Current Practices in Designing and Developing Effective Learning Center Spaces in Postsecondary Education

Juan F. Jiménez
Sam Houston State University

Abstract

This qualitative case study was conducted to understand the process learning center administrators used in the creation or remodeling of learning center spaces at a 2-year college system in the Midwest. Data were collected through interviews, which were transcribed and analyzed to conduct a within- and cross-case analysis. Four themes emerged from the creation or remodel process used: *needs assessment*, *coalition*, *implementation*, and *additional changes*. The emergent themes from the extent to which pedagogy, space, and technology were considered in the learning center designs were *instructional*, *space*, and *technology considerations*. Based on the findings, implications for practice and recommendations for further research are shared.

Keywords: learning center, postsecondary education, community college, technical college, physical space, pedagogy-space-technology framework, needs assessment,

coalition, implementation, instructional considerations, space considerations, technology considerations, stakeholder input, ambient aspects, future-proof, post-assessment

Current Practices in Designing and Developing Effective Learning Center Spaces in Postsecondary Education

Educators are trained to be flexible and find ways to support student learning no matter what space is provided (Folkins, Friberg, & Cesarini, 2015). Typically, educators are not trained in interior design, architecture, or other fields that culminate in the creation of a physical space (Burruss, 2014). Yet, educators know which spaces *feel* better than others; so, too, do the students. Those looking to create a new physical space may set out to meet with other colleagues, read professional literature, visit other institutions, and join professional associations to gather information and ideas. The literature regarding physical spaces within 2-year academic settings is minimal. Gaining a better understanding as to why administrators involved in the creation of learning center physical spaces choose the physical aspects, they do could support other institutional leaders who are tasked with creating a learning center space in years to come. The rationale to conduct this study is simple—it is one way to support administrators charged with the creation of a new physical space for learning and grow the knowledge base in this area.

Statement of the Problem

The creation or remodeling of a learning center space is something that does not happen often and may only happen once in the entire career of a learning center administrator. However, the need to remodel learning spaces is increasing due to the addition of new technologies, the number of underprepared students needing support, and the efforts to reform developmental education. There are many variables to consider, such as size, furniture, light, equipment, environment, space utilization, and educational adequacy when planning the creation or remodeling of these spaces (Arendale, 2010; Barrett, Davies, Zhang, & Barrett, 2015; Burruss, 2014; Casazza, 1999). These variables make the planning of the physical aspects of a space a high-stakes proposition, especially because Christ (1971) believed that "the primary function of a [learning center] is to help students 'beat the educational system'…by learning more in less time with greater ease and confidence" (p. 35).

Several researchers (e.g., M. Brown, 2005; W. Brown, 2014; Christ, 1971; Enright, 2000) have defined learning centers based upon either services provided, location of the physical space, or both. *Learning centers*, as defined in this study, are centralized, physical places where all types of just-in-time academic support services are provided in different modalities and at times convenient to the learner. Learning centers may differ based on

services, staffing, or location. Sometimes, the name of the space can give some insight into the main service provided. Learning centers may be centrally located, with only one location per institution, or there may be multiple locations specific to each subject area. The definitions and missions of these learning spaces have similarities even if they do not provide the same services.

Determining how the student experience is affected by physical space "is critical in order for designers to create spaces that work for the mobile, fast-paced, and multifaceted lives of university students" (Doshi, Kumar, & Whitmer, 2014, p. 1). According to White (2004), previous research determined the best practices of learning center facilities based on what learning center professionals believed should be true. As this research from 2004 is almost two decades old, continuously searching for research-based practices to support student learning is central to the purpose of a learning center. White's (2004) study was, possibly, the last time learning center professionals were directly asked about space, place, and design. Consequently, it would seem crucial to discover any best practices to include in the planning and creation of a learning center, as well as clarify why those practices are used.

Conceptual Framework

The Pedagogy-Space-Technology (PST) Framework developed by Radcliffe et al. (2008) was chosen as the conceptual framework for this study. Within this framework, the authors combined the

concepts of pedagogy, learning space, and technology and described the interconnectivity of these factors to "create new teaching and learning spaces that will encourage student engagement and improve learning outcomes" (Radcliffe et al., 2008, p. 3). The authors started with pedagogy deliberately. Knowing that each element of the PST Framework influences the other, the authors chose to start with pedagogy because of the importance of learning within the physical space. As they noted, the physical space can create restrictions or opportunities to include specific technology or pedagogy within it. Thus, it would make sense to start with determining the pedagogy first, creating the space afterwards, and deciding the specific technologies to include at the end. Radcliffe et al. did offer a caveat: the choice of pedagogy as a place to start is a recommendation, not a requirement. The process should be iterative, and the framework should be flexible enough to be rewritten to accommodate any number of decision points within a facility project.

Radcliffe et al. (2008) determined there is no explicit approach to create learning spaces, though some (e.g., JISC, 2006; Johnson & Lomas, 2005; Long & Ehrmann, 2005; Oblinger, 2006) have provided lists of principles. Yet, "there is really very little objective data based on well documented case studies or analysis that can be used to test these [lists or characteristics]" (Radcliffe et al., 2008, p. 11). Additionally, Radcliffe and colleagues wanted

to create a model all stakeholders could comprehend—not just those who are experienced in facility planning. It was through this process that the Place for Learning Spectrum was created and used to demonstrate how an institution can be viewed holistically, and each space can then be viewed as a place to support learning on a continuum as opposed to looking at places as a siloed location.

The PST Framework (Radcliffe, et al., 2008) has been referenced by other researchers (e.g., Fraser, 2014; Wilson & Randall, 2012) for similar studies. The framework has some validity within the learning space literature. Some studies (e.g., Bennett, 2003, 2006; Brooks, 2012; Oblinger, 2006; Oblinger & Oblinger, 2005; Marmot & Scottish Funding Council, 2006) mention all the components of the PST Framework even if the PST Framework was not specifically noted within the study. Ellis and Goodyear (2016) even noted the heightened awareness of learning, space, and technology in their review of literature. The more detailed PST framework also provides a starting point in the creation of an interview protocol for this study.

Research Questions

The following research questions guided this study: (a) What process did learning center administrators use in the creation or remodeling of a learning center space at 2-year institutions? and (b) How did learning center administrators perceive how pedagogy, space, and technology influenced the design of the learning center?

Review of the Literature

Studies regarding learning spaces in higher education, P-12 schools, libraries, and professional associations were reviewed. Only two of the studies included in this review (Perkinson, 2009; Wolff, 2001) were focused on space or design considerations at 2-year institutions of higher education; the perspectives at 4-year institutions dominate the learning space literature currently (e.g., Brooks, 2012; Doshi et al., 2014; Harrington, 2014; Phillips, 2014; Smith, 2000; Temple, 2008; White, 2004). The views and perspectives of those involved with learning spaces at 4-year institutions is important, but the demographics, mission, and perspectives of those involved at 2-year institutions may show differing needs regarding pedagogy, space, and technology. The literature reviewed considered space design, the experience of students who predominantly use the space, and how to support positive learning environments no matter the space chosen. It was noted in the literature that educational administrators in

postsecondary institutions are challenged in implementing researched-based practices due to the lack of replicable studies (Lee & Tan, 2011).

