Stanford | Transforming Learning Accelerator

Digital Learning Initiative

Transforming virtual learning for children and adults.

THE CHALLENGE

A high-quality education is not always available. Poverty, cultural or societal barriers, too few schools, a shortage of qualified teachers, displacement by war, natural disasters, and now disease – as we've seen with COVID-19 – all have the power to keep children and adults from accessing the learning they need to be successful in life.

Virtual learning has the power for broad impact. It allows us to deliver learning opportunities into the hands of our youngest children learning their ABCs to job seekers wanting to acquire new technical skills. It can complement in-person instruction or serve as a stand-alone course. It can help you learn to play the violin, be more empathetic, do geometry, explore the arctic, or de-stress. It can be on-demand or with a group from around the world. Mostly virtual learning allows us to engage broadly and with the most disadvantaged and remote places to offer knowledge, growth, connection, and opportunity. But only if we can address the persistent challenges facing digital learning.

Evidence from a decade of massive open online courses and the current pandemic show online learning in its current form has been insufficient for delivering on these promises. Education is more than a menu of academic courses. In-person experiences create identities, dispositions, passions that define a life course, enduring friendships, and so much more. Meaningful learning requires more than course material – it requires social interaction and the peaks and valleys that come with rich experiences.

OUR VISION

The COVID-19 crisis exploded demand for high-quality remote learning options and expanded the willingness of educational systems and businesses to invest the time and money necessary to leapfrog the field.

The goal of DLI is to transform digital learning for children and adults. We will produce fundamentally new ways of learning virtually, create more precise and effective educational tools for learners with diverse needs, and expand access to quality educational resources that go beyond instructional models that emphasize factual and procedural recall.

DLI researchers will combine science and design to understand the nature of digital learning while developing creative and tested solutions and practices. Working with public and private partners in education, technology and industry, DLI will find better ways to ensure that digital learning solutions are based on a collaborative discovery and design process.

In reaching its goal, DLI will help build a world that includes robust virtual learning options that effectively address the significance of informal learning, build knowledge, create community, advance careers, and enrich lives so that when confronted with a new crisis that threatens to disrupt learning, we are ready.

WHY STANFORD?

The Digital Learning Initiative is one of five current initiatives within the Transforming Learning Accelerator, designed to address the greatest challenges facing learners by advancing the science of learning and the design of solutions.

As part of this university-wide initiative, DLI will harness creativity and innovation from across Stanford's seven schools. Stanford currently has world-class expertise in key fields to advance digital learning – computer science, education, psychology, communications and design. Stanford also has the world's leaders in subject matter expertise. Unique to Stanford is its ability to connect expertise across fields in ways that can be catalytic for new knowledge. Partnerships with educational technology firms, school districts, corporations, and other organizations in Silicon Valley and globally will further integrate the newest ideas, technology, and mechanisms for designing, testing, and scaling solutions.

Stanford already is producing successful digital learning solutions. One example is the work of Dan Schwartz's lab to create an app that helps students learn by teaching a computer character. The program embeds proven research on sustaining motivations by taking responsibilities for others. Another example is Emma Brunskill's development of a ChatBot that is more effective at helping children learn math than traditional flashcards. Additionally, Jeremy Bailenson is bringing discoveries to scale by creating and showing how virtual reality experiences can motivate change and behavior. Immediately following the shutdown of schools in Spring 2020, Chris Piech launched a free coding course that reached thousands of college students around the world and enlisted hundreds of tutors to help. Further, Stanford students have spontaneously leapt into the space with many creative solutions for creating community online.

DLI will build on these examples and motivate more scholars and students around the challenge of bringing digital learning innovations to the world. In becoming the center of expertise and knowledge in producing high-quality digital learning solutions, Stanford will honor and advance the richness of learning and contribute meaningfully to the world.

OUR PLAN

To advance virtual learning solutions, DLI will leverage the student-centered, research, and design model that is cornerstone to the Transforming Learning Accelerator. This new structure is centered on collaboration between interdisciplinary research teams, practitioners, and designers, and embedding a pathway to impact from the start.

Program

DLI will focus on digital learning across the lifespan. This includes four distinct learning periods – early childhood, elementary and secondary education, college, and professional development. Across projects, there will be a common emphases on access, inclusion, student and faculty satisfaction, learning effectiveness writ large, and innovation.

Early Childhood – Many children do not have access to high-quality preschools or in-home support. Online learning tools have the potential to reach every household and provide caregivers with effective learning tools that support development. DLI will work closely with teams focused on early childhood development to create digital tools that support young children and their parents, teachers, doctors, and caregivers.

Elementary and Secondary Learning – In schools, children are exposed to new subjects, new people, and new ways of learning. Opportunities abound to use digital learning to reinforce formal education as well as extend informal learning at home. DLI research activities will leverage Stanford's relationships with school districts, community organizations, ed-tech providers, and others serving school-aged children. In response to COVID-19, the initiative will first focus on projects that create effective and innovative remote learning solutions for K-12 students that also empower parents, teachers, and tutors to support children who have yet to become independent learners.

College – For many, college serves as the bridge between childhood and adulthood. Colleges can promote personal
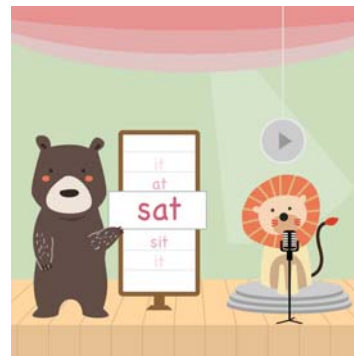
growth, creativity, critical thinking, community engagement, communication skills, professional development, and more. To extend college opportunities broadly, we will bring Stanford classes to high-need, high-potential students and create remote experiences that have traditionally depended on physical co-presence. Digital acceleration teams that include students and instructors, learning science experts, software developers, and digital learning specialists will be deployed to focus on solutions that address critical online college challenges.

