Preparing NextGen STEM/CTE Teachers in California: Makerspaces and Innovation
Presenters

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Acknowledgements
Showcase II Booth T514

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3:45 - 6:00 PM
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Critical Need for Teachers in CA & SF Bay Area
Shortages in 12 County Region

• 80% of TK-12 districts in CA report teacher shortages continue and in some cases are getting worse (Learning Policy Institute, 2018)

• Over the next 5 years, projected
  • +124,000 openings **annually** in CA for a cluster of 20 teacher occupations.
  • Nearly 28,000 openings annually (139,000/5 years) in the SF Bay Region for 20 teacher occupations, (about 20% of all teacher openings in CA)

• Critical teacher shortages in TK-12 STEM, Special Education, and CTE.

• Because foundational STEM skills are required for many in demand jobs, teacher shortages in STEM disciplines impact the career pathways that prepare students for these jobs.
Community College Chancellors Office SF Bay Area Regional Strong Workforce, Local Area Funders and National Science Foundation Funds Support this Work

STEM/CTE Teacher Preparation Pipeline (TPP), BACCC Regional Collaborative

Goal: To provide a regional model of contextualized and supported teacher preparation that successfully recruits, trains and supports existing and future Early Childhood Education (ECE), Transitional Kindergarten (TK) – 12 classroom teachers and community college educators throughout the region, especially in STEM and CTE.

TPP serves all emerging and priority industry sectors within the community college, as it responds to the pressing teacher shortage in the SF Bay region.
San Francisco Bay Area Region

- Living wage data in the region defines family of 4 earning $98,000 as lower income and barely meeting living wage.
- Housing costs are exorbitant → $3,500/m rent for 1 bdrm apartment
- High employment allows for competition for college educated employees (especially in STEM) – Median Teacher Wage at $72,000
- Growth in Sector Specific Career Pathways: Wastewater Treatment, HVAC, Cybersecurity, Allied Health, Computer Networking, Business, engineering, etc. is impacted due to lack of teachers
- Dual-enrollment (high school to community college) is growing in the region and teacher shortages in TK-12 impact viability of pathways.
Demand for Community College Teachers Significant in SF Bay Area

Community colleges are experiencing significant faculty hiring challenges. Key areas of need include:

- Nursing
- Allied Health
- Math
- Chemistry
- Computer Science/ Computer Information Systems (CIS)
- Business

Based on 2018 survey of Bay Region Community College Human Resources Directors
Supply and Demand

• **16,500** new teacher credentials issued in California, which includes the California Institution of Higher Education-Prepared, District-Prepared and Out of State/Out of Country-Prepared pathways

• # of credentials awarded annually falls far short of the number of annual openings for teachers across the state.

• ~ 60% of students who earn a teaching credential at a California State University (CSU) begin their path to teaching at a community college.

• 22 of the 23 CSUs in CA have teacher education programs that work closely with California Community Colleges to prepare future teachers,

• Over half of students graduating from CSUs completing their lower division work at a community college.

Source: 2016-17 California Commission on Teacher Credentialing report
Gaps and Challenges

• Data Sharing and Data Alignment
• TOP CODES for Future Teachers
• Identifying (coding and tracking) inter and intra disciplinary students at the community college level
• No common MOU with CSU and UC system
• Losing future teachers at the community college level, at transfer and before declaration (defining major)
• Commission on Teacher Credentialing process is cumbersome, complicated and not easy to explain
Strategies for Creating Diverse Teachers at CCSF

- Paid internship, fieldwork, work experience courses, paid employment with children and youth. Students need to work!
- ECE, after-school, youth work, paraprofessional jobs for college duration
- Choose “high hanging fruit” - students in credit recovery, with academic challenges, in basic skills classes and disconnected from school can make authentic and relevant teachers
- Intentionally serve disproportionately impacted students.
- No screening for GPA, past academic performance or test scores. Screen for desire and passion
- Secure external and internal funds to create paid employment opportunities (SFUSD, DCYF and CCSF (work –study/lab-aide) pays GYO students enrolled at CCSF in dual-enrollment to work in school sites).
Strategies for Creating Diverse Teachers at CCSF

• Easy access to ind. counseling and advising for teacher pathway support.
• Academic counselors to provide workshops, class visits in key courses and staff outreach events.
• Understand that students often “discover” teaching and that teaching finds them. Exposure to careers in education and at school sites.
• Offer teaching as a career. Tell our own story.
• Discuss benefits of teaching: reduced school year, benefits, retirement systems, work-life balance, summer employment opportunities, autonomy in the classroom, social justice.
• Students committed to social justice and helping their community make potential future teachers. Understand the youth voice and time it takes to choose teaching.
Why Makerspace?

• Dual-enrollment
  275 students in Educator Pathway in Summer 2019

• Expanding Professional Development for Current Teachers

• Partnering with other college programs to encourage interest in teaching → Makerspace
CCC Maker Initiative

- $17,000,000 investment
- 3-year project (2016-19)
- First statewide community college initiative to:
  1) Grow a statewide network of college makerspaces.
  2) Develop a CCC Maker ‘Community of Practice’ model.
  3) Align 21st century skills with STEM/STEAM research and practice.
  4) Support work-based opportunities for students.
  5) Disseminate information and resources to ecosystem.

Funded by the California Community College Chancellor’s Office 2016-19

MakerSPHERE

• MakerSPHERE project – connected spaces through both technology & community of practice
  • Collaboratory, Main Campus Library
  • SmartHUB, School of STEM
  • Industrial Lab, Evans Trades Campus
  • Allied Health VR Studio, JAD Allied Health Campus
Rethinking Learning Spaces
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Exposure to STEM/CTE in Makerspace

• MAKR 100 Practices of Making – Credit class, 3 units
• Entry level students, typically no experience
• Satisfies CCSF GE Area E and transfers to CSU
1. Paper Craft and Engineering
2. Intro to Coding, Physical Computing and IoT
3. 3D Design, fabrication and construction
Equipment, tools and technology

**Digital Fabrication**
- Universal Laser Cutter
- Vinyl cutter
- 3D Printers
- Heat press

**Shop Tools**
- Band saw
- Drill press
- Hand tools
- Soldering irons

**Paper Craft + Engineering**
- X-Acto knives
- Cutting mats
- Rulers
- Bone creaser
- Glue guns

**Computational**
- Micro:Bit
- Raspberry Pi
- Arduino
- Cisco TelePresence
- Soldering stations
- Tinkering materials
Who will be included in your makerspace?
Curriculum

• MAKR 100 Practices of Making
• MAKR 400 Maker Capstone
• MAKR 33 Making and Makerspaces for Teachers
• MAKR 1000 Supervised Making (In Progress)
• Outlines available at the booth and also here

https://sites.google.com/mail.ccsf.edu/nextgenteachers/home
Curriculum Highlight

CDEV 41B Issues – Teacher Seminar
“Make, Create, Innovate”
ChangeMakers Mini-Conference
June 2019
“Constructionism gives non-dominant youth power that they don’t get to experience within systems that they’re up against.”

— Jaleesa Trapp, PhD Student, LLK

It’s not about jobs, but not not about jobs.
Why do you teach?

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Project Resources

https://sites.google.com/mail.ccsf.edu/nextgenteachers/home