Learning centers are becoming more intertwined with libraries, and P-12 education is also searching out how to change physical learning environments (e.g., Bennett, 2003, 2007a, 2007b; Cash, 1993; Lackney, 2000; McMullen, 2007, 2008). The authors of the studies focused on libraries described how the work within a combined space could intersect and support student learning (e.g., Andrews & Wright, 2015; Applegate, 2009; Bennett, 2003; Dennis, 2011; Dryden & Roseman, 2010; Oldenburg, 1999). Though the literature describing learning spaces within the P-12 arena is not as extensive as the literature for libraries, the authors of the P-12 education studies (e.g., Earthman, 2011; Earthman, Cash, & Van Berkum, 1995; Hines, 1996; Woolner et al, 2007) did have some similar findings, especially regarding flexible space, lighting, and acoustics. However, the results of the studies did not necessarily provide a definitive direction for educational administrators to pursue. There was more description provided for a step-by-step process of creating new learning spaces, and one quantitative study (Barrett et al., 2015) was found to describe the effect of physical features on student success using statistical analyses.

The perspectives of architects and interior designers are also important to the creation of physical spaces (e.g., Radcliffe et al.,

2008, 2009; Temple, 2008; White, 2004). The professional associations included in this literature review (i.e., AUID, JISC, Marmot and SFC, and NCLCA) valued different aspects of the design and space development. Nevertheless, all the professional associations did agree on specific considerations. Flexibility in design, support of student learning (such as Universal Design), and the inclusion of multiple voices for the most effective learning center design were highlighted. However, as JISC (2006) averred, the concept of learning centers is still in development. The authors also stated no one set of conditions can be used to create learning spaces; the people who inhabit the space will affect the design and should have primary consideration due to their nuanced understanding of the mission, vision, and purpose of the institution. As the postsecondary educational landscape changes, the need to consider the impact of learning spaces on student achievement will continue to evolve. Space combinations, such as libraries and tutoring centers to form learning commons spaces, may be necessary. Thus, it is vital to continuously look for what the current practices in design and development of learning centers are and how those practices impact student success, especially regarding pedagogy, space, and technology (Oblinger, 2006).

Methods

Interviews were used as the tool for data collection. Each of the individuals (n = 8) that participated in this study shared the experience of recently creating or renovating a learning center at their institution; thus, the participants have gone through the process of incorporating specific physical aspects within the learning center design. A multisite case study (n = 3) allowed the researcher to investigate "clearly identifiable cases with boundaries and seeks to provide an in-depth understanding of the cases or a comparison of several cases" (Creswell & Poth, 2018, p. 100). The learning center administrators had different perspectives on the research-based practices used. The sites chosen, though part of the same college system, allowed for comparison between different community population areas (i.e., urban, suburban, rural) and student populations to determine if there were similarities or differences between the themes. The college system included 16 individual colleges across the state with a total student enrollment of approximately 308,000 in Fiscal Year 2019. These colleges were in either urban, suburban, or rural settings. There were several reported data about the students served by the system. About 49% of the student population were female, approximately 21% reported being a race other than white or not reported, and the average age of the student population taking all credit types was approximately 32. Approximately 15% of students were listed as academically disadvantaged (e.g., enrolled in basic education coursework or do

not meet the criteria to be successful in a program). Almost 19% of the student population was considered economically disadvantaged (e.g., at or below the federal poverty level or receive need-based financial assistance). Just under 3% of students were of limited English proficiency. The college system also served students who were incarcerated; about 2% of the student population fall into this category. Just over 11% of the student population was enrolled in basic skills courses (i.e., courses that are at or below the high school level, including English Language Learning coursework). Also, the system offered certificate, technical diploma, transfer, and associate degree programs.

Participant Selection

Criterion sampling was applied in selecting the learning centers to be included in the study. Each learning center was selected based on the following four criteria: (a) the institution must have been an institution within the same college system, (b) the learning center must have been constructed or remodeled within the last seven years, (c) the current learning center administrator must have been directly involved in the design and development of the new or remodeled learning center, and (d) my own institution could not be included in this study.

Data Collection

The interview protocol was created based upon the research questions, which guided this study, the descriptive questions guidance from Spradley (1979), and the seven stages of an interview from Kvale (1996). The specific questions were based on the personal experience of the researcher, discussions with other learning center administrators across the United States of America, and the information gathered from the College Reading and Learning Association (CRLA) and the National College Learning Center Association (NCLCA) published requirements for learning center spaces. Yin (2014) recommended pilot testing an interview protocol with selected cases based on being convenient, accessible, and located geographically nearby. The pilot test also helped the researcher ensure the questions were relevant and defined the method of data collection. The interview protocol was pretested with two learning center administrators at 2-year colleges within the same state that did not meet the criteria for inclusion. Feedback provided by these administrators supported making adjustments to the interview questions to provide greater clarity in the responses gathered.

The administrators at the institutions meeting the sampling criteria were contacted via email. Once consent was provided, each candidate was asked to complete at least one interview and, if needed, a follow-up interview. However, no follow-up interviews were needed due to saturation. Due to the global pandemic, the

interviews were held via phone or videoconferencing. Once the transcripts were completed for each interview, participants were provided their own to review for accuracy. This process afforded the participant an opportunity to review statements made, provide more information, if needed, and edit any statements, as necessary. No substantive changes to the transcripts were requested by the participants.

Data Analysis

Creswell and Poth's (2018) data analysis spiral, along with Yin's (2014) cross-case analysis, were used to analyze the data. Once all the transcriptions were completed, I imported the full transcripts into the Dedoose (Lieber et al., 2021) software to complete the *in vivo* coding process. I conducted a within-case analysis by coding the transcriptions, by institution, using first and second cycle coding (Saldaña, 2016). Analytic memo writing was a crucial component of the data analysis as well. These memos were typed and stored within the software during the data analysis process. Afterwards, a cross-case analysis was conducted to review the codes and determine similarities and differences between institutions. This analysis led to determine themes, sub-themes, and codes.

Findings and Discussion for Research Question One

The purpose of the first research question was to identify the process learning center administrators used in the creation or

remodeling of a learning center space at select 2-year colleges. Participants from three institutions were asked to provide their unique perspective regarding all aspects of the project. After multiple rounds of first and second cycle coding, a within-case analysis was completed for each institution. Afterwards, a cross-case analysis was conducted to determine the emergent themes, sub-themes, and codes. Though there were some differences in the relevant codes found during each within-case analysis, the emergent themes and sub-themes were similar. The themes and sub-themes for the first research question are presented in Table 1.

