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Zero to Go:
The Factors that Lead to Growing Active Learning Classrooms

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Active learning has been a growing trend in education for decades based on its impact on student learning and success. As such, schools, colleges, and universities have invested resources into expanding this teaching approach, including active learning classrooms. But why have some schools been successful at rapidly growing their active learning classrooms and learning spaces, while others have struggled? This article uncovers the factors that lead to successful scaling of these learning spaces and pedagogical approaches in schools, colleges, and universities, including leadership approaches, stakeholder involvement, funding methods, space planning tactics, cultural shifts, and the ties to strategic plans and missions.

Introduction

Active learning has been a growing trend in education following its introduction in the early 1990s. Since that time, several active learning (AL) pedagogical approaches have been developed, including experiential learning, SCALE-UP, problem-based learning (PBL) and team-based learning (TBL), to name a few. Countless studies have compared active learning methods to traditional lecture-based approaches to measure their positive impacts on student engagement and learning. Moreover, scholars have also analyzed how innovations in active learning classrooms (ALC) support these teaching models. The next logical evolution considers this question; now that these innovative teaching methods have been more broadly adopted and ALC have popped up at schools and universities, what factors lead to growing the number of these spaces within an institution?

This paper will share a wide-scale study involving 21 higher education (HE) and 11 primary/secondary (K12) schools that uncover the factors that led to ALC scaling. This study specifically seeks to understand why some schools have been successful at rapidly growing their active learning spaces, while others have struggled. The study discovers 11 common factors that led to successful scaling of active learning spaces in schools, colleges, and universities.

Background

Interest in active learning has been evolving for decades. Johnston et. al. described active learning as "active inquiry, not passive absorption, that engages students" (1989). In Bonwell and Eison's 1991 book on active learning, they described it as pedagogy that engages students in a wide variety of active pursuits rather than passive behaviors limited to listening and taking notes. Seymour Papert, a founding member of the MIT Media Lab, further supported this pedagogy when developing the Constructionist learning theory which states that people build knowledge most effectively when they are actively engaged in constructing things in the world (Papert & Harel, 1991).

Since those early days, there have been a number of studies focused on measuring the outcomes of active learning. In an early review of the literature, Prince examined studies on active learning that addressed introduction of concepts, student engagement, collaboration, cooperation, and problem-based learning (2004). He found that that these studies showed broad evidence for the effectiveness of active learning. Also, in a large-scale STEM study that compared lecturing to active learning in undergraduate science, technology, engineering and mathematics courses, there were improved scores of 6% using active learning and corresponding learning spaces (Freeman et.al., 2014). Moreover, the Active-Learning Post-Occupancy Evaluation study presented statistically significant differences on twelve factors between classrooms that support active learning and traditional learning classrooms. These factors include active student involvement, engagement, collaboration, stimulation (Scott-Webber, Strickland & Kapitula, 2014). Elements of AL continue to be studied and applied in a host of learning situations, disciplines, and environments.

The study of AL also brought about the need for spaces to support more dynamic student action in the learning environment. According to Talbert and Mor-Avi (2018), active learning classrooms (ALC) have developed as the interest in active learning pedagogies have gained greater interest in K12 and higher education. As such, to support these methods that encourage student movement and interaction, learning spaces have evolved. Elements of ALCs

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include formal classroom spaces used for educational activities with layouts to support this activity. Moreover, these spaces are designed as student-focused environments that include both digital and analog tools (computers, monitors, whiteboards) rather than front-facing instructor-focused rooms (Talbert & Mor-Avi, 2018).

The outcomes of active learning spaces have mirrored AL pedagogy studies. In a 2018 review of research on active learning space studies between 2012 and 2016, Talbert & Mor-Avi summarized that active learning spaces are linked to improved student learning outcomes and engagement (2018). The research shows enhanced connections to others within an active learning classroom and an ability to share and discuss ideas which leads to a level of comfort, enrichment, and more positive perception of learning. The University of Minnesota invested in many of these classrooms and conducted several studies comparing ALC learning environments to traditional classrooms to understand the impact of physical spaces on learning. They uncovered behavioral differences within these rooms that lead to performance gains of five percent (Cotner, Loper, Walker, & Brooks, 2013). However, the authors noted a number of hurdles in facilitating the transition of faculty to teach in these new learning spaces.

A small number of institutions have begun to study the challenges faced when more widely adopting AL within a department, multiple departments, or across the institution. McNeil and Borg (2020) at Nottingham Trent University, adopted a SCALE-UP model and over a series of years developed methods to increase the numbers of faculty that embraced the method. This included persistent promotion about AL to faculty, the development of teaching communities to aid faculty with the transition, and collaboration across the institution to develop a cohesive context around the expansion of AL (McNeil and Borg, 2020). The University of Akureyri in Iceland, also moved from more traditional teaching models to innovative models with the support of ALCs (Bjornsdottir & Asmundsdottir, 2020). The authors shared a three-year process of first adjusting current furniture to a more collaborative configuration followed by applying for funding to permanently change the classroom to an ALC. They describe the significant obstacles faced which included objections from scheduling and custodial staff, as well as opposition from leadership and colleagues that embrace a traditional academic mindset. Once funding was approved, the classroom was closely monitored by their teaching and learning center, which offered the space only to faculty adopting AL teaching methods. While the transition process was far more complex than expected, the data collected that showed positive outcomes helped to convince colleagues over time.

A larger scale study about adopting SCALE-UP classrooms, through a partnership of three universities in the United Kingdom, focused on the barriers faced when moving from individual faculty to adoption across multiple departments within the institution (Berkson & Richter, 2020). They initially found resistance to scaling, including a lack of collaboration among faculty. There was also opposition to changing the learning culture within some disciplines, along with challenges to adoption of AL methods by teams of faculty that teach the same course. Berkson and Richter (2020) noted that significant resources need to be put into an institutional level training program. Also, in order to change the educational culture, they needed to build a community of practice that included ongoing communication among all stakeholders, including leadership. Berkson and Richter noted that less enthusiastic academics can have a negative impact on adoption of AL and the corresponding student outcomes.

While early studies developed teaching models around AL and later work validated the improved student outcomes of both AL and ALC, this study seeks to further understand the broad array of factors that support the growth of ALCs within an institution.

Method

The goal of this project was to understand the factors that lead to scaling the number of active learning classrooms at educational institutions. This study was conducted during the first half of 2021. The research method included interviews with stakeholders from higher education (HE) and K12 institutions that received an active learning classroom grant. The grants outfitted a classroom with new furniture designed to support the flexibility and mobility needed for a wide variety of active learning pedagogy. The study initially focused on higher education and then was extended to K12 schools to determine if similar factors exist.

