increasing student engagement through cte

OSBA bonds, ballots & buildings | workshop
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<td>NATIONAL PICTURE &amp; THE CASE FOR WHY</td>
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<td>sherwood high school</td>
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<td>PANEL DISCUSSION</td>
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INTRODUCTIONS

B. Karina Ruiz, AIA | LEED AP BD+C
Principal
BRIC Architecture, Inc.

Ken Bell
Director of Facilities and Operations
Sherwood School District

James Orth
Director of Career Technical Education
Salem-Keizer Public Schools

Samantha Steele
Superintendent
Central Point School District
Students who are engaged -- involved in and enthusiastic about school -- are more likely to be hopeful for the future and have better self-reported academic performance than their actively disengaged peers.
STUDENT ENGAGEMENT

% ENGAGED, BY GRADE

SURVEYED STUDENTS WHO ARE ENGAGED WITH SCHOOL

<table>
<thead>
<tr>
<th>Grade</th>
<th>5th</th>
<th>6th</th>
<th>7th</th>
<th>8th</th>
<th>9th</th>
<th>10th</th>
<th>11th</th>
<th>12th</th>
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<tr>
<td>Overall</td>
<td>50%</td>
<td>75%</td>
<td>67%</td>
<td>55%</td>
<td>45%</td>
<td>41%</td>
<td>33%</td>
<td>32%</td>
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</table>

GRADE 5: 74%
GRADE 12: 34%
Percentage of Students Who Strongly Agree, By Grade (n = 928,888)

- In the last 7 days, I have learned something interesting at school
- I have fun at school
- At this school, I get to do what I do best every day

WHY CTE?

What is Career and Technical Education?

When APPLIED TECHNICAL LEARNING is integrated with RIGOROUS ACADEMICS students develop the SKILLS NEEDED FOR SUCCESS.

1. SKILLS to help them get jobs in the future

2. REAL-WORLD EXAMPLES to help them understand academic classes

3. The chance to work as PART OF A TEAM

More than 88 percent of CTE students are planning to continue on to postsecondary education.

6 in 10 students are planning to pursue a career related to the CTE area they are exploring in high school.

Almost 1/3 of CTE students have the opportunity to earn college credit and/or an industry certification through CTE.

WHY CTE?

High school students involved in CTE are more engaged, perform better and graduate at higher rates.

- Taking one CTE class for every two academic classes minimizes the risk of students dropping out of high school.
- The average high school graduation rate for students concentrating in CTE programs is 93 percent, compared to an average national freshman graduation rate of 80 percent.
- 91 percent of high school graduates who earned 2-3 CTE credits enrolled in college

Source: US Department of Education, as reported by the Association for Career Technical Education (ACTE).
WHY CTE?

ENROLLMENT

2017-2018 CTE Concentrator Enrollment by Career Cluster

CTE Participant Enrollment for Most Recent 3 Years

WHY CTE?

In school year 2016-2017, according to the U.S. Department of Education, Oregon served 52,720 CTE high school students.

- 88 percent of CTE high school students graduated compared to 77 percent of all high school students
- 82 percent of CTE high school students met or exceeded reading attainment goals and 79 percent met or exceeded technical skill attainment goals
CASE STUDIES
What is CraterWorks?

Students will access career technical **education** as part of core academics while rubbing elbows with talented **community** members and skilled representatives of **industry**.
the space
the process

- community meetings
- staff meetings
- industry tours
- MakerSpace visits
- funded with general fund dollars + grants (including measure 98)
CraterWorks: A MakerSpace...

1. Saturday Market
   - Monthly market space
   - Access to workshops
   - Outdoor kitchen and cafe

2. Atrium
   - Entry atrium
   - Unifying central space

3. Reception
   - The reception area is the information hub for Crab Works.

4. BrainLab
   - A flexible lab space with 3D printing, prototyping, and fabrication capabilities.

5. 3D Shop
   - The 3D shop is a celebration of innovation and creativity in design development, exploration, and experimentation.

6. Metal Shop
   - An assembly of projects in a workshop space that fosters public interaction and engagement.

7. Open Shop
   - A fabrication space for students to work on projects.

8. Wood Shop
   - Comprehensive woodshop featuring traditional woodworking, providing a space for creative expression.

9. Design Lab
   - High-speed network and high-quality imaging devices for rapid prototyping and testing.

10. Kitchen
    - Access to the kitchen.
    - Member support for training sessions in food production and gathering.
the design

• maintain industrial history of iconic building

• provide state of the industry and state of the art equipment and spaces

• flexible spaces

• local sourcing

• provide for community and school use

• incubate small business
the program

• d6 owns the building and the equipment; DIRT manages the program. together, we’re the CraterWorks LLC.

