



Technology for Equity
in Learning Opportunities

ANNUAL REPORT

2018-2019 Academic Year



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Background

The TELOS (Technology for Equity in Learning Opportunities) Initiative was established in 2015 as a result of a generous gift from the Nomellini-Olivier family. TELOS' overarching goal is to create and investigate ways that Technology can advance Equity in Learning Opportunities for preK-12 learners, educators, and families.

To achieve this goal, TELOS works to:

1. Facilitate the design, building, testing, and scaling of technology for learning;
2. Prepare and support education leaders and teachers to use educational technology in support of effective teaching and learning;
3. Support collaborative efforts in this domain both within and beyond Stanford; and
4. Shape the discourse in this arena by widely disseminating the results of our efforts and by serving as a convening force in the field.

TELOS is structured as an initiative, rather than an individual project or an organized center, so that work can be spread across all areas of the GSE and help connect diverse stakeholders.

The following report details TELOS' activities in the 2018-2019 academic year. Reports of activities carried out during the 2015-2016, 2016-2017, and 2017-2018 academic years can be found at telos.stanford.edu/resources.

Team & Partnerships



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In 2018-2019, TELOS was also supported by:



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GOAL I: Facilitate the design, building, testing, and scaling of technology for learning

Through our grants to GSE faculty and students, TELOS supports a wide variety of work at the intersection of equity, technology, and learning. At the heart of the grants program is the mission to improve educational equity by creating and investigating ways that technology can uniquely contribute toward this mission.

TELOS grants support work that addresses our goal of advancing research as well as our goal of designing and scaling solutions. Faculty and student awards fund research projects at the TELOS intersection, as well as projects that include building/scaling of technologies at the intersection. In many cases, particularly with faculty and doctoral student awards, the projects are a combination of research and technology development.

In 2018-2019 TELOS awarded its last round of funding including five new faculty projects, five new doctoral student projects, and eleven Masters student projects. The projects cover a broad range of learning domains, including literacy, language learning, engineering, music, and more—in both classroom and out-of-school settings. For example, Dr. Nicole Ardoin’s project uses AR to reveal hidden aspects of ecosystems for park visitors, with a particular focus on young people who do not typically get a chance to visit redwood forests. Dr. Antero Garcia’s work investigates how technology that low-income students currently used on long school bus rides could be leveraged to support learning. Working in Bay Area classrooms, Dr. Rebecca Silverman and Dr. Sarah Levine’s research focuses on how technology could support literacy among English learners. Projects are taking place across the world in the U.S., the Phillippines, India, Ivory Coast, and Brazil. Criteria for awards center around a strong focus on equity and projects’ potential to advance equity. The tables below share abstracts of all 2019 TELOS faculty, doctoral student, and masters student projects.

2018-2019 TELOS Grantees

2018 - 2019 Faculty Large Awards



NICOLE ARDOIN

Environmental Learning in California's Redwood Forests: Strengthening Climate Change Education through Equity-Centered Design of an Augmented Reality (AR) Application

California's coast redwood trees form the core of complex ecological communities that stretch from Big Sur to southern Oregon. Yet despite being the tallest and some of the oldest trees on Earth, redwoods are vulnerable to urbanization, drought, pollution, and climate change. Rich opportunities exist for engaging the 30 million visitors who flock annually to redwood parks in learning about and taking action to protect these highly diverse, yet threatened, ecosystems. To that end, this study explores opportunities for context-relevant, personally meaningful climate change education using visual storytelling, specifically augmented reality (AR), techniques. Through a co-design process with park visitors--particularly those who are often underrepresented in exhibit, educational, and consumer-technology design processes, including youth, the elderly, and underrepresented minorities. Dr. Ardoin and team will create AR experiences that tell the story of the iconic coastal redwood, shifting fog patterns, and climate change more broadly. The project is one of the first to examine AR's effectiveness in an informal setting in support of outdoor learning experiences; as such, it has a high potential for creating a blueprint for future AR applications in the environmental learning space.



ANTERO GARCIA

Learning on the Move: Exploring Learning, Chromebooks, and Equity on a Tinsley Voluntary Transfer School Bus

Through a collaboration with two local school districts, this study explores the uses of technology on a school bus that transports students from East Palo Alto to schools across the Peninsula each day. Studying a recent technological intervention that a district made to support students engaging in the Tinsley Voluntary Transfer Program, this study explores the academic, social, and cultural effects of busing and technology on these students. Completing preliminary observations and interviews during the 2018-2019 school year, our research team worked alongside both districts to strengthen the possibilities of technology for supporting various equity-dimensions of learning for students commuting each day across the city. Through the development of an alternate reality game that supports STEM+ and location-based learning, this project highlights how youth voice can be centered in equity-driven approaches to learning in informal learning settings. Ultimately this project investigates how technology affects these students as learners and civic participants at school and home.



SARAH LEVINE & REBECCA SILVERMAN

Using Speech-to-Text Technology to Support Students' Writing Skills, Engagement, and Identities

Speech-to-text technology (STT) allows users to speak into a computer or smartphone microphone and immediately see their words transcribed on screen, which means that STT could be an accessible, easy-to-use tool for equity in the writing classroom. In this project, we explore students' use of STT in elementary and high school classrooms. We partner with Bay Area elementary and high schools, visiting their classrooms and working with students and teachers. The study investigates if and how using STT might influence the quality of students' writing, their engagement in the writing process, and the degree to which they feel positively about writing.



SAM WINEBURG & PRASHANT LOYALKA

Testing a Digital Literacy Curriculum in the World's Largest Democracy

While the digital revolution has greatly enhanced access to information for millions, it has simultaneously allowed unscrupulous state and non-state actors to spread misinformation online. Youth are particularly vulnerable to misinformation and “fake news.” This study addresses this global challenge by testing a curriculum in India—the world’s largest democracy. Dr. Wineburg and Dr. Loyalka work closely with Freedom English Academy (FEA), an Indian NGO that provides free, English and non-cognitive skills training to low and middle-income youth in New Delhi. With FEA’s help, they will run a large-scale randomized controlled trial (RCT) in its 92 centers (that train over 20,000 students). Teachers and students from half of the centers receive the “Civic Online Reasoning” curriculum developed by the Stanford History Education Group, while the other half will not receive the program. This will be the largest test of a digital literacy curriculum to date anywhere in the world.



2018 - 2019 Faculty Innovation Awards



JELENA OBRADOVIĆ

Development and Pilot Testing of a Platform to Improve Teachers' Understanding and Report of Socio-Emotional Learning Skills in Elementary School Students

Elementary school teachers are an important source of information about students' social and emotional learning (SEL). However, existing teacher surveys are not structured to take full advantage of teachers' knowledge about their students' SEL skills. For example, these surveys ask many questions about each individual student, leading to mental overload and making it hard for teachers to distinguish between different SEL domains. Combining several promising strategies to improve teachers' reports, Dr. Obradovic and team are creating a new SEL assessment approach to collect teacher reports of students' five SEL domains: self-awareness, self-management, social awareness, relationship skills, and responsible decision making (<https://casel.org>). This assessment will have a novel response format in which teachers respond to each SEL question for all students in the classroom by considering the full range of students' behaviors, rather than focusing on one student at a time. The questions use specific, developmentally appropriate, and culturally sensitive responses, rather than vague answers that are open to bias, such as "often" or "sometimes." The product will be an iOS app to help teachers seamlessly use this assessment platform during the course of regular school days. This app will provide actionable, real-time reports to teachers about individual students and classroom averages that can be used to guide instruction and communicate with parents. Dr. Obradovic will test the new SEL assessment app in grades K-5 and get elementary school teachers' suggestions about how to improve both the questions and the app functionality.

Learn more in "News and Updates from Grantees" section below.