Table 1

Emergent Themes and Sub-Themes for Research Question One

Emergent Themes	College #1 Sub-themes	College #2 Sub-themes	College #3 Sub-themes
Needs assessment	Pre-planning	Pre-planning	Pre-planning
	Mission	Mission	Mission
	Combining services	Combining services	Combining services
		New leadership	New leadership
Coalition	Stakeholder input	Stakeholder input	Stakeholder input
	Challenges	Challenges	Challenges
Implementation	Post-assessment	Post-assessment	Post-assessment
	Security	Security	
	Utilization	Utilization	Utilization
Additional Changes			

Needs Assessment

The first theme, *needs assessment*, emerged from the participants' responses regarding the process for determining the first steps taken to create or remodel their learning centers. All participants described a process for establishing the purpose and scope of the learning center project. Though they shared unique ways of moving forward at each institution, the emergent subthemes were very similar. Those subthemes included *pre-planning*, *mission*, *combining services*, and *new leadership*.

Pre-planning. Participants at each institution shared their pre-planning process. Though this process was completed in different ways at each institution, the involvement of different stakeholders was prominent, which is similar to the recommendations from Marmot and SFC (2006). They encouraged the involvement of, and dialogue between, all stakeholders prior to starting a facilities project. The feedback gathered supports keeping the learning space dynamic and supportive. Lackney (2000) found maximizing the collaboration of all stakeholders helps uncover barriers early in the process. Also, this collaboration could support determining the project objectives.

One way to gather feedback is through the discussion of research and data. One institution (College #2) described the gathering of internal data prior to beginning their learning center project, as well as research conducted by the project team.

Examples of research conducted, or data obtained, was student usage, site visits, creating a student-led task force for recommendations, listening sessions with stakeholders, and attendance at conferences and webinars. Marmot and SFC (2006) recommended visiting other locations and providing professional development for the staff.

Modernization was also on the minds of participants at two institutions (College #2 and #3). Those teams considered what changes were needed in pedagogy or andragogy prior to discussing the space. JISC (2006) and Ellison (1973) both mentioned determining pedagogic objectives or choosing a learning theory first to transform the learning experience for students. JISC (2006) went further by stating the final design should be inspired by clear pedagogic goals chosen by stakeholders rather than any other consideration.

Participants from two institutions described the amount of time they had to prepare for the learning center project. Where College #2 had approximately three years of planning prior to the project beginning, College #3 had double the amount of time. Participants mentioned part of the reason for the timeline was due to institutional processes. The literature reviewed for this study had no mention of how much time should be spent in project pre-planning. One reason may be the one given by at least one participant at each

institution—institutional procedures may supersede any best practice found by researchers.

Mission. The determination of the mission or vision for the project as part of the needs assessment was also shared by the participants, though a specific mission statement for the project was not shared during the interviews. At each institution, questions regarding what the purpose of the space would be and how it would be accomplished dominated the pre-planning discussions. Conversations such as these match recommendations made by several researchers (e.g., Burruss, 2014; Ellison, 1973; Houston, 2015; JISC, 2006). JISC (2006) shared there is no specific set of conditions to use in the creation of the learning center as it is affected by the mission, vision, and purpose of the institution; White (2004), Ellison (1973), and Burruss (2014) would concur with this assertion in different ways. All these studies ran counter to what Temple (2008) believed was the current practice in higher education space design. He believed space planning in higher education during the time of his study was more focused with providing only the minimum amount of space and maximizing it once provided. Radcliffe, Wilson, Powell, and Tibbetts (2008) agreed with Temple's (2008) findings and created the PST Framework to counter the belief that space design in higher education was a

practical exercise in fitting as many people as possible within a space.

Combining Services. College #1 explicitly described a "bubble diagramming" process used by the architect to provide structure and visualization of how disparate services would fit within the new learning center. College #2 described a "step mapping" process, walking senior leaders and the college board members through a typical student day as the student navigates obtaining different academic services across campus. Radcliffe and colleagues (2008) wanted to create a model all stakeholders—not just those knowledgeable in facility planning—could comprehend. The Place for Learning Spectrum was that model; however, none of the participants felt hindered by their chosen process, nor felt the process was difficult to comprehend.

New leadership. Two institutions had leadership changes. College #3 experienced a presidential transition, and the prominence of the learning center project, as well as the scope of work of the individual overseeing all academic support services, grew. College #2 had all new academic support administrators, with limited administrative experience, trying to determine how to combine services. Further, the learning center moved from the academic affairs area to student affairs. None of the literature reviewed for this study specifically discussed leadership changes occurring prior to, or during, a learning center remodel.

Coalition

The second emergent subtheme was coalition. The two subthemes that arose from the interviews were stakeholder input and challenges. Participants at each institution discussed how they built coalitions of those who would be impacted by the learning center project. All participants were concerned with ensuring all voices were heard from the beginning.

Stakeholder Input. Participants stated administrators were the predominant stakeholders serving on the main project team, with faculty, staff, and students serving on sub-teams. College board members were also involved in the process; however, no board members served on either the main project team or sub-teams. Community members at one institution (College #2) also participated. The literature was replete with examples of the value of collaboration between stakeholders and the architects and designers. White (2004) recommended extensive input into the design of the space, especially those who use the space a great deal. Long and Ehrmann (2005) also believed users, not facility specialists, should design the new space. McMullen (2008) claimed the creation of the learning center required an enormous effort beginning with the cooperation of external stakeholders. Somerville and Collins (2008) viewed the building of the new space was also the building of collaborative

partnerships between those groups who will inhabit the new space upon completion of the project.

All participants described a cycle of gathering input, sharing it with the project team, making changes based on the input provided, and returning to the stakeholders to discuss the changes. When creating a learning center space, Dennis (2011) believed constant input was one of the greatest needs. Earthman (2011) advocated for school staff to determine how things were to occur within the space and the facility experts (e.g., architects and designers) would create the physical space based on the school staff input. JISC (2006) had similar recommendations.

College #2 was the only institution to include students in the design and planning process and the main project team, though all institutions sought out student feedback throughout the process. The studies conducted by Dennis (2011), Doshi et al. (2014), and Hedestig and Söderström (2012) found students are looking for the paradoxically possible—a place to be in solitude while wanting to be easily found by others. Phillips (2014) averred the physical environment was crucial to student confidence and learning; therefore, having student input in the arrangement of the physical environment increased student empowerment and community.

Challenges. There were challenges noted when seeking and obtaining stakeholder input. Space allocation was the greatest source of tension. The learning center directors at all institutions

were dismayed by the territorial nature of the main project team members. Another challenge was project team members creating their own drawings of the new learning center to continue the provision of services without making any fundamental changes to how those services would be provided in the future. Nevertheless, the learning center directors at Colleges #2 and #3 determined the friction supported a better result. Hedestig and Söderstrom (2012) noted the configuration of new learning spaces could support exploring new teaching practices. However, the authors also cautioned that users of the space bring their previous experiences with them, causing the users to try to fit old habits within the new space. Marmot and SFC (2006) provided suggestions to create improved learning spaces to minimize the impact of previous experiences.