Interviews

The study used an interview method. To develop the interview tool, a review of the literature and two preliminary interviews were conducted with test subjects in the fall of 2020. These preliminary subjects included two ends of the scaling question - one institution which had experienced significant scaling, while the other had minimal expansion of active learning classrooms. Both interviews were done as part of an on-campus tour of the facilities with AL subject matter experts. These interviews yielded insights regarding the success factors and challenges in the scaling of active learning spaces across the institution. Following the preliminary interviews, a list of questions was developed. These questions were then shared with two additional ALC

researchers before finalizing the list of questions for the interview tool.

The interview procedure used a semi-structured interview process (Sekaran & Bougie, 2009). The interview tool provided a list of predetermined questions to ask the respondent, however the open-ended construction of the questions allowed for other issues to surface through the interview. Questions centered around the following subjects: stakeholders' AL knowledge, institutional champions, planning and funding processes, ties to student success and strategic planning, and cultural characteristics within the organization. They were also asked to share the number of ALCs before the grant, along with the number of ALCs developed within a three-to-five-year period after receiving the grant.

Participants

The subjects for the study focused on institutions that had received an active learning classroom grant. The interviews were conducted with the primary investigator or other related contact for the grants. These included interviews with 47 faculty, administrators, and leaders. Since the grantees included a broad range of institutional sizes and types, invitations were sent to all 46 higher education and 36 K12 grant recipients. Of those, 21 higher education and 11 K12 institutions were interviewed for the study.

Higher Education. Among the HE institutions, interviews were conducted with 21 schools that included interviews with 34 leaders, administrators, and faculty. The higher education interviews included broad demographics in terms of institutional size and characteristics. Among the colleges interviewed, 85% were public and 15% were private. The size of the schools, ranged from less than 1,500 students to large universities with greater than 20,000 students (Table 1). Additionally, as illustrated in Table 2, the schools were also identified by their Carnegie classification to ensure there was a broad range of institutions represented.

Primary/Secondary Schools. To verify the same trends occurred in the K12 schools, a smaller sample of interviews were conducted. A total of 11 interviews were conducted with leaders, administrators, and faculty of the 32 grant recipients. Among the K12 participants, 82% of schools were public, while 18% were private. Fifty-five percent of the schools were middle schools, while 45% were from high schools. The size of the schools ranged from less than 500 students to greater than 2,000 students (Table 3).

Data Analysis Process

Following the interviews, each interview was transcribed and coded for common and emerging themes, and then categorized into four broad categories and 11 subcategories that are reviewed in the results section.

Results

The following section presents the results of the interviews. This begins by establishing a baseline of the pre-grant ALC status of the schools and then comparing it to the post grant status. Then a summary of the scaling factors that were uncovered in the interviews is presented along with a categorization of the schools. Finally, the details of each scaling factor is presented.

Status Before and After ALC Grant

To create a baseline, schools were asked to share the number of ALCs at their institution. Before receiving an active learning (AL) grant, 81% of HE institutions had no previous ALCs, while just 19% had between one and three of these spaces. At the K12 schools, 55% had zero classrooms prior to receiving the grant, and 36% had between one and three ALCs. Only one K12 school shared that they had more than three. See Table 4 for the pre-grant status of these schools.

Table 1: Size of Higher Education Institution Participants

Size	Less than 1,500	1501-3000	3001-7000	7001-10000	10001-20000	Greater than 20,000
Percentage	5%	14%	19%	14%	14%	38%

Table 2: Carnegie Classification of Higher Education Institution Participants

Carnegie Classification	Associates	Bachelors	Masters	Doctorate: Professional	Doctorate: Research	Doctorate: High Research
Percentage	19%	14%	14%	5%	34%	14%

Table 3: Size of Primary/Secondary Participants				
Size	Less than 500	500-1,000	1,001-2,000	2,001-2,500
Percentage	9%	55%	27%	9%

Table 4: Number of ALCs before receiving the ALC grant			
	Zero (0)	1 to 3	> 3
Higher Education	81%	19%	0%
Primary/Secondary K12	55%	36%	9%
Combined	72%	25%	3%

Table 5: Number of ALCs within three to five years of receiving the ALC grant				
	>3	4 to 9	10-20	> 20
Higher Education	33%	29%	19%	19%
Primary/Secondary K12	36%	0%	28%	36%
Combined	34%	19%	22%	25%

After three to five years following the introduction of the ALC grant, 34% of the schools experienced minimal growth (combined K12 and colleges). A small amount of scaling was seen at 19% of the schools (4 to 9 additional classrooms). Among those schools that experienced more significant growth included 22% between 10 to 20 ALCs, and 25% with greater than 20 classrooms (Table 5).

While the overall size of the institution was considered, there is no direct evidence that size plays a role in scaling, however it should be acknowledged that growth at larger universities had less of an overall impact. However, some HE institutions in this category have 50 or more ALCs. Likewise, at K12 schools and smaller colleges that grew ALCs between 10 and 20 additional classrooms, this may, in some instances, represent the entire school. It should also be noted that during each of the interviews there was interest or strong interest in growing their active learning classrooms. In other words, no one interviewed communicated a lack of interest in ALCs which could be tied to corresponding low levels of growth.

Uncovered Scaling Factors

Through the interview coding process, eleven common factors emerged as practices that led to successful scaling of active learning classrooms. These can be combined into the following four categories that include knowledge and training of stakeholder, growth practices employed, team and institutional support, and ties to the institution's student success factors (Figure 1). The details regarding these factors are presented below.

School Categories

Each institution was reviewed to determine both the level of scaling experience, as well as the scaling factors employed. The study uncovered that those institutions that were successful in scaling AL classrooms had established most or all of the practices or factors, while the schools that were less successful, used less factors. As such, institutions were clustered into groups to better understand their approaches (Table 6). Group A (28%) saw the most growth and employed all or most of the factors. Group B (25%) had mid-level growth of ALCs and used between six and nine factors. Lastly, Group C (47%) had little to minimal scaling and was found to only use a few of the factors uncovered.

