

Engineering Education Initiatives at

Kanazawa **T**echnical **C**ollege



Robert W. Songer

2014 CDIO Asian Regional Meeting

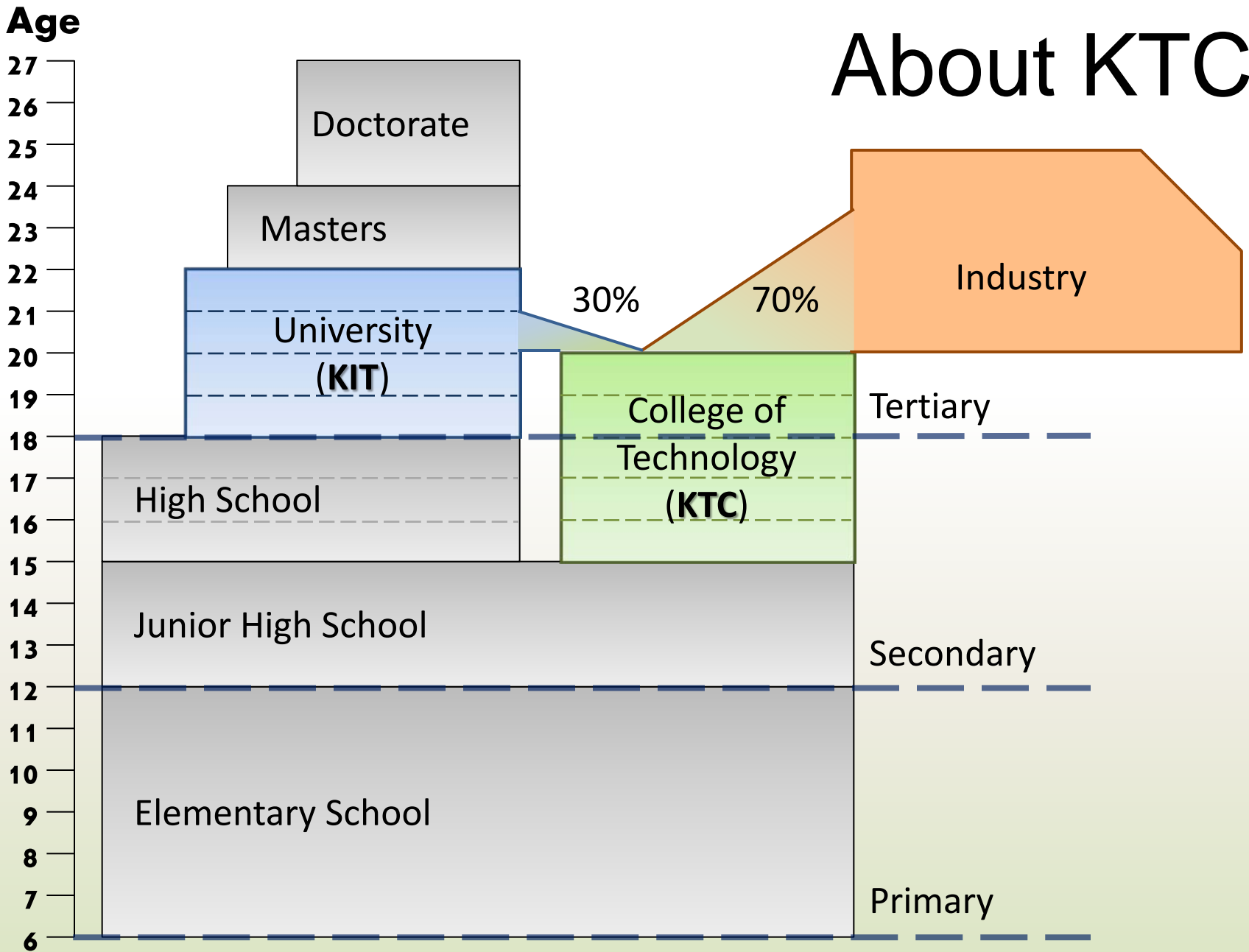
March 24 – 26, Kanazawa Institute of Technology