2018 - 2019 Doctoral Student Awards



KELLY BOLES

eModeler

Building upon Manipul8: An interactive experience to facilitate geographically distant, real-time, tangible collaborative opportunities for mathematics teacher professional development (TELOS Grantee 18-19), eModeler seeks to expand opportunities for mathematics teachers to act as designers of virtual, tangible learning environments. eModeler is a design studio, allowing teachers to exercise agency in the way a digital, tangible, and dynamic collaborative learning module is built and experienced by students and teacher peers alike. User-designers enter into a Microsoft® Powerpoint® - like interface and can specify specific digital objects, aids, and other behaviors in response to end-users' tangible and physical actions. This study considers the ways in which teachers plan and execute design choices within the design studio. Specifically of interest is how teacher designers draw upon their beliefs, knowledge, resources, and practices to inform module design. eModeler provides teacher-designers, regardless of school resources and geographic boundaries, the ability to build and modify these dynamic collaborative learning modules, designed for the unique and varying needs of student learners.



RAQUEL COELHO

Automated Writing Feedback as a Means of Enhancing High School Students' Argumentative Writing Abilities

Learning to argue is one of the core objectives of education. It is a key human skill, vital to success in the workplace as well as in everyday life. The existence of (or lack thereof) robust learning opportunities for students from disadvantaged backgrounds to become competent arguers will be a key factor in the extent to which we combat or continue to reinforce existing privilege. This study aims to augment formative feedback in underserved public schools in Brazil so as to foster high school students' learning of increasingly more advanced argumentative writing skills. To this end, the present study addresses three questions. The first is whether human annotators can reliably identify argumentation structures in persuasive essays to yield annotated data of high quality. The second concerns the automatic recognition of key components of an argument, grounded in Toulmin's (1958/2003) argumentation model. The third is whether automated formative feedback targeted specifically at argument structures in students' essays might improve their argumentative skills in the context of reasoning about local polemic issues.



HSIAOLIN HSIEH

Probing with LogoSearch: Research on Equity and Fairness in Linguistically Diverse Classrooms

Vygotskian theories describe learning as a social phenomenon mediated by language as the tool, and language as primarily acquired through meaningful interaction in which knowledge co-construction occurs. Drawing from the sociolinguistic framework, this research project aims to leverage the technology of LogoSearch—an interactive language repository of students' classroom conversations created with TELOS funding during 2016-2017—to conduct an investigation into equity and fairness in learning through analysis of student conversations. The goal is to explore how different configurations of students in small group discussions influence opportunities to learn in linguistically diverse PreK-12 classrooms. Specifically, the study examines whether gender and English proficiency level correlate with different indicators of opportunity for minority students to participate in meaningful classroom dialogues. This investigation will also contribute to the research agenda of LogoSearch ("promoting equity and fairness in linguistically diverse classrooms"), and further stimulate the ongoing development of the platform (i.e. the continuing evolution of an interactive language repository) through a deep engagement with its search interface, with a view to expanding it into a full-blown researcher's dashboard.



BRANDON REYNANTE

Participatory Design in Humanitarian Engineering Education

This study seeks to investigate field-tested methods for participatory design in humanitarian engineering education through an ethnography of one particular project aimed at addressing the lack of reliable and affordable lighting in a rural village in the Philippines. Humanitarian engineering programs have appeared at many universities in recent years with the dual (potentially conflicting) aims of improving the well-being of underserved communities and providing students with cross-cultural design experiences. However, many of these service-learning initiatives struggle to produce equitable and sustainable outcomes because students are often motivated by an uncritical desire to help and will implement technologies without meaningful community participation in the design process. This may result in re-entrenchment of inequitable power relations, misinterpretation of community needs, failure to leverage local knowledge, inattention to the structural causes of inequality, and inability of communities to maintain and replicate solutions. Findings from this research may generate insights about indigenous design practices, strategies for integrating engineering knowledge and indigenous knowledge, the role of power dynamics and student mindsets, and how local contextual knowledge could be intentionally designed into other learning and innovation processes.



ADITYA VISHWANATH

Participatory Virtual Reality Design

This study explores engaging young learners in 360-degree video virtual reality (VR) content creation on local topics of social justice. Leveraging VR affordances of immersion, presence, and realism, we examine how learners engage in first-person perspective-taking with VR to foster experiential learning, inquiry learning, and guided noticing, so as to connect students to economic, social, and cultural realities of their local environment. This project consists of a mixed-methods investigation of how young learners learn to use storytelling with VR—creating, consuming, and sharing 360-degree media content. Taking a participatory design approach of designing with users, participants will learn to use 360-degree cameras and supporting equipment (tripods, body mounts, mics, viewers). The research will examine the social and technical dimensions of integration of this VR-making process and aim to provide design recommendations on how 360-degree media may be used as a novel storytelling and documentation tool in field research engaging learners as co-designers.



LAUREN BEATON & IRINA STHAPIT

Robotics

Programming jobs are everywhere, but a leaky pipeline deters many from entering the workforce. A gender gap continues to exist within STEM fields, particularly computer science (CS). Many girls lose interest in STEM at various points of their life, with the first major drop-off occurring around the age of 12. Cultural norms lead many kids to view programming as boring, too technical, and ultimately not for them. Robotics is a puzzle game that aims to challenge these norms by introducing computational thinking skills inside fun biology quests. Kids play the role of a programmer in a robotics lab, upgrading their robot with animal-inspired features as they navigate through the game world. Robotics integrates programming instruction with biology content and would be introduced to learners as a unit of their science class, allowing them to see potential interesting applications of CS (i.e., robotics & biomimicry) in a way that applies to their own interests, while also bringing basic CS instruction into schools and classrooms without needing teachers to have experience in computer science instruction. Robotics illustrates the interdisciplinary nature of STEM while building skills that will help students to thrive in the 21st century.



KENNETH FERNANDEZ & JOYCE HE

Designing Sketch and Learn: Creating a Playful Sketching Experience that Helps Learners Build a Practice Toward Visual Notetaking (aka “Sketchnotes”)

Notetaking is an important practice in classrooms around the world, and is useful for capturing information and forming connections between large amounts of information and ideas. However, traditional notetaking methods tend to follow a linear structure, and students are often trained to capture information in a verbose text-based format. Visual notetaking, also known as sketchnoting, taps into both the verbal and visual processes of decoding and encoding information, allowing learners to use a combination of words and images to make meaning from verbal or text-based information. Not only do studies show the potential benefits of sketchnoting, educators who have taught sketchnotes in their classrooms have also reported that it opened up opportunities for minority students such as neurodiverse individuals and language learners, providing them with another means of expressing their ideas and showing their understanding of content. To facilitate the learning of sketchnotes, Mr. Fernandez and Ms. He designed Sketch & Learn, a web-based game that engages learners in playful sketching quests that help them build a visual library and a dedicated practice towards sketchnoting. Drawing on insights from learning theories on scaffolding, game design, and best practices from educators, Sketch & Learn builds learner's efficacy by providing small victories, immediate feedback and guided deliberate practice — ultimately helping them to take control of the information around them, form connections, express ideas, and make their learning visible.





ANDY JIANG

Wolfgang: Helping novice music learners feel musical through embodied learning of musical tension

Living in a world filled with music, humans have naturally developed implicit knowledge about music. Without us realizing how it works, the tension and resolution in our favorite songs elicit an array of emotions that move us. Unfortunately, middle school students often don't realize how much they already know about music and give up music at a stage critical for their aesthetics and identity development because they don't feel "musical" enough. This study explores the possibility of creating an embodied and playful learning experience for novice music learners through Wolfgang, an expressive musical toy where players learn to play their favorite songs by applying physical tension to change musical tension.



