# Learning Innovations Inventory

## About the Inventory

This inventory highlights 22 promising learning innovations surfaced through the University Innovation Alliance's Learning Innovations Initiative, funded by Axim Collaborative. These innovations were piloted or implemented in foundational STEM courses to improve student success.

## Purpose

The inventory is designed to help institutional leaders, faculty, and practitioners discover scalable strategies that address high DFW (Drop/Fail/Withdraw) rates, support better learning outcomes, and close equity gaps.

## Selection Criteria

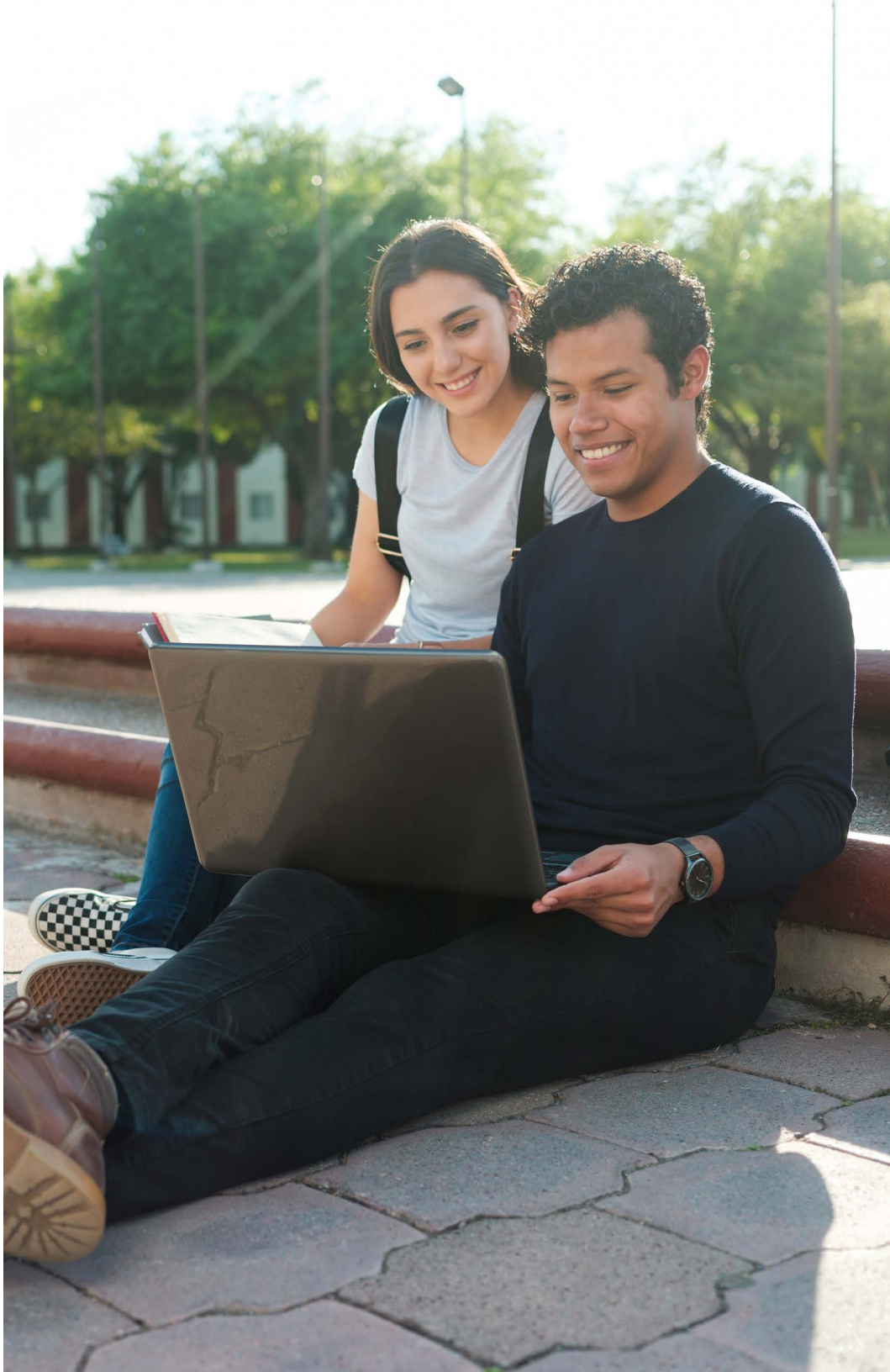
Innovations were selected based on their relevance to gateway STEM courses, early signals of effectiveness, and potential for adoption across institutions. Each entry reflects research-based or tested practices shared by faculty across UIA campuses.