 About KTC

 Why CDIO at KTC

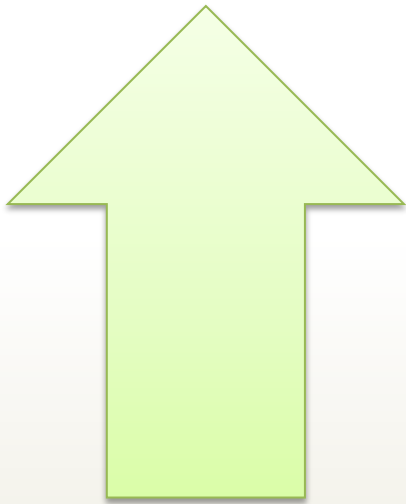
 Practical Examples

About KTC

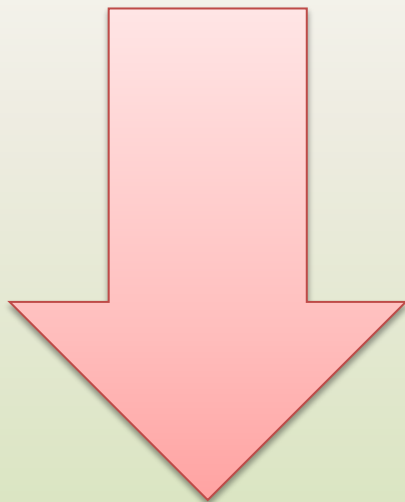


Kosen

(College of Technology)



Quality of graduates
Mobility for international scene



Quantity of graduates
Low- and mid-level trainability

Fundamental Competencies for Working Persons

Generic skills for working with various people in the workplace and the local community

Compiled in by the Ministry of Economy, Trade and Industry (METI)

2006

2010

Adopted into industrial policy for developing global human resources

Fundamental Competencies for Working Persons	CDIO Syllabus v2.0
Ability to take action	2.4 Attitudes, Thought and Learning
Initiative	2.4.1 Initiative and the Willingness to Make Decisions ...
Ability to influence	3.1.4 Team Leadership
Ability to execute	2.4.2 Perseverance, Urgency and Will to Deliver...
Ability to think through	2. PERSONAL AND PROFESSIONAL SKILLS AND ATTRIBUTES
Ability to discover issues	2.1.1 Problem Identification and Formulation 2.4.4 Critical Thinking
Planning skills	4.3.4 Development Project Management 4.7.6 Planning and Managing a Project to Completion
Creativity	2.4.3 Creative Thinking 4.7.8 Innovation ... 4.7.10 Implementation and Operation ...
Ability to work in a team	3. INTERPERSONAL SKILLS: TEAMWORK AND COMMUNICATION
Ability to deliver a message	3.2 Communications
Active listening skills	3.2.7 Inquiry, Listening and Dialog
Flexibility	3.2.8 Negotiation, Compromise and Conflict Resolution
Ability to grasp situations	3.1.1 Forming Effective Teams 3.1.2 Team Operation 3.2.10 Establishing Diverse Connections and Networking
Self-Regulation and Discipline	2.5.1 Ethics, Integrity and Social Responsibility 4.1 External, Societal, and Environmental Context
Ability to manage stress	2.4.5 Self-Awareness, Metacognition and Knowledge Integration 2.4.7 Time and Resource Management

