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**Virtual Training Simulator in  
Automotive Training**

Jamie Justice  
Kentucky Community and Technical College  
System



# The Kentucky Community and Technical College System (KCTCS)

- Statewide system of publicly funded two year technical and community colleges
- Sixteen colleges
- Associate degrees, diplomas, and certificates--variety of occupational programs, and university transfer programs
- Enrollment > 81,000 for 2004/05

# Global Auto Industry Has Arrived

- Aisin Auto Castings, London (KY)
- Daimler Chrysler
- Asian brands growth in Europe
- Emergence of China Market with VW, GM, Toyota, etc., **plus** Chinese domestic brands coming to US
- Vehicle content sourced worldwide

***No truly “national” companies!***

# “World Class” Quality and Cost-- the Business Entry Point

“The day is gone when we can introduce a new model and automatically raise the price to the customer. The competitive environment is so severe that we must now introduce a new model with more features and technology and reduce the base price.”

Ron Zarella, former GM President  
at Toyota’s Georgetown, KY plant

# Quality and Value Rule

## *Perception = Reality*

- Fit and finish and great reliability are one dimension of quality
- Technological sophistication and gadgets drive the customers' perception of quality

# Proliferation of Electronic Gadgets

- Telematics emergence
  - Linked to safety systems via GPS
  - messages for service via active monitoring of vehicle performance
  - wireless and voice activated personal electronics for all devices
- Active safety devices for crash avoidance
- 90% innovation thru electronics and 80% of that thru new-generation software

# New Technology's Wide Reaching Impact

- OEMs' and suppliers design and manufacturing
- Dealership service technicians
- Breakthrough new systems required
  - Electrical power systems, battery capacity
  - Alternative fuel systems
  - IT applications explosion

# Industry Innovation and Technical Education

## FAST AND FLEXIBLE

The mantra of the industry--the key to profitability and market responsiveness

*Toyota is shooting for a **6 month** new model development lead time with no prototype build; virtual design and assembly up to first trial production run*

# Observation

- In 1913, Ford required 6 weeks to build a single model of black cars of extremely simple design and no options
- Today, cars are welded, painted, and assembled in about one day, with enormous sophistication and variety of options

# Observation

- In 1913 it took 16 weeks to teach Physics 101 or English 101

How long do we take today?

- Today we require 55 minute or 2 hour blocks of time in high schools for a semester or year long course.

How long does it really take for effective learning to occur?

# Observation

- Schools and colleges seem to be saying to the student, we will not change, we will increase time (cost) as the amount of knowledge and skills required increases!!
- How can educators replicate what industry demands, be FAST AND FLEXIBLE?

# The Minimum Expectations

- Integrate new higher skills and knowledge into existing content, discard the unnecessary
- Reduce the learning cycle time
- Increase access to training
- Meet both employer (customer) and student (client) requirements
- Increase instructors' technical expertise
- Equip workforce with higher academic and technical performance

# KCTCS Approach

- Responsiveness to the changing requirements of jobs and students' complex lives
- Retool the training delivery model
- Adopt a Just-In-Time model
  - What is needed
  - When it is needed
  - Where it is needed
  - In the quantity needed

# Instructional Transformation

## Learner Centered Approach

- “chunking” curriculum into modules based on skill standards
- Multiple entry/exit points
- Options for time and location
- Reduce cycle time of learning
  - Use learning technology
  - Credit for industry based training
  - Credit for life experiential learning

# Required Supporting Systems

- Course credit approval authority changes:  
outside the box thinking
- Administrators and instructors new way of thinking:  
time does not = competency
- Portable documentation of skill attainment  
widely recognized skill standards

# KCTCS Examples of Retooling

- Industry-based Modularized Accessible Credentials (IMAC)
- Kentucky Manufacturing Skill Standards
- Visualization and Immersive Education
  - Simulator with Toyota
  - Assessment Technologies

# IMAC

## **Primary Partner: Ford Motor Company**

- Align company training requirements with college courses
- Modularize courses upon specific skills and award fractional credit hours
- Develop on-line and CD based delivery for accessibility and flexibility
- Connect company training and on-floor demos with classroom using portable low cost video technology