Even with all the challenges faced by the project teams, all learning center directors noted how valuable the support they received from administration was to the success of the project. None of the literature included in this study noted the importance of administrative support as described by the participants; however, Beckers, van der Voordt, and Dewulf (2016) hoped their findings would be used by administrators at all levels in making informed decisions. It is possible there is a gap in the literature because it is assumed a facility project would have the support of middle and upper administration.

Implementation

The third theme was *implementation*. There were three subthemes included: *post-assessment*, *security*, and *utilization*. After the learning center remodel was completed and people were able to use the new space, the team looked to determine whether the new space met the goals and purpose of the project.

Post-assessment. The post-assessment process at each institution was described as either not having a formal process or as intentionally anecdotal. The facilities participant at College #1 was forthright in his assertion that post-assessment was something his institution does not do well. Earthman (2011) believed post-assessment was an underutilized part of the planning process, and rarely occurs because evaluation is not considered part of the entire process. Lee and Tan (2011) found most of the research centered on learning space design rather than on formal methods to evaluate those same spaces and were not evidence-based nor comprehensive. They specifically noted the challenge of finding learning space design contacts at higher education institutions, the informal nature of evaluation used, if at all, and project teams maintaining minimal documentation regarding the evaluation of the learning space. Radcliffe et al. (2008) determined there was no explicit approach to create learning centers, and questions were created to consider once the learning space is operational.

Security. The learning center directors at College #1 and #2 shared concerns regarding keeping the space secure. The director at College #1, being a librarian, was focused on the security of the physical items within the space. She ensured there was only one entrance to the learning center and had Radio Frequency Identification security gates installed. She also pushed to have extra security cameras installed in the hallways where computers were being temporarily positioned, even though the facilities participant noted the security department on campus did not feel cameras were necessary. The director from College #2 was not trained as a librarian and multiple entrances were part of the final design. A library security gate was installed in the rear entrance to deter theft. However, the only time an alarm was set off was when faculty were leaving the space. Sliding metal gates were installed to restrict access when an area was no longer being staffed. More important to him, though, was ensuring the staff felt safe in all spaces. The all-female writing staff raised concerns regarding being in the back corner of the space without the ability for other staff to see what is occurring within the writing space. These types of security concerns were not found in any of the literature reviewed for this study.

Utilization. The goal of all participants was to increase the usage of the learning center by students, faculty, staff, and administration. Each participant described how an increase in

flow, combining services heavily used by students, and being able to see students actively working within the space were driving forces in students using the space. This, in turn, drove faculty to start gathering where students could be found, abandoning the traditional office hours concept for time spent with students in the learning center. JISC (2006) recommended faculty spend time in the learning center to allow for connections between faculty and students to grow separate from the connections formed within the classroom. Multiple researchers (e.g., Dennis, 2011; Doshi et al., 2014; Harrington, 2014; JISC, 2006) noted usage as an important aspect of learning center space, and the findings of this study conform with that conclusion.

Additional Changes. As discussed earlier, even though there was no formal post-evaluation process at each institution, the participants still looked to find more input to determine if additional changes were needed. Existing literature emphasized the need for continuous change within the learning center. Dennis (2011), particularly, found the learning center is reinvented on a continual basis. Though the participants in this study were pleased to hear non-learning center employee stakeholders had no major changes requested, the learning center staff, including participants, still saw issues to address.

One of the items brought forward by participants of College #1 was having to install computers in the hallway outside the learning

center temporarily due to construction issues. Feeling as though there was little choice but to acquiesce, the learning center director wanted them moved as soon as possible. However, to the ultimate surprise of the director and others, the students were elated at the opportunity to have a quasi-computer area in the hallway. Even when half the computers were moved into the learning commons, the students still preferred to work in the hallway. When working on redesign projects, it is common to have temporary solutions become part of the final layout. As Woolner et al. (2007) stated, "the most successful [design solutions] are likely to be those which are seen as interim solutions and which have within them elements of flexibility and adaptability" (p. 64). JISC (2006) noticed more consideration should be given to the use of hallways or walkways through buildings, using the term learning streets for these spaces. Somerville and Collins (2008), along with Oldenburg (1999), mentioned the hallway as third space, or an area not typically thought of as a space for learning and changing it into a learning center.

JISC (2006) encouraged pilot testing design ideas more than once prior to final implementation so any potential challenges can be determined and appropriate solutions applied. The unique opportunities found at College #1 and #3 are consistent with the JISC (2006) recommendations—needing to complete

multiple learning center remodel projects. Representatives from both institutions described their experience with multiple projects either after or before the main learning center project, respectively. Each remodel project at both institutions afforded learning opportunities to the directors, who would take the previous designs and tweak them for the subsequent project. Then, the directors circled back to the main learning center to see if more adaptation was necessary. Very little changed at College #1. With having the opportunity to pilot at a smaller, regional campus, the director at College #3 did make a major change—the separation of the library from the learning center. The combination was a disaster, which did not meet the intended goals of the project, and subsequent projects kept an adjacency model, where the library and learning center are near one another but not in the same location (though, at the main campus both areas are on separate floors, with the library directly above the learning center).

Findings and Discussion for Research Question Two

The purpose of the second research question was to determine whether the impact of pedagogy, space, and technology was considered at all during the learning center project. Multiple rounds of first and second cycle coding, a within-case analysis, and a cross-case analysis were conducted to determine emergent themes, sub-themes, and codes. The emergent themes and sub-themes for all

three institutions were similar. The themes and sub-themes for the second research question are presented in Table 2.

Table 2

Emergent Themes and Sub-Themes for Research Question Two

Emergent Themes	College #1 Sub-themes	College #2 Sub-themes	College #3 Sub-themes
Instructional considerations	Stakeholder input	Stakeholder input	Stakeholder input
	Faculty implications	Faculty implications	Faculty implications
Space considerations	Stakeholder input	Stakeholder input	Stakeholder input
	Ambient aspects	Ambient aspects	Ambient aspects
	Physical aspects	Physical aspects	Physical aspects
	Future-proof	Future-proof	Future-proof
Technology considerations	Access	Access	Access
	Budgetary implications	Budgetary implications	Budgetary implications
	Delivery mode	Delivery mode	Delivery mode
			Future-proof

Instructional considerations

The first theme participants raised was *instructional considerations*. Two subthemes emerged from the interviews: *stakeholder input* and *faculty implications*. The participants believed instructional considerations were important to designing their learning center. This belief was due to their belief these considerations are impacted by the physical space, and the input from all stakeholders would be critical.