## Categories

1. AI & Digital Learning Tools
2. Immersive & Active Learning
3. Flexible & Adaptive Course Design
4. Peer & Human-Centered Support

## How to Use

Browse each tab by category. Use the inventory to spark campus conversations, inform redesign initiatives, or select pilots for scale. Click links in the 'Learn more' column to explore tools and resources.



# AI & Digital Tools

| Innovation | What's the Innovation? | What Challenge Does It Address? | What's Needed to Implement It? | Intended Impact | Learn More |
|---|---|---|---|---|---|
| **AI-powered Teaching Assistant** | AI tool that answers student questions, offers explanations, and provides real-time guidance within course platforms. | Limited access to instructors or TAs for timely help, especially in large courses. | Access to the tool, alignment with course goals, and integration with LMS or platform. | Increase access to timely academic support, improve student understanding and persistence. | LINK |
| **Charlie** | Conversational AI chatbot used to assist students in course planning, reminders, and academic support. | Student confusion about academic planning or assignments, especially for first-gen learners. | Setup and customization of chatbot, alignment with advising systems and academic policies. | Boost student engagement, organization, and follow-through with academic tasks. | LINK |
| **AI Lab Framework** | Framework and guide for responsibly integrating AI into instruction, including prompt design and use cases. | Lack of faculty confidence or training in using AI effectively in course design. | Faculty development, access to the framework, and intentional integration into course design. | Improve faculty ability to adopt AI tools effectively and responsibly. | LINK |
| **AI-Based Tutoring** | Adaptive tutoring system powered by AI that personalizes learning and identifies knowledge gaps in real time. | Generic learning pathways that fail to adjust to individual student needs. | Adoption of a platform, integration with course materials, and student orientation. | Accelerate mastery of content and reduce DFW rates through tailored support. | LINK |
| **Braincandy** | Interactive web-based tool that enables instructors to pose questions and receive real-time feedback from students. | Low student engagement or lack of real-time insight into student understanding. | Faculty training, internet-connected classrooms, and alignment of questions to learning goals. | Foster student engagement and provide formative feedback for instructors. | LINK |
| **Digital Homework with Analytics** | Homework platforms that provide instant feedback, track student progress, and identify areas needing support. | Delayed feedback and missed opportunities to intervene when students are struggling. | Adoption of a homework platform, content alignment, and student orientation. | Identify learning gaps early and improve student outcomes through personalized feedback. | LINK |

# Immersive & Active Learning

| Innovation | What's the Innovation? | What Challenge Does It Address? | What's Needed to Implement It? | Intended Impact | Learn More |
|---|---|---|---|---|---|
| **Virtual Science Labs** | Online platforms that simulate science lab environments, allowing students to conduct experiments virtually. | Limited lab access dueto space, cost, or scheduling constraints. | Licenses or platform access, internet connectivity, and faculty alignment of lab content. | Increase access to high-quality lab experiences and improve conceptual understanding. | LINK |
| **Dreamscape Learn** | Narrative-based VR experience that combines immersive storytelling with active learning in biology courses. | Low student engagement and difficulty retaining complex content in traditional formats. | VR headsets, platform access, and faculty training on integration into syllabus. | Boost student engagement and comprehension of STEM content. | LINK |
| **Immersive Visualization in Large Lectures** | Use of 3D models, simulations, and animations to visualize abstract STEM concepts in large lecture halls. | Abstract or complex content that is hard to grasp via lecture alone. | Tech-enabled classrooms, prepared visualizations, and alignment with lecture topics. | Support diverse learning styles and enhance comprehension through visualization. | LINK |
| **Flipped Classroom** | Students review content before class, allowing class time to be used for problem-solving and engagement. | Passive learning and low engagement in traditional lectures. | Faculty preparation, flipped materials, and systems for accountability (quizzes, etc.). | Promote active learning and deeper understanding of course material. | LINK |
| **Active Learning in Large Classes** | Instructional redesigns that embed collaborative activities, polling, and peer discussion into large courses. | Disengagement and limited interaction in large-enrollment courses. | Faculty training, instructional support, and tools for student engagement. | Improve student outcomes and satisfaction through interaction and collaboration. | LINK |
| **Course-Based Undergraduate Research Experiences (CUREs)** | STEM courses where students engage in authentic research as part of the curriculum. | Lack of early exposure to research and limited hands-on learning opportunities. | Curriculum redesign, mentoring infrastructure, and institutional support for research activities. | Foster scientific thinking, increase student confidence, and improve retention in STEM. | LINK |

