Rigor, Relevance & Relationships in Career Technology Education
The new “3 R’s” for the 21st Century Learning Environment

21st Century Skills: 21st Century Learning Environments

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Chester Bartels
Learning Objectives:

• Understand how the new “3 R’s” are realized in a new career technology education facility
• Understand the diligent and organized steps taken by the district to identify the need and plan for how to address it
• Develop an understanding of key strategies that can be employed in the planning of a new CTE facility
• Understand how the physical design, including many sustainable strategies, can be woven into the project
• Collectively discuss what the 21st-century learning environment looks like, including in the context of CTE and workforce development
• Develop a Mission Statement and Guiding Principals for the optimal CTE facility and environment
Agenda

• A little background:
  ◦ Dorchester County

• Time-out:
  ◦ What is 21st-Century Learning?
  ◦ The new “3 R’s”

• Identify the NEEDS & Address the OBSTACLES
  ◦ Workforce development
  ◦ Curriculum
  ◦ Alignment of facilities
  ◦ $$$

• Implement the PLAN
  ◦ The new Dorchester Career & Technology Center

• Workshop Activities
Dorchester County, Maryland
"The HEART of the Eastern Shore"

- Founded in 1669
- 600 square miles of land & water
- 1,500 miles of shoreline
- 2010 population - 32,350
- Cambridge – County seat – 11,753 pop.
Dorchester County, Maryland
"The HEART of the Eastern Shore"

- Total labor force (civilian) – 16,450
- Median household income - $44,500 (MD - $70,000)
- Employment by place of work:
  - Manufacturing 20.0%
  - Trade, transportation, utilities 16.7%
  - Local government 12.3%
  - Education & health services 12.0%
  - Leisure & hospitality 11.8%
- 37% of residents commute outside County for work
- Unemployment rate 11.1%
County's Changing Economy

- Agriculture & Seafood industry
- Decline of the health of the Chesapeake Bay:
  - Development
  - Agriculture
  - Overfishing
- Decline in seafood packing houses
- Outsourcing of jobs
- Businesses closing
- Graduates moving out of County
...all is NOT well...
Steps to attract “new, clean industries”

- Location/transportation access
- Tax exemption for manufacturing & warehousing
- Capitalize on hospitality & location
- Enterprise Zones (tax incentives)
- WORK-FORCE DEVELOPMENT
Time-out
Workforce Development

...is really...

Workforce EDUCATION & TRAINING

...which means...

Creating a 21\textsuperscript{st} century learning environment

...which requires...

Understanding the 21\textsuperscript{st} century Learner
The 21st Century Learning Environment

What Does It Look Like?
The 21st Century Learner is...

- Digitally Literate
- Environmentally Aware
- Social
- ALWAYS ON
- Mobile
- Community-oriented
forces driving change

Digital Influence

Alternative Methods of Delivery

Globalization

Learning Environment
The **Digital Divide**

**Digital Immigrants**  
- teach by
- Delivering content
- Presenting & Telling
- Linear Stories
- One Thing at a Time
- Face-to-Face
- One Size Fits All

**Digital Natives**  
- learn by
- Being Engaged
- Doing & Game play
- Random Access & Exploring Options
- Multi-tasking
- Going Online
- Are Highly personalized
“Gamers have amassed thousands of hours of rapidly analyzing new situations, interacting with characters they don’t really know, and solving problems quickly and independently.”

-- Beck and Wade, Got Game
The **Learning Environment** must respond

Learner-centered
Technology-rich
Flexible, agile & adaptable
Variety of types & sizes of spaces
Sir Ken Robinson has something to say about this...
The 3 R’s, - 20th century version:

- Reading
- Writing
- Arithmetic
The new 3 R’s for the 21st Century:

Rigor
Relevance
Relationships
Rigor

n. The quality of being extremely thorough, exhaustive or accurate.

- Concise Oxford English Dictionary
“Studies show that aligning high school standards to college and workplace expectations is a critical step toward giving students a solid foundation in the academic, social and workplace skills needed for success in postsecondary education or a career.”

- National Conference of State Legislatures
Research shows that RIGOR in high school curriculum is more important in predicting post-secondary success than:

- Parent education level
- Family income
- Race/ethnicity

- National Conference of State Legislatures
Relevance

n. Closely connected or appropriate to the matter at hand.

