WHAT DO WE WANT OUR LEARNERS TO BECOME?

Our “learners” are faculty who will become:

• Reflective practitioners of well-researched pedagogies.
• Aware of the many ways that learning spaces can influence student learning and creativity in their use of space to support learning.
• Knowledgeable about the evolving learning preferences of students.
• Willing to approach their teaching in a scientific way—gathering evidence and using it to influence their own practice.
• Empowered to think about the needs of their curriculum and how those needs can be met by different uses and configurations of learning spaces.

WHAT EXPERIENCES MAKE THAT BECOMING HAPPEN?

• Having opportunities to study the effects of a teaching innovation in a pilot setting.
• Seeing data about the benefits of different pedagogies on student learning.
• Having access to a “laboratory” space to experiment with innovative pedagogies with flexible furnishings, lighting, layout, and configuration.
• Learning from the space, not just in the space.
WHAT SPACES ENABLE THOSE EXPERIENCES?

- Flexible, black-box spaces that invite creativity.
- Infrastructure that serves present technologies and also enables the exploration of technologies of the future.
- Spaces able to adapt and evolve, as users continue to experiment with pedagogies and technologies that enhance learning and teaching.
- Spaces with usable lifetimes that outlast the current "standard" configurations of classroom spaces.

HOW DO WE KNOW?

- Research shows that today’s learners prefer curriculum that focuses on hands-on learning in a team-based atmosphere.
- Research shows that more effective learning takes place when students can actively and collaboratively engage in the learning process.
- Case studies demonstrate that space can influence collaboration and teamwork by encouraging interaction and providing teaching resources that use technology to share and capture ideas.
- The professional work environment is moving to more open and collaborative office settings; learning environments need to mimic these real-world practices to prepare students for their future careers.
Background

The Discovery Learning Research Center (DLRC) is a unique active learning environment at Purdue, in that “learners” are faculty seeking deeper experiential knowledge about how students learn and about how particular pedagogical approaches and spatial affordances enhance student learning. In the context of this R1 campus, the DLRC provides an opportunity to bridge the cutting-edge research work done by STEM researchers at Purdue with the exploration of cutting-edge pedagogical approaches—in service of the University’s fundamental education mission. The DLRC has three goals, to:

- Catalyze large-scale, interdisciplinary research programs in teaching and learning, especially in STEM and STEM related fields
- Promote articulation between the scholarship of teaching and learning and actual classroom practice—at all levels.
- Provide leadership across the University in influencing STEM public literacy and educational policy.

Our goal is to help to bridge the gap between what is known from research on education and what is actually taking place in the classroom. We would like to help Purdue transform educational practice in order to maximize student success, but also to explore educational trends that other universities would want to follow.
— Gabriela C. Weaver, DLRC Director

About the DLRC

The DLRC is housed on the first two floors of the Hall for Discovery and Learning Research on the Purdue campus. The DLRC is conceived of as a sandbox space for faculty experimenting with pedagogical innovations, assessing the impact of a particular approach, and determining the influence of spatial variables on the learner. These are a carefully designed and monitored set of strategies that reflect the larger DLRC goals—improving learning within a particular classroom setting and to influence teaching and learning at Purdue—campus-wide.

The DLRC offers specialized facilities designed for educational research, for developing and experimenting with educational materials, methods, and instructional technologies. The DLRC also engages Purdue colleagues in interdisciplinary collaborations on scholarly projects related to learning. Each of the spaces for learning within the DLRC are reconfigurable as spaces for research on learning:

- The project laboratory (STEM) is a space for engineering and group design projects.
- The science laboratory is a sandbox space to explore a variety of STEM learning environments within the traditional lab setting.
- The learning studios have the flexibility provided by movable walls, furniture and tension grids.
- Breakout spaces extend the capabilities of the adjacent learning studios, promoting the interactions and articulation that are the essence of the DLRC.
One DLRC Product—The Flipped Chemistry Classroom

Gabriela Weaver, DLRC director, doesn’t lecture to her general chemistry students—at least not in class. She records short lecture snippets that students review online before the class period. While at “class,” students work problems introduced in those snippets while she wanders around the room, observing students as they are learning, seeking where they are having difficulty.

Her efforts are part of the growing evolution of classrooms that invert (or flip) the traditional sequence of lecture/homework, with professors providing lectures or other course-related materials via the Web and students actively engaged in the formal classroom setting. This approach is adapted from the work of Robert Beichner (featured elsewhere in this guide), originally designed for large enrollment introductory STEM courses.

The whole idea of flipping the classroom and putting most of the content delivery outside of class time is that it frees up the class time, challenging students with more complex, realistic problems, under the guidance of an expert and in collaboration with peers. They get more and deeper opportunities to practice becoming problem-solvers.
— Robert Beichner

Assessment

The DLRC is the ideal setting to experiment with, practice, and assess such approaches as flipping the classroom. In the first two iterations, Weaver used exams from the American Chemical Society to normalize student performance between the conventionally taught first semester course and the flipped second semester course. Student performance improved significantly from the first to the second semester. The assessment data from Purdue is similar to that from chemistry faculty at other institutions involved with flipping the learning experience of their students.

Planning Principles

Conceptualization of the DLRC was driven by three design elements: flexibility, transparency, and access.

The element of flexibility was based on the concept of the “black box” theatre. Just as with theatrical black boxes, the programming needs of the DLRC required spaces that could adapt to a multitude of different settings. The flexible design allows DLRC researchers to reconfigure rooms into learning pods of various sizes, experiment with novel technologies, adjust breakout spaces, vary seating arrangements, etc. With the overhead tension grid, faculty can alter acoustics, lighting, and mechanical systems.

The element of transparency was important because the spaces had to make visible—intellectually and visually—the process of learning. Faculty curious about how learning happens and eager to explore which factors ensure effective learning and teaching experiment in DLRC spaces equipped to record video and sound interactions between learners, learners and faculty, and with the technologies and tools that help researchers review and analyze how students work and the dynamics by which they engage in the learning process.

Architect: BSA LifeStructures
Photos courtesy of: BSA LifeStructures and Purdue University
Location: West Lafayette, Indiana
Net/gross square footage:
Net usable square footage: 81,795 NSF (assignable 56,400 SF, nonassignable 25,390 SF) Gross square footage: 91,860 GSF
Cost: $19,500,00 (construction cost)
Construction period: 18 months
Date completed: November 2009
Disciplines housed: This facility is more research centers and groups than disciplines - the majority of the first two floors are home to the Discovery Learning Research Center.