Why Auto Mechanics Matters:
Understanding College and Career Readiness

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WHAT

HOW

WHY

- Products / Services
- Processes / Value Proposition
- Causes / Motivation

Discussion Outline

1 Ready, or Not?
2 “Readiness” Writ Large
3 Design as Catalyst
Ready, or Not?
“Our high schools are obsolete --- they were designed 50 years ago to meet the needs of another age. Today, even when they work exactly as designed, our high schools cannot teach our kids what they need to know.”

-Bill Gates

February 2005, National Summit on High Schools
• Teacher-centered instruction
• Comprehensive offerings
• Organized by departments
• Classrooms: 1 teacher, 25 students, 1 subject/1 hour
Absolutes | Artifacts
The Blank Stare of Disengagement

“...Anyone? Anyone?...”

Source: “Ferris Bueller’s Day Off,” 1986
THE EDUCATION CRISIS

- 30% of students in the U.S. fail out of high school
- 33% of U.S. college students require remediation
- 46% of U.S. college students do not graduate

1 STUDENT DROPS OUT OF HIGH SCHOOL EVERY 26 SECONDS.

Source: (http://www.knewton.com/college-readiness/infographic/)
THE UNPREPARED NATION: College Readiness Today

Many of today’s high school students are graduating without the skills or knowledge necessary to succeed in college. As a result, many require remediation or drop out of college. We explore how unprepared U.S. students truly are, and discuss the implications.

Dropout Nation

Nationally, only 56 percent of students who begin postsecondary education receive a degree within six years. Here’s how it breaks down by state:

Preparedness Perceptions

High school and college instructors have vastly different perceptions of how ready freshmen are for college work. How do you think students are doing? Among 18-24 year olds, some see college graduates as well-prepared, but many believe remediation is needed.

How Unprepared Are Our Students?

According to Knewton’s ‘The Unprepared Nation’ infographic, only 20 percent of high school graduates in 2011 met college readiness benchmarks in four subjects.

Source: (http://www.knewton.com/college-readiness/infographic/)
“…more than 60% of employers say applicants lack ‘communication and interpersonal skills’—a jump of 10 percentage points in just two years.

A wide margin of managers also say today’s applicants can’t think critically and creatively, solve problems or write well.”

Source: TIME, November 10, 2013
# Fortune 500 Most Valued Skills

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<th>1970</th>
<th>1999</th>
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<tbody>
<tr>
<td>1 Writing</td>
<td>Teamwork</td>
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<td>2 Computational Skills</td>
<td>Problem Solving</td>
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<td>3 Reading Skills</td>
<td>Interpersonal Skills</td>
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<td>4 Oral Communications</td>
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<td>5 Listening Skills</td>
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<td>6 Personal Career Development</td>
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<td>7 Creative Thinking</td>
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<td>8 Leadership</td>
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<td>9 Goal Setting / Motivation</td>
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<td>10 Teamwork</td>
<td>Writing</td>
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21st Century Skills

Partnership for 21st Century Skills (P21)

FRAMEWORK FOR 21ST CENTURY LEARNING

21st Century Student Outcomes and Support Systems

- Learning and Innovation Skills – 4Cs
- Critical Thinking & Communication
- Collaboration & Creativity

Life and Career Skills
- Core Subjects – 3Rs and 21st Century Themes

Information, Media, and Technology Skills
- Standards and Assessments
- Curriculum and Instruction
- Professional Development
- Learning Environments
The majority of respondents (59%) reported that they agree or strongly agree that they developed most of the skills they use in their current job outside of school. Only 15% disagree or strongly disagree, indicating they felt that they developed these skills in school.

Developing 21st century skills in the last year of school is positively correlated with higher perceived work quality later in life. In fact, those who have high 21st century skill development are twice as likely to have higher work quality compared to those who had low 21st century skill development.

Across the 21st century skills included in this study, real world problem-solving is the significant driver of higher work quality; however, less than two-thirds (63%) of respondents reported developing this skill often in the last year of school and that number drops to less than half (39%) for high school graduates.

