Leveraging a University to Create K20 Local Opportunities to Learn

Mica Pollock, Susan Yonezawa, Monica Sweet, and Nan Renner

Center for Research on Educational Equity, Assessment, and Teaching Excellence (CREATE), UC San Diego

September 2020

#CREATEequity Public Drafts are designed to share work in progress at UC San Diego CREATE and prompt dialogue with people doing equity work in education.

Send comments to micapollock@ucsd.edu.
Scholars and advocates argue that universities should use their resources for the public good (Marginson, 2014; Camhi, 2013) and more specifically for local community benefit (Hatcher et al, 2020; community-wealth.org 2020), as part of universities’ focus on “teaching, research, and public service. . . critical to the well-being of our democratic society” (AAU, 2014). As “anchor institutions” that stay local (Porter et al, n.d.), universities already contribute local benefits through employment and stimulation of local commerce (Walshok, 1995), especially when “town and gown” collaborate proactively (Hatcher et al 2020)—even as universities typically pay few taxes locally and often exacerbate local disparities via gentrification (Schneider & Klor de Alva, 2016).

In this short article, we contend that universities actually are vastly underused engines of potential local opportunity generation. As scholars argue, “The question for all local anchor institutions is: What do anchor institutions do to advance their communities’ development?” (Birch et al 2013, 8) We propose that U.S. universities can support all who work or live on campus to participate in creating necessary local opportunities to learn (LOTL).

The current COVID-19 crisis threatening universities’ economic futures may make such recommendations for “doing more” locally feel truly ill-timed. Yet the work we propose here actually creates critically needed resources for campus as well as K-14 communities—and such work is particularly crucial at a moment when all sectors of education are under tremendous fiscal strain.

We propose that each campus fund a team of education researchers and expert practitioners to help campus faculty, staff, and students in all disciplines to co-create and spread necessary LOTL in K-14 schools (kindergarten through community college) and informal learning spaces. This team can shepherd substantive and sustained “two way” collaboration between campus and community (Tiller & Ness, 2020; Weerts & Sandmann 2008; Hatcher et al 2020). The team can:

- a) help university and local partners collectively leverage university grants, time, expertise, research content, connections, and energy to co-create locally desired K-14 learning opportunities that also support university people’s needs;
- b) meet with faculty researchers who want help designing broader impact, education, and evaluation plans necessary for grants, and students and campus staff seeking meaningful outreach participation and partners;
- c) connect K-14 partners to university partners to together determine, pinpoint, and create locally necessary learning opportunities for students and their teachers;
- d) help campus and community partners conduct research to determine which programs are more or less beneficial, and for whom.

We call this work creating LOTL K-20, because people on and off campus get opportunities to learn and because critically needed resources are created for both entities.

Many campuses already offer basic “broader impact” supports for grant-writing (Ferraro et al., 2013). The National Science Foundation for years has required that researchers pursue “broader impact” with a proportion of federal grant dollars, including via “educational and outreach activities” (National Science Foundation, n.d.). We propose that campuses can apply this “broader impact” logic systemically and deeply, through stable, sustained, staffed efforts (Birch et al 2013, 10) addressing local opportunity gaps.

We base our argument on seven years of such work. Since 2013, in a campus effort called the CREATE STEM Success Initiative (CSSI), our campus’ Chancellor has invested in a small team of education researchers and practitioners in our equity-focused education Center, including three Authors (Author 1 is funded by a faculty position to direct our Center). Our campus-funded CSSI team includes three full time and several part-time personnel. We know hundreds of K-14 partners and work continually to understand...
the region's educational needs. We collectively have skills in education research and evaluation as well as advocacy and program design and execution; we have backgrounds in educational anthropology, developmental and experimental psychology, education policy, cognitive science, and youth development, and deep expertise in teaching the subject areas. As “boundary spanners” crossing between university and community (Weerts & Sandmann 2010), we connect continuously with our large network of local district/school leaders and teachers and informal education providers, including stipended K-12 district liaisons who know their districts’ needs. We work to identify and develop:

• learning opportunities that local students, educators, and district leaders need and want;

• resources that university faculty, student organizations, and staff have to offer;

• learning events and sustained efforts to increase LOTL that might benefit community and university people’s growth simultaneously;

• people and processes to create the LOTL.