• supports CTE programs by providing students and teachers access to projects that are part of their core academic program.

• available to teachers as a shared resource, much like a school library or computer lab; staffed with local artisans, skilled hobbyists and tradespeople. CraterWorks assembles the talent to support virtually any project.

• community accesses the space on a membership model.

• small business incubation, mentorship, job skills training
CraterWorks hosted the 2019 Oregon Cheese Festival—thousands of visitors toured the space prior to our official opening.
so far

mt. rushmore • build a better dog treat • the chemistry of chocolate • healthy meal prep • district leadership team retreat • skateboard deck building class • evening classes in wood and metal • saturday market • STEPS students partnered with peers to build flexible work stations •
CTE in Sherwood School District

• Long standing commitment to hands-on learning
• Trimester schedule and 28 credit diploma
• College credits attached to CTE programs
• 98.5% district graduation rate
• CTE programs include:
CTE in Sherwood School District

- **Common Challenges**
  - Facilities
  - Equipment
  - Staff

- **Two very different case studies:**
  - Bowmen House
  - Auto Mechanics
Increasing Student Engagement Through CTE
Career Technical Education Center (CTEC)

...wasn’t the beginning of CTE in SKPS, but helped jumpstart the community’s awareness
Program Development

Defining Program Outcomes
Defining Facility Requirements
Defining Equipment Lists
**Drone Technology & Robotics**

**Description**
The CTEC Drone Technology & Robotics program will provide students with the opportunity to learn technical and professional skills consistently expected within the Unmanned Autonomous Systems (UAS) industry. The program will provide innovative curriculum, instruction, facilities, and equipment for students to learn advanced aspects of programming, designing, assembling, operating, and analyzing assets from unmanned autonomous systems for air, ground, and/or water. Students will have the opportunity to learn and practice skills necessary to prepare for careers in robotics, programming, engineering, and UAS design and operation. Students will study for the Part 107 Operating License.

**Student Outcomes**
- Design, build, repair, and operate systems
- Understand, design and implement mission dynamics and protocols
- Understand and implement practical application of equipment
- Understand and implement the engineering process and lifecycle
- Quality management systems (ISO standards)
- Trouble shooting process and refinement
- Certifications – Part 107 certification
- Dual Credit – Central Oregon CC – Aviation UAS

**Curriculum Materials**
- A. Flight and other Simulators
- B. Electronics lab (diodes, soldering equip, motherboards, breadboards, micro-controllers, etc.)
- C. 3 D printers
- D. CAD Lab, laptops
- E. Arduino platform
- F. Micro-controller kit
- G. CNC Mill
- H. Quad-copters / cameras controller set up (small, medium and a couple of large)

**UAS Courses**
- Intro to UAS (0.5 credit)
- Basic Electronics (0.5 credit)
- Designing with Microcontrollers (0.5 credit)
- UAS Mission Planning & Integration (0.5 credit)
- UAS Development & Prototyping (1.0 credit)
- Mission Operations & Analysis (1.0 credit)

**Integrated Core Courses**
- English 11 (1.0 credit)
- English 12 (1.0 credit)
- Physics (1.0 credit)
- Environmental Studies (0.5 credit)
- Earth/Space Science (0.5 credit)

**Suggested FTE**
- 1.5 licensed program teachers
- 1.0 Instructional Assistant
- 0.5 English
- 0.5 Science

**Student Capacity**
90-120

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**McKay – Automotive**

**Description**
Students enrolled in Automotive Technology use a variety of applications to learn about skills needed in the Transportation Industry: Engine repair and performance, Wheels and tires, Electricity and electronics, HVAC, Hydraulic systems such as brakes, steering, suspension, transmissions and on board computer systems. Live on-vehicle lab and shop work plus exposed to careers the Transportation industry.

**Student Outcomes**
- Earn Up to 10 student ASE certificates.
- College Credit
- Pathways for Associate, Bachelor and Technical degrees.
- Job-entry (Automotive Industry) level ready
- Ready to continue education after high school

**Specialized Curriculum, Materials, Equipment, Facilities**
- A. Alldata Pro on-line service manual.
- B. Mitchell1 Pro-Demand on-line service manual.
- C. Five car hoists and up-date tools both pneumatic and cordless.
- D. Up-to-date equipment such as Scanners, HVAC and Electrical testers.

