PTC Education Program

PTC Education Program
PTC Schools Program
“Brining Technological Literacy to Tomorrows Work Force”

Daryl Lundin
Hutchinson Minnesota
1050 Students Grades 9-12
The Origins of Engineering

The definition of an Engineer

Historically:
The invention of the steam engine in the latter part of the 18th century, providing a key source of power for the Industrial Revolution, gave enormous impetus to the development of machinery of all types. As a result, a new major classification of engineering dealing with tools and machines developed, receiving formal recognition in 1847 in the founding of the “Institution of Mechanical Engineering”.

The definition of an Engineer

Present:

1. To lay out, construct, or manage as an engineer.

2. A crafty schemer.

3. Industrial engineering.

4. Engineering that deals with the design, improvement, and installation of integrated systems (as of people, materials, and energy) in industry.
What is a 21st Century Technician?

• The role of the technician as a support and parallel position to engineers has become increasingly important.

• To ignore or bypass these positions would be foolish and wasteful of our time creating curriculum for engineering only.
Therefore, what are the traits of technicians and engineers which must be developed?

What do we envision for the Future?

What is a Modern Engineer/Technician?
- 5 years from now?
- 15 years from now and beyond?

How should middle/high schools engage and entice students into pursuing a career as an Engineer or Technician?

How does PTC (Pro/E software) assist in the delivery of this new curriculum?
“Think Globally!” “The Global Engineering Initiative”
PTC Education Program

Mission Statement

PTC's Education Program prepares the new generation of students for success in a technological world.

Through free/low cost applications, extensive curricula and assessment tools; PTC is bridging the gap between Education and Industry enabling today’s students to be tomorrows innovators.
PTC Education Program’s Sponsors

The PTC Education Program is sponsored in part by the following companies:
Who are PTC?

- Global software company based in Needham, MA, USA
- 4,052 PTC employees in more than 30 countries
- 40,000+ worldwide customers
- 16th largest software company in the world
- Fastest growing software company in the world
  - 2006: 19% growth, 2007: 15% projected growth
- Developed the first Parametric Feature-based design software (Pro|ENGINEER) over 20 years ago.
  - education
- Awarded:
  - Start Magazine’s ‘Hottest’ Companies 2005
  - Manufacturing Business Technology Global 100
  - 2005 Electronics Industry Yearbook: 50 Companies to Watch
  - Second-Highest In-Kind Giver
    By Business Week Magazine
Examples of Student Work with Pro/E
Engineering and Design
Why is PTC committed to Education?

Inspire students to embrace technology and pursue technology related careers

- The welfare of our customers is linked to the pipeline of technologically literate students
  - Example: many PTC Customers are aerospace organizations. 54% of this workforce is over 45 years old; 33% will be eligible to retire in five years
    - There are not sufficient numbers of students in the pipeline to replace them
    - Less than 10% of high school graduates pursue undergraduate degrees in engineering. Of the 10% who enter engineering, only about 50% earn a degree in engineering
  - Prepare students for college/university engineering programs
  - BUILD the engineering pipeline!

- Let’s put this issue into perspective! Here are the number of Engineers graduating each year:
  - USA: 130,000
  - India: 400,000
  - China: 1 million
**Why is PTC committed to Education?**

PTC is focused on developing technological literacy skills through 3D design, technology, pre-engineering and engineering programs.
PTC Education Program – By the Numbers

Global Impact:
- 15,000 teachers
- 10,000 schools
- 3.5+ million students
- 28 countries

North America:
- 7076 teachers
- 5400 schools
- 1.2+ million student
- 450 Universities and colleges

Since the launch of Pro|ENGINEER Schools Edition (summer ’06):
- 30 Instructors
- Over 1000 teachers trained in the US
PTC Education Program

The PTC Education Program is preparing the next generation of engineers by providing leading edge product development solutions to both the K-12 and college/university level.

Capabilities and Benefits:

- Build technological literacy
- Develop the necessary soft skills
- Improve critical thinking and strategic thinking skills
- Increase students confidence
- Experience project-based problem solving
- Become familiar with advanced design processes
- Prepare for real-world careers in technology
PTC Schools Program – Not just about the software

Our Schools program is not just providing free/low cost applications!

**Program**: An integrated course of academic study

- PTC is focused on delivering an integrated program aimed at inspiring the next generation of Engineers, Designers and Technicians.

Our integrated program provides the following four elements:

- Free/low cost design applications
- Complete curriculum and project based activities
- Assessment tools
- Global Engineering Education Program

PTC is the only company that can provide and support these elements across the board and across the globe.
Design Applications

Pro|ENGINEER - The FASTEST and only SCALABLE 3D design solution on the market.