Model Core Curriculum

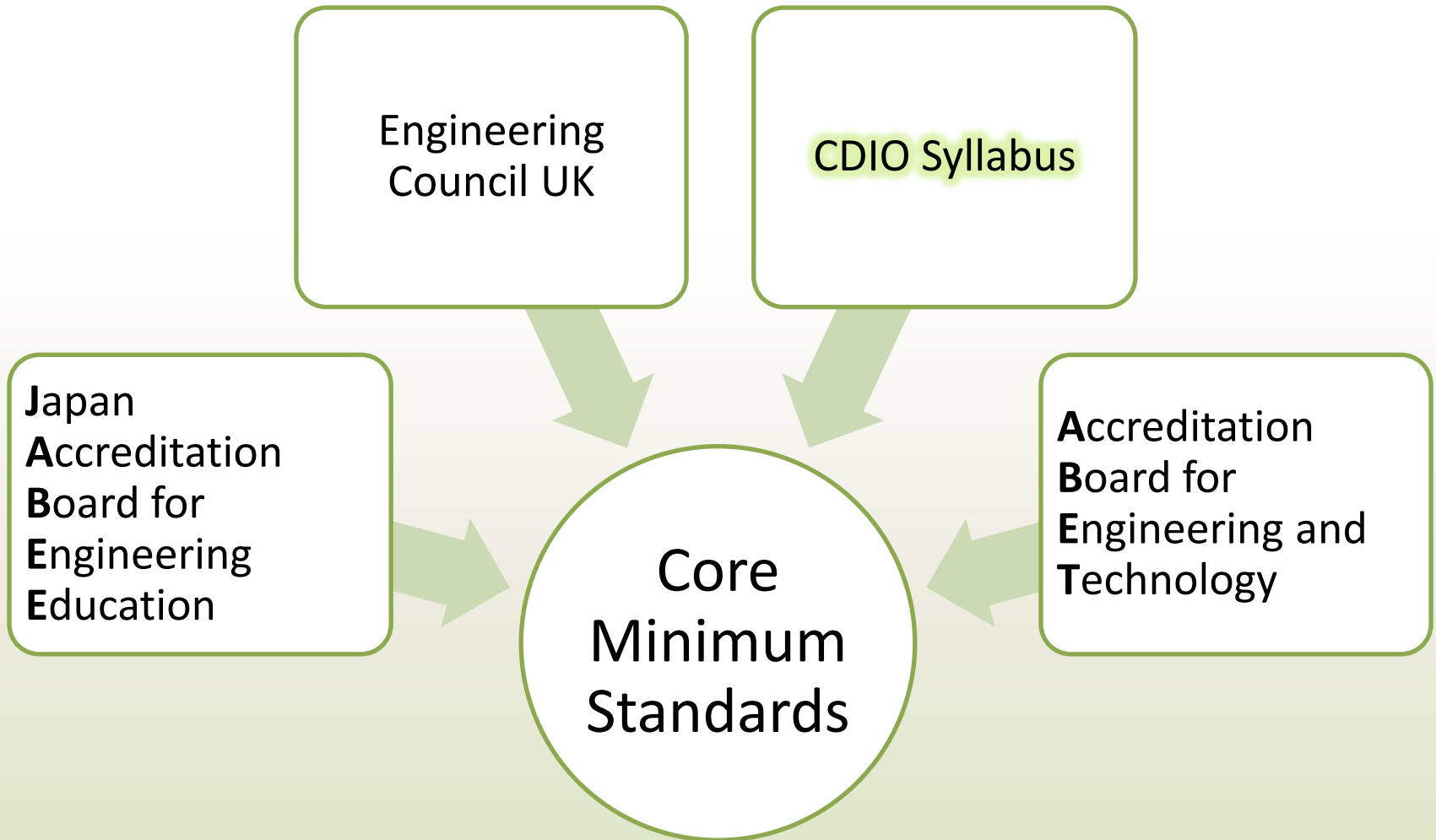
Fundamental abilities,
specialized abilities, and
cross-disciplinary abilities
with competency levels
set to industry requirements



Tentative plan published by the
Institute of National Kosen

2012

Model Core Curriculum Engineering Education Outcomes



Model Core Curriculum

Anticipated Efficacy

1

Improvement of practical and creative engineering education

2

Social accountability for the quality of education

3

A basis for students to realize their own academic progress

4

Smoother compatibility in the certification of transfer credits

Model Core Curriculum Anticipated Efficacy



Effective indicators for third-party evaluations, JABEE, etc.