- Concise Oxford English Dictionary
Relevance

“Research shows that creating multiple pathways to graduation, through a variety of learning opportunities, provides students with a meaningful high school structure that links subject areas and encompasses both personal experiences and connections to the world of adult work.”

- National Conference of State Legislatures
Relevance

“The career academy is a model of high school design that creates personalized learning opportunities through career-related experiences during high school...Recent research finds that career academies improve labor market preparation and successful school-to-work transitions.”

- National Conference of State Legislatures
Bloom’s Six Levels of Taxonomy

Rigor

Evaluation  6.
Synthesis  5.
Analysis  4.
Application  3.
Comprehension  2.
Awareness  1.

Knowledge (Rigor)
Relevance

1. Knowledge in one discipline
2. Apply knowledge across disciplines
3. Apply knowledge in one discipline
4. Apply knowledge to real-world predictable situations
5. Apply knowledge to real-world unpredictable situations
Students gather and store bits of knowledge and information. Students are primarily expected to remember or understand this acquired knowledge.
Students use acquired knowledge to solve real-world problems, design solutions, and complete work. The greatest level of application is to apply appropriate knowledge to new and unpredictable situations.
Students extend and refine their acquired knowledge to be able to use that knowledge automatically and routinely to analyze and solve problems and to create unique solutions.
Students have the competence to think in complex ways and also apply knowledge and skills they have acquired. Even when confronted with perplexing unknowns, students are able to use extensive knowledge and skill to create solutions and take action that further develops their skills and knowledge.
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<th>Knowledge (Rigor)</th>
<th>Application (Relevance)</th>
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**Student and Teacher Roles**

- **Students Think**
  - In complex ways: analyze, compare, create and evaluate.

- **Teachers Work**
  - To create and assess learning activities. The student may be a passive learner.

- **Students Think and Work**
  - In more complex and unscripted settings using higher order thinking skills to solve real world tasks.

- **Students Work**
  - To apply knowledge and skills in real world tasks.
Relationship

n. The way in which two or more people or things are connected, or the state of being connected.

- Concise Oxford English Dictionary
Relationship

Three key RELATIONSHIPS must be established:

- Teacher and subject matter
- Student and subject matter
- Teacher and student

- Egg Harbor Township Schools
Consider teaching and learning as a triangle in which all parts are needed to create and support the whole.

- Egg Harbor Township Schools
Relationship

A fourth key RELATIONSHIP:

The interconnectedness between different areas of study and coursework...

...acknowledging and understanding that subjects are indeed interrelated and not stand-alone topics or courses.
“Training and educating potential workers is a major concern. This process starts in the local County school system with both academic and technological training.”

www.docogonet.com, Dorchester County’s official website
Identifying the NEEDS:

Changing industry
Sluggish economy
Keep residents in the County/region
Workforce development
Identifying the NEEDS:

Changing industry
Sluggish economy
Keep residents in the County/region
Workforce development

Upgrade the CTE curriculum
Focus on pathways that support regional needs
Align the facilities with the curriculum
Addressing the OBSTACLES:

The Career & Technology curriculum:

A shift from the old Vo-Tech, Trade-School mentality...
Addressing the OBSTACLES:

The Career & Technology curriculum:

A shift from the old Vo-Tech, Trade-School mentality...

To:

21st Century Learning
Rigor, Relevance & Relationship

A school where kids are competing to get in

So they can be prepared for the 21st century workplace
The DCTC Time-line

Nov. 2003  DCPS – Facilities Condition Assessment
“The largest issue pertaining to interior shell issues are repairs and upgrades to the Dorchester School of Technology....”

“The Dorchester School of Technology has several heating deficiencies that should be addressed...”

“All of the highest priority need requires improvement of fresh air and exhaust systems in the Dorchester School of Technology...”
The DCTC Time-line

Nov. 2003  DCPS – Facilities Condition Assessment
Oct. 2004  DCPS – Educational Adequacy Study
Educational Adequacy Study, Oct. 2004

Dorchester School of Technology:
“Structurally the workshops are in decent condition with adequate remodeling could serve as a good flexible learning space for some of the current programs.”
Dorchester School of Technology:
“Structurally the workshops are in **decent** condition with **adequate** remodeling **could serve** as a good flexible learning space for **some** of the current programs.”