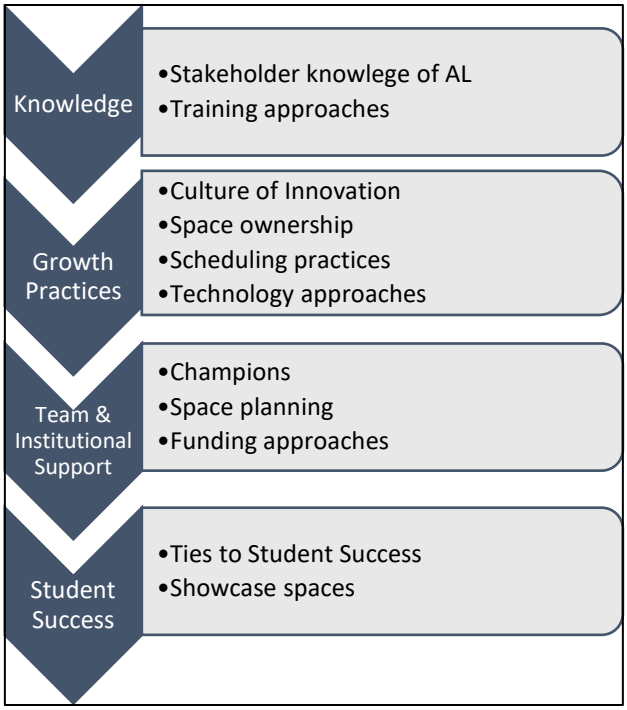

Figure 1. Scaling Factors

Table 6: ALC Scaling Groups (combined HE & K12)			
Name	**Percentage**	**Scaling**	**Use of Factors**
A	28%	Average growth of 20 or more AL classrooms (or throughout school). If they have not fully transitioned all spaces to AL, they have active plans to grow more spaces.	All or most factors (10-11)
B	25%	Average growth of 10-20 AL classrooms. May be planning for more.	Some factors (6-9)
C	47%	AL classroom growth of zero to 9 with no current plans for more.	Few factors (5 or less)

Scaling Factors

The following section presents all 11 scaling factors within the four categories of knowledge and training of stakeholder, growth practices employed, team and institutional support, and ties to the institution's student success factors. Also included are highlights of best practices employed at some institutions. As necessary, any specific practices or observations that were uncovered in the K12 environment that differs from higher education are also described.

Knowledge & Training

The level of understanding of active learning pedagogy and research plays a significant role in the success of scaling ALCs. The following reviews how AL knowledge of the stakeholders and training is tied to expansions of active learning spaces.

AL Knowledge Among Stakeholders

Those interviewed for this study were asked to categorize the level of knowledge of active learning pedagogy and related research among leaders, administrative support staff, and faculty at the institution.

- **Leaders.** Leaders are described as those in academic leadership, such as provost, academic vice president, president, dean, principal, or superintendent. Among Group A, 100% of these schools described the leaders as having a high level of knowledge about active learning (pedagogy and research). The B Group had 71% in HE and 75% in K12 with a high-level knowledge. Of the schools that had minimal scaling success, only 13% of leaders had a high level of knowledge of active learning (combined HE and K12), but rather were characterized as either having medium knowledge (47%) or little knowledge (40%).
- **Administrative Support Staff.** The administrative support staff is defined as those that support faculty, training, and teaching methods across the school. This group is often made up of directors of teaching & learning, directors of curriculum, instructional designers, or information technology personnel. Among the schools that experienced significant scaling, 100% of people in these positions were considered to have a deep knowledge of AL, particularly among directors of teaching & learning or curriculum. Group B described 50% of these individuals as having high level knowledge and 50% medium-level knowledge at both HE and K12 schools. Even at the schools with less scaling, 54% at HE and 47% at K12, described people in these positions as having a high-level of AL knowledge.
- **Faculty.** Overall faculty tend to have lower level of knowledge of active learning, both in terms of pedagogy and the supporting research. Among the A Group schools that had significant scaling, 44% describe the faculty as having a high-level understanding of AL. The B Group schools describe 88% of faculty as having medium level knowledge with only 13% as high. Among the schools that had less scaling, 67% of faculty were characterized as having medium level knowledge of active learning, with the remaining 33% as having low-level knowledge. However, the K12 teachers in all groups show a much higher level of knowledge of active learning than HE faculty, which is not surprising considering the educational background between these two groups.

Overall, the Group A schools categorized more of these stakeholders as having significant AL knowledge. While the support staff administrators often had a medium or high level of knowledge, the key driver tends to be those in

leadership. In other words, schools with leaders that had significant knowledge of active learning showed more growth of active learning spaces.

Training Approach

The interviews revealed that approaches taken by schools to train faculty on active learning pedagogical methods informs how successful they are in scaling active learning across the institution. Schools that have higher levels of scaling ALCs support the effort with a more strategic and structured approach to training faculty that often includes many initiatives. The commonly used methods described include:

- **Structured Training Programs**. A structured training program designed for a wide audience of faculty is often used by schools that have successfully scaled active learning. Specifically, 90% of Groups A and B developed structured training around active learning pedagogy, while only 34% of Group C do this. This often includes a series of professional development sessions or workshops that may culminate in a certificate for faculty to use in their professional portfolio.
- **Coordinated Training by Experts**. These training programs are commonly developed and coordinated by the institution's head of teaching & learning or curriculum who have a deep knowledge of active learning pedagogy, practices, and methods. The programs are designed to address faculty needs but often are successful in making cultural shifts and acceptance of AL.
- **Faculty Incentives**. Along with training programs that provide a certificate, 33% of successful HE schools include financial incentives to attract faculty into the training programs. Also, some higher education institutions further incentivized trained faculty by providing classroom priority. These schools are also more likely to recognize the scholarship of teaching and learning in promotion and tenure decisions.
- **Unveiling Events/Workshop Space**. To gain the greatest exposure, training initiatives often use a new active learning classroom to host an unveiling event or workshop for faculty. Among all schools, 71% used this as a practice. This can begin a cultural shift and excitement around the space and pedagogy.
- **Ongoing Support.** Schools that successfully scale shared that they provide one-on-one support or teaching communities for faculty as they transition to this new pedagogy.

Some successful schools have developed some unique approaches that have supported great numbers of faculty as they have adapted teaching methods. These include:

- **Testing & Support Space**. One school used their new grant active learning classroom during the first semester as a space where individual faculty could test a pedagogical approach for one class session. This was coupled with closely coordinated one-on-one support by the teaching & learning experts to ensure a successful plan and implementation. This approach created a positive cultural shift and excitement among large numbers of faculty within a short period of time (Participant HE-2).
- **Faculty Sharing - Poster Session**. This same school hosted a poster and speaker session in the active learning classroom where faculty shared their lesson plans with each other. Again, this created significant buzz among faculty to support this newer pedagogical approach (Participant HE-2).

Of the schools that are less successful in scaling, 100% tend to focus only on faculty that showed prior knowledge or interest in active learning methods. While this approach is meaningful to those faculty interested in AL, this more organic approach often contained the training to a limited number of faculty.