TIANXING MA

Octans: Chart your constellation of support. A web platform for adolescents to identify and expand their social support networks to explore interest-driven learning pathways

Octans seeks to empower low-income and culturally marginalized high school students by raising their awareness of the importance of social capital and guiding them to notice, act upon and expand their surrounding resources. The embedded resource in this system, social capital, is a key determinant in our academic and career trajectories. Low-income and culturally marginalized students often face an uphill battle in accessing these resources that more affluent peers gain through their social networks. Fortunately, these networks are dynamic, and we can learn to recognize, nurture, and utilize our social networks. Explicitly discussing the importance of social capital and developing students' help-seeking skills has been demonstrated to have enduring positive effects on students' social networks. As a web platform, Octans features (1) explorations of how relevant role models have used social capital using multimedia storytelling, (2) an interactive visualization tool that helps students identify and reflect on their social network, and (3) a goal-setting and action-planning journal with prompts and strategies to build social capital. Along with other mentoring resources, Octans aspires to prepare learners to pursue interest-driven learning pathways using their social networks.



ESZTER MESZAROS

BOND: Share more. Preserve memories. Have fun.

One of the most crucial predictors of later academic and broader life success is the quality of language input children receive during the early years. While families that engaged in more intergenerational storytelling showed better emotional well-being than their peers whose families shared less personal stories amongst themselves, need finding results suggest that there are missed opportunities for families to engage in deeper conversations. BOND is a suite of free applications that allows families to have meaningful conversations, even if they have only limited time or are on the go. The first piece of the suite that is developed is The BOND Show, a mobile based talk-show, where the parent and their child get to be star guests in a conversation hosted by a cartoon host of their choice. The host asks deep, generative questions from both the parent and the child, making it easier and more fun to engage in rich conversations.



EMILY RAPADA

Beyond the Game

Over 45 million youth in the US participate in sports, yet conversations about emotional health in athletics are non-existent. By focusing only on physical health, we deprive young athletes of critical opportunities to grow emotionally-- coaches can change that. Beyond the Game equips coaches with the tools, resources, and confidence they need to change the culture of sports through dialogue. Through a guided web-based experience and team activities, Beyond the Game empowers athletes and coaches alike to talk about the importance of emotional health. By unlocking the potential in all coaches, Beyond the Game redefines the meaning of health.



ELENA SEMEYKO

Recollect: An app for intermediate-level language learners

Many language learners cannot remember a new word from the first time they encounter it and therefore need to review the word multiple times. This challenge is particularly acute for intermediate- and advanced-level language learners who have to memorize words and phrases that are used less often than the basic vocabulary learned before. Also, to be able to actively use a word in their oral and written communications, learners have to master multiple aspects of word knowledge: not only its meanings and forms, but also frequency of use, stylistic behavior, and associations with other words. The latter aspects can be mastered through exposure to multiple examples of word usage in context. However, finding those examples manually is quite time-consuming for students. The app developed for this project automates the search for word usage examples and combines it with spaced repetition practice. Every time a student repeats a word, she sees an example of its usage taken from her favorite book or movie. As a result, the student gradually learns how to apply the word to multiple situations and is better prepared to use the word in real life.



DIEGO SIERRA

Inspireo

Our opportunities to have valuable learning experiences, formal and informal, are being intercepted by the private interest of companies to nudge us to watch, read, buy or think about. The distractions of advertisement and addictive technologies affect everyone, including students from both high-income and low-income backgrounds. But while students from high-income backgrounds have countervailing influences in their lives, like well-resourced schools, private tutoring and a wealth of options for extracurricular activities, these resources are not available to students from low-income backgrounds. Therefore, the design of persuasive technologies affects negatively to a larger extent low and middle income students, and therefore increases learning inequality.

Inspireo is a mobile companion designed to empower students to direct their own learning in an increasingly distracting digital world. Through a mobile app, students can connect their purpose with their practice, set attainable goals, and establish new habits through reflection routines. Inspireo helps learners focus their attention toward their goals and away from digital detours.



YUQI YAO

Nartshell: Unleash Your Inner Artist

Picasso once said "every child is an artist, the problem is how to remain an artist once he/she grows up". Although we celebrate the creativity that inspires art, and the artists who inspire creativity, much of art education today focuses on specific techniques rather than creativity itself. Nartshell, an exploratory web game, provides underserved students a safe space to flex and hone their creativity as artists. Students travel around in a virtual world of "nartshells" to interact with and learn from characters based on famous artists like Andy Warhol. Moving through progressively harder challenges, students unlock new paintbrushes and other visual effects tools to level up their art ability and creative confidence. Nartshell is designed to offer richer art and creativity learning opportunities in settings that have limited access to them.



LUYI ZHANG

Nails on Ninth: Fostering Empathy around Immigration through Story-Driven Gameplay

The 2016 elections ushered America into a time of exceptionally volatile politics. It brought to the forefront of politics our country's ongoing struggle to define what it means to be an American, and, even more importantly, who gets to be an American. The media plays a critical role in shaping our idea of who belongs and who does not. It both mirrors and fuels Eurocentric, patriarchal values which undergird American culture. While minority groups are well-informed about the dominant group through television, magazines, books, and newspapers, the reverse is untrue. Representation of minority groups in the media are often limited to stereotypical depictions. This project aims to counter the dominant narrative in an expanding corner of media, video games. Nails on Ninth is a serious digital game for young adults that challenges the characterization of immigrants as "undesirable." The game uses perspective-taking and narrative-driven gameplay to foster empathy around the immigrant experience. Nails on Ninth challenges stereotypes and assumptions around immigration while raising the player's awareness about racial and ethnic discrimination in modern-day America. The game is designed for PC and macOS platforms.



STEPHANIE ZHANG

Hello, Muzu

Debugging is a difficult skill for novice programmers, and is often accompanied by emotions of frustration, anger, and defeatism. Past research has shown that when students encounter a bug they can't solve, they often attribute the failure to their own lack of ability, rather than a natural step in the programming process. This poses a particular risk for minority populations in CS, who already encounter stereotypes that they are not good at programming. Despite the importance of debugging instruction, the skills for getting unstuck are often overlooked in CS curricula. Hello, Muzu is a chatbot embedded in Scratch designed to teach students the process, strategies, and mindsets for getting unstuck. When students encounter a bug while programming, the conversational agent, Muzu, scaffolds their debugging process by prompting reflection through directed questions. Muzu also teaches students a set of strategies to isolate their bug, such as clicking on individual blocks of code to decompose the problem. Finally, Muzu aims to shift students' mindsets towards failures and bugs as new learning opportunities. A pilot study conducted with students aged 11-15 showed that students felt more confident in their debugging ability and emotionally supported by the chatbot. Preliminary findings also demonstrated that the UI interface helped to reduce the cognitive load of debugging. Importantly, qualitative findings showed that students also began to see debugging as a powerful idea that had implications far beyond CS.

News and Updates from Grantees

New Technology, Collaborations, & Funding

BY: JELENA OBRADOVIĆ

We have created the [Assessment of Motivation, Effort, and Self-Regulation \(AMES\)](#), an iPad app that measures social and emotional learning (SEL) skills in elementary school students. AMES includes five games that assess executive functions, delay of gratification, persistence, and challenge seeking--skills that are associated with success in school. This pragmatic research tool makes it possible to do standardized, group-based assessments, allowing us to measure social and emotional learning skills in larger, more representative populations with minimal disruption to teachers and students. We have conducted an initial field test of the app, have established a research-practice partnership with Boys and Girls Clubs of the Peninsula, and are using the app in Côte d'Ivoire and Ghana.



