NEXT GENERATION OF TUTORIALS

FINDING TECHNICAL INFORMATION AT PURDUE

PURDUE UNIVERSITY LIBRARIES
SIEGESMUND ENGINEERING LIBRARY
Access. Knowledge. Success.

Michael Fosmire; Bruce Harding; Megan Sapp Nelson;
Amy Van Epps (Purdue University, West Lafayette, IN)

Background of Treasure Hunt Assignment

- Originated in 1980's
- Has been transformed by new formats and resources, but fundamentally the same goal:
  - To help students articulate needs and locate information that they may come across in their careers
- Applicable to many disciplines and levels in engineering and technology
- Can be a group or individual activity

Sources of Questions

- **Texts**
- **References & handbooks**
- **Catalogs**
- **Dictionaries**
- **Patents & trademarks**
- **Historical**
- **Company information**
- **Material specifications**
- **Standards**
- **Current events /campus life**
- **Receive questions from alumni, colleagues, and practitioners who come across ‘interesting’ information needs**

Sample of Questions

- If serviced once a week, what is the minimum number of portable toilets required for a 40-person (31 men / 9 women) migrant work camp?
- Source: ANSI standard
- 5 total. 4 for men (1 / 10);1 for women (1 / 10).

Another Question

- Which three elements spark ‘easily’ when held to a grinding wheel?
- Source: Handbooks
- Answer: Iron (Fe), Titanium (Ti), Cerium (Ce).

Challenge of Treasure Hunt

- Students inaccurately guess topic of question.
  - Required to select the appropriate category for previous webliography.
- Students do not recognize key terms
- Or students do not have knowledge to accurately guess which topic is appropriate.

Expert Systems

- Simulate knowledge of an expert
  - Narrow, well-defined domain
- Respond to user input

- Use in libraries is not new
  - Not widely known/used
  - Commonly used for database selection

Developing the content of the expert system - Thesauri

- Started with archive of past questions
- Staff created thesauri containing variety of terminology used in questions

  Example: Fasteners list features:

  - ANSI (inch) rivets
  - Belt rivet
  - Black metal washer
  - Bolt
  - Button head rivet
  - Clipped flat washer

Developing the content – Logic Statements

- Created logical statements that reflect the questions.

  Example:

  - “What are the angles on the countersink portion of a 00 bell type counterdrill?”
  - Thesauri contain keywords – counterdrill in “tool” thesaurus
  - If (tool) then *standard*

Programming the Expert System

- Began with Open Source product
  - CLIPS
  - Problems with the logic
- Now home-grown, written in C#
  - Logic statements working as expected
- Web interface, Google-like search box
- Will accept full-text of the question

Screen shot of Expert System

PURDUE UNIVERSITY Libraries Access. Knowledge. Success.

Finding Technical Information at Purdue

Terblend alloy is a mixture of what specific materia | Search

Keywords matched: **material, specific, Terblend , what**

100% Materials

Handbooks and databases detailing data about metals, plastics, and ceramics, including properties, and composition of materials.

http://www.lib.purdue.edu/engr/inst/MET102/materialsQT.html

100% Standards and Specifications

Standards are documents giving regulations of size, quality, or quantity for p
lists of parts and processes for an engineering project.

http://www.lib.purdue.edu/engr/inst/MET102/standardsQT.html

65% Catalog

Prepared primarily to increase sales of products. Useful in that they provide
limitations, construction, cost etc. Material is out-dated quickly.

http://www.lib.purdue.edu/engr/inst/MET102/catalogs.html

50% Business / Corporate

Information regarding businesses and corporations, including personnel, loca

http://www.lib.purdue.edu/engr/inst/MET102/company.html

50% Fasteners

Information detailing standards and specifications for Standard and Metric s

http://www.lib.purdue.edu/engr/inst/MET102/fasteners.html

50% Mechanics and Machinery

Handbooks and databases giving machinery standards, data regarding mech

http://www.lib.purdue.edu/engr/inst/MET102/mechanics.html

50% Google

Useful for "current events"-type information. Useful for locating company inf
what would be found in an encyclopedia.

http://www.google.com

PURDUE UNIVERSITY Libraries Access. Knowledge. Success.