We also write our own grants for education programming and research, in which we bring together the campus and K-14 community in locally desired ways and study programming systematically to determine efficacy and scalable models.

In the CSSI, we’ve focused strategically on producing LOTL in STEM (Science, Technology, Engineering, and Math), as our community has many STEM opportunity gaps and our campus pursues STEM grants prolifically. Our Center supports LOTL creation in all subject areas. In our first seven years of the CSSI, our small, campus-funded CSSI team accomplished the following:

• Supported more than 230 + campus faculty and postdocs to help conceptualize and submit outreach/education and broader impact plans, making their STEM grants more competitive overall.

• Supported 917 “service” outreach and education projects out of our campus and in the community.

• Helped campus colleagues and community partners write, submit, evaluate, and/or execute 248 grants/contracts/funded projects focused on STEM. That includes:
  • $51.9M to campus (98 awarded); $9.3M in pending grant applications
  • $16M to community education partners (15 awarded).

• Assisted new K-20 student success efforts reaching over 14,000+ students directly, from transitional kindergarten to graduate school;

• Conducted 86 evaluations of projects supporting K-20 students and educators;

• Helped execute 225 + teacher development efforts, with immediate impact on the pre-college preparation of hundreds of students each year and thousands more over time.

Our efforts have ranged from sustained multi-district efforts to support teachers’ professional development and student learning in computer science and mathematics, to one-time community learning events sparking STEM excitement in Spanish (what we call “thrilling” students, adding to our longer investments in “skilling” students and teachers). We prioritize investments in the “instructional core” (Elmore 2008) of local teaching and learning during the school day, with informal learning events our next priority. At all times, we pursue “a two-way model of engagement” that “allows institutions of higher education to bring the community into the process as researchers and experts in their community with needs and priorities, not just subjects of a study aimed to improve their community” (Tiller & Ness, 2020, 2).

In each CSSI effort, more specifically, our goal is to co-create necessary local opportunities to learn (LOTL), steered by a commitment to equity. We co-create opportunities filling specific opportunity gaps experienced by students of color, low-income students, English learners, girls, and others with less access to the local “prosperity grid” (Reno & Gu-
mus-Dawes 2010) and specific careers. Geographically, we focus most on students concentrated in high-poverty schools throughout our region and the teachers in those schools. (By “region,” we mean those who would consider the college/university their nearest local four year institution.)

In these efforts to leverage a university for local opportunity creation, Center staff act as equity designers (Author 1 2017) who continually ask local educators and university partners:

What do university stakeholders have to offer?

What LOTL are needed and missing, where?

What available university resources (expertise, space, time, equipment) could be tapped, or grown through grants?

Using those resources, who (i.e. which students, teachers, university stakeholders, and other local partners, from which schools, districts, and local organizations) should be invited to participate in which collective learning events focused on improving which aspects of education?

How can learning events be designed to offer specific LOTL to young people and educators, while also benefiting campus participants?

How do our efforts meet local needs?

As education researchers, we use our research skills to determine which opportunities to learn are desired and missing; we also study our efforts at LOTL creation. Our work relies heavily on the concepts of “continuous improvement” networks (Bryk, Gomez, Grunow, LeMahieu, 2013) and design-based Research-Practice Partnerships, which design educational interventions through long-lasting collaborative relationships with practitioners and share work across networks (Penuel, Allen, Coburn, Farrell, 2015; Penuel and Gallagher, 2017). However, while many RPPs envision tapping education researchers primarily, we (as education researchers) strategically tap researchers in all disciplines as partners with the K-20 community. We tap our own research skills to help design, implement, iterate, and scale high-quality, equity-oriented opportunities to learn. We next provide brief examples of our work.

Leveraging an entire university to create equity-oriented LOTL

As equity-oriented professionals, CSSI staff introduce university partners to community members they don’t yet know in our segregated region. We have convinced faculty to spread structural engineering outreach beyond wealthy areas close to campus (where they already had connections) to low-income areas where we did. We have helped faculty create new summer internship slots for community college students who might then transfer to our four-year university. We have helped faculty bring rural students to campus for the first time. We have plugged campus colleagues into community-based events as outreach providers or panel speakers to support Black and Latinx students’ access to college. We help partners handle glitches that otherwise would block opportunity creation: buses that need chaperones per district rules, university IRB clearances that otherwise delay K-12 projects, and so forth.