Our research-practice partnership with the Boys and Girls Clubs of the Peninsula (BGCP) studies SEL skills in low-income, predominantly English language learners who are below proficiency in reading. We assessed 130 second and third graders in fall 2018 and completed follow-up assessments in May 2019. This study has helped us build a strong relationship with BGCP and is providing information about AMES test-retest reliability, relations among SEL skills, and longitudinal growth in SEL. In addition, we have conducted group-based administration with up to 15 students at a time to make data collection scalable.

We presented the results from fall 2018 to BGCP reading coaches, instructional support staff, and administrators and engaged in discussion about how to make the data more useful for practitioners. We also [produced a report](#) for BGCP summarizing the findings from fall 2018, [presented the results from the spring assessments](#) in August 2019, and are working on a second report for BGCP as part of our dissemination efforts. We have received a small grant from the Spencer Foundation to extend this study next year by examining whether SEL helps students benefit from the “Building Readers” program, an intensive literacy intervention administered by BGCP. We have also received a small grant from the Stanford-Sequoia Research Collaborative to support this work.



SPENCER



In the summer of 2019, we employed AMES as part of an intervention study in which children will watch short, animated videos to help them regulate their emotions during a learning challenge. We will examine the effects of these videos on children’s physiological arousal and performance on the AMES tasks. This work is funded by a research fellowship from the Jacobs Foundation.

International Extensions

One of our goals is to understand the development of SEL skills in low- and middle-income countries.

With a seed grant from the Jacobs Foundation-SRCD Development in the Digital Age Research Consortium, we have started a collaboration with Dr. Kaja Jasinska at the University of Delaware and Dr. Amy Ogan at Carnegie Mellon. As part of this study, we assessed 700 elementary school children in rural Côte D’Ivoire to understand how SEL skills are related to literacy and we will assess these children a second time to learn about growth in these skills.



Together with Dr. Sharon Wolf, we received a seed grant from the Global Engagement Fund at to administer AMES tasks in Ghana as a part of a longitudinal study led by Dr. Wolf. The objective of this study is to examine how EF and motivation develop and are linked to school success in Ghana. The study will build on an existing longitudinal project with a sample of children who were part of an intervention study to improve the quality of early childhood education in Ghana in 2015-16. The results will inform future work to develop school-based interventions targeted at the development of EFs and motivation, in hopes of improving learning outcomes at a large scale.



GOAL II: Prepare PreK-12 education leaders and teachers to use educational technology in support of effective teaching and learning

A major obstacle to unlocking the potential benefits of educational technology is the scarcity of opportunities for pre-service and in-service teachers to learn to find, use, create, critique, and curate high-quality digital content. To address this gap, the TELOS Initiative has collaborated with the Stanford Teacher Education Program (STEP) to support technology learning for pre-service teachers, and the Center to Support Excellence in Teaching (CSET) to do the same for in-service educators. In both partnerships, TELOS uses face-to-face and online programs that are focused on helping teachers review the relevance of various educational technologies, then use them effectively in their own teaching so that they serve as educational leaders within and beyond their schools. Through this work, TELOS works to identify innovative models for the preparation of teachers and education leaders to be critical consumers and users of technology. Additionally, TELOS convenes workshops and seminars organized around powerful learning for educators, student teachers, and administrators. The specifics of how TELOS worked toward this goal during 2018-19 are described below.

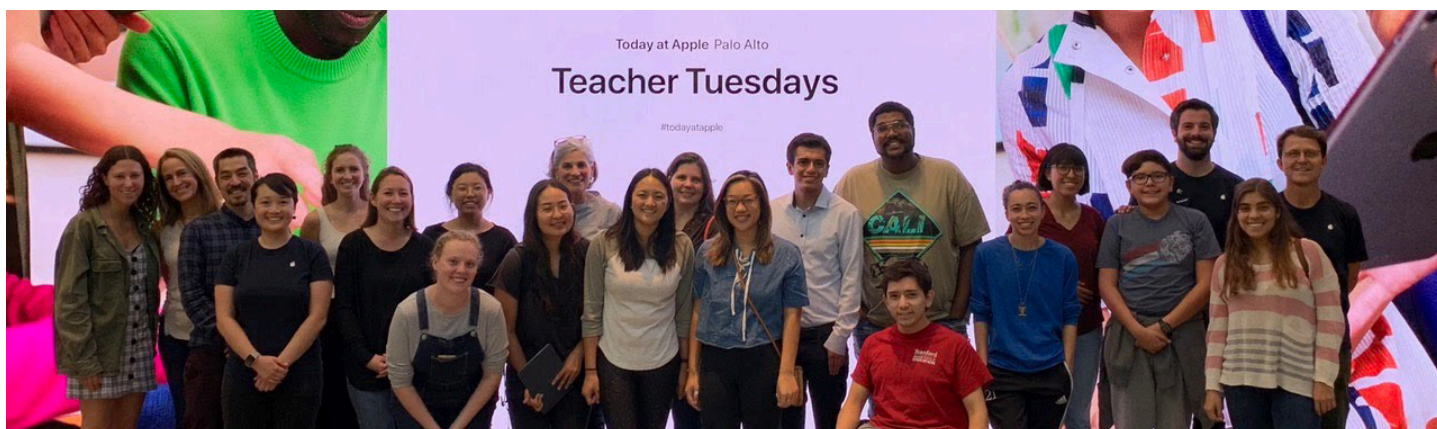
STEP Activities

In the 2018-2019 school year, Christine Bywater continued her role in STEP as the Clinical Associate in Educational Technology and supported technology integration in the pre-service program

iPads with VPTL

Christine continued the collaboration with the Vice Provost for Teaching and Learning office (VPTL) and Kenji Ikemoto, Academic Technology Specialist at VPTL. VPTL loaned each STEP student an iPad to use for the academic year. Kenji Ikemoto supported the deployment of iPads to the students during Orientation Week June 2018. This year, VPTL also supported faculty and instructors to integrate technology by loaning iPads for instructional use. Ten STEP instructors borrowed iPads for their teaching.

Adding to the iPad program from 2017-2018, Christine and Kenji collaborated with the Stanford Apple Campus Rep, Amelia O'Donahue, and the local Apple store on University Avenue to provide additional support for the STEP students. The Apple Store hosted 3 exclusive "Teacher Tuesdays" workshops for STEP students at their University Avenue store.



Over half of the STEP students participated in:

- Creating Photo Essays & Stories- Apple Creatives facilitated a one-hour workshop on how to use photography in class projects. They showed STEP students how to design a photo essay to tell a visual story. This was followed by a 30 minute Q&A session where STEP students asked questions about their own use of the iPad in teaching as well as graduate students.
- Video Workshop & Explore Lab - a 90 minute session, in which students received individual support on best ways to cut video clips, export videos, and sync audio. Following the working session, they then explored some iMovie and Clips basics with a fun and interactive activity based on Apple's Small Screen Magic Video Lab Co-Created with Zach King.
- Coding & Robotics: Apple Creatives facilitated a one-hour "field trip" on coding and robotics for STEP students. They experienced the fundamentals of coding, did hands-on work with robots, and solved problems collaboratively. They also received resources for teaching, as well as opportunities for teacher support.



Course Infusion

Utilizing the iPad partnership with VPTL and building off of the work in the previous years, instructors continued to work with Christine Bywater to infuse technology into their coursework. Examples of multimodal and multimedia activities included:

Course: Dis/ability & Access in Elementary Classrooms, Spring 2019

Goal: Provide multiple ways for students to express understanding

Tool: [Poplett](#)

Course: Elementary Teaching Seminar, Fall 2018

Goal: Transform an assignment from a written reflection to a digital platform that allows for collaboration, communication, and creativity.

Tool: [Google Sites](#)

Course: Secondary Teaching Seminar, Fall-Spring 2018-2019

Goal: Allow for a variety of ways for students to capture their experiences and their growth throughout the year. Transform the end of the year assignment from a written paper to a portfolio that is updated monthly.