Quick Links
- Your Library Account
- Interlibrary Loan
- Course Reserves
- Hours
- Maps

About | Help | Catalogs | Libraries and Units | Articles and Databases | Guides and Instruction | Giving | Ask a Librarian

MATERIALS/PROPERTIES/STRENGTH OF MATERIALS

Materials (Metals/Plastics/Ceramics) | Physical Properties | Strength of Materials

Materials (Metals/Plastics/Ceramics)

Books

Oberg, E., Jones, F.D., Horton, H.L., Ryffel, H.H., McCauley, C.J. et al. (Eds.). ***Machinery's Handbook*** (27th ed). New York: Industrial Press.
REF 621.08 M18m
Latest edition on Reserves at Circulation Desk and at Reference.
Available via http://www.knovel.com/knovel2/Toc.jsp?BookID=1074

ASM metals handbook. (1990). Materials Park, OH: ASM International.
REF 669.106 Am33h
Available via http://purl.lib.purdue.edu/db/asm

Alloy Digest. Upper Montclaire, NJ: Engineering Alloys Digest.
REF 669.05 AL57
Available via http://purl.lib.purdue.edu/db/asm

Gale, W.F. & Totemeier, T.C. (Eds.). (2004). ***Smithells' metals reference book*** (8th ed.). Oxford [England]; Burlington, MA: Elsevier Butterworth-Heinemann.
REF 669.00212 Sm68m 2004

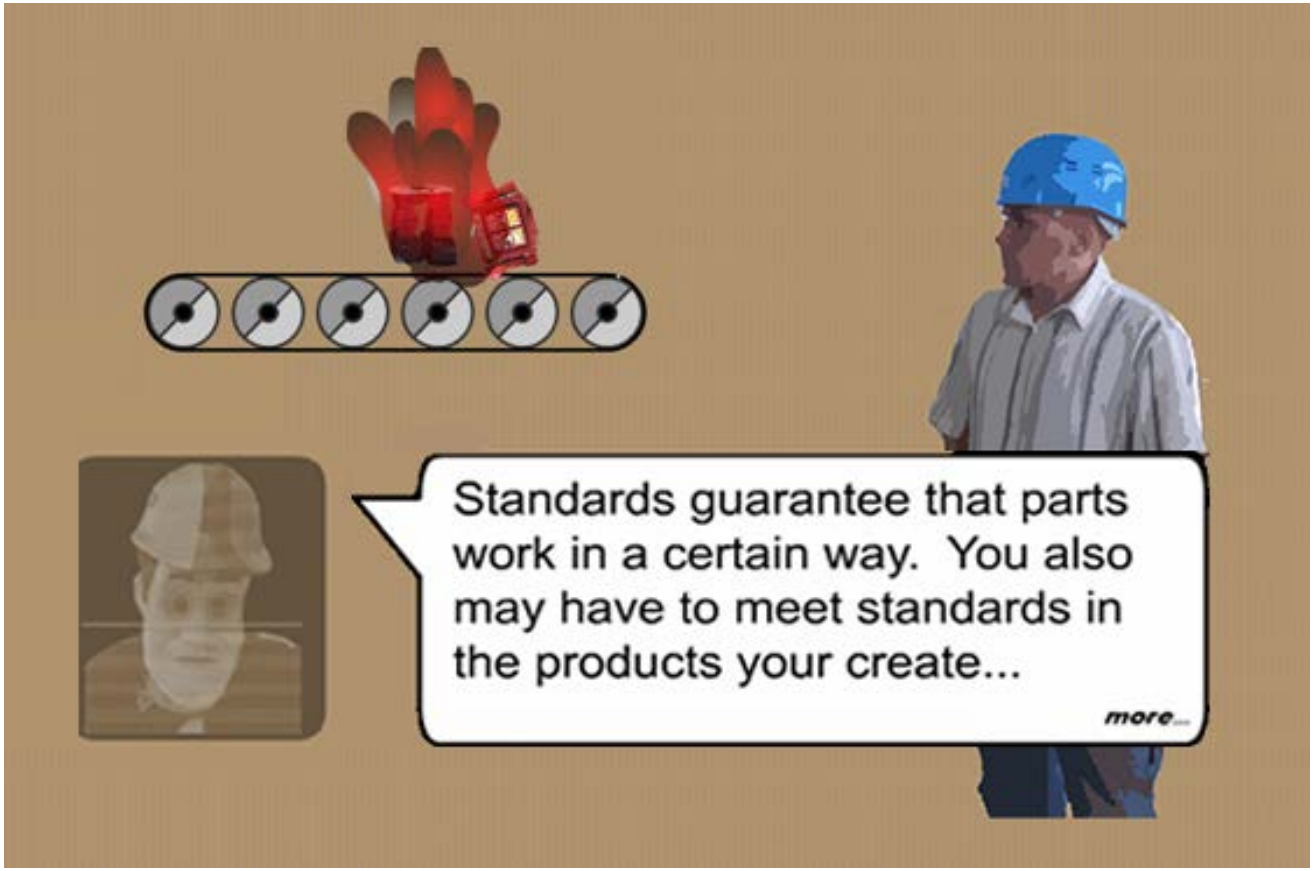
Brandes, E.H. & Brook, G.B. (Eds.). (1998). ***Smithells light metals handbook***. Oxford; Boston, MA: Butterworth-Heinemann.
REF 669.72 Sm68 1998