# IMAC (Cont'd)

- Evaluate company based training to award college credit
- Credential company trainers as college adjunct staff
- Certificates, diplomas, or degrees are credential options
- Instructors gain industry experience and industry experts advise on training content

# Achievement Based on Skills Standards: Documentable/Portable

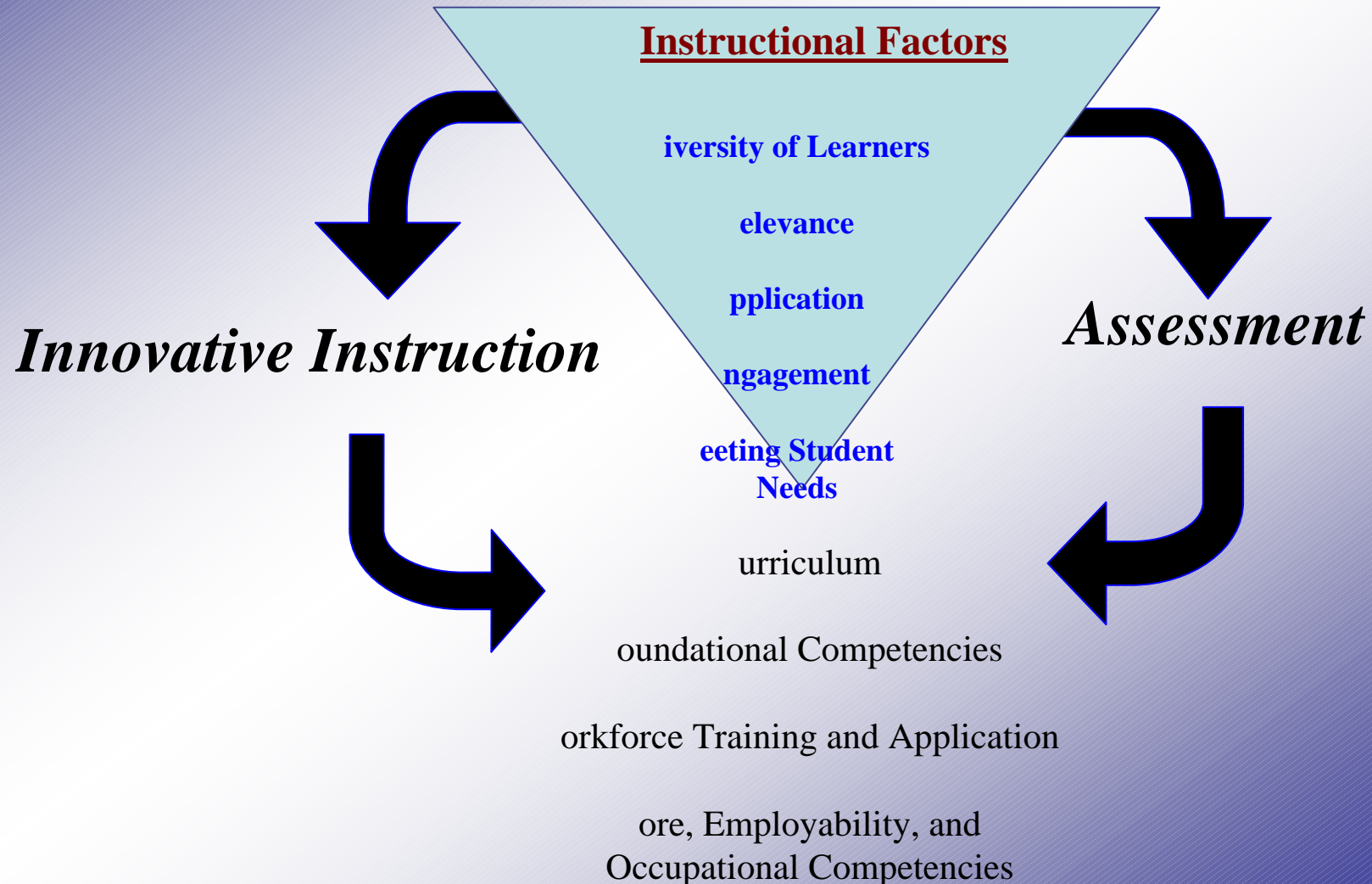
- The Kentucky Manufacturing Skills Standards (KMSS)
  - Basic and Advanced Level Skill Standards
  - Based on the requirements of the state's manufacturing companies
  - Has assessment and curriculum components, both paper and pencil and on-line