Tool: Sutori

Torsh TALENT Pilot

Prior to the iPad deployment, STEP students checked out video cameras to be used for videotaping lessons and receiving feedback from supervisors. In the past many students found this process tedious and cumbersome and it didn't allow for a robust or rich feedback cycle. Christine viewed student teaching reflections and supervisor observations as part of preservice education that could be greatly enhanced with the use of technology. Building from the successful use of [TORSH Talent](#) by CSET and SHEG for their work, she piloted the use of the platform in STEP. She piloted three phases with the STEP program--utilizing their iPads through the partnership with VPTL. The Talent platform allows a teacher to use a smart device to upload classroom video directly to the cloud and then later access it to share with colleagues, supervisors, or instructional coaches. Whoever is shared on the video can comment on the video as part of their reflection about the teaching. The platform also provides a mechanism for teachers to upload lesson plans and student work in conjunction with the video of the related class period.

Phase I Fall 2018	Phase II Winter 2019	Phase III Spring 2019
<ul style="list-style-type: none">Piloted TORSH Talent with 7 supervisors and their supervisees (36 total students). This group completed 1 formal observation and 3 informal observations using the platform. Lessons were recorded using iPads and the TORSH Talent app and feedback and reflection was completed in the platform.	<ul style="list-style-type: none">Continued pilot with 7 supervisors and their supervisees (36 total students). Supervisory groups continued to use the platform for observations, but also tested the use of the platform in preparation for edTPA.Two instructors piloted the use of the platform in the Elementary cohort. All 22 Elementary students were set up with accounts (if not already in Phase I). Instructors modified lessons and students recorded enactments of concepts discussed in class for feedback from peers.	<ul style="list-style-type: none">Completed pilot with 7 supervisors and their supervisees. Tested a variety of ways Supervisory groups could use the platform to determine best practices for a whole program roll out.Gathered feedback from course instructors to inform use in other courses.

Key Takeaways from Pilot

Overall the pilot was a success and enhanced the ways in which supervisors could provide feedback to preservice teachers. In particular, we noticed that

- The way in which users shared their teaching and comments on teaching was more dynamic and thoughtful.
- The level of reflection was deeper and supervisors felt it prepared students for a career of reflective practice.
- Students were able to make stronger connections between research and practice because they could stop and see their practice again and through someone else's eyes.
- Students in the pilot recorded their practice more and asked for more observations from their Supervisors in comparison to those not in the pilot.

The use of the technological tool enhanced the supervisory experience by creating a more communal feel about feedback and was most effective when Supervisors focused on the students' growth as teachers. This reduced the sense of being evaluated and increased the idea of being part of a community of practice. The preservice teachers who used the Talent platform had a clearer understanding of both their own and others' growth as teachers as well as a deeper understanding of the obstacles that get in the way of effective teaching.

Because of the success of the pilot, STEP has contracted with the TORSH Talent platform for the 2019-2020 school year. All STEP students and Supervisors will use this platform for observations. The program is also considering using the platform to administer edTPA.

Technology Integration Practices (TiP) Tools

In 2018-2019 year, Christine Bywater, Vielka Hoy, and Molly Zielezinski continued their work on the Technology Integration Practices Tool. The Technology Integration Practices (TiP) Tools support school districts, schools, teachers, and coaches in infusing in infusing technologies and pedagogy, tracking professional growth, and measuring instructional practices in support of equitable student learning. This year, they revised the tool and received feedback from GSE faculty members Brigid Barron, Janet Carlson, Antero Garcia, and Shelley Goldman. The three tools designed are:

District Assessment Tool which measures a district's capacity to enact technological practices. As such, this tool is designed:

- To provide school districts with a means to assess their capability to implement technological practices,
- For use by school district personnel and administrators,
- To be used prior to the introduction of the Lesson Observation and Career Trajectory Tools.

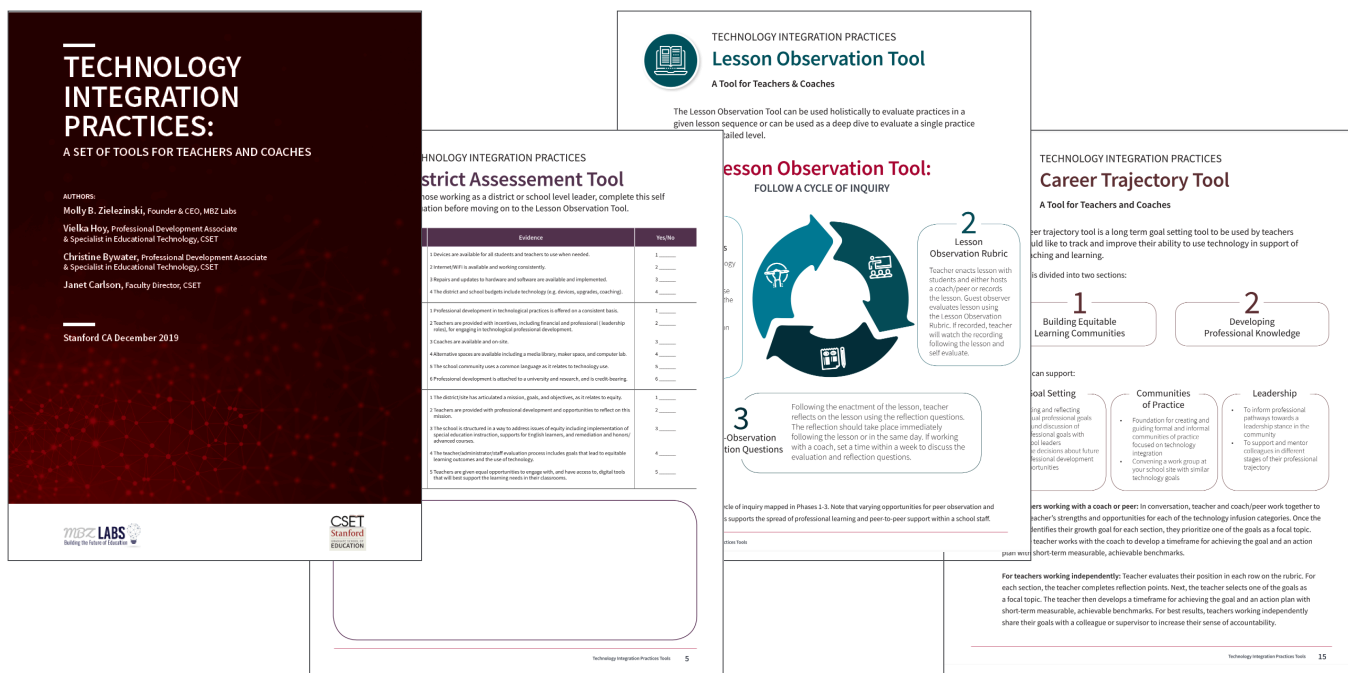
Lesson Observation Tool which evaluates technological instructional practices and is designed to

- Provide teachers with a means to assess their integration of practices in a lesson, unit, or course,
- Be used by pre-service and in-service teachers and their coaches in all subject areas.

Career Trajectory Tool which measures the use of technology across one's career and is designed to

- Provide teachers with a means to create their own goals for long-term professional growth,
- Use by pre-service and in-service teachers and their coaches in all subject areas.

The team is completing revisions in August of 2019 and will start user testing in Fall 2019 with K12 schools. Christine & Vielka will launch PLE sessions in winter 2019 that will support the use of the tools with teachers and schools. They hope to have a digital version by spring 2020 for teachers and schools to engage with. Shawn Kim from GSE IT and Kenji Ikemoto from CTL are adapting the tool to be used with Stanford university faculty and instructors. They are set to start using the tool as part of the Technology Infusion for Education (TIE) TIE program in winter 2020.