Schools Edition

- **Donated** software for certified middle and high school teachers
- Affordable teacher training workshops taught by certified trainers (technology teachers). Upon successful completion of training and follow-up project, a teacher becomes certified.
- For classroom and students’ home use (up to 300 seats per school)

Schools Advanced Edition

- **$60 per seat** for a two year license
- Complete CAD/CAM/CAE solution for schools
- Includes technical support and access to web-based training
Introduction of Pro/ENGINEER

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<th>11/12 years old</th>
<th>12/13 years old</th>
<th>13/14 years old</th>
<th>14/15 years old</th>
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<th>19 years old</th>
<th>18+ years old</th>
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<tr>
<td>Year 7</td>
<td>Year 8</td>
<td>Year 9</td>
<td>Year 10</td>
<td>Year 11</td>
<td>Year 12</td>
<td>College</td>
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middle school ↔ high School ↔ Work based learning / vocational ↔ Higher Education ↔ Degree

Pro/E introduction

Pro/DESktop

D&T Syllabus / Curriculum

Tutorials written to support D&T Curriculum and aid learning how to use the software

Pro/ENGINEER in 53% of UK Universities with Engineering Courses
Pro/ENGINEER Pilot

PTC Working in partnership with teachers

- International Pro|ENGINEER pilots
  - 18 month pilot (started August 2005)
  - US, Australia, New Zealand and UK
- Pilot findings
  - Teachers are over worked
  - FREE software is not enough
  - No bandwidth to develop classroom material
  - Financial limitations, (departmental budgets)
  - Curriculum support / relevance: CRITICAL!
  - Cross curricula links, STEM: Important
  - Industry best practice methodologies: Important
D&T Program development focus

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- middle school
- High school
- Work based learning / vocational
- ‘A’ Levels
- National Diploma (starting 2008)
- Higher Education
- Degree

Science Syllabus / Curriculum
D&T Syllabus / Curriculum
Mathematics Syllabus / Curriculum
ICT Syllabus / Curriculum

Tutorials
Focused on meeting the Program of Study

Tutorials
Focused on meeting the Program of Study with relevance to the Awarding Body

Pro|ENGINEER
science. technology. engineering. math.
making good minds great

www.mn-stem.com
PTC Curriculum development
Curriculum structure
Cross-curricula mapping
On-line Curriculum
PTC Curriculum Development

Leveraging Industry Best Practice

- Understand industry application of the technology
- Terminology familiarization
- Understand the design process
  - The Product Development Lifecycle
- Inter-discipline design
  - Mechanical, Electronic, Product Design, etc.
  - Multi-discipline, distributed design teams
    - Design in the US, manufacture in China
    - Design for manufacture
- PTC Customer base
  - Industry leading companies
Global Engineering Education Program

This Global Engineering Education Program opens the door for students to collaborate on design problems with others; including:

- Higher education
- Local high tech businesses and/or government agencies
- Other secondary schools

This program is enabled via Windchill ProjectLink, a project-based collaboration tool accessed through the internet.

Through our partnerships, businesses or government will provide “real world” design challenges and provide advice to students at the K-12 and undergraduate levels.

- Minnesota was the first state to adopt this program, enabling all 450 secondary schools districts to access global engineering.
PTC Schools Program

Providing best in class industry leading software supported by comprehensive cross curricula tutorials, lesson plans and schemes of work.

AT NO COST

But don’t take our word for it…

I Know, I’m using it…
The Global Engineering Initiative in Minnesota…

- **August 2006**: Governor Pawlenty announces a partnership with PTC aligned with the STEM Initiative.

- **September 2006 – July 2007**: The Minnesota Department of Education provides free training for over 150 instructors.

- **January 2007**: PTC trains additional Trainers of Trainers to deliver additional Pro/E workshops in the state.

- **March 2007**: Hutchinson High School, Lakeville High School, Orono High School, Chisago Lakes High School and Wabasha-Kellogg High School are the first to sign on to pilot the alpha versions of PTC’s engineering curriculum.

- **February 2007**: Governor Pawlenty and Alice Seagren, Commissioner of Education announce their partnership in the Global Engineering Initiative. Other partners include the Minnesota High Tech Association and the University of Minnesota.

- **August 2007**: PTC will deliver course descriptions for two semester length engineering courses that Minnesota educators will be able to present to local administrators and curriculum directors for consideration as course offerings for the 2008-2009 academic year.
PTC / ITEA Partnership

PTC and ITEA have partnered on implementing a comprehensive design and global engineering initiative to all 50 states, districts and schools.

Each component; ITEA’s ‘Engineering by Design’ and PTC’s Design and Global Engineering Initiative, are complementary and aligned on addressing technology and engineering education kindergarten through 12th grade.

These comprehensive components are aligned with national standards; including ITEA (Standards for Technological Literacy), NCTM, AAAS and NAS.

Kendall N. Starkweather, Ph.D., DTE
Executive Director
(703) 860-2100
itea@iteaconnect.org
University Program

Our approach to education does not end in K-12. PTC is working with higher education institutions to provide opportunities for students.

University site license

- Unlimited seats of Pro|ENGINEER for campus-wide use
- Includes free tutorials and classroom materials, technical support by PTC and software upgrades

Program is expanding worldwide

- 1,200 university participants worldwide
- 70,000+ engineering students graduate with Pro|ENGINEER experience each year
Top Engineering Universities in the US teach with Pro/ENGINEER

University Program is expanding nation-wide (Universities in every state are teaching Pro|E!) – and across the globe.

45 of the top 52 Mechanical Engineering programs are members of University Plus!

Top Mechanical Engineering Programs* using Pro|ENGINEER Wildfire in the classroom

7. U of Southern Cal. 17. UCLA 27. U of Minnesota 42. Dartmouth
48. Boston University
49. U of Delaware
50. Arizona State U
51. Brown University
52. U of Notre Dame

Thank You
For Your Time

Contact Info.

- Daryl Lundin
daryll@hutch.k12.mn.us
- 320-587-2151 ext. 5408
Contact Info.

Daryl Lundin
daryll@hutch.k12.mn.us

–320-587-2151 ext. 5408

For Information about Design & Technology in Schools program, go to:

www.ptc.com/for/education