it could be used, as well as describing the wireless eBook server that the other SBC (a Raspberry Pi 3b model) was running and how it could be used in a classroom setting. Papers taped to the glass wall on either side of the kiosk explained how to access the eBook server, encouraged passersby to try it out, and also invited them to participate in a survey about their experience.

This design was a moderate success, as it generated some conversations with faculty, staff, and students who had seen the kiosk and liked the idea of it, though only a few had tried it out, and fewer had taken the survey related to the experience. The kiosk was also a minor failure, in that while it did generate some interest and led to more people pausing to contemplate the ETL, the discussions generated tended to be more about the kiosk itself and wanting to try out variations on it, as opposed to greater interest in the ETL itself. One IT colleague did however view the ETL as a great passive presentation space for students to show off their projects through similar kiosks in the future. What was learned from this experience was that more attention will be necessary with future kiosks to explain to potential users how they might use the space to both develop and display their projects, as opposed to the kiosks themselves being standalone bridges to inspire potential use of the space itself.

Realizations Based on the Experience with the Design Challenge

As with the realizations from Design Challenge 4A, a focused workshop or training series to educate faculty, staff, and students on what the space was, what equipment was available in the space, what acceptable use looks like, and how



FIGURE 10. The eBook Server kiosk providing both information and interaction opportunities.

they could make use of the space may have been a more effective approach. Again, such basic efforts could have been effective in both demystifying the space, as well as encouraging further exploration. In this case, as with Design Challenge 4A, I tried to model use and inspire others to do so too, or at least engage with me about the ETL and hopefully become interested in using it or experimental technologies themselves. Had there been these recommended general practices and policies in place, there would not need to be such a specific example as my kiosk, as it could have just been another experimental use supported by the space

Design Challenge 4C: Can we have a Regular Presence in the Space?

As noted in Design Challenge 4A, having a regular faculty presence in the space had led to mixed results and was not going to be as sustainable as first hoped. It was at this time that an IT colleague and I moved toward having a more sustained student presence in the lab, especially ones who were willing to take a deep dive into the limited, though professional-grade equipment present in the ETL. Some students who had previously tried using the space over a sustained period, but had all of their recordings ruined by the earlier noise concerns from the air handling system, did not jump at the chance for an extended return to the ETL.

Significance of the Challenge

There is a fundamental problem with a space that is intended to support student learning but is unable to encourage students to visit or spend time there. Additionally, if only individual faculty and staff members, semi-random events, some classes, and an interactive kiosk are the only things regularly seen in the space, students may wonder if they have a place in there or a need to use it.

Alternative Ideas that May Have Worked

Had an acceptable use policy been in place, then students would have more readily known that they were welcome in the ETL and had examples of ways they could have been using the space. Having more equipment that was of consumer quality instead of broadcast or professional quality could have been more inviting to students who may have otherwise been intimidated.

Design Response: Cultivating an Individual Pioneer

Eventually, one of our students who had a clear vision for a series of videos she wanted to produce for an online course she was developing and knew I was looking for students who wanted to complete work in the ETL, asked if she could use the space. After providing her with basic training on the space and resources, she began to use it weekly. When she was unable to find the equipment she needed in the ETL, she went to the CTC to see if they had what she needed. If particular equipment was unavailable, she would then go to the radio and television office in the School of Communication and borrow it from them. When she did not like the way the lighting grid was arranged and we were waiting for policy guidance, since it had been suggested moving the lights on our own could be an Occupational Safety and Health Administration violation, she went directly to the dean's office to get permission to move the lights around. When all of my switcher board settings were erased by an unknown party who had visited the ETL and the lights started acting up, instead of waiting till we sorted out what may have happened, she asked a radio and television faculty member to visit and see if he could help sort out the hardware side of the problem versus the policy side we were dealing with of who had been in the ETL and how had the erasure and potential light damage occurred.