The same training approaches used in higher education are also seen in K12 schools. However, at the K12 level, bond initiatives, driven by superintendent and community stakeholders, can drive the renovation and building of more modern schools. While these new learning spaces are exciting, the research showed there was often a disconnect with preparing and training faculty to teach in these new spaces when transitioning from an existing traditional teaching model. Specifically, faculty shared a lack of training and support to make the shift to more open learning spaces that have movable furniture, learner choice, and less rigidity (Participants K12-5, K-12-6, K12-11). On the other hand, charter and private schools that embraced student-centered learning methods in their mission, were found to focus on hiring knowledgeable AL faculty and then provide ongoing training and support (Participants K12-4, K12-2, K12-1, K12-3).

Growth Practices

The study found there were many common practices employed at schools that lead to the growth of active learning classrooms and pedagogical practices. These include a culture of innovation across the institution, methods of classroom ownership, scheduling practices, and technology solutions. The following reviews these growth practices and how they support active learning spaces.

Culture of Innovation

Schools were asked if they considered their culture to be innovative, specifically in terms of embracing new ideas related to teaching and learning. Among the A and B Groups in HE, 90% reported they had innovative cultures. Among the HE schools with less success in scaling, only 54% described their culture to be innovative. These innovative mindsets were credited for faculty, administrators, and leaders to embrace active learning pedagogy. The less successful schools reported pockets of innovation; however it was not widespread, which tended to block interest in active learning.

Among K12 schools, 100% of the Group A schools reported they had a highly innovative culture. They were also clear that this culture of innovation lead to rapid transformation of active learning spaces, associated teaching methods, and even personnel recruitment and hiring. Among the schools that had some or limited success in scaling (Group B and C), 50% reported there were pockets of innovation, while 50% stated there was little innovation. These schools went on to explain that while some individual teachers attempt to practice active learning, the school's core traditional teaching model and associated faculty performance standards held back any movement toward changes. In other words, the foundational structures in place kept faculty from trying new innovative teaching methods.

Classroom Ownership

The ownership of the classroom space and how it is utilized can also play a role in scaling. Of the colleges that had more success with scaling (Groups A and B), spaces are always used as general classrooms. In other words, the schools have invested in classrooms that are not limited to one department or for a particular discipline. Meanwhile, among Group C, that experienced minimal scaling, 72% limit use of the spaces to a specific department and do not open them up for more general use. When schools have only a few AL classrooms, this approach tends to lead to less exposure across the campus.

While it is not unusual for K12 schools to have a teacher-owned model of classroom ownership, Group A and B schools employed a student-centered learning model. As such, classrooms were often shared among two or more faculty with a focus on student choice and autonomy (Participants K12 -1; K12-2; K12-3). Schools with less scaling at K12 use a teacher-owned approach classroom assignment so any active learning spaces had limited exposure.

Scheduling

In higher education, the approach used to schedule classrooms was also seen to influence the growth of active learning classrooms. Among the colleges that had the highest level of scaling (Group A and B), many used well-designed scheduling processes that match the intended pedagogy with the learning space. Among the HE Group C schools, they did not differentiate these classrooms based on the intended pedagogical purpose. As such, it was found that this approach often led to misalignments such as active learning classroom being used for lectures. This approach often blocked ALCs from use by faculty that practiced AL pedagogy. Some successful schools developed some best-practice approaches that support the optimal utilization of classroom assignments and spaces.

- **Classroom Databases**. Universities have developed outward facing classroom databases that provide photographs, capacity, equipment, and even details on windows, lighting, and floor type (Participant HE-4). One school, not specifically part of this study, rated each space by the Educause active learning score system (Indiana University Classroom Technology Services, 2021; EDUCAUSE Learning Space Rating System (2021).
- **Matching Classroom to Pedagogy**. Rather than focus on the technology in the classroom, one college developed a process in which they match the intended pedagogical approach to the classroom assignment. This was done through a well-trained and experienced scheduling coordinator in the registrar's office who works with the teaching & learning center. This school also created a naming convention for their classrooms based on the intended pedagogy (Participant HE-9).
- **Priority Scheduling**. Priority classroom scheduling is also provided as an additional perk to faculty that have completed active learning training (Participant HE-5).

Technology Approaches

Since classroom technology is such an important component of all learning spaces today, the approaches that schools use to integrate technology solutions plays a role in scaling AL spaces. Among the Group A and B institutions, with success in scaling, 80% have a user-centered approach that is often standardized in most classrooms. A user-centered approach is described as information technology specialists working with faculty groups to developing classroom solutions that are designed for high functionality and impact with ease of use for faculty and students. Those that had limited scaling (Group C), 63% used this same user-centered approach. Nearly all of the K12 schools (90%) report using a standardized approach to classroom technology. However, when information technology worked closely with faculty teams, they were also successful in developing more user-centered approaches.

When a more complex technology solution is taken in both K12 and HE environments, it can be a significant block to

growing more of these classrooms. It was reported that complex technology can be a turn off to faculty who experience frustration in the classroom. Therefore, unless issues are resolved quickly, the AL classroom develops a negative reputation among both faculty and student users. Moreover, when the AL classroom receives more expensive equipment, this often results in associating active learning with an expensive reputation, which can be a turn off for decision makers. One Group A mid-sized college took a different approach to technology in their ALCs by developing a reduced-cost improved user experience which helped them to scale their ALCs quickly across the institution (Participant HE-2).

Student & Institutional Success

The study uncovered connections between active learning pedagogy, related spaces, and institutional success factors. These were related to student success measures as well the use of AL classroom as a showcase. The following summary reviews these success factors.

Student Success

All educational institutions, at both higher education and K12, track outcomes related to student success. At the higher education level, these may include course-level completion rates, or broader institutional retention and graduate rates. In the K12 environment these often include standardized test scores and graduation or college acceptance rates. More recently, institutions have also begun to develop metrics for student engagement and wellbeing to support diversity, equity, and inclusion goals. Regardless of the student success factors used by the school, participants were asked if they connect active learning pedagogy and classrooms to student learning and their success factors (Figure 2).

Among the more successful higher education schools (Groups A and B), 70% reported to have made connections between the student success outcomes and active learning classrooms. This rises to 83% when only considering Group A that had significant scaling success. Among Group A and B K12 schools, 86% of schools report that they tie active learning teaching methods and the corresponding spaces to their school's student success factors. This is most often noted when asked about reasons that these schools fund these projects. These same schools also have tied active learning to their teaching methods, overall mission, and strategic plan.

Among higher education colleges, Group C, that had less success with scaling, only 18% have made any connections between active learning and their student success factors. The K12 Group C had a similar result with just 25% of these schools tying active learning to student success outcomes. The HE and K12 Group C schools mainly focused on faculty development and the active learning pedagogy. As a result, they have not made a connection between active learning and overall student outcomes. Because of the disconnect, there may be a lack of focus on active learning as a driver of institutional student success.