CDIO vs. JABEE

CDIO Syllabus v2.0	JABEE 2012 Criterion 1								
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
1.1 Knowledge of Underlying Mathematics and Science			■		■				
1.2 Core Fundamental Knowledge of Engineering			□	■	■				
1.3 Advanced Engineering Fundamental Knowledge, Methods and Tools				■	■				
2.1 Analytical Reasoning and Problem Solving					■				
2.2 Experimentation, Investigation and Knowledge Discovery					□				
2.3 System Thinking					□				
2.4 Attitudes, Thought and Learning							■	■	
2.5 Ethics, Equity and Other Responsibilities	□	■					□		
3.1 Teamwork									■
3.2 Communications						■			
3.3 Communications in Foreign Languages						■			
4.1 External, Societal and Environmental Context	■	■							
4.2 Enterprise and Business Context	□								
4.3 Conceiving, Systems Engineering and Management					□			□	
4.4 Designing					■				
4.5 Implementing					■				
4.6 Operating					□				

□) Weak Correlation ■) Strong Correlation

CDIO vs. JABEE

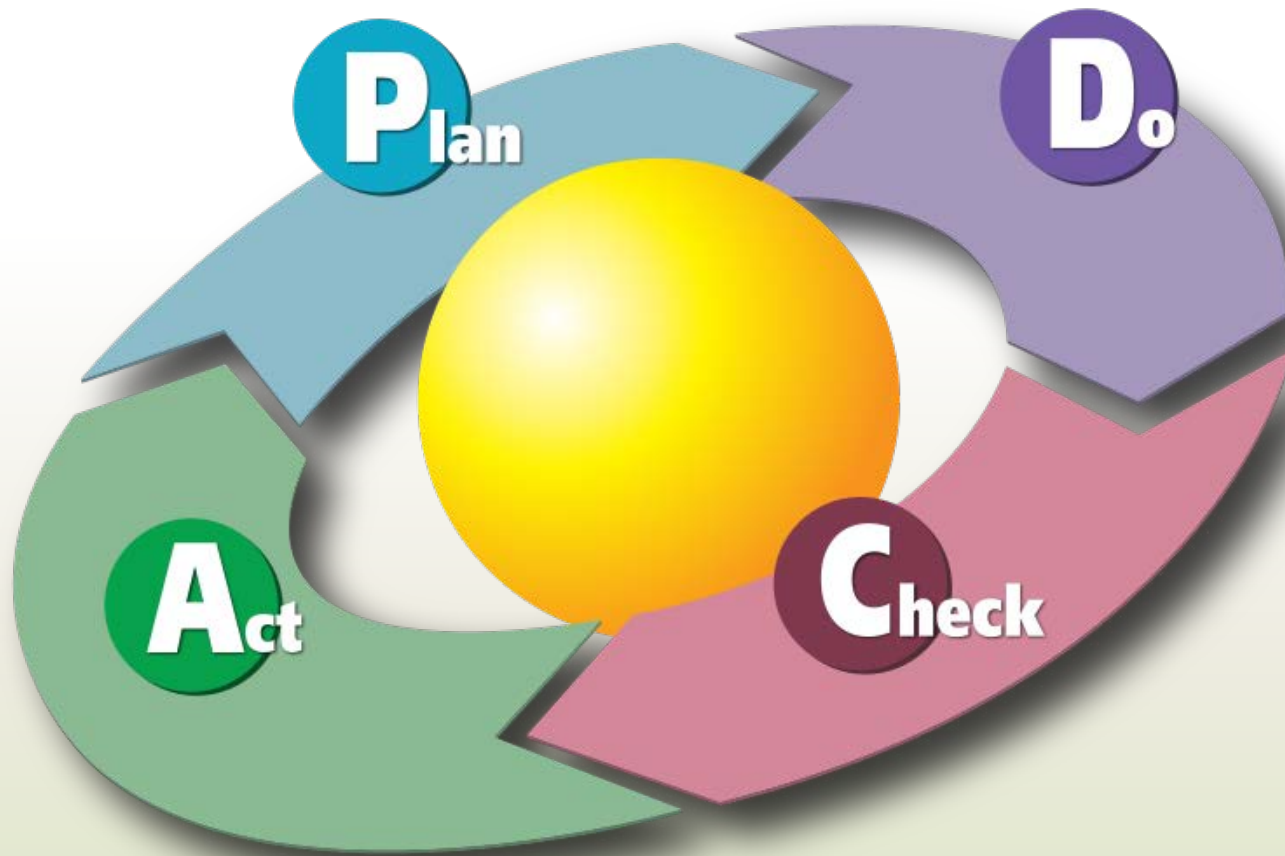
CDIO Standards v2.0	JABEE 2012 Criteria									
	1	2.1	2.2	2.3	2.4	2.5	3	4.1	4.2	
1.) CDIO as Context*	□									
2.) CDIO Syllabus Outcomes*	■									
3.) Integrated Curriculum*		□								
4.) Introduction to Engineering										
5.) Design-Build Experiences*										
6.) CDIO Workspaces						■				
7.) Integrated Learning Experiences*							□			
8.) Active Learning			■							
9.) Enhancement of Faculty CDIO Skills*				□						
10.) Enhancement of Faculty Teaching Skills				■						
11.) CDIO Skills Assessment*							■			
12.) CDIO Program Evaluation								■	■	