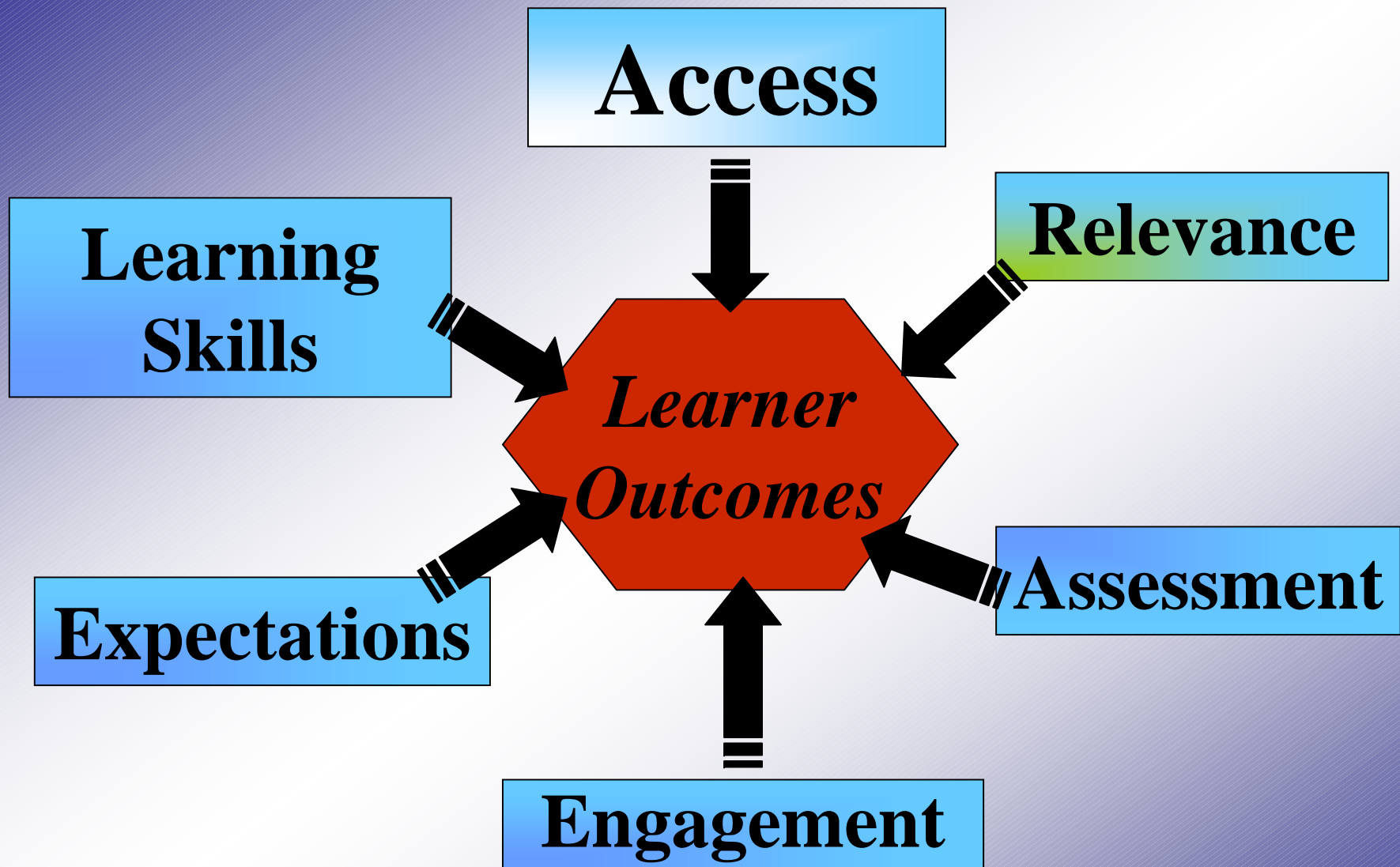
# Expectations

- Integration of new and existing content
- Shortened learning cycles
- Increased access to training
- Meeting employer and student needs and expectations
- Enhanced, more engaging technical and academic instruction
- A more highly skilled workforce with strong academic and technical skill sets