When consulting with faculty, CSSI staff also emphasize that investing in LOTL for local teachers (particularly, teachers of low-income students of color) translates to learning opportunities reaching many more young people over time. We call this investment “the multiplier effect.” We have convinced faculty seeking large nanoengineering grants to provide summer “Research Experiences for Teachers” (RETs) that support teachers of low-income students to design lessons taking faculty content into classrooms. We have urged faculty to go beyond one-off teacher lectures (e.g., sharing Chemistry research) to make a sustained investment in teachers’ pedagogy (e.g., improving an aspect of high school Chemistry teaching). We also convince faculty to shape grants or service to contribute to LOTL in areas of particular need. We might support an oceanographer to share her work (and the math underlying it) with high school math teachers, for example, or support oceanography graduate students to share compelling real-world oceanography projects with local children instead of “helping.”
by tutoring in reading. As our wider Center is staffed by professional development experts, we particularly hone sustained projects supporting teachers in key pedagogical areas (e.g., transitioning to inquiry-based science) or subject areas (e.g., the new and necessary field of K12 computer science, and in STEM the often-forgotten “M” of mathematics). Partnerships with district leaders (and grants we write to create networks of educators) then work to take such efforts system-wide.

When we design new LOTL in partnership with K12 educators, our goal is to provide quality local opportunities, not just “more.” K-12 educators help CSSI staff design the timing of learning events (school day, after-school, vacation, and Saturday learning events), compensation (volunteer/paid/hourly/professional development credit/stipends for teachers), venues, participant configurations, and communications (e.g., whether a professor should talk with a small group of Chemistry teachers about new science, or a large multidisciplinary group; how the professor can participate in active dialogue with educators rather than lecturing to them).

In each effort, we also work to maximize benefits to a diverse range of participants. For example, we helped a professor who studies the chemistry of cells to leverage his National Science Foundation (NSF) grant to fund a campus-based course. Over three years, the course brought students and teachers from local low-income high schools (in our campus’ Upward Bound program) to do hands-on science activities with the professor’s graduate students and undergrads. A CSSI staff member who supports local science teacher development brought in additional local teachers to learn from the same activities. Participating graduate and undergraduate students gained knowledge and skill in experiential teaching, while Upward Bound students explored chemistry and our university. Several years later, some participating undergrads are now teachers, and some high school students are now Biology majors on our own campus—and these online lessons now have hundreds of views and downloads by others. The same NSF dollars could have been spent on a public lecture or a static website. Instead, they supported STEM learning across hundreds of local and campus people.

We’ve also supported multigenerational bilingual learning events in local communities, where undergraduate/graduate students, postdocs, and faculty have introduced young people and families to STEM careers and local professionals. While it was standard on campus for faculty or students to join single “outreach” events, CSSI efforts are designed for deeper and sustainable impact. CSSI staff have supported local community college students (themselves low-income students of color) to join STEM outreach and connect to our university, supporting both K-12 students’ growth and their own (Vasquez forthcoming). While honing outreach activities in public libraries, local museums, afterschool settings, community college fairs, and local STEM conferences, we’ve also embedded them in STEM resource fairs enhancing programs already inviting high school students to our campus for college exposure. We then collect activities in a standing resource bank so that student organizations seeking next “outreach” opportunities don’t have to reinvent curriculum.

In such efforts, we pursue sustained LOTL creation, rather than one-offs, because a university’s community trust is always threatened if projects disappear. It is here that our education researcher skills become particularly necessary. We next offer two brief examples of intentional research-based efforts at sustained opportunity creation.

**Leveraging researcher skills for sustained LOTL creation**

In one multi-year project funded by a federal Office of Naval Research (ONR) grant, we worked with campus partners to pair ONR-funded scientists with local teachers to bring cutting-edge research into local high school science classrooms in lessons developed through lesson study protocols (Takahashi & McDougal, 2016). Traditional “outreach” efforts had leveraged many of these professors simply through single lectures in their own children’s classes. Instead, our grant linked 80 teachers from four large school
districts that serve 44% of the region’s low-income youth, with over 18 researchers across our campus and local industry, plus their doctoral students and post-docs. Small groups of teachers learned about content through 2-day sessions with researchers, who themselves learned about specific connections to the K-12 Next Generation Science Standards. Through a lesson study process, teachers then designed and practiced lessons. Teachers shared exemplary lessons with other teachers, K-12 administrators, and faculty researchers in a public regional conference and final celebration. Teachers then shared the lessons with colleagues in their schools and districts; in one district, a lesson module developed through this grant has become part of the curriculum in every high school Physics class.