Smith, H.E. (Ed.). (1996). ***Mark's standard handbook for mechanical engineers***. New York, NY: McGraw-Hill.
REF 621 M4645 1996
Available via http://www.knovel.com/knovel2/Toc.jsp?BookID=346

Animated Tutorial

- Addresses more learning styles:
  - Visual, textual, kinesthetic
- Increases engagement by students
- Varied paths through tutorial
  - Can concentrate on individual needs
- Provides background/context for expert-system users
  - ‘Browse,’ rather than ‘search’ approach
- Links to expert system results—integrates two approaches

Tutorial sample shot



Tutorial sample shot

Pre-test and Post-test

- Pre and post-tests given
  - Prior to tutorial implementation and after
  - Pre-test: self-assessed ability to use sources
  - Post-test: repeat of self assessment and change in confidence in using sources

Pre- and Post-test questions

- Questions asked
  - Ability to use the online catalog
  - Determining when to use a particular source
  - Ability to use standards, patents, handbooks, codes, encyclopedias and dictionaries

Results

Repeated Measures t-test by material type

	Pre-Tutorial Fall 2006	Post-Tutorial Spring 2007
Library catalog	8.574979	6.902311
When to use technical information	7.235174	5.686069
Standards	6.60359	7.382625
Handbooks	4.916889	3.31599
Patents	5.748451	5.008601
Codes	5.541192	4.544838
Encyclopedias	1.692071	0.992933
Dictionaries	0.291111	-1.27273

> ± 2 = statistically significant

Results

Testing for changes between Fall 2006 and Spring 2007

Type of material	**Between Groups t-scores**
Library Catalog	-0.925
When to use technical information	-0.74075
Standards	-1.05912
Handbooks	-0.25441
Patents	0.012309
Codes	-0.39745
Encyclopedias	0.366887
Dictionaries	0.15987

> ± 2 = statistically significant

Results

- Reduction in number of reference transactions
- Indicates students were consulting the tutorial
  - initial direction on sources to use

Semester	Number of students	Number of transactions	Transactions per student
Spring 2006	90	546	6.1
Fall 2006	63	323	5.1
Spring 2007	80	295	3.7

Conclusions

- Tutorial had a positive impact
- No adverse effects on student learning of the material
- Student scores on the assignment not markedly different than other semesters

Questions?

- Michael Fosmire (fosmire@purdue.edu)
- Bruce Harding (harding@purdue.edu)
- Megan Sapp Nelson (msn@purdue.edu)
- Amy Van Epps (vanepa@purdue.edu)

PURDUE UNIVERSITY LIBRARIES

SIEGESMUND ENGINEERING LIBRARY

Access. Knowledge. Success.