Stakeholder Input. Stakeholder input was a topic raised throughout the interviews with participants. The evidence of a project team discussing instructional considerations is not typical. Bennett (2003) noted the creation of knowledge was the work of the learning; therefore, the learner should own the space. Owning the space would require including students in any feedback or input being sought. Nevertheless, Burruss (2014) believed architects and designers were better judges of adult learning needs than faculty and administrators. Temple (2008) found little evidence to suggest changes in facilities were made based on the interconnection of space, teaching, and learning. Additionally, he found little documentation on how administrators expected the physical space and the teaching and learning occurring within to be affected. Two items arose from the participants, which were not found in any other studies reviewed: students being integrated into the main project team at one institution (College #2) whereas College #3 spent 18 months deliberating which instructional considerations to include. Though these were observed by the participants, none of the literature reviewed for this study required students to be part of the main project team to obtain input from them. Neither did the literature mention a recommended amount of time for these deliberations.

Faculty implications. The College #1 IT representative believed it was important to determine what type of pedagogy was to be

used first before deciding how to physically make that happen. Participants at this college chose to have more open, collaborative spaces which eschewed the traditional services used previously. This choice meant a move to more active learning opportunities within the learning center space. Marmot and SFC (2006) believed the choice of a particular pedagogic or andragogic style was enhanced by the learning space used. Though at different times, some researchers (e.g., Andrews & Wright, 2015; Brown, 2005; JISC, 2006; Marmot & SFC, 2006) noted movement in the learning profession from instructor-centered to student-centered paradigms.

Space Considerations

The second theme, *space considerations*, coalesced from the participant interviews. Four subthemes were found within this theme, which were *stakeholder input*, *ambient aspects*, *physical aspects*, and *future-proof*. Physical space changes are affected by many variables, and different variables were found by participants for each institution.

Stakeholder input. The uniqueness of having students as members of the project team at College #2 was only surpassed by using the learning center project as a capstone project for the interior design program students. The students were heavily involved in the design of all aspects of the new learning center. Though some of their ideas were not included, many were part

of the final design. Participants also noted there were unrequested, and required, changes received from upper administrators who were not present for any discussions. These situations usually occurred when discussing the space configuration or layout more than situations involving instruction or technology. Nevertheless, stakeholder input was highlighted by Smith (2000), and ensuring the mission, vision, and goals of the learning center were communicated to the architect and interior designer. The architect and interior designer are usually generalists, she continued, so the collaboration between the instructional specialists and the space and design specialists is critical.

Doshi et al. (2014) concluded students do not use space in the same way as other stakeholders; therefore, the input of students regarding what they need, and the ability to control it, should be incorporated. Dryden and Roseman (2010) determined student input could affect new policies and procedures within the new space (e.g., elimination of noise, better furniture and lighting, collaborative learning spaces). Dennis (2011) found students wanting social and quiet space within the same location. Though input received from stakeholders in other studies (e.g., JISC, 2006; Lee & Tan, 2011; Oblinger, 2006; Oblinger & Oblinger, 2005; Radcliffe et al., 2009; Temple, 2008; Temple & Fillippakou, 2007) revealed an overwhelming request for flexible space, Burruss (2014) ascertained administrators and faculty overwhelmingly requested

flexible room designs, but also requested traditional arrangements of tables in rows. Just under half (49.7%) of designers chose flexible space.

Ambient aspects. Participants considered how to create noise zones within the new learning center. Areas for library services needed to be quieter compared to those where tutoring services would happen. College #1 and #2 participants shared one challenge was getting the faculty to understand the different noise zones; students had no issue adjusting at either institution. College #3 did not have to worry about the difference in noise zones because of the decision to keep the library and learning support services separated on two different floors. Nevertheless, the learning center director did create differences in noise levels within the library, with the entrance near the desk as the louder area and it became quieter as one moved toward the back of the space. Researchers (Burgstahler, 2012; Cash, 1993; Dennis, 2011; Folkins et al., 2015; Lackney, 2000; Long and Ehrmann, 2005) noted acoustics as another aspect of the physical environment that impacted student success.

Lighting was a predominant factor during the planning process at College #2 and #3. The students at College #3 wanted the prominent source of light to be sunlight within the new learning center. The same was true at College #2; however, one area deemed the quiet area had abundant natural light but was

completely underutilized and, finally, reconfigured for other purposes. Different researchers over three decades (e.g., Cash, 1993; Folkins et al., 2015; Smith, 2000; Temple, 2008) noted lighting was an important consideration which impacted student success.

Only one institution (College #2) had participants who discussed color considerations. The color palette described by the participants was what is usually found within a typical coffee shop—mostly neutral. The final choice of the color scheme was made by the eight interior design students. Cash (1993) and Barrett et al. (2015) noted color as another statistically significant design parameter in supporting student learning. Counter to the findings at College #2, Burruss (2014) concluded one-third of participants verified administrators and faculty were not inclined towards a specific color choice; however, the designers in the study preferred neutral and cool colors.

Physical aspects. The learning center director at College #1 asked the main project team a question regarding how to create a learning center which uses space efficiently and is comfortable. One of the responses shared by all participants was the use of flexible and movable furniture. An open learning environment was requested by the students at College #3, feeling students would not feel welcome if the space felt closed-off or constrained. The inclusion of soft seating, participants believed, would help build a sense of home and keep students from leaving campus. The term *flexible* is

used by different researchers (e.g., Bennett, 2007a; Brooks, 2012; Burruss, 2014; Davies et al., 2013; Fraser, 2014; McMullen, 2007; Temple, 2008; Woolner et al., 2007), with each author considering it to be an important aspect of physical space design. Christ (1971) asserted focusing on flexibility to provide students with options of learning environments. Long and Ehrmann (2005) and Smith (2000) shared a recommendation to determine how to use space in multiple ways. For example, if a classroom is not used for a large part of the day, consideration should be given to use that space for other services.

Temple (2008) noted flexible spaces allowed people working within a space to rearrange it to their own needs which, including comfort of the space, were also preferences of students and faculty. Folkins et al. (2015) shared flexible seating, and the ability to rearrange the furniture, was a necessary component of active learning, which the JISC (2006) and Marmot and SFC (2006) noted was the better pedagogic method for student learning. Only Applegate (2009) found students preferred space that is not as flexible or social. She posited students preferred areas which created a social dynamic within, but students did not want to hear others speaking within the space. The facilities participant (College #1) noted the square footage per student calculation would need to be increased to fit the furniture, which was also being discussed at College #2. Folkins et al. (2015)

determined active learning classrooms needed 20 to 35 net assignable square feet per student versus the 15 to 20 net assignable square feet per student in a traditional classroom.

Study rooms, sometimes referred to as huddle rooms, were also a key component of each learning center project. A participant from each institution shared the wish of having been able to include more than they did at the time as students use them constantly. The director at College #2 had to restrict the use of huddle rooms to students only as faculty tried to use the huddle rooms as an office hour location, which limited student access. Huddle rooms were one of the seven distinct learning spaces found within higher education according to Temple (2008). Wolff (2001) considered space to congregate, obtain information, provide instruction, and provide contemplation as features important to project-based learning.