We studied the experiences of participating teachers, faculty, and doctoral students to learn more about impact and sustainability. Interviews indicated that faculty, post-docs, and grad students valued learning new, more interactive ways to communicate their science to teachers and gained valuable outreach experiences to fold into subsequent grant proposals. The teachers reported significant increases in their excitement about teaching science, their content knowledge, and their ability to implement the NGSS. They also reported that their students were significantly more engaged with the new lessons; our review of student work demonstrated learning consistent with NGSS. Most importantly, the lesson study process itself became more foundational to local districts’ professional development. This work thus supported teachers, who gained experience in lesson study and local examples to bring science to life for students; faculty, who gained knowledge about how to more effectively communicate about their work and ideas for next grants; university students, who gained experience in communicating science to new audiences; and local K-12 students simultaneously, making the benefits truly K-20. And in a move key to sustainability, the project created a slate of new high school science teacher leaders who have since been tapped repeatedly to lead and develop additional science teacher professional development experiences in the region.

In another multi-year project, CSSI staff helped faculty who were experts in their subject area (computer science) but less experienced with K-12 systems, take their expertise into districts and schools to create new CS courses that previously did not exist. In two consecutive grants from NSF, our education researchers used their knowledge of school and district systems to help campus CS faculty and local K-12 teachers and system leaders together boost computer science (CS) skills and coursework in local school districts. CSSI personnel helped faculty and staff to develop an engaging and practical CS training for 71 teachers, then helped district leaders create 27 completely new AP Computer Science Principles (CSP) courses in 19 schools. CSSI researchers then worked with CS teachers to make sure their CS curriculum was engaging and educational for their students, while studying how districts were adding and sustaining rapidly changing CS curricula while broadening participation. In the first two years of the second grant, half of the middle and high school teachers from three large districts serving high proportions of low-income students of color were women, and a significant number were Latinx. By the grant’s end, a district that had started with one CS course was offering CSP courses in all of its high schools (18 CS courses taught by 11 teachers in 11 different high schools), with 36 new courses taught by 22 teachers in 20 schools across the three participating districts. Of the approximately 1,200 students enrolled in these classes, 27% were girls and 47% self-identified as Hispanic. CS coursework is now expanding into the districts’ middle and elementary schools.

This work brought new CS education-related organizations to our university and Center, further stabilizing our regional ability to grow CS opportunities (e.g., our Center now hosts a CS Teachers’ Association and regional chapter of Code.org). Current grants building on the work seek student input on course-taking and focus attention on the CS experiences of English learners. There are future plans to incorporate undergraduate students and alumni into CSP classes to provide additional mentoring to students, again making benefits truly K20.
Reimagining a university as a contributor to local opportunities to learn (LOTL)

On many college and university campuses, campus PIs and students figure out K-12 “outreach” and service efforts on their own. Other campuses provide “broader impact” supports for grant design. We suggest that campuses should fund stable support teams to help university stakeholders figure out how to do locally beneficial and equity-oriented outreach, and to design education/broader impact plans for grants in limited time with the most benefits to both university and community. Faculty and program leaders also need help evaluating how the work is going, with learning then applied to subsequent projects.

We also stress the import of local “impact.” University faculty often feel most pressured to produce knowledge for national or “global” impact (and indeed, to enable their own possible relocation); meanwhile, public schools in the backyards of many universities are seriously under-resourced (Darling-Hammond 2010), short-changing universities’ own local communities with a tremendous lost potential in wealth and well-being. While universities alone cannot repair systemic local opportunity gaps, universities can play a far larger role in local opportunity creation and distribution with the help of experienced education researchers and practitioners. Such support teams can help colleagues truly broaden the local benefits of federal, state, and philanthropic dollars by investing directly in local teaching and learning. If guided by local communities’ needs and knowledge of education research, shaping locally necessary opportunities to learn strengthens the foundation of the entire community, including the teaching, service, and grant-getting strength of the university.

