Leveraging People, Space, and Systems to Ignite Active Learning

JULES A. KEITH-LE, HEATHER MCCULLOUGH, RICH PREVILLE, AND KURT RICHTER

Sparking Change

In 2014, the University of North Carolina at Charlotte (UNC Charlotte) sparked change with a commitment from leadership to stop building new theater-style lecture halls and, with a partnership between the Center for Teaching and Learning and Classroom Support, to build two state-of-the-art, evidence-based, active learning classrooms. At the same time, a faculty community of practice (the Active Learning Academy) focusing on active learning methodology in course design and in the classroom was formed. The academy's mission is to create a community of practice among instructors who are interested in promoting active learning. It additionally provides a space for faculty to become familiar with best practices and new technologies, while receiving support from active learning experts and instructional designers on challenges. The Active Learning Academy has grown steadily in size each year with members representing all colleges and departments on campus. Through additional partnerships with the Provost, Registrar's Office, Facilities Operations, Disability Services, and Environmental Health and Safety, UNC Charlotte continues to build flexible and needs-based active learning spaces across campus. Long-term strategic plans are moving the campus from a departmentally controlled classroom scheduling model to a central scheduling model that prioritizes placing Active Learning Academy members in active learning teaching spaces.

From Then Until Now: History

Active learning is rooted in American educational literature as early as 1924 when John Dewey described it as "an active, personally conducted affair" and "something an individual does when he studies" (Dewey, 1924). In their seminal work, Bonwell and Eison (1991) define active learning as students "doing things and thinking about the things they are doing." Yet definitions of active learning only begin to scratch the surface of a large practice of pedagogical methods. It is often clearer in practice than in definition. When one sees active learning in practice, it is often a dynamic educational experience. Active learning practice at UNC Charlotte has had a large and diverse following in the ranks of our instructors over the years. Our efforts to support them with community, professional development, resources, and tools are evidenced in the chapters of this book.

The design of teaching spaces, particularly in higher education, has not always supported activities like those observed in active learning classrooms. From their acoustics and lighting to their aisle widths and seating density, most traditional learning spaces are designed for information to flow one way—from the front of the room and toward the audience. Active learning classrooms are different. Active learning classrooms, or ALCs as we call them, are designed to support movement and sound to and from all directions and among different groups, from conversations within the same group to conversations among different groups to an instructor giving instructions one-to-one or one-to-many. The pedagogy, technology, and room furniture all serve one purpose in an ALC: to facilitate collaborative learning.

UNC Charlotte began its journey to provide more coordinated pedagogical and technological support for active learning methodology in 2014. With strong support from Academic Affairs, two classrooms in Kennedy,[1] the oldest building on campus, were renovated to support an active learning environment. Plans for these classrooms included hosting larger classes, setting the stage for faculty to employ student-centered teaching that was collaborative and hands-on, and offered technology-assisted interactive options. The Center for Teaching and Learning (CTL) and Classroom Support (CS) partnered in developing and providing technical and pedagogical support to instructors who used the renovated classrooms.

The SCALE-UP Model

Ideas around redesigning the university teaching spaces began in the 1990s, and J. M. Wilson (1994) termed this new model the *studio classroom.* The studio classroom was one space that was meant to serve as lecture hall, discussion forum, and lab (Baepler, Walker, Brooks, Saichaie, & Petersen, 2016). Dr. Robert Beichner, our colleague at North Carolina State University, has been working on the student-centered active learning environment with upside-down pedagogies (SCALE-UP) project since the 1990s. Beichner formed a group of more than two dozen schools to collaborate on designing classrooms that could merge the concept of lab and lecture in a way that would provide a new alternative to the traditional method of teaching (Beichner et al., 2007). The pedagogical framework supporting the SCALE-UP model creates environments that lead to cooperative learning, which encourages students to be engaged in the learning process, reduces lecture time, and teaches students how to solve their own problems and find the answers to the questions themselves (Beichner et al., 2007). The continued collaboration among Beichner's "adopters" can be followed on a website hosted by North Carolina State University and supported, in part, by the U.S. Department of Education's Fund for the Improvement of Post-Secondary Education (FIPSE), the National Science Foundation, and Hewlett-Packard (North Carolina State University, 2019).