Future-proof. The facilities representative from College #2 stated a project like this does not come often, suggesting the project team think 15 years into the future when determining what to include in their new space. Also, the team used the insights of the interior design students to build in components they felt were beneficial. The one variable the project team could not account for was future growth. Temple (2008) defined the term *future-proof* as ensuring adaptability in room configuration to accommodate future, and unknown, needs. White (2004) mentioned approximately two-thirds

(63%) of survey respondents had adequate space for present, but not future, needs. Smith (2000) described a similar concept in her study, advocating for including program growth in any redesign plans. McMullen (2008) also shared future-proofing a new space required the ability to reconfigure the space to include new elements. Lackney (2000) urged the merger of physical and virtual learning spaces as a prominent feature of futureproofing. Also, Radcliffe et al. (2008) created the PST Framework to include components of futureproofing within the planning and evaluation of a new learning space.

Technology Considerations

The final theme was *technology considerations*. Several subthemes emerged within this theme. Those subthemes were: *access*, *budgetary implications*, *delivery mode*, and *future-proof.* All representatives described their technology needs. Though some were similar, others were not. Nevertheless, there were similarities in how solutions were determined given their unique situations.

Access. Electrical access was paramount for students at each institution. The placement of electrical outlets affected the layout of the room and the furniture chosen for the new learning center. The inclusion of access for mobile technology had a similar effect on space. Mobile technology included the opportunity for students to charge their personal devices within the space. Along

with access to electricity, access to reliable internet connections, whether using institution-owned or personal devices, is critical in the information age. Access to technology was raised by Folkins et al. (2015) who described the growth of wireless technology and the challenge of connecting personal technology to institutional configurations. In the study by Dryden and Roseman (2010), about one in five respondents wanted more computer and electrical connections. The students in the study by Dennis (2011) desired ample technology and large surfaces for working. Both JISC (2006) and Marmot and SFC (2006) discussed the impact of technology on pedagogical considerations, with their analysis based on the rise of technology and the ability of people to access learning through mobile solutions. The desire for providing access was limited only by the budgetary constraints of the project.

Budgetary implications. All participants described the difficulty in fulfilling project requests while staying within the budget constraints. Decisions, such as the purchase of laptops versus desktop computers or the number of electrical outlets, forced the hands of the project team from including everything. Every participant noted choices were judicious to provide the greatest amount of flexibility without spending too much money. However, the project team at one institution (College #1) used their budget to purchase what the facilities participant deemed as "the latest and greatest [technology] within the spaces." However, some of the

technology purchased was not used by faculty either because of inadequate training or not fitting the pedagogical methodology of the staff. At College #2, staff forgot to include costs related to signage, requiring the learning center director to create signage within the institution until budgetary funds were available. The facilities participant from College #3 also noted the dreadful choice of whiteboard paint instead of purchasing wall-mounted whiteboards. The participant noted the difficulty in maintaining the paint on the walls without chipping, as well as multiple issues of removing eraser debris from the surrounding white walls. Later, funds were used to replace the whiteboard paint walls with actual glass, dry-erase boards. White (2004) was concerned with the number of learning center personnel not involved the purchase of computers, which he deemed to be the most important learning technology available in a learning center. Hedestig and Söderström (2012) realized the design of learning spaces was challenging when balancing technology improvements, financial considerations, learning theory incorporation, and student learning preferences. They further described low-level technology (e.g., huddle boards, whiteboard tabletops) as methods of supporting the presentation of student work with minimal cost.

Delivery mode. All participants at each institution described the use of mobile solutions as a predominant feature of their

technology choices. At each institution, the type of solution used, whether laptops, tablets, or electronic huddle boards, the idea was to move away from a traditional space and give options to students so they can learn in a flexible and comfortable way. At College #1, mobility created opportunity as the whole institution transitioned during the global pandemic. The IT team was able to move into the learning center and use the newly acquired technology to check out to students who did not have their own personal devices. Temple (2008) described the change in technology, which has required less physical space when remodeling. Thus, embedding technology within a space has become easier. Wilson and Randall (2012) described the pod room at Bond University (Australia) as a flexible space, allowing the instructor and students opportunities to learn in different active-learning spaces within the classroom. Folkins et al. (2015) considered flexibility as providing opportunities for students to use their own personal devices within institutional configurations. Each of these authors were adamant on a flexible delivery mode to future-proof a learning space.

Future-proof. Only one institution (College #3) noted futureproofing in regard to technology. The purchase of the Virtual Desktop Infrastructure (VDI) software supported the growth of technology access without requiring the purchase of desktop towers or laptops. All that is required is a monitor, keyboard, and mouse. Though Temple (2008) originally used the term *future-proof* to mean

spaces that are adaptable to accommodate future needs, he also described the flexibility of incorporating technology as it has shrunk in size over time. JISC (2006) warned educators to consider how technology would impact their chosen pedagogical methodology. Ellis and Goodyear (2016) noted the division between physical and virtual spaces are not as well-defined anymore, and students are seeking greater flexibility. They did caution, however, this flexibility could lead to fragmentation, which requires faculty and staff to find compelling methods to connect students together, as well as connecting students with the content taught. Fragmentation was not found in this study, possibly due to the minimal use of virtual spaces at each of the institutions studied.

Implications for Practice

For brevity, two implications for practice are noted. Overall, this study is distinctive within learning center physical space literature. Of the studies reviewed for this study, only two focused on 2-year institutions within the last 20 years. One of those, Wolff (2001), examined the effect of the physical learning environment on project-based learning. The other author (Perkinson, 2009) considered the relationship between learning space and the learning-centered paradigm based on the perspective of developmental education faculty. Continuing to grow the literature base focused on the experience of learning

center creation at 2-year institutions can support balancing the recommendations and conclusions drawn, which are currently skewed toward 4-year institutions.

Institutional leadership should better document the processes used in the creation or remodeling of a learning center, as well as conduct a post-evaluation. Evaluating the final product is as important as better understanding how these projects begin in the first place. Several researchers (e.g., JISC, 2006; Johnson & Lomas, 2005; Lee & Tan, 2011; Oblinger, 2006; Radcliffe et al., 2008) noted the lack of a formal process for post-assessment. Even the participants noted there was some informal post-assessment, with one describing their evaluation as intentionally informal. Though Radcliffe et al. (2008, 2009) created a framework to support all processes of learning space creation, including post-evaluation, it has not been translated into an evaluation process that has been peer-reviewed. It is also important to consider what is being measured by a post-evaluation, considering there are multiple variables affecting student success beyond the physical learning environment.

Recommendations for Future Research

This study focused on three institutions within one 2-year college system in the Midwest. It is possible other institutions within the same state or region could have provided different results. Similarly, institutions in different regions of the United States of

America, as well as in different countries, could give a different sense of best practices to be included across the spectrum. Also, including students as participants in the study would allow them a voice in sharing what they need to create a sense of place and space.

This study included interviews only. Conducting a documentary analysis of project team notes, charettes, iterations of space design, architectural renderings, surveys, among other documents, can only provide greater insight into the results of the study. Moreover, being able to conduct a walkthrough of the spaces being studied with explanations from each of the participants individually could allow a cross-case analysis within project team members to determine what each believes is important to a successful learning center project.