Figure 2. Connections between AL, spaces & student success

Showcase/Marketing Spaces

Nearly all schools include the active learning classrooms as showcases for a number of reasons. Among all higher education participants, 95% reported that they use the classroom as a showcase. These reasons include:

- **Prospective Students**. ALCs are often used as showcase classrooms for campus tours and marketing materials. More successful schools realize that the next generation of college students are used to some form of active learning in their K12 experience and look for similar experiences in college, as opposed to large lecture halls (Participant HE-1, HE-2, HE-8).
- **Partnerships**. A few schools have described innovative partnerships using the active learning classroom particularly in the discipline of education. One example includes an ALC at a university that is connected remotely with classrooms in K12 to train new teachers as well as provide professional development to teachers in the field (Participant HE-11).
- **Influencers**: Schools have also described how AL classrooms were used to show the excellence of the institution's programs to board members, donors, accreditors, and other external stakeholders.

Among K12 schools, there was more of a division regarding the use of AL spaces as showcases. Only K12 Groups A and B reported using the ALC as a showcase to attract prospective students or illustrate their learning model and student outcomes. This was often connected to the type of teaching model adopted at the school. Those that used the spaces as showcases often embraced an active learning teaching model such as project-based learning throughout the school. Among the other schools, a more traditional teaching model was used, therefore these classrooms and the related pedagogy was not in keeping with the standards.

Team & Institutional Support

The study found the amount of team and institutional support played a role in the growth of active learning spaces. These included factors such as influential champions, leadership involvement, space planning teams and methods, as well as funding approaches. The following factors related to the team and institutional support received.

Champions

Individuals who act as champions for active learning pedagogy and spaces were found to be critical components to growth. The following details the champions, blockers, and common players in scaling AL:

- **Champion - Teaching & Learning**. In higher education, the director of teaching & learning nearly always acted in the role of champion for AL. In fact, among all HE participants, 80% identified the director of teaching & learning, or similar role, as their main champion. Among the HE Groups A and B, this rose to 100%. The successful institutions developed a cohesive team built out of the teaching & learning center. This champion tends to have regular and ongoing interactions and communications with both leadership and faculty and can influence decision-making and cultural shifts at the institution. In the K12 environment, sometimes the curriculum director can play a similar role, but this was not nearly as consistent as HE's teaching & learning director.
- **Champion - Leaders**. The institution's leader plays an even more important role in scaling ALCs. As noted above, higher education leaders are most commonly university president, academic vice president, provost and deans. Among HE Groups A and B, 100% of these schools identified the leader as a champion of active learning approaches. In comparison, among the HE Group C schools, that had little or no success scaling, only 36% identified the leaders as a champion for this cause. In K12 schools, the leader also played a large role in championing ALCs. As seen in HE, 100% of K12 Groups A and B schools identify the leaders (principals and superintendents) as the main champion of AL, while no K12 Group C schools identified the leader as a champion. Successful schools in both HE and K12 described their leaders as well informed in terms of how active learning supports student success, and therefore will prioritize budgets and planning in this area.
- **Blockers.** While a few HE schools identified leaders and faculty as blockers to scaling active learning, 54% of HE

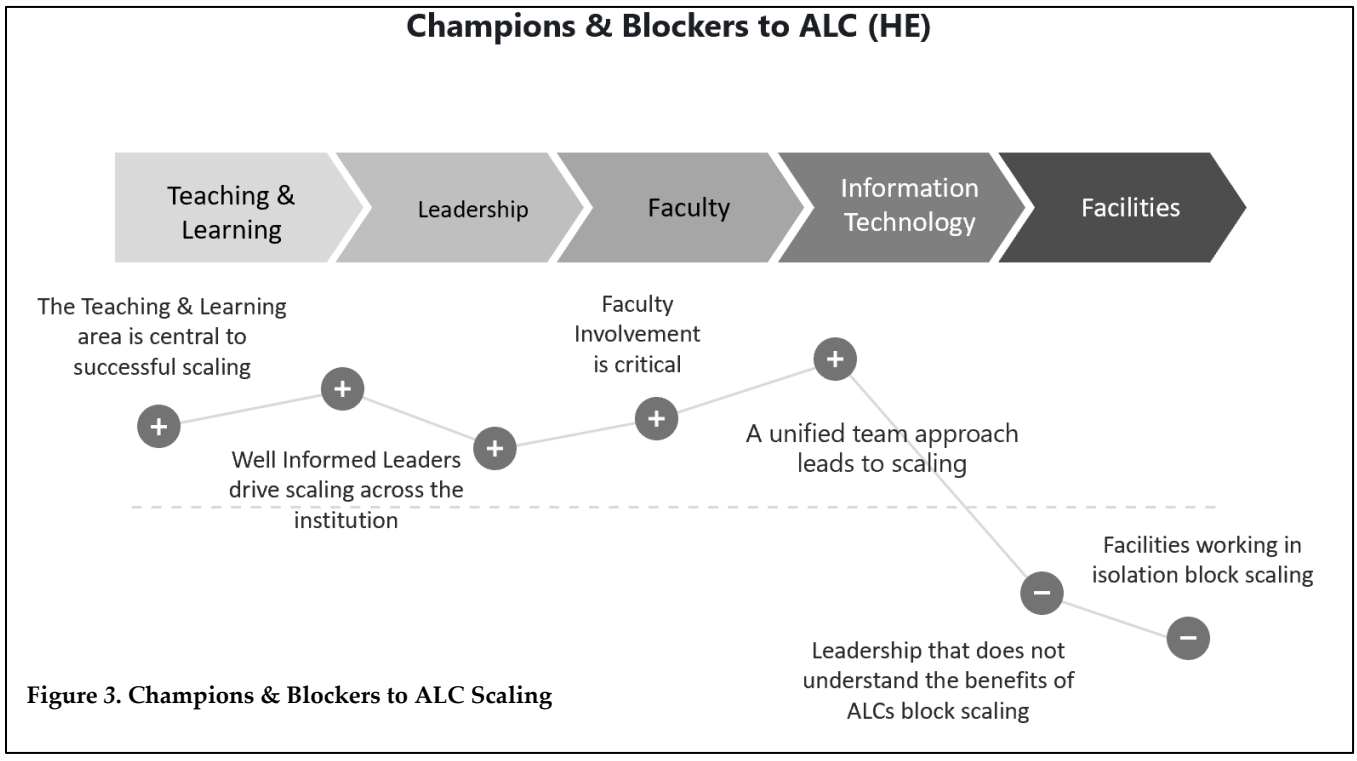

Figure 3. Champions & Blockers to ALC Scaling

Group C schools noted that the facilities staff were significant blockers to scaling. Participants noted several reasons for this challenge. Facilities staff are often focused on standardizing classrooms and may make decisions in isolation. They often report up through the finance part of the organization rather than academics, so there may not be a natural way for facilities to interact with academic or information technology departments. Among K12, facilities were less likely to be identified as blockers which might be because the organization is less complex in terms of reporting lines. Among all groups of K12 schools, the blockers are reported as follows: 67% of faculty, 22% of leaders, and 11% of facilities.