Slightly ahead of the guerilla staging, cultivating an individual pioneer has been the most successful design because it has had some of the most substantial "ripples" through the COE. By seeing a concrete example of what kind of educational product could be produced within the ETL, in the form of videos to support an online class, the department faculty who reviewed her work became very interested in using the space to develop videos to support their teaching efforts, especially in distance education courses. Students seeing one of their own in the lab completing work would also be more likely to visit and ask questions about what she was doing and what they might be able to do in the ETL as well. This series of events also showed the CTC the value of having a dedicated person to support the space, which led to the pioneer being hired as a graduate assistant with a primary focus on supporting the function of the ETL and being an ambassador for it by being a regular presence in the space. In this new role, she also became an effective communication channel between the IT faculty and the CTC, as well as being someone who could point out the immediate need of purchasing accessible equipment, so that she and others did not need to borrow equipment from another college to be able to complete work in our own.

Realizations Based on the Experience with the Design Challenge

With the amount of time and effort that went into developing the ETL and trying to cultivate uses, it would have greatly assisted the design experience of the project if a full-time or part-time director had been appointed. This would have helped the space to have a single recognized leader as well as an individual who had it as part of their job expectations/ appointment to facilitate participation and success in the space. The development of safety procedures for which elements of the space could be manipulated and in which ways would have also expedited modifications to the space on an as-needed basis. For example, were lights able to be moved around the space? If so, what was the proper way for doing so, and who was allowed to make these changes? In this case, having a dedicated student employee for the ETL led to a small, but growing amount of interest in the lab and how it could be used. Not having such a person in the lab in the first years or the ETL's existence likely led to lost opportunities for more use of the space. The absence of safety procedures led to working with the confines of the space (i.e., This is the way the lights were installed, how can we best work with them since we may not be allowed to move them?) and limiting experimentation.

WHERE ARE WE NOW?

In coordination with the dean's office and CTC, an important step that was taken was the more formalized assignment of roles to help understand how the ETL was going to be used. I currently serve as the official approver of both student and faculty uses for the ETL. This helps to address questions of what uses are appropriate. It also helps to address knowing who is in the space and if certain setups can be left in place for multiple days or weeks since I know who will be in the ETL, as well as when I will need to do guerilla staging for special events. Several digital scheduling options are being explored so that others can also know when the space is being used. This has largely been successful, but there are the occasional times when materials show up in the space and it is not always clear who put them there, why they are there, or how long they will be there. In some instances, this appears to be some of our IT students doing this as we encourage working on experimental projects there. On other occasions, it is the CTC staff or student employees using the space as a staging area such as when they were preparing a large number of laptops for deployment.

More equipment has been purchased for the ETL by the CTC. These include a variety of microphones and some consumer-level video cameras that are easier to operate and facilitate more readily plugging the output into video editing software without needing to convert between proprietary video formats as with the professional-grade camera that has been in the ETL from the beginning. This means that little or no equipment will need to be borrowed from the School of Communication when students wish to produce media. The addition of consumer-grade video editing software into the ETL control room is also making it possible for more faculty, staff, and students to be able to edit media without needing to learn the higher-end, specialized software that was previously the only option in the control room's editing bay.

As noted earlier, the pioneering student was later hired as a student worker in the CTC, mainly tasked with supporting the ETL and helping faculty, staff, and students who wanted to complete projects there. As she did when she was working on her project, she is always pushing ahead with asking for different equipment and configurations, not being held up with the same kinds of policy considerations that other stakeholders have been. She also makes a point of spending a certain amount of her shifts in the ETL itself, which has led to more passersby stopping in and learning more about the space. Her previous contact with faculty in the School of Communication has also led to some visits to the space by faculty members and some of their students because of our specialized software and the options presented by the different layout of the space.

REFLECTIONS VERSUS FAILURE ANALYSIS

While the ETL still has not yet become the space that we believe it can and should be, it is not a failure and as a result, failure analysis is not appropriate. Much like how we would have events and then nothing in the space, there were also times of great engagement and times of disconnects. While I cannot speak to all of the sources of disconnect for different stakeholders, I can at least discuss and take ownership of my own. The first types of disconnect came from simple discouragement at different points in the process and the need to step away from the space to be able to come back to it and the process of helping to shape the ETL with new energy and a positive mindset.