Strategic local LOTL creation is not one-sided: it is an investment that benefits both community and campus. Our campus is particularly energetic in STEM grant-seeking and admittedly, more self-interested in local preparation than some campuses: 1 in 5 campus undergraduates are educated in our region’s K-14 schools, and we are part of a public system charged with educating and serving the state. Yet we believe that any higher education campus can participate in and benefit from LOTL creation. On every campus, professors need grants in order to do their work; many funders require strong outreach or “impact” plans to secure grants. On many campuses, campus leadership wants to solidify positive community connections; on ours, campus promotion policies encourage faculty “contributions to diversity.” University students are often hungry to make a difference in something that matters; when such students help spread LOTL to younger people, they invest simultaneously in their own career development through gaining experience in program building and public communication. Local partnerships make universities more familiar and attractive to potential local students; and every region benefits economically when local people are better-educated and better-employed. Combine the vast need for additional resources in public education with an explicit interest from many funders in supporting new college-going students as our future citizenry and workforce, and interests in creating equity-oriented LOTL intersect.

Thus, when staff in our Center purposefully act as “equity designers” focusing collective efforts on specific opportunity gaps and students less connected to the “prosperity grid” (Reno & Gums-Dawes 2010), we simultaneously:

• Help colleagues secure grants through funder-required education plans in basic science grants, as well as through grants devoted to education research.

• Enable the creation of education programs that otherwise would not exist.

• Strengthen previously fragile relationships with regional low-income and underrepresented communities.

• Forge new relationships with philanthropy and industry organizations and federal agencies now funding collective projects between campus and K-16 partners.

• Connect campus stakeholders to K-12 schools.
and organizations, to offer valuable supports to students and teachers while learning about the local community.

- Spark excitement among faculty, staff and students who have wanted to enact impactful education efforts in local communities, and now have the support to do so.

Such effort helps transform the campus role in our region and the sense of what university people do. CSSI staff now receive almost daily requests from campus faculty, staff, students, K-14 partners, and community groups to help design and evaluate education projects with the most benefits to both university and community.

**Conclusion: The key role of education researchers in co-creating LOTL via universities**

Early in our initiative, an Engineering faculty member admitted that “we have no idea if our outreach is helping in any way — just that maybe it’s better to do it than not do it.” The role of education researchers in this co-design work is essential. By the end of our collaborations, researchers from other disciplines a) understand more about K-12 systems and policies, practices, and pedagogies, to support next efforts; b) know more about effective ways to bring their work to the local education community; and c) learn more effective ways to communicate/translate their science, including in their own teaching. In essence, we give them the tools and concepts they need to create future LOTL themselves.

Not all education researchers can support this work. Our Center leads this initiative precisely because we have deep relationships across a regional education network of K-12, community college, university, industry, and non-profit partners. We are a center composed of sub-organizations and individuals linked to thousands of the region’s educators, students and community organizations. Many CSSI projects thus include lead partners from industry, community non-profits, school districts, county offices of education, community colleges, and informal education organizations (e.g., the local science center; university aquarium; local libraries and community centers). We also know key people inside education systems—equity champions and network “influencers” (Moukarzel et al 2020) who have the power and potential to shape school and district priorities. Our Center’s researchers also are unabashed equity advocates who passionately invite others to close opportunity gaps. We are equity catalysts who spark excitement and opportunity-creation efforts with others, equity implementers who can execute activities and events that convene people to talk and learn, and equity analysts who analyze and publicly discuss efforts at opportunity creation. Any campus can assemble a team with these priorities.

Our final bold contention is that beyond preparing for the professoriate, more education researchers can be developed and employed expressly to help universities produce equity-oriented LOTL in collaboration with expert practitioners, while publishing material on those efforts as we are doing here. Such education researchers also can push universities beyond the classic work of researching education’s problems toward a local role in opportunity creation and spread. University-led K12 education research has long struggled to be useful to those actively working and teaching in schools and classrooms. The development and support of new types of university experts who daily bridge the gap between education research and the broader education community will go a long way toward ameliorating the problem.

In sum, we propose that every university can and should be a place where faculty, students and staff help create necessary local opportunities to learn as a basic part of their work; that each university should pay highly skilled staff researchers and practitioners to shepherd such opportunity creation, just as universities pay staff for other essential functions; and that funders can ask and support universities to proactively engage in this work. We invite an ongoing dialogue with colleagues across the country committed similarly to creating local opportunities to learn, so collectively we can better leverage universities for the public good.
Works Referenced