# Flexible & Adaptive Course Design

| Innovation | What's the Innovation? | What Challenge Does It Address? | What's Needed to Implement It? | Intended Impact | Learn More |
|---|---|---|---|---|---|
| **Universal Design for Learning** | An instructional framework that offers multiple means of engagement, representation, and action/expression to support all learners. | Traditional course structures often fail to meet the diverse needs of students. | Faculty training in UDL principles and redesign of course content and delivery. | Improve accessibility and engagement for all learners. | LINK |
| **Flexible Deadlines & Grading** | Course policies that allow flexible deadlines or late work policies to reduce penalties for life disruptions. | Rigid course deadlines disproportionately affect students facing life challenges. | Revised syllabus policies, instructor support, and clear communication to students. | Reduce barriers to success and support equity in course outcomes. | LINK |
| **Mastery-Based Pacing** | Students progress through material at their own pace, demonstrating mastery before moving forward. | Fixed schedules don't accommodate learners who need more time or support. | Modularized course design, automated assessment tools, and instructor oversight. | Enable students to learn at a comfortable pace and demonstrate mastery. | LINK |
| **Growth Mindset Modules** | Short learning modules that teach students about the growth mindset and how it applies to learning in STEM. | Students may lack confidence or hold limiting beliefs about their learning potential. | Integration of mindset content into syllabus or LMS and brief reflective activities. | Promote resilience and persistence through positive beliefs about learning. | LINK |
| **Student Self-Paced Video Modules** | On-demand video content allowing students to review material at their own pace and on their own schedule. | Students struggle to keep up with lectures or need repeated exposure to content. | Recorded lectures or custom videos, a platform to host content, and instructor prompts to guide use. | Enhance comprehension and performance through repeated, flexible review. | LINK |

# Peer & Human-Centered Support

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|---|---|---|---|---|---|
| **Peer Course Facilitators** | Students trained to support instruction and lead discussions or review sessions for peers. | Students need peer-led guidance and additional scaffolding in difficult content areas. | Recruitment and training of facilitators, coordination with faculty, and clear roles. | Enhance learning and build community through relatable peer support. | LINK |
| **Embedded Course Coaches** | Staff or graduate coaches embedded in a course section to provide academic and motivational support. | Instructors have limited capacity to provide individualized support in large courses. | Hiring, training, and embedding of course coaches aligned with course goals. | Improve student persistence and performance with targeted academic coaching. | LINK |
| **Learning Assistants** | Undergraduate students assist instructors in large classes by supporting learning activities and group work. | Large class sizes reduce opportunities for interaction and support. | Learning assistant program infrastructure, training, and instructional alignment. | Increase student engagement and confidence in large class settings. | LINK |
| **Supplemental Instruction (SI)** | Trained peers lead out-of-class review sessions focused on historically challenging courses. | Students in high-failure courses need additional structured learning opportunities. | Coordination with academic support centers, training for SI leaders, and scheduling logistics. | Reduce DFW rates and increase student success in gateway courses. | LINK |
| **Faculty-Student Feedback Loops** | Intentional feedback mechanisms between students and faculty to refine course design or instruction. | Lack of feedback channels reduces student agency and limits course improvement. | Tools for collecting feedback (e.g., surveys or focus groups) and commitment from faculty to review and act on insights. | Promote responsive teaching and inclusive course design. | LINK |