# *A Teaching Learning Methodology*

*Meeting Student Needs*



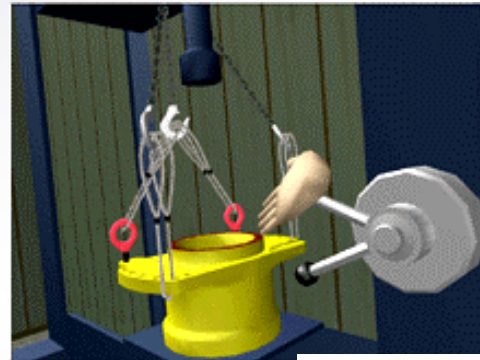


# Visualization and Immersive Education

- Improved Instructional Delivery
- Engaging Learners
- Targeted Instruction and Assessment Tool
- Increased Content Delivery and Maximized Learning
- Real Physics Integration
- Improved Visual Modality
- Shortened Learning Cycle

# Classroom/Training Applications

- Emergence Learning Solutions
  - Classroom Instructional Tool
  - Industry Training
  - Student Engagement and Captivation



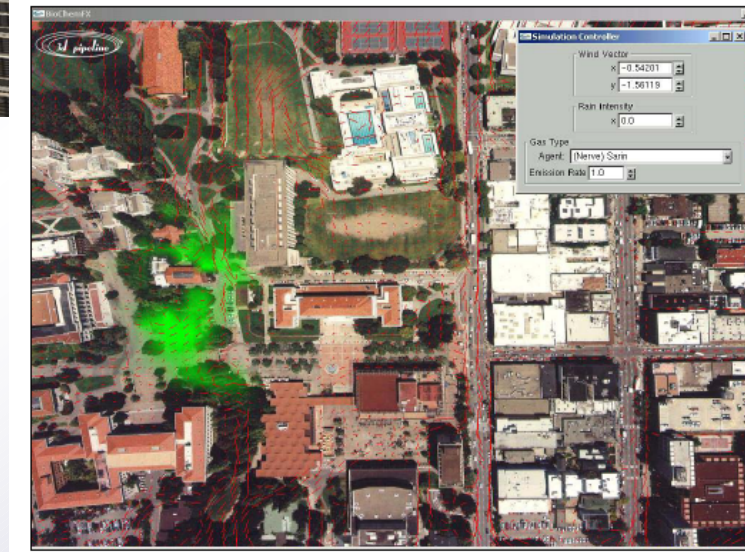
Jamie Justice of KCTCS demonstrates the Emergence 3D Visualization System at NCATC



# Simulation Development

- Custom Industrial Simulations
  - Learner exposed to real operation of “high value” machines in a controlled safe environment.
  - Instructor fault insertion or timed error.
  - Data collection on student response and reaction.
  - Reduced training time and cost.
  - Pre-hire or incumbent skills assessment tool.

# Simulation Samples



# Impact/Goals

- Shortened Learning Cycles
- Better Trained Workforce
- Skill Level Evaluation for Targeted Instruction
- Reduced Training Costs
- Maximized Exposure to New Technologies across Colleges or Classrooms
- Enhanced Critical Thinking Skills

# Applications for Emergence Learning

- Medical
- Manufacturing
- Electronics
- Nanotechnologies or Small Component Training
- Other

# Benefits

- Student Engagement and Captivation
- Common Visual Perspectives for All Learners
- Real-time Assessment Data
- Enhanced Opportunities for Training/Retraining Local Workforce
- Innovative Technical Currency of Faculty
- Joint Applied Research Projects with Business/Industry
- Ability to Attract Significant Private Sector Support
- Improved Competitive Position in Funded Research and Grants
- Potential Publishing Revenue Sharing Opportunities
- Enhanced Opportunities for Graduates in the Region