The second type of disconnect came from working within the confines of being both a designer for the ETL, but first and foremost being a new tenure-track faculty member in the college. It is not surprising that when you explore similar spaces at other universities and colleges, you will find that they have a full-time or part-time director, often a tenured faculty member or a center director with only a single such space as their responsibility. This type of appointment makes sense, as a tenured faculty member will have a certain level of job security that allows them more freedom to question decisions and the clout to have a stronger impact on policy creation and enforcement. A center director will likely not have the same teaching, scholarship, and service expectations that are placed on tenure-track faculty members, thus being freer to focus on the effective development and/or operation of their center or special spaces.

As noted at the beginning of this case, I was excited about the possibilities of ETL as a job applicant and as a new employee. I was also excited to investigate the space to uncover the history of its function and the decisions that went into it. I was also flattered to become the person that was regularly turned to when the possibilities of the ETL needed to be demonstrated to special visitors or for special occasions. However, as a tenure-track faculty member, and a new hire to the college, this also placed me in a precarious situation. By needing to investigate the space and uncover how it came to be in its current form, there was also the implication that tacit judgment would be passed on to stakeholders for what worked and what did not. Having not been a part of the initial design or development stages of the ETL, and not being able to locate related policy or procedure documents

REALIZATIONS FOR FUTURE LEARNING SPACE DESIGN

Planning and Policies

- Develop and maintain an easily accessible guiding document, which all stakeholders can review and comment on. This way if any of the designers of a space depart, there is still the guiding document that everyone has been able to see from the early planning stages and has had the opportunity to comment on and contribute to.
- Develop and maintain easily accessible materials and budget documents, which all stakeholders can review and comment on. This way it will be clear what has been purchased, what is being purchased, what items are not able to be purchased, and which funds are being drawn from in each instance.
- Develop and maintain an easily accessible role and structure document, which all stakeholders can review and comment on. This way everyone involved knows who should be carrying out which duties and who the gatekeepers are while avoiding politeness paralysis, misunderstandings, hurt feelings, or delays in carrying out necessary functions.
- Develop and maintain an easily accessible space use and liability policy document, which all stakeholders can review and comment on. This way inappropriate use requests can be curtailed, appropriate uses can be encouraged, what elements of the spaces are allowed to be modified can be made clear, and if something is damaged it will be clear who will be responsible for it.

Space, Equipment, and Furnishings

- Make use of local subject matter experts in the further development of such spaces through the selection of appropriate structural developments, as well as the purchasing of equipment and furniture. This will allow the voices of faculty and staff who have expertise in these areas to provide as much guidance as possible to best inform the use and diminish the influence of vendors who have a primarily financial motivation.
- If local subject matter experts are part of the other stakeholder groups, they should be informed via direct communication or through the documents previously described of decisions made or not made based on their feedback.

Logistics and Security

- A central scheduling officer, possibly the full or part-time director of the space, or a scheduling system should be utilized to limit the possibility of two parties trying to use the space at the same time. Having known blocks of time being used will also allow those using the space to safely leave the room set up as they need it over an extended period.
- Users of the space should be able to have a reasonable sense of security in knowing that what they leave in the space will reliably be there when they return. This may come in the form of the space being locked and only accessible to those using it and the director (or a proxy) or having lockable drawers, lockers, or cabinets where materials can be safely stored between uses.
- Develop unsecured (i.e. non-lockable) options for users of the space to leave materials in the space for later use when the space will be used over multiple days, but there is little fear of materials being stolen.
- Develop a way for equipment locations and configurations to be saved. For positioning of equipment such as tripods, multiple colors of gaffer tape could be applied to the floor. For computers or other digital devices, persistent password protected local or network folders or unique user profiles may suffice when technologies have those options.