- **Unified Team Approach.** To avoid individuals from blocking the scaling process, successful schools report using a purposeful unified team approach to create understanding among all the parties that support teaching and learning spaces. This includes teaching & learning, faculty, information technology, facilities, and leadership. One university shared that they noticed conflicting needs among parties, particularly facilities, until they brought the players together to understand each other's needs (Participant HE-5). See Figure 3 for summary of best approaches to create champions and avoid blockers to the process.

Space Planning

Related to the champions of active learning, schools also shared their approach to academic space planning. Among the HE and K12 schools with successful scaling (Groups A and B), 90% of these schools developed a broad multifunctional team that planned spaces. This approach was said to encourage sharing among the stakeholders in which participants were able to share perspectives. Players invited into this process often include academic leaders, directors of teaching & learning/curriculum, faculty, information technology, and facilities (Figure 4). One HE school also worked with procurement when planning spaces (Participant HE-7). Participants noted that the leadership involvement played an important role in educating and informing leadership of the need, who can then direct institutional priorities and funding.

Among the schools with less success, only 27% use an approach that included all the stakeholders noted above. Ten percent took a more top-down approach that was driven by leadership. Among these projects, participants shared there were disconnections from the leader's vision and the needs of the academic community, resulting in spaces that were underutilized or misused. Higher education schools that did not have success in scaling (Group C) reported 63% had no leadership in the planning process. Of these, 36% included small teams of staff from the teaching & learning centers working with information technology and a few engaged faculty members to address individual academic spaces rather than a broader institutional approach to ALCs. The remaining 27% of HE Group C schools that worked without leadership involvement, used an approach that was directed by facilities. In these cases, while technology was considered, there were few academic voices involved which limited conversation about the benefits of active learning environments.

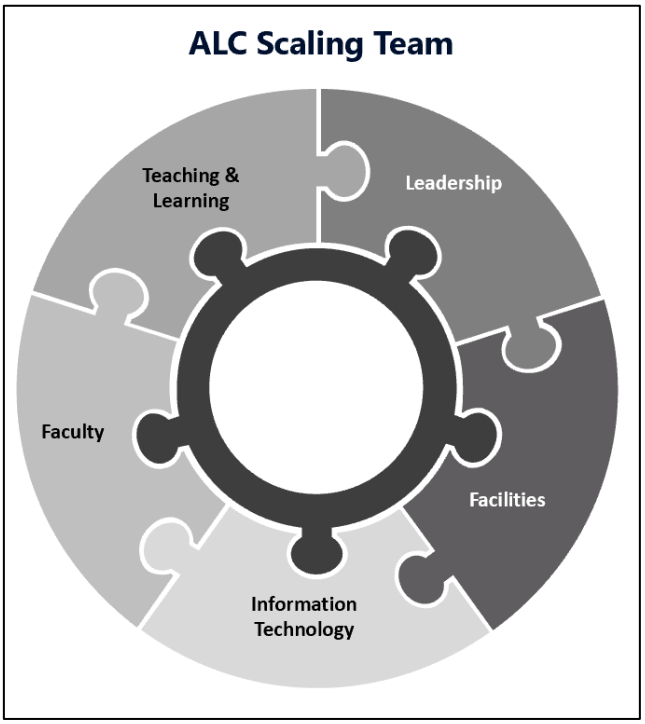

Figure 4. Optimal ALC Scaling Team

Among the K12 Group A and B schools that had scaling success, 85% report that space planning is done with a broad multifunctional group that includes leadership (superintendents, principals), administration (curriculum directors, information technology, facilities) and teachers. As noted, among these groups it is not unusual for those planning large-scale projects to tour other schools to learn about their teaching and learning models, and planning process. Seventy-five percent of less successful schools report a process mostly driven by leaders in isolation which led to minimal buy in from teachers.

Among the Groups A and B in HE and K12 were included several best practices regarding space planning:

- **Classrooms of the Future**. One community college formed a broad-based multifunctional committee to design "test classrooms" that included innovative technology, furniture, and space utilization (Participant HE-7). These classrooms were then used by faculty and

the committee collected feedback about the spaces and affordances. This information was then used to inform the college master plan.

- **Faculty/Student Needs Assessment**. Several colleges noted that their teaching & learning center regularly assessed the classroom needs among faculty in terms of pedagogy, technology, and other attributes. Along with this, students are often surveyed regarding their needs and reactions to learning spaces. This data was used to understand shifting pedagogical and learning approaches and then compared to current classroom environments to inform classroom upgrades (Participants HE-15, HE-9, HE-6).
- **Low Hanging Fruit**. Schools also report focusing renovations on classrooms that were underutilized and considered "ugly ducklings." By taking this approach, these schools noted that they rarely upset faculty users, but were often met with appreciation which increased utilization rates (Participants HE-4, HE-11).
- **New Construction/Renovation**. Some schools reported that leaders committed to active learning made pledges that new construction and renovation projects would move away from lecture-style spaces and only include active and collaborative learning environments (Participants HE-5, HE-6, HE-3).
- **School Tours**: Among the K12 schools planning for large-scale projects, planning teams would often tour other schools to see innovative spaces and learn how they are used (Participants K12- 5, K12-4).

Funding

The institutions have a variety of methods they use to fund active learning classrooms. All (100%) of the HE and K12 Group A and B schools have integrated AL as an institutional priority which is connected to part of the strategic plan or master plan. While 90% of schools that have less success (Group C) rely on grants, donor support, or end-of-the-year remaining department budgets. The following