These words should SCARE us:
- **decent**
- **adequate**
- **could serve**
- **some**
Educational Adequacy Study, Oct. 2004

Recommendations:

“Classrooms and labs attached to these workshops have to be redone, including culinary arts, medical services and horticulture.”

“Furthermore, a feasibility study could be conducted which will provide insights on the benefits and liabilities of the current location, and the educational programs that are offered at the School of Technology.”
Conclusions:
“Career and technology education is currently at a crossroads. The current program is not adequately supported by the facility, due in large part to the technological changes that have occurred in the use of technology in the work place and industry. These changes over the last thirty years and the specialized requirements of the evolving curricula contribute to the problem. There are opportunities to review current programs and explore new programs that should be available to high school students in Dorchester County.”
Conclusions:

“The question of adequacy of the program is currently being explored by the school, trade community and district staff to determine the long-term direction that the program will take.”
The DCTC Time-line

Nov. 2003  DCPS – Facilities Condition Assessment
Oct. 2004  DCPS – Educational Adequacy Study
July 2006  DSOT Feasibility Study
Sept. 2006 DSOT Educational Specifications
Career & Technology Education: 
Educating Tomorrow’s Workforce Today

“Career Technology Education (CTE) provides high school and community college students an opportunity to pursue a sequential technical and academic program of study leading to advancement in a career field.”

- Maryland State Department of Education
Career & Technology Education:
MSDE CTE Career Clusters

- Arts, Media and Communication
- Business Management & Finance
- Construction & Development
- Consumer Services, Hospitality & Tourism
- Environmental, Agricultural & Natural resource Systems
- Health & Biosciences
- Human Resource Services
- Information Technology
- Manufacturing, Engineering & Technology
- Transportation Technologies
DCTC Career Clusters
“18 Programs...Endless Possibilities!”

• Arts, Media and Communication
  ◦ Interactive Media Production

• Construction & Development
  ◦ Computer Aided Drafting & Design
  ◦ Carpentry
  ◦ Masonry
  ◦ HVAC
  ◦ Electricity
  ◦ Welding

• Consumer Services, Hospitality & Tourism
  ◦ Culinary Arts
  ◦ Cosmetology
DCTC Career Clusters
“18 Programs...Endless Possibilities!”

- Environmental, Agricultural & Natural Resource Systems
  - Horticulture
- Health & Biosciences
  - Skilled Nursing
- Human Resource Services
  - Childcare / Early Childhood
- Information Technology
  - IT Networking Academy (CISCO)
- Manufacturing, Engineering & Technology
  - Digital & industrial Electronics
- Transportation Technologies
  - Diesel & Marine Repair
  - Automotive Technology Repairs
  - Automotive Body Repairs
Conclusions of Feasibility Study:

- Current facility is grossly inadequate to properly support current and future CTE curriculum
- Costs to renovate and expand existing facility exceed costs to build new on current site
- Desire for program to evolve into comprehensive high school
- Building a new replacement facility next to existing high school, as a CTE wing, is best approach financially, educationally and for future development of program.
Addressing the OBSTACLES:

State funding support:

- Maximize State $$ contribution
- Replacement facility (rather than renovation)
- Demonstrate re-use of existing facility
### The DCTC Time-line

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Adaptive re-use study

Identified other potential new uses for existing DSOT facility:

- Administrative functions
- Maintenance
- Swing school for future renovations

Demonstrated to State that current facility could be re-used rather than demolished.

Helped convince State to support new facility, which led to maximum State funding participation!
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Planning & Design Process

- Meetings with Instructors, Students & Staff
- Meetings with Local & Program Advisory Committees
- Monthly updates to Board of Education
- Community information & input meetings
- Tours of other CTE facilities (incl. Board members)
- Coordination with local and State funding authorities
- Construction Manager hired early in design
- Intensive FFE specification & procurement
New facility must to be designed to promote:

- Rigor - Emphasis on academic coursework with practical learning
- Relevance - Learning environment to real-world
- Relationship - Interconnectedness of Curriculum

Also:
- Flexibility / Adaptability
- Facility as a Teaching Tool
- Sustainability
- Community
Existing Site Plan
First Floor Plan
Second Floor Plan
“Career and technology education programs will provide a well-prepared workforce for area employers as well as well-prepared students to be successful in post-secondary training or college. A major part of student preparation will be in adapting to an ever-changing technological society. Career and technology education programs will work with traditionally academic programs in providing a well-qualified pool of potential employees, trainees, and college students.”