UNC Charlotte reached out to Beichner, consulting with him on the design and the construction of two new active learning classrooms. We followed the design of the SCALE-UP model as we worked to renovate the Kennedy building to house not one but two of these

1. As a result of the tragic events of April 30, 2019, the Kennedy Active Learning Classrooms have been permanently closed and will be repurposed to include a contemplative space documenting the history and honoring the victims.

classrooms. One large ALC can seat up to 126 students, and a smaller ALC seats 36. These classrooms were needed to support instruction, discussion, group work, and entire class interaction. Flexible seating consists of round table-pods that support team interaction among students. Each pod seats nine students and provides three university-supported laptops, an instructor microphone for speaking to the class as a whole, speakers that engage with the room's integrated sound system, and a digital display that can be controlled using a touch-panel switch by any of the computers at the pod. The instructor's lectern also features a digital display allowing for control of all digital monitors in the room, multiple drop-down projection screens, handheld and lavalier microphones, and the ability to push out multiple forms of media at the touch of a button. The wireless capability and layout of the room unchain the instructor from the lectern and promote instructor–student engagement moving around the room. Instructors have the power to share materials with all the tables' digital displays or to share each table's work with the entire classroom.

The CTL has always believed that our mission is to guide instructors to become reflective teachers, critically reviewing and refining their own learning practices, and to engage in professional development in place through this work. The new ALCs provided an opportunity for transforming instruction. However, that opportunity needed careful cultivation and support to be realized.

The new classroom spaces attracted considerable attention from faculty across campus. The demand to teach in the space was high. However, the CTL and CS recognized that instructors would need guidance and support to transform their teaching in a way that maximizes the potential of the learning space. As a result, any instructor who taught in one of the new ALCs was required to participate in the faculty community of practice, the Active Learning Academy (ALA) that included both technical and pedagogical training. The program also included regular interactions with instructional technologists and designers. Faculty acknowledged that the deliberate effort required to modify lessons and instructional approach was often significant. The instructional designers recognized that faculty skills developed over time and through regular and deliberate participation in the ALA. Campus interest in active learning grew, and after several years, the ALA expanded to welcome faculty who taught in any style classroom.

The Active Learning Academy

The CTL chose an academy model of training because of the strong history of peer-led training to engage faculty in professional development and to have lasting impact. In the 1960s and 1970s, education training focused on methodologies that included experiential learning (Bonwell & Eison, 1991). This training encompassed programs that included new math, learning by doing, and activities that fell generally under the heading of active learning (Bonwell & Eison, 1991). In the 1980s, this kind of learning expanded through programs that taught reading through the writing process and saw the beginning of the science, technology, engineering, and mathematics (STEM) movement (Bonwell & Eison, 1991). The active learning methodology seeks to pair instructors who are open to this kind of learning with the high-tech support of our active learning classrooms. UNC Charlotte's ALA sought to do just this, while also providing

a community for them to collaborate on pedagogies, activities, and using the new classrooms in their instruction.

The first ALA piloted from fall 2014 through spring 2016 with the participation of 109 academics from all across the campus. At the end of the first cohort, UNC Charlotte hosted its first Active Learning Conference. Dr. Robert Beichner spoke about the active learning space there, where he addressed questions of why active learning is such an effective means of instructional practice, how to promote active learning at the university level, and the value of learning for all students in such an environment. Members of the UNC Charlotte ALA participated in an interactive poster session demonstrating their unique approaches to instruction and sharing their successes in the classroom. This inaugural event has morphed into an annual Spring Active Learning Expo hosted at UNC Charlotte, where ALA faculty showcase the work they are doing around active learning and share resources.

The Richter Active Learning Continuum

Former CTL Senior Instructional Technologist Dr. Kurt Richter's vision and depth of experience contributed to the development and continued success of the ALA. Richter was the instructional technologist who designed and led the first cohorts of the ALA. When identifying the learning objectives and goals supporting the academy, he created the Richter Active Learning Continuum, a framework for the transformational process faculty would experience as they embraced moving away from the traditional "sage on the stage" and toward the active methodology supporting a new role of "guide on the side." Richter included key elements that would be transformed, including: grouping, seating, work products, teaching style, assessment, and dialogue (see Figure i.1). This model is still one we follow today. As each year's ALA cohort forms, teams of engaged faculty work to move their courses and teaching from traditional lecture to full implementation of active learning practices.

