https://library.educause.edu/~/media/files/library/2018/8/2018horizonreport.pdf

Kopie gemaakt voor NL verwijzingen door Marij Veugelers

Redesigning Learning Spaces

Short-Term Trend: Driving Ed Tech adoption in higher education for the next one to two years

As universities engage with strategies that incorporate digital elements and accommodate more active learning in the physical classroom, they are rearranging physical environments to promote these pedagogical shifts. Educational settings are increasingly designed to support project-based interactions with attention to greater mobility, flexibility, and multiple device usage. To improve remote communication, institutions are upgrading wireless bandwidth and installing large displays that allow for more natural collaboration on digital projects. Some are exploring how mixed-reality technologies can blend 3D holographic content into physical spaces for simulations, such as experiencing Mars by controlling rover vehicles, or how they can enable multifaceted interaction with objects, such as exploring the human body in anatomy labs through detailed visuals. As higher education continues to move away from traditional, lecture-based lessons toward more hands-on activities, classrooms are starting to resemble real-world work and social environments that foster organic interactions and cross-disciplinary problem solving.[74]

Overview

According to widespread research and several meta- analyses, active learning is the most effective mode for learning.[75] Internationally, higher education has em-barked on an evolutionary path away from reliance on the lecture to active learning engagements—a shift vis-ible in the design of its learning spaces. The diffusion of active learning practices is mirrored in the rapid growth of the active learning classroom (ALC) in higher educa-tion. Attendance at ALC-related events has increased significantly, and EDUCAUSE research identified the ALC as the top strategic technology for 2017.[76] Together with makerspaces, ALC designs increasingly promote coursework that helps learners discover, invent, solve problems, and create knowledge.

A study at Seattle Pacific University suggests that a course conducted in an ALC increases student engage-ment and also motivates instructors to engage in more active learning.[77] Another study conducted at Iowa State University investigated how learning space de-sign can impact learner engagement. The study found that removing the spatial barrier between learner and instructor is a key ingredient of active learning engage-ments and that flexibility and openness were important factors in promoting a community of learners.[78] As part of the 4TU project in the Netherlands, four technical universities—Eindhoven, Twente, Delft, and Wagenin-gen—are aiming to develop expertise in engineering education, including by integrating makerspaces into the curriculum.[79] An Eastern Kentucky University re-search project studied student usage patterns in learn-ing spaces to determine natural “hot spots”—locations in a room’s design that learners use most heavily for spe-cific course activities.[80] The variety of options in a cam-pus library often can allow nuanced spaces.

As promising as the new learning space technologies are, some studies caution against over-reliance on them. These studies suggest that learning in classrooms that are equipped with the basics of moveable furniture and copious writing surfaces often can be on par with the learning in high-end, technology-laden ALCs. Moreover, the complexities of learning space technology itself can discourage faculty adoption of ALCs and even impose impediments. Given the significant costs associated with building and maintaining high-end ALCs, most institutions can outfit only a small portion of their classrooms in this manner. This has prompted discussion around issues of access equity and led to proposals for an alternative in the form of *learning-ready classrooms*. Such classrooms are equipped with basic, affordable active learning technologies that institutions can implement in more classrooms.[81] Leaders in learning space design can take these discussions as a starting point for developing an institutional learning space master plan that includes various ALC designs and diffuses active learning engagements as widely as possible.

Implications for Policy, Leadership, or Practice

Several tools are available to assist institutions with learning space policies, as well as with managing strategic and tactical aspects of learning spaces. The Learning Space Rating System is a set of criteria for scoring a classroom’s design with respect to

its support for active learning.[82] FLEXspace is an international collection of detailed examples of learning spaces.[83] Examples of toolkits for learning space design include the U.K. Higher Education Learning Space Toolkit[84] and North Carolina State University's Learning Space Toolkit.[85] McGill University has published its own guidelines for designing teaching and learning spaces.[86]

Resources such as these can assist with the creation of learning space master plans, which in turn can promote the alignment of learning space designs with an institution's overall strategic priorities.