* Essential standards for a CDIO program

□) Weak Correlation ■) Strong Correlation

Kaizen

(Continuous Improvement)



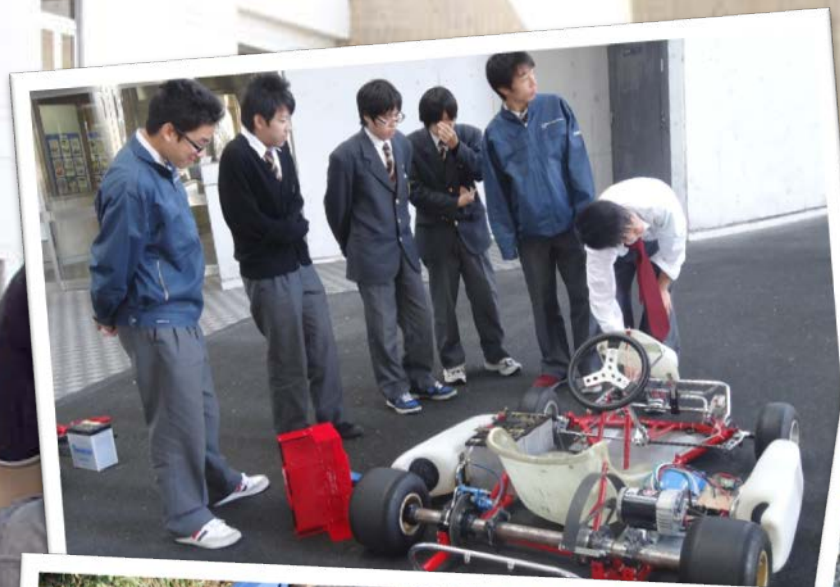
CDIO Standards & PDCA

Score	Description	PDCA
5	Evidence related to the standard is regularly reviewed and used to make improvements .	A
4	There is documented evidence of the full implementation and impact of the standard across program components and constituents.	C
3	Implementation of the plan to address the standard is underway across the program components and constituents.	D
2	There is a plan in place to address the standard.	P
1	There is an awareness of need to adopt the standard and a process is in place to address it.	
0	There is no documented plan or activity related to the standard.	

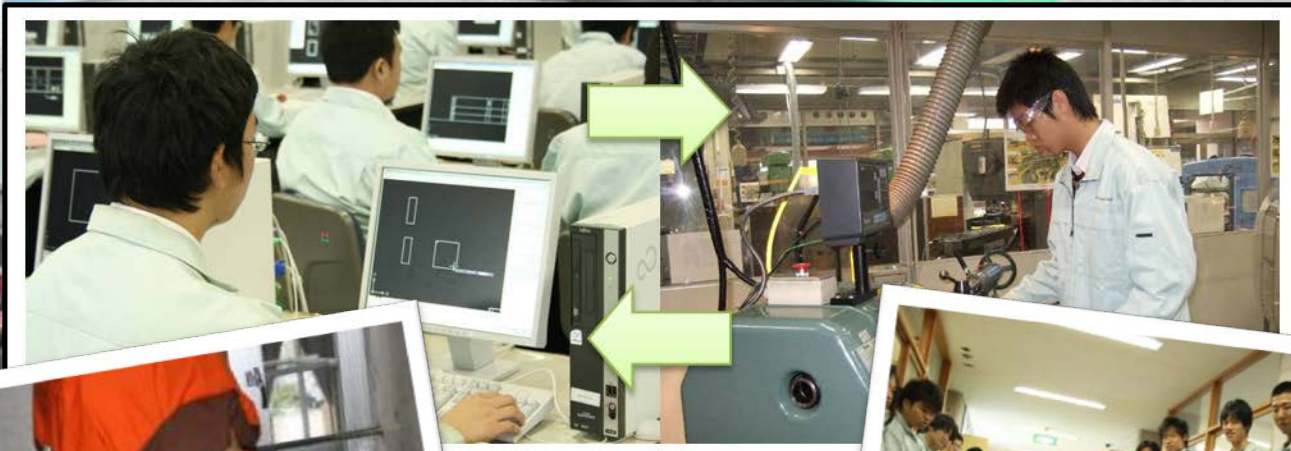
Authentic Learning Experiences
Community Collaboration Projects