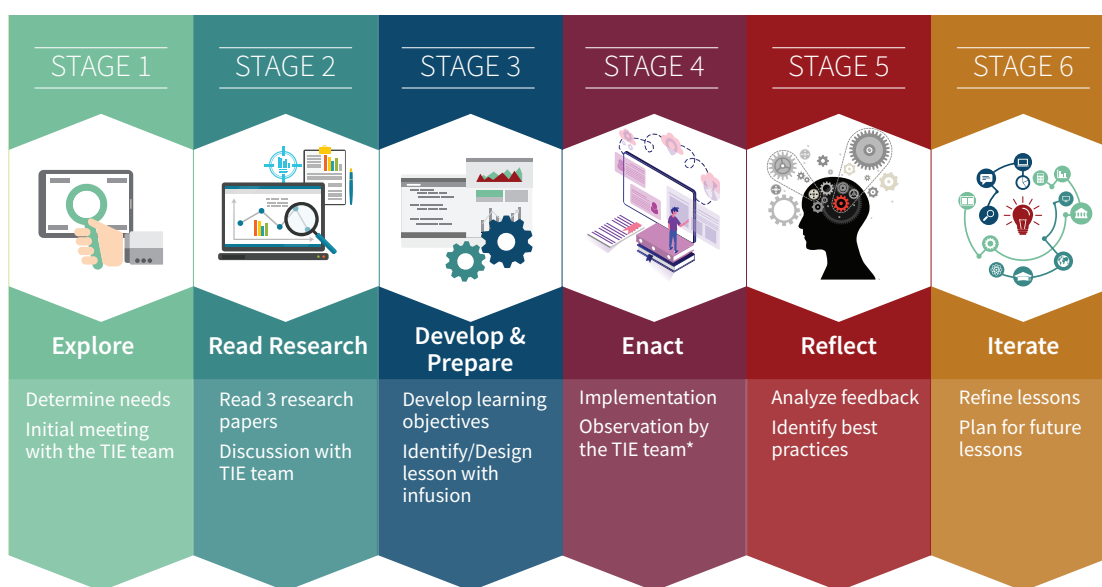


Technology Infusion for Education (TIE) Program

The Technology Infusion for Educators (TIE) is an initiative aimed at promoting the effective use of technology as a tool for learning. The initiative provides a series of opportunities for faculty, instructors, and educators to meet with a team of technology and learning experts to infuse more technology-driven practices into their teaching. This team will consist of representatives from GSE IT, CSET, and the Center for Teaching and Learning (CTL), who will work closely with a variety of educators, including K12 teachers and Stanford faculty. Christine Bywater co-lead the initiative with Shawn Kim, from GSE IT, and Kenji Ikemoto from CTL (of VPTL).

In 2018-2019, members of the team piloted various stages with the Stanford GSE faculty to inform the iteration of the TIE stages and the creation of the Technology Integration Practices (TiP) tool.

Since the pilots provided the TIE team with the opportunity to enact some parts of the TIE stages, the team is now ready to launch the full initiative- a 6 stage process, with the inclusion of the TiP Tool, to three different audiences: GSE faculty, K-12 teachers and school teams, and non-GSE Stanford faculty. This is set to launch in Fall 2019.



Computational Thinking

As coding curriculum becomes more prominent in schools and computer science standards have emerged in California, the TELOS team understands the impact this will have on teacher preparation and development. These technologies shape our self-conceptions and our relationships with other people; we rely on them to structure our knowledge and our ideas about the world. In order to engage students with computer science in a more equitable way, it is imperative that teachers understand the foundational principles of computational thinking. We want our schools to be where students are empowered with the skill sets to enact social change for themselves and others, and in order to do this computational thinking needs a central place in the curriculum. Our schools ought to be filled with equitable opportunities to participate in and critique computational cultures and teachers should be prepared in a way that allows them to integrate these practices into their subject areas.

The content was delivered in two areas; a pre-service course in the Stanford Teacher Education Program's secondary curriculum and instruction sequence and a professional learning experience for in-service teachers in San Mateo County.

The goal of both projects was to introduce the content knowledge and the emerging pedagogical content knowledge of computational thinking.

For both the course and the PLE, TELOS bridged the research to practice partnership by collaborating with San Mateo County of Education. Sandra Velásquez was brought on to support the teaching of the courses and coaching of the students and teachers. Sandra is the current Coordinator of the Innovative Learning & Technology Integration for SMCOE. She previously was in the SJ Unified School District as an elementary school teacher and then instructional coach for ELD and technology.

The goal of the collaboration was to co-design and co-facilitate the course, and for Sandra to provide ongoing instructional coaching support to participants from the county.



STEP Course

Computational Thinking C&I Elective launched Spring 2019. Collaborating with STEP alums, Monica Yupa and Chris Proctor, Christine Bywater and Vielka Hoy co-created the [syllabus](#) for the Spring 2019 course. Sandra, Christine, and Vielka taught Computational Thinking to 14 STEP students. The goals of the course were to

- Develop an understanding of the need for computational thinking related activities in teaching practice with an emphasis on pedagogy.
- Describe the core practices of computational thinking and be able to use it as a way for students to access information, express their thinking, learning, and ideas, and increase their computational fluency.
- Understand the impact interdisciplinary integration of computational thinking practices can have on student identity.
- Empower teachers to be ready for future learning and recognize opportunities where they may be able to embed these practices into their content areas.

Class experiences included:

- Multiple visits to the GSE Makerspace. In collaboration with Karin Forsell and Aaron Ragsdale students explored tinkering experiences that infused pedagogical practices with computational thinking principles.
- A panel of community representatives discussed ways their organization is addressing issues of equity through computational thinking. Lisa Delapo, Krause Center of Innovation, Frieda McAlear, Kapor Center, and Aaron Ragsdale, East Palo Alto Academy HS were the panelists.
- Exposure to a vast array of technologies to use with students
- A field trip to the Computer History Museum to engage in activities with Raspberry Pi, experience a guided tour, and meet with Educational Professional Development staff to understand the resources and opportunities the museum can offer their students and themselves.

In class survey results, 100% of the students would recommend the course to others.



Professional Learning Experience for InService

As part of the SMCOE partnership, Vielka, Christine, and Sandra modified the STEP course into a 3 day PLE for San Mateo County K12 educators.

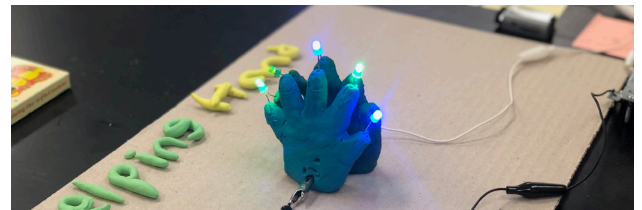
22 K-12 educators registered for the 3 day course that focused on:

- Recognizing computational thinking practices as a way for students to access information, express their thinking, learning, and ideas, and increase their computational fluency
- Developing an understanding of computational thinking practices
- Understanding the inequitable effects of identities and stereotypes around computing
- Identifying opportunities to activate CT competencies and modify a lesson plan to include CT practices

The PLE experiences included:

- A visit to the GSE Makerspace. In collaboration with Karin Forsell and Aaron Ragsdale teachers tinkered with tools that infused computational thinking principles with pedagogical practices.
- A panel of community representatives to discuss ways their organization is addressing issues of equity through computational thinking. Lisa Delapo, Krause Center of Innovation, Aaron Ragsdale, East Palo Alto Academy HS, and Mary Jo Madda, Creative Strategy Manager for diversity + education initiatives at Google, including Code Next and Tech Exchange.
- Hands on computational thinking activities that could be replicated into their class context.
- Opportunity to modify a current lesson plan to include CT, share with the community, and receive feedback

In PLE evaluation forms, 100% of the participants rated the experience as a 5/5 and would recommend it to their colleagues.