Successful leadership in learning space development requires a holistic approach. On one hand, research indicates that the design of learning spaces impacts instructor and learner perceptions and engagement levels and can lead to gains in learning outcomes.[87] However, learning space design alone does not guarantee better learning outcomes. Unless the course designs are explicitly adapted to take advantage of the room, outcomes may fall short of expectations. Further, students unfamiliar with ALCs and active learning practices may even resist them.[88] To succeed in adopting and implementing these practices, an institution's teaching culture must evolve.[89] Even when using an ALC, much depends on the instructor. Ultimately, the goal of greater learner achievement results from a confluence of factors beyond classroom design, including instructor development, tailored course design, and ongoing student support.

To maximize flexibility and ease of use, learning space technology is becoming fully wireless, supported by wireless projectors and roving mobile devices.[90] Experimentation is also under way with voice activation for learning space technology, often using off-the-shelf products such as Alexa to leverage a room's technology through a natural language interface.[91] Institutions and vendors are already experimenting with the integration of extended reality (XR) technologies—that is, virtual, augmented, and mixed reality—into learning spaces to support both individual and team learning.[92] XR applications span the range of academic disciplines. Dynamic Anatomy is a project at Leiden University and the Leiden University Medical Center to explore the application of virtual reality in medical education.[93] Visual display walls, which are similar to XR technology, are becoming a standard part of learning space strategy at various institutions. Examples include Indiana University's IQ-Wall[94] and Georgia State University's interactWall, which lets students examine close-up images of human organs and take 360-degree tours of Mayan archaeological sites. Stanford University has equipped one of its spaces with a synthetic acoustic system consisting of 40 hanging microphones and 76 speakers to support both class-wide discussion and small group work.[95]

For Further Reading

The following resources are recommended for those who wish to learn more about redesigning learning spaces.

Educational Equity and the Classroom: Designing Learning-Ready Spaces for All Students

educau.se/eduequity

(Maggie Beers and Teggin Summers, *EDUCAUSE Review*, May 7, 2018) The authors advocate for a universal design approach to learning spaces, arguing that high-end ALCs are typically expensive and account for only 2–5 percent of the classrooms on a campus. As an alternative, they make the case for ubiquitous "learning-ready" spaces that support the needs of all students.

FLEXspace

educau.se/flexspac

FLEXspace is an open and international collection of detailed examples of learning spaces. Each learning space description may contain classroom details, floor plans, photos, and the room's LSRS score.

A Guide to Teaching in Active Learning Classrooms: History, Research, and Practice

educau.se/activclas

(Paul Baepler, J.D. Walker, D. Christopher Brooks, Kem Saichaie, and Christina I. Peterson, Stylus Publishing, 2016) This book offers a thorough treatment of ALC-related teaching topics and challenges, such as managing student resistance and convincing students that working in an ALC is beneficial.

Journal of Learning Spaces

educau.se/jourls

(University of North Carolina at Greensboro) This open, peer-reviewed journal—which is published biannually by the UNCG library—includes research reports, position pieces, case studies, and book reviews and addresses all aspects of learning space design, including operation and pedagogy.

Learning Space Rating System (LSRS)

educau.se/lsrs

(EDUCAUSE) The Learning Space Rating System (LSRS) project provides a set of measurable criteria to assess how well a classroom's design supports and enables active learning. The LSRS credits form the basis for a rating system that will allow institutions to benchmark their environments against best practices in the higher education community.

The U.K. Higher Education Learning Space Toolkit

educau.se/lspace

(Universities and Colleges Information Systems Association) This document offers a thorough treatment of learning space design in higher education and is written, as the authors describe, “from the point of view of the professional support services who play a key role in such projects.”

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Endnotes

79 https://www.4tu.nl/cee/en/

93 https://www.mr4education.com/