In their last year of school, those who often used 21st century skills are more likely to have had greater student aspiration and engagement; and student aspiration and engagement is also positively correlated to work quality later in life.

Across the student aspiration conditions, good teacher-student relationships is a primary driver; students who feel their teachers care and support them are more likely to perceive themselves as successful and valued in their jobs later in life.

Although a wide majority (86%) of respondents says they used computers and technology to complete assignments or projects in their last year of school, only 14% report they used technology for collaboration, indicating that students are not developing the type of advanced technology skills that would be used later in the workplace.

Younger respondents, aged 18-22, report slightly higher levels of 21st century skill development and this may be an indicator that teaching strategies are changing in the U.S.; however, the largest opportunity may lie with high school graduates who report the lowest levels of overall 21st century skill development.
Future Work Skills 2020

While all six drivers are important in shaping the landscape in which each skill emerges, the color-coding and placement here indicate which drivers have particular relevance to the development of each of the skills.

KEY
Drivers—disruptive shifts that will reshape the workforce landscape
Key skill needed in the future workforce

extreme longevity
Increasing global lifespans change the nature of careers and learning

computational world
Massive increase in sensors and processing power make the world a programmable system

superstructured organizations
Social technologies drive new forms of production and value creation

Design Mindset
Virtual Collaboration

Sense-Making

rise of smart machines and systems
Workplace robotics nudge human workers out of rote repetitive tasks

New Media Literacy

Social Intelligence

Computational Thinking

Cognitive Load Management

Cross Cultural Competency

New and Adaptive Thinking

globally-connected world
Increased global interconnectivity puts diversity and adaptability at the center of organizational operations

new media ecology
New communication tools require new media literacies beyond text

Trans-disciplinarity
Careers of the Near Future

vertical farmer  underwater welder  genetic counselor  elder care worker

sustainability professional  statistician  precision toolmaker  cyber security specialist

Source: TIME, November 21, 2011
Job-Sharing with Droids?

http://www.ted.com/talks/andrew_mcafee_what_will_future_jobs_look_like

http://www.ted.com/talks/marco_annunziata_welcome_to_the_age_of_the_industrial_internet

http://www.ted.com/talks/erik_brynjolfsson_the_key_to_growth_race_em_with_em_the_machines

http://www.ted.com/talks/rodney_brooks_on_robot
“Readiness” Writ Large
“Creativity is as important in education as literacy, and we should treat it with the same status.”

-Sir Ken Robinson
How Do States Define Career Readiness?

**Kentucky**

A career ready student is a student who is preparatory in a Career and Technical Education career major and has reached the benchmarks on WorkKeys or ASVAB and KOSSA or an Industry Certification.

**Nebraska**

A career ready person capitalizes on *personal strengths, talents, education and experiences to bring value to the workplace and the community* through his/her performance, skill, diligence, ethics, and responsible behavior.
Real-World Experiences

Pathways to Prosperity: Meeting the Challenge of Preparing Young Americans for the 21st Century

“...a network of multiple pathways that connect both work and learning.”

Learning for Jobs (OECD, 2010)

“...a high quality WBL component is the best way to prepare young people for careers.”

“...integration of high-quality WBL more systematically into CTE programs...a promising way to increase students’ educational engagement and their career readiness and attainment.”
Three Domains of Work

Three competencies that must be mastered for students to develop 21st-century competencies (as opposed to skills).

The cognitive domain, which includes thinking, reasoning, and related skills;

The intrapersonal domain, which involves self-management, including the ability to regulate one’s behavior and emotions to reach goals; and

The interpersonal domain, which involves expressing information to others, as well as interpreting others’ messages and responding appropriately.

College + Career Readiness

Skill sets are well understood. Students should have:

- Core Academic Competency
- Strong Social / Cognitive Capacity
- Marketable Technical Expertise or Talent
- Planning Skills that Apply Learning to College and Career Opportunity

*Social / Cognitive behaviors is a placeholder for the skill category that encompasses terms such as employability, social-emotional, soft-skills, critical thinking skills, learning behaviors, Habits of Mind, 21st century skills.
“In the United States, postsecondary education and training has become more necessary than ever.”