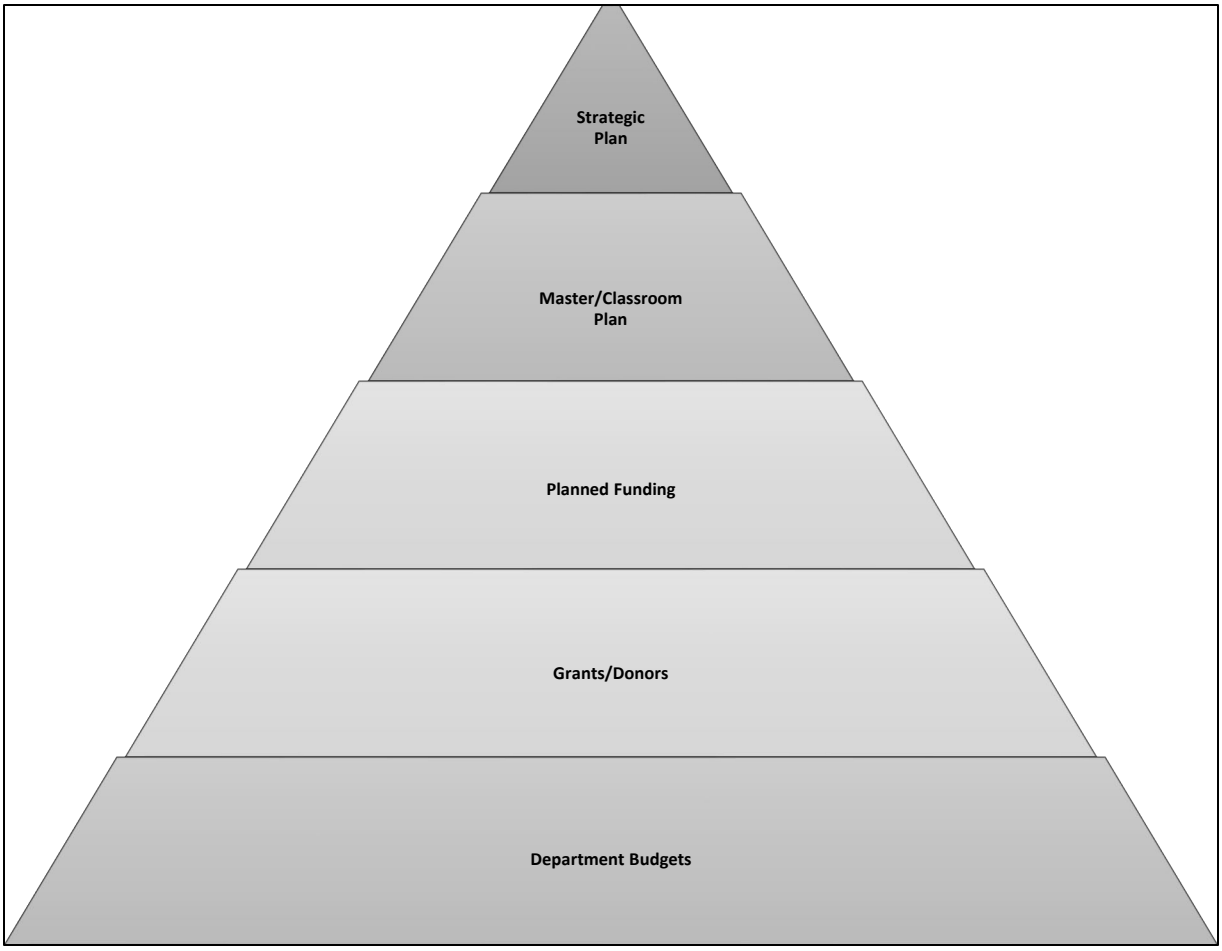

Figure 5. Funding approaches for ALC

outlines these approaches to funding AL classrooms and other spaces (Figure 5).

- **Leadership Driven Priorities**. Based on the involvement of leadership in the planning of academic spaces, 100% of K12 and HE successful schools (Group A and B) have reported that leaders prioritize the funding of these projects by driving opportunities on an institution-wide basis.
- **Strategic Plan**. Eighty percent of Group A and B schools at K12 and HE have incorporated the active learning pedagogy and innovative academic spaces into their overall strategic plan. Along with pedagogical approaches, these schools invest in their spaces as a plan to modernize their schools and campus to aid both recruitment and retention of students (Participants HE-1, HE-7, HE-8). Many times, this also includes a master plan that specifically covers classrooms (Participant HE-7, HE-1).
- **Planned Funding**. Schools that have a planned funding approach are also more successful. Among successful schools, 90% employ annual funding to upgrade classrooms on a regular annual basis. Some also report a process of transparently using student technology and other fees to directly fund classroom upgrades (Participant HE-16). Among the less successful Group C schools, only 9% report they use a planned funding approach to maintain and upgrading classrooms.
- **Grants or Donors.** Ninety percent of the less successful Group C schools rely heavily on grant funding to create AL spaces. As such, these schools are often challenged with upgrading more than just a handful of classrooms.
- **Year End "Left Over" Funds.** Among 20% of the Group C HE schools, funding is also reported to come from "left over" year-end department funds. Since these efforts are usually driven only by one individual or small groups, they do not afford system-wide planning and are usually confined to classrooms for one department. Among K12 schools, one school reported that funds normally used to support teacher classroom requests was pooled to create an AL space by the principal (Participant K12-10). However, because the space was created without teacher input, it gets little use.
- **Bond Initiatives/Large Capital Campaigns:** Among K12 schools, the prior approaches are used, however, bond funding initiatives are often key drivers to funding large projects at public schools. The focus of these projects tends to be on both upgraded facilities and updated teaching models. At private schools, successful schools have equivalent-type large fundraising campaigns to fund upgraded facilities. While updated teaching models are a focus for private schools, these schools are also focused on enrollment.

While both HE and K12 use a variety of different approaches to funding ALCs, the more successful schools develop long-range planning tactics which are supported by large-scale and consistent funding models. Using a one-by-one approach with grants or end-of-the-year funds may grow a classroom here or there but does not create a larger impact across the institution.

Discussion

There are several themes that stem from this study. Most notability, schools that have had success in growing active learning and associated ALCs do so by using a multitude of practices to leverage broad cultural shifts, allocation of resources, and influencing institutional strategies and priorities. Successful K12 and HE schools build these practices from existing resources and thread them together to develop a wholistic strategy that includes a mix of people, innovations, and funding. Among the practices uncovered in this study, three seem to be critical to the success of growing ALCs: alignment of AL to institutional outcomes, faculty training and ongoing support, and a leadership-driven team approach.

Alignment of Active Learning to Institutional Outcomes

One of the clear themes from the study is that schools that understand the benefits of active learning have used this knowledge in making connections to their own school's strategic priorities. While this can take many forms, from improved test scores to student retention, schools that successfully scaled intentionally invested in this approach with the goal of improved student outcomes. Moreover, this is not a short-term solution, but rather a deliberate and planned funding approach very often tied to their strategic or master plan.

One of the most impactful examples of this connection is from one of the HE schools from the study (Participant HE-3). This college surveyed their students using the National Survey of Student Engagement (NSSE), an instrument that helps to assess students' engagement in the areas of academic challenges, learning with peers, experiences with faculty, and campus environment (2020). This national survey allows schools to compare assessment scores with similarly situated colleges. This school noticed that in many of these categories, their students scored below other schools of similar type and size. Because of their understanding of AL, they then developed a plan to make improvements, one of which included expanding active learning and ALCs at their institution to help improve student engagement. This was placed in their strategic plan and became an institutional priority which drove funding to scale. As part

of this plan, they will continue to use this instrument to track improvements in student engagement.