Professional development – Thriving in a changing world requires the continual development of individuals after they enter the workforce. More than other sectors, working individuals and employers have taken advantage of online learning platforms. Ensuring that these highly motivated individuals and businesses have access to rich professional development tools that quickly and effectively build expertise is essential. DLI will work closely with TLA's Workforce Learning Initiative and partner organizations to create better workforce growth opportunities.

DLI will create an infrastructure to advance innovation and develop a pathway for bringing solutions to scale with creative partners. DLI will develop and host experts innovating in digital learning and create a centralized space for sharing ideas and convening.

Outcomes

Our short-term goals to meet this year's needs include working directly with school districts, parents, and research partners to accelerate knowledge that can help more immediately. Findings from our initial projects will be rolled out as they are revealed through professional learning, convenings, media, and partnerships. Over the course of the initiative, we will:

- Uncover components that lead to remote learning effectiveness and impact;
- Expand the boundaries of online learning. Push the frontiers of both technology and pedagogy;
- Make measurable progress in reducing disparity;
- Identify areas where digital learning advances knowledge more quickly, propels deeper learning, and offers greater personal growth.
- Leverage new tools. Use new technology (e.g., biometric sensors, virtual reality, software) that can better sense learner needs and deliver technologically enriched solutions.
- Incubate and scale innovative designs. Support promising efforts, from pilot trials to large scale dissemination.

NEXT STEPS

DLI has moved to identify and share digital learning solutions, emphasize rapid prototyping, promote synergies in digital learning, and engage students in innovation. Key steps during the 2021 academic year include:

Create a Hub of Activity – DLI will bring together Stanford faculty, students, and others from across disciplines interested in learning sciences, design, digital learning, and impact. We will expand external partnerships to schools, social enterprises, ed tech, and businesses interested in digital learning innovation. And, DLI will promote a talk series with industry experts and hold a conference to fuel intellectual curiosity, share new findings, and identify pathways to impact.

College Projects Piloted at Stanford – A team of students, faculty, learning science experts, programmers, and digital technology specialists have been deployed to focus on higher education digital learning solutions. Selected projects focus on areas that have been highly disrupted by the pandemic and are in need of novel digital alternatives. This year's projects focus on three areas: field-based study, clinical learning experiences (e.g., teacher education), and dorm and community center life. Members of the digital acceleration team will design solutions, pilot them at Stanford, and then expand beyond Stanford through strategic partnerships.

Stanford College Classes – A task force will be formed to design a pilot digital education program that brings Stanford courses to high-needs, high-potential students. The pilot would launch with one course (potentially CS106A), a small number of students, onsite partner instruction, and online tutoring. Additionally, the Task Force would perform outreach to partner institutions and individuals who are knowledgeable and engaged with the audiences we intend to reach, in preparation for scaling to a larger program.

PreK-12 Projects – Seed projects focused on pandemic-induced challenges that could also open new pathways for education in the long run will begin. Awards went to six faculty from the Schools of Medicine, Humanities and Sciences, Education, and Engineering. These included projects to create new forms of AI-infused tutoring supports that join teachers, parents, and tutors; enabling synchronous remote musical performances; and, virtual game worlds that support inclusion and social support for students with disabilities. Funds will support faculty, students, and researchers in research, design, and outreach.

Promote Student Innovation – Graduate students will receive training and mentoring through research assistantships as part of the PreK-12 and university projects. In addition, DLI will host a student technology design challenge for undergraduate and graduate students. Students interested in developing designs that support community and promote learning will have access to an incubator for learning design and technical support, financial support, and partners with on-the-ground experience, technical expertise, and outreach networks.

Disseminate Digital Innovations – DLI will collect and share the knowledge generated at Stanford. Through a capture project, research assistants will vet practices, surface promising trends, add additional components to a resource website, and expand access to outside groups.

Plans articulated here may undergo further refinement.

ACADEMIC LEADERS

LEADERSHIP

Dan Schwartz, I. James Quillen Dean and Nomellini & Olivier Professor of Educational Technology, GSE
Jennifer Widom, Frederick Emmons Terman Dean of the School of Engineering; Fletcher Jones Professor in Computer Science and Electrical Engineering
Shelley Goldman, Professor Emerita, GSE
Kristen Pilner Blair, Director of Research of DLI, Senior Research Scholar, GSE

FACULTY ENGAGEMENT

Peter Williamson, Associate Professor and Faculty Director, Secondary Teacher Education Program, GSE
Ira Lit, Associate Professor and Faculty Director, Elementary Teacher Education Program, GSE
Sarah Levine, Assistant Professor of Education
Ryan Petterson, Lecturer and Director of Field Education, School of Earth, Energy and Environmental Sciences

DESIGN TEAM MEMBERS

Karin Forssell, Director of Learning Design and Technology MS Program
Dan Colman, Dean, Stanford Continuing Studies
Paul Kim, Associate Dean for Technology, GSE
Shawn Kim, Director of Digital Learning Solutions, GSE
Heidi Chang, Director of Professional Learning, GSE
Keith Bowen, DLI post-doc, GSE

STUDENT AND POSTDOC PARTICIPATION *in 2020*

10 Graduate student research assistants
3 Postdoctoral scholars

DEVELOPMENT CONTACT

Heather Coleman Trippel
Associate Dean for External Relations, GSE
htrippel@stanford.edu