maker space:

Promoting Engagement of the California Community Colleges with the Maker Space Movement

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STEM/STEAM SKILLS FOR THE CREATIVE ECONOMY
what is making?

Creating.

+ Communal
  Interdisciplinary
  STEM/STEAM-focused
  Diverse
  Process
  Open-ended, inquiry-based
  Fun and playful
  Empowering

maker space
what can students learn?

Making & makerspaces are complementary

“4 C’s” of 21st Century Skills:
Creative Thinking ◆ Critical Thinking ◆ Collaboration ◆ Communication

Soft Skills:
Problem solving ◆ oral & written communication ◆ teamwork/collaboration ◆ leadership ◆ creativity/innovation ◆ self-direction ◆ professionalism/work ethic
the robots are coming

21st Century Skills are increasingly important

Via MIT Technology Review: Image courtesy of Simbe Robotics; image courtesy of Savioke; image courtesy of Knightscope; image courtesy of Starship Technologies
making and WBL

Work-based learning programs:
• Improve completion rates
• Develop workplace skills (teamwork, creative problem solving)
• Increase student interest in potential career paths
STEM: life-long impacts

Mean earnings for STEM vs. non-STEM bachelor’s degree holders from 1970 to 2014.
(Source: University Ventures Letters, Volume VI, #5. March 4, 2016.)
making strong ecosystems

2013 World Economic Forum survey of 1,000 entrepreneurs: 8 pillars of entrepreneurial ecosystem

- Technical Talent
- Mentoring, training
- Kickstarter; Indiegogo
- Current-based learning
- Etsy; Ebay
- Risk Tolerance/Support
- Culture of Respect
  - Tolerance of risk and failure, celebration of innovation, positive image of entrepreneurship

Ranked least prevalent pillar worldwide (41%, 31% excl. US)

Cultural Support

Maker Mindset

* Ranked least prevalent pillar worldwide (41%, 31% excl. US)
making assessments

Academic: P21 Framework
Connections matter, and a dense network of connections, among a small number of programs, is arguably more important than a sparse network among a larger number.\(^{16}\)
making considerations

- 10+ Makerspaces statewide
- Lead institution
- Geographically dispersed
- Connect CCs to regional economies
- Offer links to jobs, WBL
Making considerations:

- Strong support from CTE, STEM/STEAM
- Staff commitment
- Mutually beneficial interactions between MSs and traditional course offerings
- Integrate with traditional instruction framework
- Complement existing course offerings
how might the network look?

• Lead – responsible for growth and success
• Steering committee – draw from outside
  • CEOs from MSs outside network
  • Excs from businesses & foundations
  • Reps of key Maker orgs (Maker Media, Fab Lab)
• Regularly meet/share knowledge
  • Webinars (every other month, rotating topics)
  • Annual in-person meeting @/near Maker Faire
how might the network look?

• Sharing of staff resources
  • Pool buying power for equip/software
  • Pool staff time for grant applications/requests for donations

• Shared methodology for identifying how each MS will meet network’s goals
start measuring success

**Questionnaire-style:**

- # of measurable products
- # workshops, badges, etc. completed
- # CC students, faculty, etc. served
- User demographics
- Is MS receiving contributions from local bus & gov’t?
- Do regional employers recognize and value badges, etc. earned at MS?

**Behavioral Metrics:**

Learning Dimensions Rubric framework (Exploratorium, 2015)

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**Facilitation Field Guide**

<table>
<thead>
<tr>
<th>Facilitation Goals</th>
<th>Practices</th>
<th>Techniques</th>
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</thead>
<tbody>
<tr>
<td>Spark initial interest</td>
<td>Welcome people and invite them to the space</td>
<td>Sit and introduce yourself</td>
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<tr>
<td></td>
<td>Introduce the activity and set the mood for the interaction</td>
<td>Orient learners to the available tools and materials</td>
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<tr>
<td>Sustain participation by following the learner’s ideas</td>
<td>Value tentative ideas, “mistakes,” and wrong directions</td>
<td>Offer a place to start working</td>
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<td>Support their process in moments of failure and frustration</td>
<td>Meet them at eye level when explaining or modeling</td>
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<tr>
<td>Deepen understanding through making connections</td>
<td>Guide people to go a little bit further than they could on their own</td>
<td>Show examples that demonstrate a variety of thinking</td>
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<td></td>
<td>Surface connections between projects and links to outside learning experiences</td>
<td>Suggest a prompt that generates possibilities</td>
</tr>
</tbody>
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http://tinkering.exploratorium.edu/learning-and-facilitation-frameworks
start making

Startup checklist:

☐ Goals
☐ Staff
☐ Activities
☐ Tools/Equipment
☐ Space/Infrastructure
☐ Community and Campus Support
☐ Website and Database
☐ Funding Strategy
thank you!

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