- DCTC Vision Statement
“We have worked very closely through the entire process of the project to get our Local Advisory Council members’ and our Program Advisory Committee members’ input. They are the experts continuing to work within the field and have the latest information available for each industry. This was done to insure the instructional opportunities for students prepared them with industry standard equipment in an industry standard environment.”

- Kermit Hines, Principal, DCTC
“Mrs. Hurley’s Medical Services class and Ms. Zinnel’s Culinary Arts students have been working on a joint project studying diabetes and the diseases effect on the human body. Students learn the components of a healthy diet and how the right foods can impact the disease. They learned about three types of diabetes and how each is treated. Focus was on the American Diabetic Association Diet and risk factors, signs and symptoms of the disease as well as normal blood sugar levels and the dangers of levels that are too high or too low. The classes then prepared and enjoyed an ADA lunch and dessert.”

- DCTC Newsletter
Green Design Features inherent in the project:

- Geothermal HVAC system
- Ample natural day-lighting
- Energy-efficient lighting & controls
- Indoor environmental quality
- Water-efficient landscaping
- Reduced water use plumbing fixtures
- Efficient building envelope
- Reflective roofing
- "Best Practices" Storm-water management
- Low VOC materials
- Acoustic performance
- Sustainable material use
Flexibility – Agility - Adaptability

Programs initially in design:
- Computer technology labs:
  - Computerized Accounting
  - Technical Support
  - Applications Support
- Criminal Justice

New programs incorporated:
- Computer technology labs:
  - IT Networking Academy (CISCO)
  - Interactive Media Production
  - Digital & industrial Electronics
  - CADD Lab
- Homeland Security
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March 2007 Design Commences on new DCTC
Aug. 2009 Construction Commences on new DCTC

Aug. 2011 New DCTC opens for business!!
Develop a Mission Statement and Guiding Principals for the optimal 21st century CTE facility and environment

What will a CTE facility look like in 2030?

- Develop a Mission Statement about this
- Create a list of Guiding Principles for planning & design
What will a CTE facility look like in 2030?

• Consider 3 things:
  1. How will the 21st century technical professions impact:
     • Curriculum and pedagogy
     • Teacher/mentor and Industry partner influence or role
     • Building and campus
  2. What are the hallmarks of 21st century learning as related to:
     • Curriculum and pedagogy
     • Teacher/mentor and Industry partner influence or role
     • Building and campus
  3. How might the new 3 R’s be realized or supported through:
     • Curriculum and pedagogy
     • Teacher/mentor and Industry partner influence or role
     • Building and campus
Workshop Activity

• Break into 3 groups:

1. Project the trends of 21\textsuperscript{st} century technical professions
2. What are the hallmarks of 21\textsuperscript{st} century learning
3. How might the new 3 R’s be realized

• Report
Sources/Acknowledgements:

Dorchester County website – www.docogonet.com
DCPS website – www.dcps.k12.md.us
DCTC website – www.dsot.dcpsmd.net
MSDE website – www.marylandpublicschools.org
Egg Harbor Township website – www.eht.k12.nj.us
NCSL website – www.ncsl.org
TED website – www.ted.com
Sir Ken Robinson website – www.sirkenrobinson.com
3 R’s from Slide Share – www.slideshare.net
Rigor/Relevance Framework – www.leadered.com
HCM website – www.hcm2.com

Images by:

Patrick Ross Photography
Google Images
http://www.glaesernemanufaktur.de/gmd.html

Reports & Studies:

Facilities Condition Assessment – Aramark
Educational Adequacy Study – AT Studio
DSOT Feasibility Study – BSA+A
DSOT Educational Specifications – BSA+A
Administration
Shared Resources - Second Floor

STEMS Classroom
- 862 SF
- 800 SF

Student Testing
- 265 SF
- 250 SF

Conference
- 190 SF
- 200 SF

Office
- 159 SF
- 120 SF

Office
- 152 SF
- 120 SF

Workroom
- 186 SF
- 200 SF

Storage
- 61 SF
- 100 SF

- 94 SF

Electrical
- 81 SF

Seminar
- 264 SF
- 250 SF

EMR
- 60 SF
Consumer Services Cluster (Part.)
Information Technology / Accounting Cluster - Second Floor
Transportation Cluster