This connection was further supported by Middleton (2020), the head of learning and teaching at Anglia Ruskin University in the UK. Through his essay that shares his experience of growing active learning spaces and practices, Middleton notes that the expansion of active learning spaces across the institution "situates development as a strategic matter through alignment to the business priorities for learner engagement and retention, and the need to address outcomes relating to the future graduate" (p. 174, 2020). He further supports exploring how opportunity and strategy can provide meaningful collisions. He was able to influence a simple refurbishment project by bringing in academic voices that provided strategic shift at the institution to support active learning classrooms and pedagogy.

Faculty Training and Ongoing Support

The next theme that emerged from this study is the need for faculty training and ongoing support. Moving from a more traditional stand-and-deliver approach to student-centered active learning method does not happen without well-developed training and ongoing support. Schools that experienced success in scaling, coupled this with an intentional institution-wide training program that not only supported faculty through the transition but also expanded the knowledge of the benefits of AL, while influencing cultural shifts and excitement among the teaching community.

One highly developed and sophisticated examples of training comes from the University of North Carolina - Charlotte, that created an institution-wide "Active Learning Academy" (2021). They reported that over 250 instructors have completed the program, with many attending it multiple times. The year-long series develops supportive teaching communities as faculty transition to AL and ALCs. Moreover, the program incentivizes faculty through a stipend and provides them priority in classroom selection. This university also supports AL research and case studies and then developed these into a collection in an open-source book (Keith-Le & Morgan, 2020). Another example of a well-developed program comes from Indiana University's Active Learning Mosaic Initiative (2021).

This theme of faculty support is further reinforced by a large-scale study conducted by the University of Melbourne and international partners called the Innovative Learning Environments and Teacher Change Project (ILETC, 2021). The work sought to understand how the physical classroom spaces impacts learning and how-to best support teachers in making the most of these spaces. One of the many outcomes from the study included the identification of 14 principles that appear throughout the data when assisting faculty in the transition to active learning spaces (Imms & Mahat, 2020). These include:

- **Time**. Teachers need time to experiment with new pedagogies
- **Technologies**. Faculty need to learn how to use them, and their impact on teaching
- **Professional Development**. Teachers need to be supported through professional development
- **Institutional Support**. Teachers need support from the school structures and organizations such as time for professional development, and supportive environment to experiment
- **Design Process**. Teachers need to be a part of the design process to connect teaching methods to space designs
- **Collaborative Practices**. This work needs to be supported with collaboration and teamwork
- **Student Experience**. Faculty need to understand the actual student experience
- **Design Affordances**. Faculty need to understand and learn how to use all the elements of the spaces
- **Teacher Experience**. Faculty need to apply methods in order to adopt changes
- **Spatial Competencies**. Teachers need support in developing lessons that use the spaces
- **Pedagogy**. Faculty also need support in developing pedagogies that leverage the features of the space
- **Evaluation**. Faculty need to learn how to evaluate the impact of learning in these spaces
- **Leadership and Change**. Teachers should be included in decisions regarding institutional planning when transitioning to new spaces.
- **Curriculum**. Impact of space on curriculum (Imms & Mahat, 2020).

Leadership Driven Team Approach

The last theme that emerges from this study is the need to develop a cross-functional team driven by a leader who has developed deep knowledge regarding the benefits of active learning. A team approach that connects academics, technology, facilities, and more, serves as a platform that shares perspectives as well as active learning knowledge among these key players. While the person who connects with the team is often a director of teaching & learning or director of curriculum, the ongoing involvement of someone in leadership that can direct funding priorities is critical to making impacts across the institution. On the other hand, developing these spaces in isolation, with a top-down approach tends to not only create spaces that are not widely adopted, but can also grow unintended employee morale challenges among teachers that are forced to, or barred from, using the spaces.

This theme of a stakeholder involvement is also supported by Middleton (2020). He states, "In learning space development, ensure that the value of all stakeholders is accommodated through an ethos of co-production and purposeful conversation" (Middleton, 2020, p. 174). He also notes that the academic voice must be present in these conversations to influence the design for the spaces for learning (p. 174). Having multiple voices also prevents one particular pedagogical adoption, but rather creates spaces that can be flexible and meet the needs of many, particularly the students. The University of Indiana's Active Learning Mosaic Initiative further supports the idea of multiple voices in their process of creating an ALC master plan (Morrone & Roman, 2019). They promote adding multiple layers of viewpoints to the process that includes collecting data from both faculty and students. Students were specifically asked about features and affordances that create value in the classrooms.

While schools and colleges are limited by a host of constraints, including funding and staffing, the study was able to uncover a wide range of strategies and best practices employed by both small and large schools in expand active learning and associated classroom spaces. By developing a deep knowledge of the AL benefits, and working with cross functional teams to share perspectives, schools at K12 and HE were able to overcome obstacles to develop strategies to grow active learning classrooms.

Limitations and Future Work

This study utilized participants from an ALC grant program that was administered over a five-year period, therefore each of the schools and universities had a different time period to develop an active learning approach. For example, some schools were in the first grant cycles, while others were in later grant cycles. While there was no direct evidence that time aids or deters ALC scaling, a more direct approach would have been to limit the study to only one year of the grant cycle. However, since the goal of the project was to study a large number of HE and K12 schools, grantees over a five year period were included.

Nearly all schools interviewed noted that the COVID-19 pandemic impacted their ability to grow their active learning classrooms. The focus of all schools during this period was to immediately adjust teaching practices and platforms to meet the needs of students and to support faculty. While some schools did advance some practices, particularly in terms of technology, most put their plans for active learning spaces on hold. Several did mention that they have active plans that will pick up following the pandemic.

In terms of future work in this area, more in-depth studies could be conducted on each of the scaling factors identified in this study. Moreover, additional wide scale studies, such as this could be conducted to further investigate these findings. Additionally, future work could also separately focus on the nuances afforded in higher education and K12 schools or how this topic is approached in the public or private educational environments.

Conclusions

This article presented results from a wide-scale study seeking to understand the factors that lead to the growth of active learning classrooms across an educational institution. The participants for the study included 21 higher education and 11 primary/secondary schools after they received a grant for an active learning classroom. While about half had success in scaling their active learning classrooms, the remainder struggled despite their best efforts. The study revealed 11 common factors or practices employed that aid schools in both HE and K12 in growing the number of ALCs over time.

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