Staffing, Safety, and Training

- Depending on the specialization of the space, a full-time or part-time director should be appointed. This will help the space to have a single recognized leader as well as an individual who has it as part of their job expectations/appoint-ment to facilitate participation and success in the space. Tenured faculty members will have more security in such roles and may be able to accomplish more than non-tenured faculty.
- Develop safety procedures for which elements of the space can be manipulated and in which ways. For example, are lights able to be moved around the space? If so, what is the proper way for doing so, and who is allowed to make these changes?
- Educate faculty, staff, and students on what the space is, what equipment is available in the space, what acceptable use looks like, and how they can make use of the space.
- Train faculty, staff, and students on the basic functions of the space and how equipment can be properly used. This will both demystify the space as well as encourage further exploration.

TABLE 1. Considerations when Designing and Implementing an Innovative Pedagogic Support Space

for it, this tacit judgment became couched in a deficit state by not knowing the different pressures and relationships at the time decisions were made. By having to question others, there was also the risk of unintentionally creating an adversarial relationship as the first impression of me as a new faculty member. At the time, I also did not feel I had the authority to impose any policies, especially when I could not always reliably access the ETL. These considerations do not make for a comfortable position to be in, especially when some of the same stakeholders would be the ones voting on my tenure case in the future. Even if this uncomfortable situation can be navigated, which I felt I did as well as I could, there was still the concern of balancing the job and duty expectations of a tenure-track faculty member, trying to be both a champion and advocate for the ETL, and trying to make it work as a space that could be of interest to faculty, staff, and students, but also functional enough to be used when there is interest.

At one point a year into the ETL's existence, I realized that I had spent approximately 75 hours in the space and/or researching materials concerning it. In the tenure-track equation, this meant I essentially had 75 hours of mostly service. While the ill-defined and shifting aspects of the space did provide the occasional teaching and workshop opportunities, it delayed a portion of my research agenda and cut into my teaching preparation and grading time. As a result, I needed to spend less time in the space to balance out the other demands of my appointment. I did not want to let anyone down, and always found time for the special events when called upon, but this need to reassess my workload and productivity also removed me from having as much day-to-day involvement with the ETL as I had previously and likely slowed additional development within the space, which otherwise would have occurred sooner. These are important considerations for deciding who should be assigned or appointed to design, develop, and/or run such spaces. A tenure-track faculty member may be a good member of the team doing such work, but may not be the best choice to lead such efforts. With all of this in mind, it also demonstrates another benefit to having well-defined guiding documents, policies, procedures, and records. With these in place, awkward and precarious situations can be limited, especially for tenure-track faculty (i.e. This is what the guiding documents call for now versus this is what I am suggesting should be done.), and projects can be better sustained even after key stakeholders depart.

CONCLUDING THOUGHTS

The realizations that occurred from this case are ones that could have assisted my design efforts if they had already been in place or if they could have been formulated and agreed upon by stakeholders early in my efforts with the ETL. These realizations were shared in this case's design challenge sections and are summarized in Table 1 (previous page). They were formulated after over three years of helping to work through an ill-defined design. Had the noted documents, policies, procedures, and staffing been in place and followed, it would have mattered far less that the chief architect of the ETL had left and that different stakeholder groups had been involved in different ways at different times during the space's design and subsequent build-out because there would have been records of every decision and the reasoning behind them, as well as policies in place from the beginning. Additionally, we would not still be building policy and continuing to get foundational technology and infrastructure pieces into the space. It is also less likely that a vendor, even a university preferred one, would have had such a decisive voice in different design and implementation decisions for the ETL. Even with these noted elements were being followed, there could still be concerns to work through. With so many new aspects present in a newly renovated building, it is easy for most involved to get caught up solely in learning how to function in the new general spaces of the building and for unique spaces like the ETL to be overlooked. However, with policies in place, interested parties could have started working in the ETL right away as opposed to needing to build foundational pieces first.

As noted earlier, including others in the design of such spaces can help to meet different needs (Casanova et al., 2017) and how the space is executed can say a lot about how that space can be used and by whom (Leijon, 2016). If all stakeholders' voices are not present throughout the design process, and there is not a clear record to refer back to for understanding different decisions, some stakeholders such as vendors can end up having too strong of a voice in the development of a space. While vendors may have good intentions, their primary motivation is a financial one and they do not need to live in such spaces after they are built. This over-representation of one stakeholder can increase the likelihood of an ill-defined design occurring.

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