The Active Learning Academy Today

After the pilot, the ALA transitioned to an annual cohort that followed the academic calendar, beginning in the fall and culminating in the spring with a large event promoting the research and service in active teaching and learning of its members. The model for the academy depends on faculty leaders in active learning who serve as facilitators of smaller teams of cohort participants. Team facilitators are supported by a university-funded stipend and coordinate monthly meetings among their team members where they examine course designs and teaching methods, and experiment with ways to transform their courses using best practices in active learning methodology. The CTL provides cohort support by scheduling special active learning events and scholarly speakers, and sharing the latest in research and tools with academy members. At the end of each cohort, UNC Charlotte hosts the Spring Active Learning Academy Expo, where teams showcase, demonstrate, and actively share what they have worked on over the past year with the campus at-large. Faculty who participate in the ALA have been given priority scheduling for active learning classrooms.

In 2018, strategic organizational improvements were made to the academy. These improve-

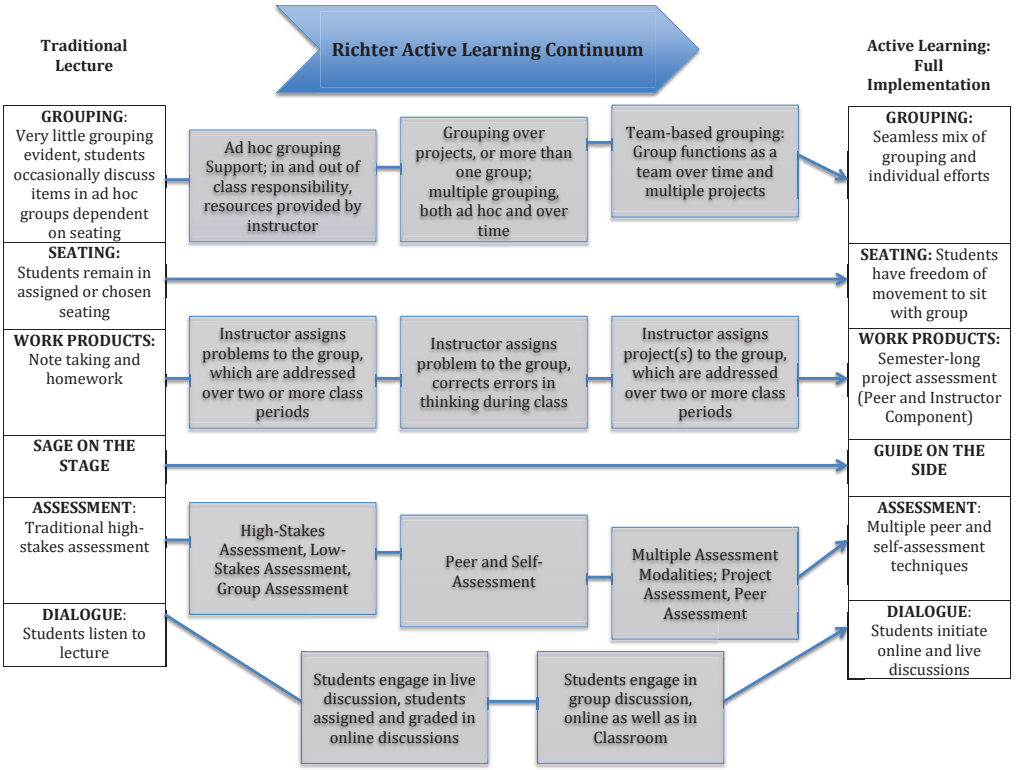

Figure i.1. Richter Active Learning Continuum.

ments included recruiting veteran academy members to work on writing and publishing this book and building a framework into the academy that allowed for members to grow to become facilitators. Additionally, awards for "Excellence in Active Learning Leadership" and "Emerging Active Learning Leader" are given out annually at the end of semester event.

More Active Learning Classrooms

In 2014, there was a great deal of discussion between CS and CTL about supporting the flipped classroom model. The number of faculty adopting the practice had outgrown the two original ALCs, and other spaces on campus were not ideally arranged to support active learning. With the support of Academic Affairs, CS changed their mission statement to include support for learning environments that improve student and faculty experiences in the classroom and, importantly, support for the creation of instructional media.