Different research approaches would also enhance this topic. A longitudinal, quantitative analysis of one institution from beginning to three years post-completion is one potential opportunity. Another study could focus on student grade impacts or student retention fluctuation of new instructional practices. A further study could conduct a demographic analysis of student success based on changes in the learning center. Finally, a comparative study of student participation in learning centers where students were a major part of the project team versus where students were not could be conducted. Such a

study could provide rich data to determine how valuable it is to include students in more ways than passive opportunities (e.g., surveys).

Summary

The purpose of this qualitative case study was to try to understand the process learning center administrators used in the creation or remodeling of a learning center space at a 2-year college system in the Midwest. The participants shared their experience and described the impact of pedagogy, space, and technology in their design decisions. They described the challenges and successes of working as a team focused on student success, knowing this project may not be remodeled again during their careers.

This study fills a gap in the literature of learning center space design which has focused more on libraries, P-12 education, and 4-year institutions of higher education. Potentially, this study can provide the impetus for others to conduct their own study and highlight the important contributions found within the 2-year colleges heretofore unexplored. Additionally, this study could advance the work at 2-year institutions in being viewed as co-equal to that of the 4-year institutions—a distinct contrast to the history of how 2-year institutions have been viewed previously. The 2-year institutions, with their mission of open-enrollment, strive to live up to the expectations set by their communities—internal and external. Learning centers were born out of a desire to support students in

their journey through higher education. Both 2-year institutions and learning centers are shining examples of providing opportunities out of cycles of poverty and other social maladies. It takes all of us to ensure these contributions continue to be celebrated and be highlighted in the research literature.

References

Andrews, C., & Wright, S. E. (2015). Library learning spaces: Investigating libraries and investing in student feedback. In D. M. Mueller (Ed.), *Creating sustainable community: The Proceedings of the ACRL 2015 Conference* (pp. 467-475). Chicago, IL: American Library Association.

Applegate, R. (2009). The library is for studying: Student preferences for study space. *Journal of Academic Librarianship*, *35*, 341–346. https://doi.org/10.1016/j.acalib.2009.04.004

Arendale, D. R. (2010). Special issue: Access at the crossroads: Learning assistance in higher education. *ASHE Higher Education Report, 35*(6), 1–145. https://doi.org/10.1002/aehe.3506

Barrett, P., Davies, F., Zhang, Y., & Barrett, L. (2015). The impact of classroom design on pupils' learning: Final results of a holistic, multi-level analysis. *Building and Environment, 89*, 118-133. https://doi.org/10.1016/j.buildenv.2015.02.013

Beckers, R., van der Voordt, T., & Dewulf, G. (2016). Why do they study there? Diary research into students' learning space choices in higher education. *Higher Education Research and Development*, *35*(1), 142-157. https://doi.org/10.1080/07294360.2015.1123230

Bennett, S. (2003). *Libraries designed for learning*. Washington, D.C.: Council on Library and Information Resources. Retrieved from https://www.clir.org/pubs/reports/pub122/

Bennett, S. (2006). The choice for learning. *The Journal of Academic Librarianship, 32*(1), 3-13.

Bennett, S. (2007a). Designing for uncertainty: Three approaches. *Journal of Academic Librarianship*, *33*(2), 165–179. https://doi.org/10.1016/j.acalib.2006.12.005

Bennett, S. (2007b). First questions for designing higher education learning spaces. *The Journal of Academic Librarianship*, *33*(1), 14–26. https://doi.org/10.1016/j.acalib.2006.08.015

Brooks, D. C. (2012) Space and consequences: The impact of different formal learning spaces on instructor and student behavior. *Journal of Learning Spaces, 1*(2), 1-10. Retrieved from http://libjournal.uncg.edu/jls/article/view/285/275

Brown, M. (2005). Learning spaces. In D. Oblinger & J. Oblinger (Eds.), *Educating the Net Generation* (pp. 12.1-12.22). Retrieved from https://net.educause.edu/ir/library/pdf/pub7101.pdf

Brown, W. C. (2014). *What is a learning center?* Retrieved from http://files.eric.ed.gov/fulltext/ED552875.pdf

Burgstahler, S. (2012). *Universal design in education: Principles and applications.* Retrieved from https://www.washington.edu/doit/sites/default/files/atoms/files/Universal-Design-Education-Principles-Applications.pdf

Burruss, W. J. (2014). *Adult learning environments: Request upon and preferences of interior designers* (Doctoral dissertation). Available from ProQuest Dissertations & Theses database. (UMI No. 3152156)

Casazza, M. E. (1999). Who are we and where did we come from? *Journal of Developmental Education, 23*(1), 2-7.

Cash, C. S. (1993). *Building condition and student achievement and behavior* (Unpublished doctoral dissertation). Virginia Polytechnic Institute and State University, Blacksburg, VA.

Christ, F. L. (1971). Systems for learning assistance: Learners, learning facilitators, and learning centers. *Proceedings of the Annual Conference of the Western College Reading Association, 4*(1), 32-41. Retrieved from http://files.eric.ed.gov/fulltext/ED114795.pdf

Creswell, J., & Poth, C. N. (2018). *Qualitative inquiry & research design: Choosing among five approaches* (4th ed.). Los Angeles, CA: SAGE Publications, Inc.

Davies, D., Jindal-Snape, D., Collier, C., Digby, R., Hay, P., & Howe, A. (2013). Creative learning environments in education—A systematic literature review. *Thinking Skills and Creativity*, *8*(1), 80-91. https://doi.org/10.1016/j.tsc.2012.07.004

Dennis, P. (2011). The learning commons: Build it ... and they will come. *Tennessee Libraries*, *61*(2), 3–5.

Doshi, A., Kumar, S., & Whitmer, S. (2014). Does space matter? Assessing the undergraduate "lived experience" to enhance learning. *Planning for Higher Education Journal, 43*(1), 1-20.

Dryden, N. H., & Roseman, S. G. (2010). Learning commons: Addressing the needs of commuter regional campuses. *Journal of Library Administration, 50*, 581-601. https://doi.org/10.1080/01930826.2010.488917

Earthman, G. I. (2011). Decisions and decision-makers in planning educational facilities. *The ACEF Journal*, *2*(1), 5–15.

Earthman, G. I., Cash, C. S., & Van Berkum, D. (1995). *A statewide study of student achievement and behavior and school building condition*. Retrieved from https://files.eric.ed.gov/fulltext/ED387878.pdf

Ellis, R. A., & Goodyear, P. (2016). Models of learning space: Integrating research on space, place and learning in higher education. *Review of Education*, *4*(2), 149–191. https://doi.org/10.1002/rev3.3056

Ellison, J. W. (1973). *The concept of college and university learning resource centers*. Retrieved from https://files.eric.ed.gov/fulltext/ED077229.pdf

Enright, G. (2000). Question #1: What is a learning assistance center? In F. L. Christ, K. Smith, & R. Sheets (Eds.), *Starting a learning assistance center: Conversations with CRLA members who have been there and done that* (pp. 1-5). Clearwater, FL: H& H Publishing Company.