GOAL III: Catalyze Collaborative Efforts at the Intersection

A major challenge TELOS seeks to address is the limited interaction between key influencers at the intersection: designers of learning technologies; researchers who study what kinds of technology work, for whom, and for what purpose; educators who prepare teachers to use technology in their classrooms; and practicing teachers who are already working with technologies in their classrooms. TELOS seeks to better connect these groups to ensure that those who shape technology are informed by research and practice related to teaching and learning, and that those who prepare teachers are informed with the latest innovations and knowledge about their effectiveness in promoting learning. We also work to inform leaders in all of these areas by promoting understanding of the social, cultural, and economic contexts in which people are using technology.

In 2018-2019 TELOS efforts included both new and continued collaborations. We developed a new research-practice partnership with San Francisco Unified School District, supported international STEAM learning efforts by Iridescent, while also continuing existing partnership with Redwood City School District and the FamLAB project.

Research-Practice Partnership with SFUSD Personalized Learning Environments Pilot



In 2018, TELOS embarked on a collaboration with the San Francisco Unified School District in which TELOS serves as a research and design partner for the district's [Personalized Learning Environments Pilot program](#). The program launched in fall 2018 with 12 K-5 elementary schools across San Francisco whose central goal is to improve learning opportunities for historically underserved students including African-American students, Latinx students, and English language learners. The program is led by the district's Department of Technology and includes a focus on powerful uses of technology in the classroom.

SFUSD is California's seventh largest school district, serving over 57,000 students, of whom 55 per cent are from lower income families, 29 per cent are classified as English language learners, and more than 80 percent are students of color. As part of SFUSD's [Vision 2025](#), the district identified [ten "Big Shifts"](#) to realize over the next decade in order to equip students with the 21st century skills, knowledge, and dispositions outlined in the SFUSD Graduate Profile. As one aspect of these efforts, SFUSD leaders hypothesized that "personalized learning" can provide student-centered learning opportunities that are scaffolded, student-paced, adaptive, engaging, and flexible so that all students meet rigorous academic standards and effectively communicate, collaborate, create, and think critically as global citizens in preparation for college and career. Although the term "personalized learning" is often equated with adaptive software, SFUSD's vision is a more holistic approach of attending to individual students' needs. This approach includes flexible classroom design and practices, as well as professional development for teachers that focus on a set of [core mindsets](#) as well as collaborative and creative uses of technology to support students' learning. The pilot program, which is being implemented in over 40 classrooms across 12 K-5 elementary schools, was created with the belief that these methods will be particularly potent for supporting and providing equitable learning opportunities for African-American students, English learners, special needs learners, and other historically underserved groups.



SFUSD teachers engage in professional development around purposeful technology integration



Personalized Learning Environments Pilot Classrooms

Throughout the 2018-2019 academic year Amber Levinson, with support from Brigid Barron, has led a collaboration with the pilot leadership team providing research and design partners, conducting formative interview research with pilot teachers, attending all professional development sessions and design meetings, and developing a close working relationship that led to a productive set of data sharing routines to support the integration of findings from the research into the Pilot design. The partnership with Stanford has been crucial to the success in design of the program, with ongoing data collection and feedback on the professional development for pilot teachers. Based on observations and interviews, the Stanford team ensured that the pilot design team captured the voice and experience of teachers to empower them as designers of learning experiences that benefit SFUSD's historically underserved student populations.

In the first phase of the research (2018-2019 academic year), we carried out observations of professional development sessions and interviews with pilot teachers, with a particular focus on teachers in the schools serving the highest proportion of underserved students. The teacher interviews revealed that many teachers have come into the pilot to strengthen their knowledge of how to integrate technology to support student learning and engagement. By the end of the year, teachers were beginning to integrate technology more frequently into their instruction and have expanded their conceptualization about how to utilize technology for a variety of learning purposes and collaborative activities, as a result of the professional development and resources the Pilot program provided. Teachers also reported they are implementing different classroom routines which give students more responsibility and choice, and observe increased student engagement which they attribute to these changes. The research has also indicated ways that the Pilot needs to support teachers in designing personalized learning experiences in better coordination with the teachers' regular responsibilities.

The second year of the pilot, which began in July 2019 and is funded by SFUSD with support from TELOS, involves interviews, classroom observations, and student case studies to capture a more in-depth picture of the pilot's impact.

Redwood City School District Research-Practice Partnership

Research on Middle School students use of Newsela and other digital reading resources



In 2018-2019 Brigid Barron, Amber Levinson, along with graduate students Judy Nguyen and Cindy Lam continued to work in partnership with Redwood City School District. Researcher Amber Levinson along with graduate students Cindy Lam and Judy Nguyen met with school leaders and technology coaches at McKinley Institute of Technology Middle School and presented case studies of students focusing on students' use of Newsela and other digital reading tools to illustrate how students are using these resources in and out of school, the ways in which they used these tools to explore their interests, and ways that some students' families—who were all primarily Spanish-speaking—also interacted with the tools at home and co-read with students.

Based on discussions with school leaders about the topics most important to them and the findings generated from the research, the team has developed a teacher brief which is being finalized and will be shared with educators in the district. The team also developed a poster, presented at the AERA annual meeting.

Research on use of Bookopolis in the classroom

In 2018-2019 graduate student Cindy Lam with support from Judy Nguyen embarked on two studies on elementary school teachers and students' use of Bookopolis, an online social reading platform for students. These studies aim to help address the lack of research on how to nurture motivation and engagement to sustain a child's reading development into eventual expertise, both as an individual capacity and as a shared activity within a wider community. In particular, the study focuses on the role of peers in supporting engagement in reading.

The first study involved exploratory research involving two case studies of classroom teachers who use online peer recommendation tools to foster enthusiasm for reading in their elementary classrooms. The second study builds on the findings from the first, to examine another case study of an elementary classroom using the same recommendation tool, while incorporating the student perspective in addition to the teacher perspective. Both studies use insights from the learning sciences and sociocultural perspectives to examine the role of one online social networking tool, Bookopolis, in how children engage with reading across setting and time as it pertains to social interaction, meaning-making, and interest development in a classroom community. Both teacher and student interviews and online peer recommendation data are analyzed to provide portraits of the interacting roles of teacher pedagogy, peer interaction, and the affordances of Bookopolis in supporting engagement in reading. Although this research is still ongoing, initial findings can be found here.

FamLAB Spark Grants Program

In 2017-2018 TELOS collaborated with the Joan Ganz Cooney Center and partners in the FamLAB Project to host an innovation lab at Stanford for groups of innovators and leaders at the TELOS intersection to support their thinking around new solutions to connect children's learning across home, school, and community settings. In 2018-2019, Brigid Barron and Amber Levinson contributed to this project as judges in the FamLAB Spark Grants competition, evaluating proposals from educators, researchers, policy-makers, and developers across the country. The purpose of the FamLAB Spark Grants program provided grants to US-based non-profit organizations and educational institutions to undertake innovative research and development (R&D) work, design capacity-building tools, and lead community engagement projects. These one-year grants are intended to spur knowledge development and experimentation, including the launch of a network of leaders who will exchange best practices and plan future activities.

Iridescent Family AI Challenge Finalist Pitch Practice

In May 2019, TELOS hosted a “pitch practice” event for partner Iridescent, a non-profit organization dedicated to empowering the world’s underrepresented young people, especially girls, through engineering and technology to become innovators and leaders. As part of this work, Iridescent launched the AI Family Challenge where families from around the world submitted ideas to help their communities using AI. 7500 families from countries around the world completed the AI Family Challenge curriculum and submitted their designs to the challenge competition.