Figure 2. By 2020, nearly two out of every three U.S. jobs will require some postsecondary education and training.
Common Core State Standards and Career/Technical Education

The core components of a great CTE program:

• Relevant and rigorous curricula that scaffold to third-party, validated, and recognized credentials;

• Teachers who are certified and whose skills are current in the industry certification area in which they are teaching; and

• Rich opportunities for work-based learning experiences.
Design as Catalyst
Arlington Career Center

- Designed as pull-out VoTech facility
- School, public library, community college campus, elementary school, community use, athletic facilities
- Prompted by growth in enrollment
- Included in 2014-2024 CIP
- Catalyst for innovation
Arlington Career Center

- Transformation of current program
- Rebranding
- Equitable admissions
- Leverage change in other high schools
Arlington Career Center
Arlington Career Center
Skills for College and Career Readiness

Tony Wagner, Rigor Redefined
http://www.tonywagner.com/resources/rigor-redefined

• Critical thinking and problem solving
• Collaboration and leadership
• Agility and adaptability
• Initiative and entrepreneurialism
• Effective oral and written communication
• Accessing and analyzing information
• Curiosity and imagination
Skills for college and career readiness that can inform how we think about design:

- Critical thinking and problem solving
- Collaboration and leadership
- **Agility and adaptability**
- Initiative and entrepreneurialism
- Effective oral and written communication
- **Accessing and analyzing information**
- Curiosity and imagination
Agile Spaces

Furniture on wheels that can be reconfigured again and again through the day
Math Challenge Problem

\[
\left(15\right)^{2009} + 123 = \ ? \text{ mod } 2009
\]
Adaptable Facilities

Limited only by the imagination of the users of the space
Inviting Curiosity and Encouraging Imagination:

- Transparency
- Exposed Building Systems
- Architectonic
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How do you know a great school when you walk into it?

There’s a buzz, an energy.
A great school is a **place**: a second home where students develop a sense of belonging.

Courtesy VMDO Architects
A great school is **healthy** and **wholesome** to nourish the social, physical and mental needs of the student.

Courtesy VMDO Architects
Every space in a great school provides opportunities to promote effective teaching and learning.
A great school embodies our **civic** values and reflects the aspirations we hold for our children.

Courtesy VMDO Architects
What’s the source of all the buzz, all the energy?

- Students empowered to take charge of their own learning
- Students and teachers who can’t wait to get to school in the morning, and don’t want to leave at the end of the day
How can design help create all that buzz, all that energy?

- The school becomes an incubator for learning; it provides a toolkit for creative pedagogy that is always changing.
- The school is a work in progress just as the students themselves are works in progress.
- The school evolves constantly, just as the students do.
If we want students to come to school and not want to leave, the school must connect students to the natural environment by:

- Blending buildings and landscapes
- Creating indoor/outdoor learning spaces
- Incorporating, green, growing, living things
- Celebrating the gift of changing natural light
- Providing fresh air and operable windows
- Embracing renewable energy
- Designing with climate and weather
If we want students to come to school and not want to leave, the school must appeal to their senses, the school must be:
Uninhibited / Safe
What spaces do students find inviting/appealing, exciting/vibrant?

Where do they feel social/comfortable, uninhibited/safe?
Provide technology and infrastructure so learning and teaching can take place anywhere, anytime, inside, outside and beyond the school building.
Interest + Imagination
What Now?
“What’s it all mean?”

“...it’s all good...it’s all good...it’s all good”
College and Career Readiness

“Right now, the moment is here, and the opportunity is clear:

...to finally break down the silos between their disciplines and collectively find ways to ensure that the new standards rigorously engage all students in both academic and CTE courses.”

(Achieve, Inc 2012)
What We Learn from Shop Class:

• Learning is Messy
• Learning is Noisy
• Learning is Autonomous
• Mistakes Happen
• Craftsmanship Matters

Source: Joanne Kelleher, Asst. Principal, NY
Thank you

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