Practical Examples

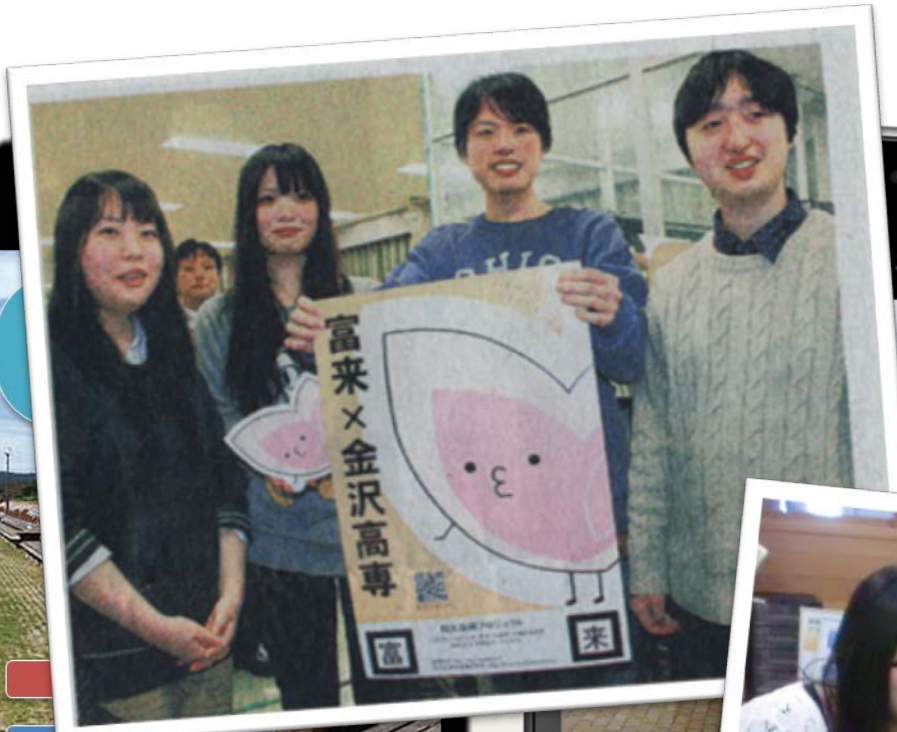
Electrical & Electronics Engineering



Mechanical Engineering

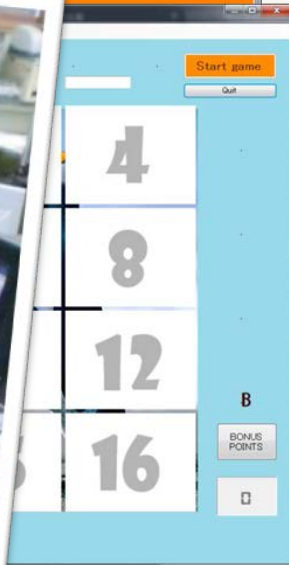


Global Information Technology



b.△m

b.□m





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Thank You

References

Songer, Robert and Takeshi Fujisawa. "An Interpretation of the CDIO Framework with Self-Assessment." *Creative Engineering Design Education* 13.1 (2013): 70-78.

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Download these slides at:

<http://www.slideshare.net/RobertSonger/engineering-education-initiatives-at-ktc>