In the final phase of this project, the six finalist families (from Bolivia, Palestine, Pakistan, Spain, the U.S. and Uzbekistan) came to Silicon Valley in May and TELOS hosted a field-trip/pitch practice before the final competition the following day. This was the very first global AI competition for a school-aged audience, and was especially unique as it involved parents as well (70% of whom are mothers). At the pitch practice, families visited Stanford, presented their prototypes, and received feedback from expert judges in the fields of technology, design, and learning (TELOS Research Associate Amber Levinson contributed as one of the judges). Finalist prototypes included:

Duckweed Vacuum Cleaner, Bolivia - Invention uses image recognition to find and eradicate invasive species in Lake Titicaca ([Pitch video](#))

My Drawings Speak Up, Palestine - Analyzes drawings to see if children are experiencing violence or bullying ([Pitch video](#))

Scoutbot Waterguardian, Spain - Visual recognition and alert system that monitors public pools for drowning ([Pitch video](#))



GOAL IV: Shape the discourse in this arena by widely disseminating the results of our efforts and by serving as a convening force in the field

In 2018-2019 TELOS continued to convene educators, researchers, technology designers and other stakeholders to discuss key issues at the intersection.

Technology and Equity in Early Childhood Symposium (November 2018)

The topic of technology for early childhood is a controversial one, and parents, early childhood educators, and technology designers are eager for knowledge on this topic. This symposium focused on questions at the heart of the debate: what do we know about the role technology can or should play in children's early learning? How can early childhood educators guide families in understanding whether and how to use technology with their children? Bringing together experts from academic research, teaching practice, and community organizations, the session approached this topic from an equity perspective, focusing on the issues as related to supporting under-served children and families. The event garnered over 220 RSVPs and fostered a lively audience discussion.

This event also acted as a springboard for a “train the trainer” event led by Common Sense Latino and Silicon Valley Community Foundation.

TECHNOLOGY AND EQUITY IN EARLY CHILDHOOD

TUES, DECEMBER 4
5:15 - 7:45 PM
(INCLUDES RECEPTION WITH FOOD & REFRESHMENTS)
STANFORD UNIV,
CERAS 101
RSVP AT
telos.stanford.edu/events/all


Technology for
Equity in Learning
Opportunities

The topic of technology for early childhood is a controversial one. What do we know about the role technology can or should play in children's early learning? How can early childhood educators guide families in understanding whether and how to use technology with their children? This session will approach this topic from an equity perspective, focusing on these issues as related to supporting underserved children and families.

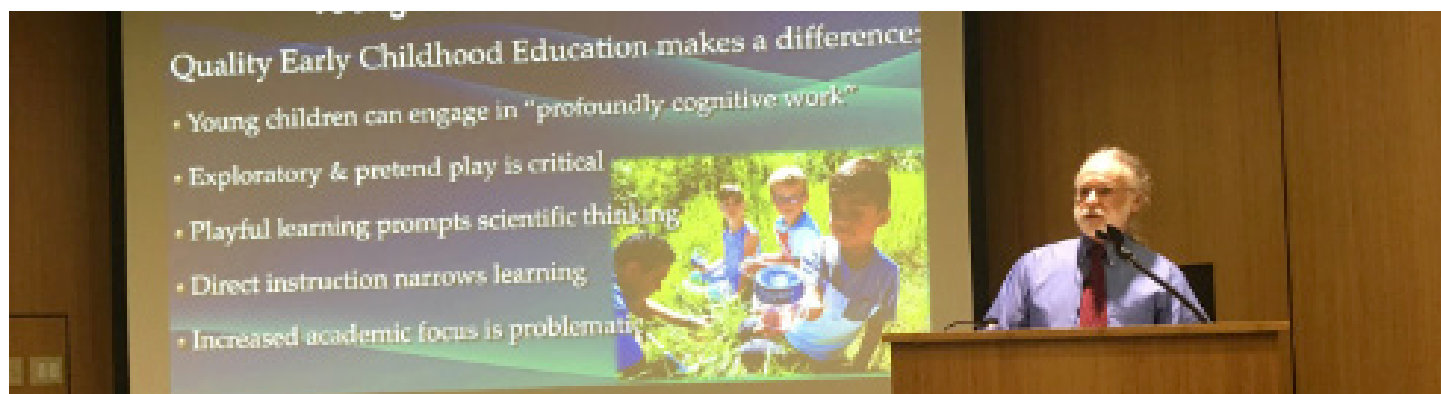
SPEAKERS


Maria O. Alvarez
Vice President,
Common Sense Latino


Michelle Sison Hyman
Deputy Director,
Center for Early Learning at Silicon
Valley Community Foundation


Mark Bailey
Professor & Director of
the Child Learning and
Development Center,
Pacific University


Ximena Dominguez
Director of Early
STEM Research,
Digital Promise



Professor and early childhood educator Mark Bailey of Pacific University presents at the Technology & Equity in Early Childhood Symposium

Equity in Education Conference | Bridging Research to Practice (February 2019)

The TELOS Initiative, the Center for Race, Inequality, and Language in Education, and the Center to Support Excellence in Teaching at Stanford University, hosted 135 education practitioners on Saturday February 2, 2019 in CERAS. The Equity in Education conference engaged practitioners in a full day of learning to consider how to better serve students who are traditionally underserved in our classrooms.

This full day of learning included a call to action by students, 24 90-minute, practitioner-based workshops, and a panel of Stanford researchers discussing the questions of how to bridge research to practice in service of equity in our schools.

This was the first year of the [Equity in Education Conference](#). As part of the conference organization and structure, the TELOS team worked to have explicit workshops with a technology strand as part of the participants learning. The workshops featuring technology infusion included:

- Antero Garcia, Stanford University, “Playing with Equity”
- Cathy James & Chandra Leonardo, Redwood City School District, “Fostering Independence with Digital Tools”
- Apple Education Development Executives, Apple Inc, “Everyone Can Code: How Coding is Addressing Equity and Access” & “Everyone Can Create”
- Bryan Flaig & Nicole Peleg, Redwood City School District, “Physical Computing with Hummingbird Robotics”
- Sarah McGrew, Stanford History Education Group, “Helping students evaluate digital information across the school day”
- Martin Cisneros, Santa Clara County Office of Education, “Tech Tesoros for ELL Instruction in the Modern Classroom”
- Karyn Warner, Redwood City School District, “Amplifying Student Voice: Creating Opportunities for Speaking With a Purpose”
- Cherise Martinez McBride, UC Berkeley, “What’s Tinkering Got to Do with it? Literacy & Digital Pedagogy”

Due to the success of the conference, The Center to Support Excellence in Teaching at Stanford University will partner with the Center for Race, Inequality, and Language in Education to host the 2nd annual conference in Winter 2020.



Closing & Next Steps

In 2019 TELOS completes its five years of work toward creating and investigating ways that technology can advance equity for prek-12 learners, educators, and families. On October 7, 2019 the initiative hosted a “TELOS Festival” showcasing the broad range of faculty and student projects supported and promoting discussions around key issues at the TELOS intersection. These grantee research and design projects, many of which are still either under way or continuing to grow beyond their TELOS grant period, will carry forward the work that TELOS has infused throughout the GSE. Several of these projects have also yielded free curricula and/or technology tools that will continue to be used by practitioners and researchers in the field. TELOS work will also continue through our work with PK-12 educators via CSET (in-service educators) and STEP programs (pre-service educators) at Stanford. Our forthcoming report on overall impacts across the five years of TELOS will highlight these efforts and the ways they are continuing on in 2020 and beyond.



Technology for Equity in
Learning Opportunities
at Stanford University

Annual Report
2018-2019 Academic Year

telos.stanford.edu