As of 2019, there are 20 ALCs in use or under construction on the UNC Charlotte main campus. Seating capacity ranges from 36 to 128. The newer rooms have all been designed to meet departmental needs for flexibility, both in budget and space. They have movable tables and chairs, multiple digital displays and projectors, smart board technology, a facilitator podium with a master control panel, sound integrated throughout using microphones and speak-

ers, and various types of whiteboard surfaces to write on. UNC Charlotte recently received a $67,000 grant from Steelcase Education's Active Learning Center program to add a new active learning classroom and conduct assessments and research on the impact of the newly designed space. Future plans focus on larger active learning spaces to continue replacing traditional theater-style lecture halls.

Impact on Faculty and Student Success

As an institution of higher education, student success is at the forefront of every decision UNC Charlotte makes involving the scholarship of teaching and learning and campus space allocation. The Freeman et al. (2014) meta-analysis of student performance in active learning versus traditional learning in STEM classes found that active learning increases student performance. The average exam scores increased by 6% in the active learning classes. Another major finding from the Freeman et al. (2014) study is that students in the traditional lecture classes were 1.5 times more likely to fail than those who were in active learning classes.

This research led UNC Charlotte to examine the preliminary impact of active learning on our campus. In a survey of faculty members who were participants in the ALA, 47% of faculty surveyed reported that they needed more preparation time for an ALC course when compared to a traditional course, but 83% were extremely likely to request an ALC again.

In a survey of students conducted on the impact of ALC use at UNC Charlotte, students reported an overall trend of positive reactions and improved student success. Of the students surveyed, 65% responded that they "somewhat" or "strongly" agreed that they were more engaged with the subject matter in an ALC than in a traditional classroom. Survey results also showed that 64% of students responded that they "somewhat" or "strongly" agreed that they were more supported by their peers in an ALC than in a traditional classroom.

Of the ALA faculty who participated in the survey, 50% reported better student performance in an ALC when compared to a traditional classroom, with 33% reporting equal performance. The initial measure of DFW ("D", "F"/fail, and withdraw) rates for nonwhite versus white students in active learning classrooms was 9% versus 14%. This finding suggests further study is needed surrounding the impact of the ALC on DFW rates. The survey found no significant difference in student achievement by gender or race in ALCs, suggesting the environment of the ALC may act to mitigate gender and race differences found in traditional classroom settings.

The Active Learning Academy's Book

This book is the direct result of the work at UNC Charlotte leveraging people, spaces, and systems to ignite a campus-wide culture of active learning methodology. The authors of the following chapters are faculty who have been ongoing participants in the ALA over multiple cohorts and many years. Each chapter tells a story about their journey to move away from traditional lecture and toward full implementation of active learning. The authors of this book hope the reader will find useful resources or ideas within these pages that can spark change across all institutions of higher education.

References

Baepler, P., Walker, J. D., Brooks, D. C., Saichaie, K., & Petersen, C. I. (2016). *A guide to teaching in the active learning classroom: History, research, and practice.* Sterling, VA: Stylus Publishing.

Beichner, R. J., Saul, J. M., Abbott, D. S., Morse, J. J., Deardorff, R. J., Bonham, S. W., . . . Risley, J. S. (2007). The student-centered activities for large enrollment undergraduate programs (SCALE-UP) project. In E. F. Redish & P. J. Cooney (Eds.), *Research-based reform of university physics*. College Park, MD: American Association of Physics Teachers. Retrieved from https://projects.ncsu.edu/per/Articles/Chapter.pdf

Bonwell, C. C., & Eison, J. A. (1991). *Active learning: Creating excitement in the classroom* (ASHE-ERIC Higher Education Report No. 1). Washington, DC: The George Washington University, School of Education and Human Development.

Dewey, J. (1924). *Democracy and education.* New York, NY: Macmillan.

Freeman, S., Eddy, S. L., McDonough, M., Smith, M. K., Okoroafor, N., Jordt, H., & Wenderoth, M. P. (2014). Active learning increases student performance in science, engineering, and mathematics. *Proceedings of the National Academy of Sciences of the United States of America (PNAS), 111*(23), 8410–8415. doi:10.1073/pnas.1319030111

North Carolina State University. (2019). SCALE-UP: Student-centered active learning environment with upside-down pedagogies. Retrieved from http://scaleup.ncsu.edu

Wilson, J. M. (1994). The CUPLE physics studio. *Physica Teracher, 32*(9), 518-523. doi:10.1119/1.2344100