Folkins, J. W., Friberg, J. C., & Cesarini, P. A. (2015). University classroom design principles to facilitate learning: The instructor as advocate. *Planning for Higher Education Journal*, *43*(2), 1-18.

Fraser, K. (Ed.). (2014). *The future of learning and teaching in next generation learning spaces*. Bingley, United Kingdom: Emerald Group Publishing Limited.

Harrington, K. D. (2014). *Community on campus: The role of physical space* (Doctoral dissertation) Retrieved from https://scholarworks.gsu.edu/epse_diss/92/

Hedestig, U., & Söderström, M. (2012). *User centered design of learning spaces*. Proceedings of 7th Eden Research Workshop, 22-23 October, Leuven. Budapest, Hungary. Retrieved from http://urn.kb.se/resolve?urn=urn:nbn:se:umu:diva-145570

Hines, E. W. (1996). *Building condition and student achievement and behavior* (Doctoral dissertation, Virginia Polytechnic Institute and State University). Retrieved from https://files.eric.ed.gov/fulltext/ED478350.pdf

Houston, A. M. (2015). Revisiting library as place: Balancing space planning priorities by focusing on core purpose. *Reference & User Services Quarterly*, *55*(2), 84-86. https://doi.org/10.5860/rusq.55n2.84

JISC. (2006). *Designing spaces for effective learning: A guide to 21st century learning space design*. Retrieved from http://www.jisc.ac.uk/media/documents/publications/learningspaces.pdf

Johnson, C., & Lomas, C. (2005). Design of the learning space: Learning and design principles. *EDUCAUSE Review, 40*(4), 16-28.

Kvale, S. (1996). *Interviews: An introduction to qualitative research interviewing.* Thousand Oaks, CA: SAGE Publications, Inc.

Lackney, J. A. (2000). *Thirty-three educational design principles for schools & community learning centers*. Retrieved from https://files.eric.ed.gov/fulltext/ED450544.pdf

Lee, N., & Tan, S. (2011). *A comprehensive learning space evaluation model. Final Report 2011.* Retrieved from http://hdl.handle.net/1959.3/195103

Lieber, E., Salmona, M., Taylor, J., & Weisner, T. S. (2021). *Dedoose* (Version 9.0.85). SocioCultural Research Consultants, LLC. www.dedoose.com.

Long, P. D., & Ehrmann, S. C. (2005). Future of the learning space: Breaking out of the box. *EDUCASE Review, 40*(4), 42-58.

Marmot, A., & Scottish Funding Council. (2006). *Spaces for learning: A review of learning spaces in further and higher education.* Retrieved from http://aleximarmot.com/userfiles/file/Spaces%20for%20learning.pdf

McMullen, S. (2007). *The learning commons model: Determining best practices for design, implementation, and service.* Retrieved from http://faculty.rwu.edu/smcmullen/McMullen%20Final%20Sabbatical%20Report.pdf

McMullen, S. (2008). U.S. academic libraries: Today's learning commons model. *PEB Exchange, 2008/04*. Paris, France: OECD Publishing. https://doi.org/10.1787/245354858154

Oblinger, D. (Ed.). (2006). *Learning spaces*. Retrieved from https://www.educause.edu/ir/library/pdf/PUB7102.pdf

Oblinger, D. G., & Oblinger, J. L. (Eds.). (2005). *Educating the net generation*. Retrieved from https://www.educause.edu/ir/library/pdf/pub7101.pdf

Oldenburg, R. (1999). *The great good place: Cafés, coffee shops, bookstores, bars, hair salons, and other hangouts at the heart of a community*. Philadelphia, PA: Da Capo Press.

Perkinson, B. J. (2009). *Community college facility design: The relationship between the learning-centered paradigm and learning space as viewed through the lens of developmental studies faculty* (Doctoral dissertation). Available from ProQuest Dissertations & Theses database. (UMI No. 3364565)

Phillips, M. (2014). *A place for learning: The physical environment of classrooms*. Retrieved from http://www.edutopia.org/blog/the-physical-environment-of-classrooms-mark-phillips

Radcliffe, D., Wilson, H., Powell, D., & Tibbetts, B. (2008). *Designing next generation places of learning: Collaboration at the Pedagogy-Space-Technology nexus*. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.215.788&rep=rep1&type=pdf

Radcliffe, D., Wilson, H., Powell, D., & Tibbetts, B. (2009). *Learning spaces in higher education: Positive outcomes by design*. Retrieved from http://www.academia.edu/10392806/Learning_Spaces_in_Higher_Education_Positive_Outcomes_by_Design

Saldaña, J. (2016). *The coding manual for qualitative researchers* (3rd ed.). Thousand Oaks, CA: SAGE Publications, Inc.

Smith, K. (2000). Question #17: What are some space, furnishings, and equipment considerations in the design of a LAC? In F. L. Christ, K. Smith, & R. Sheets (Eds.), *Starting a learning assistance center: Conversations with CRLA members who have been there and done that*. Clearwater, FL: H& H Publishing Company.

Somerville, M. M., & Collins, L. (2008). Collaborative design: A learner-center library planning approach. *The Electronic Library, 26*(6), 803-820. https://doi.org/10.1108/02640470810921592

Spradley, J. P. (1979). *The ethnographic interview.* New York, NY: Holt, Rinehart, and Winston.

Temple, P. (2008). Learning spaces in higher education: An under-researched topic. *London Review of Education, 6*(3), 229-241. https://doi.org/10.1080/14748460802489363

Temple, P., & Fillippakou, O. (2007). *Learning spaces for the 21st century: A review of the literature*. Retrieved from https://www.heacademy.ac.uk/sites/default/files/learning_spaces_v3.pdf

White, W. G., Jr. (2004). The physical environment of learning support centers. *The Learning Assistance Review, 9*(1), 17-27.

Wilson, G., & Randall, M. (2012). The implementation and evaluation of a new learning space: A pilot study. *Research in Learning Technology, 20*(2), 1-17. https://doi.org/10.3402/rlt.v20i0.14431

Wolff, S. J. (2001). *Sustaining systems of relationships: The essence of the physical learning environment that supports and enhances collaborative, project-based learning at the community college level* (Doctoral dissertation). Available from ProQuest Dissertations & Theses database (UMI No. 3029580)

Woolner, P., Hall, E., Higgins, S., McCaughey, C., & Wall, K. (2007). A sound foundation? What we know about the impact of environments on learning and the implications for building schools for the future. *Oxford Review of Education, 33*(1), 47-70. https://doi.org/10.1080/03054980601094693

Yin, R. K. (2014). *Case study research: Design and method* (5th ed.). Thousand Oaks, CA: SAGE Publications, Inc.