**Program Courses/Sequence**
- Advanced Automotive Chassis
- Advanced Automotive Engines /Engine Performance
- Advanced Automotive Lab

**Technical Skill Assessment/Industry Credentials**
- 1. ASE MLR certificate.
- 2. ASE Engine Repair Certification
- 3. Auto Trans./Transaxle Certification
- 4. Manual Drive Train & Axles Certification
- 5. Suspension & Steering Certification
- 6. Brakes Certification
- 7. Electrical/Electrical System
- 8. Heating Ventilation Air Conditioning Certification
- 9. Engine Performance Certification
- 10. Automotive Service Technician Certification
Bond Research
Dreaming & Scheming
Expansion Plans
North Salem HS CTE program development

8 CTE programs in 6 of the 6 Oregon Career Clusters with 10.87 FTE could serve almost 1,800 students, while others would be able to acquire CTE programs at CTEC or through the IDT process.

Existing/Planned Programs

<table>
<thead>
<tr>
<th>FTE</th>
<th>Agriculture, Food &amp; Natural Resource Systems</th>
<th>Arts, Information &amp; Communications</th>
<th>Business &amp; Management</th>
<th>Health Sciences</th>
<th>Human Resources</th>
<th>Industrial &amp; Engineering Systems</th>
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<tr>
<td></td>
<td>Existing</td>
<td>Expanded</td>
<td>Proposed</td>
<td>Total</td>
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**Existing**

1. Business & Management – Marketing – program currently has 1.5 FTE, collaborates with MAPS Credit Union Marketing Department and operates the school student store. Expansion of FTE noted below.

2. Culinary Arts – remodeled kitchen with CTE Revitalization grant summer 2014, with 1.87 FTE currently. See below for expansion request.

3. Health Services – Health Sciences – program currently has 1.0 FTE, a classroom for the general Health Services classes. See below for expansion request.

4. Early Childhood Education – program currently has 0.87 FTE, has undersized classroom adjacent to private Pre-School/Daycare program on campus. See below for expansion request.

5. Woods Manufacturing – program currently has 1.0 FTE, undersized shop area. See below for expansion request.

6. Pre-Engineering – current program has 0.67 FTE in a computer lab. See below for expansion request.

Expansion of Programs

1. Graphic Design – Ideally, develop larger classroom space for full computer lab and work space to include equipment, large format printer and enough sections for students to access program courses increasing 0.67 FTE.


3. Culinary Arts – Student interest and demand is high, so expanding existing program into adjacent classroom, adding basic level of tabletop burners or basic stoves, 3-compartment sink and hand washing station, 2-3 dishwashers, 2 convection ovens, refrigeration, storage shelving, work tables, basic kitchen equipment/tools, and necessary exhaust/ventilation, plumbing, electrical, and remodeling. Increasing 0.13 FTE would be ideal.

4. Health Services – Health Sciences – Add Pharmacy Technician component as a capstone to the program. Additional 0.5 FTE, additional instructional space with “Pharmacy Shop” for Pharmacy Identification and Pharmacy Procedures courses. This program would seek to provide students with knowledge and skills to qualify for Oregon Pharmacy Technician certification.

5. Early Childhood Education – Utilize existing space as observation room to the pre-school and for planning activities to be delivered in pre-school. Add classroom large enough to hold normal high school class and include a teaching demonstration area. The Teacher Cadet courses should be included in this program, increasing 0.5 FTE (or more depending on sections of Teacher Cadet).

6. Woods Manufacturing – Larger shop area is required to truly offer precision and custom woodworking. The goal is to design and manufacture furniture and cabinetry. Needed are a computer lab for computer-aided design, space to continue introductory instruction as well as larger work space for advanced furniture and cabinetry, additional storage space for in-progress student projects and raw materials, increased capacity dust-removal system. Increase 1.0 FTE to accommodate student interest.

7. Pre-Engineering – Student interest is increasing in this program as Robotics has been added to the list of program courses. Needed is a classroom space large enough to accommodate a computer lab and a lab work area for building and testing robotics. Increase 0.33 FTE.

Potential New Programs

1. Agriculture, Food & Natural Resources – Environmental Science/Natural Resources – Currently, offered are a smattering of environmental science sections. Further developing the program into a logical sequence is required and adding FTE to offer enough sections to be a full program of study. Could collaborate with Engineering Science program for Environmental Engineering capstone course.
Bond Strategy
Design Process
Strategically Leveraging Funds

Capital Bond
HS Success (M98)
Other
Jim Orth    CTE Director

orth_james@salkeiz.k12.or.us
panel
discussion

OSBA bonds, ballots & buildings | workshop
Q & A

OSBA bonds, ballots & buildings | workshop
thank you
design that **empowers** learners to change the world.