ELSEVIER

國立成功大學
National Cheng Kung University

Elsevier drives technology innovation in engineering R&D and teaching

Alan Lieberman
May 2019

Alan Lieberman - Introduction

I started to work with online information resources for engineers when I joined Knovel during 2008.

- During the past eleven years I have:
  - Collaborated with customers to help ensure that the they understand the power of our products.
  - Analyzed usage data to steer product enhancements.
  - Coordinated engineering projects with other Elsevier teams.
  - Facilitated global business development.

Personal:

- My father was a Civil Engineer.
- I attended Franklin & Marshall College (A.B.) and Rutgers, the State University of New Jersey (M.B.A.).
- I am married and I have two sons.
- My older son received a M.B.A. from the University of Chicago Booth School of Business and is working for General Mills.
- My younger son is a PhD candidate at Princeton University.

FRANKLIN & MARSHALL COLLEGE

THE STATE UNIVERSITY OF NEW JERSEY RUTGERS

CHICAGO BOOTH
The University of Chicago Booth School of Business

PRINCETON UNIVERSITY

Elsevier Overview

Driving Innovation in Engineering

How Universities Use Knovel

How Elsevier facilitates partnership and collaboration

Elsevier's mission

Elsevier is a global information analytics company that helps scientists and clinicians to find new answers, reshape human knowledge, and tackle the most urgent human crises.

Academic and Corporate Researchers

Academic Executives

Government

Health Professionals and Students

Healthcare Institutions

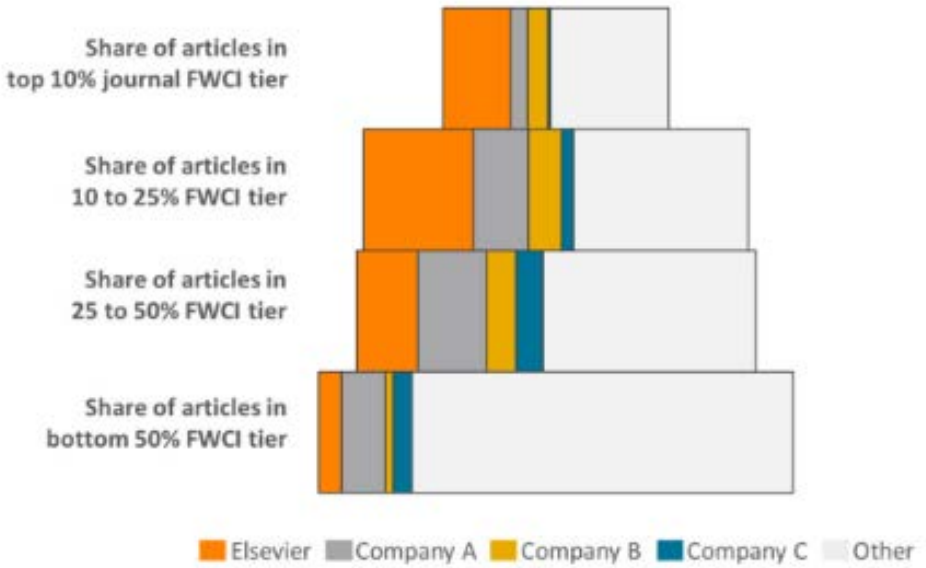
Corporate & Academic Engineers

At Elsevier, we believe easily accessible information is the key to impactful research and education

Journal and Article Quality

Share of articles per journal quality tier

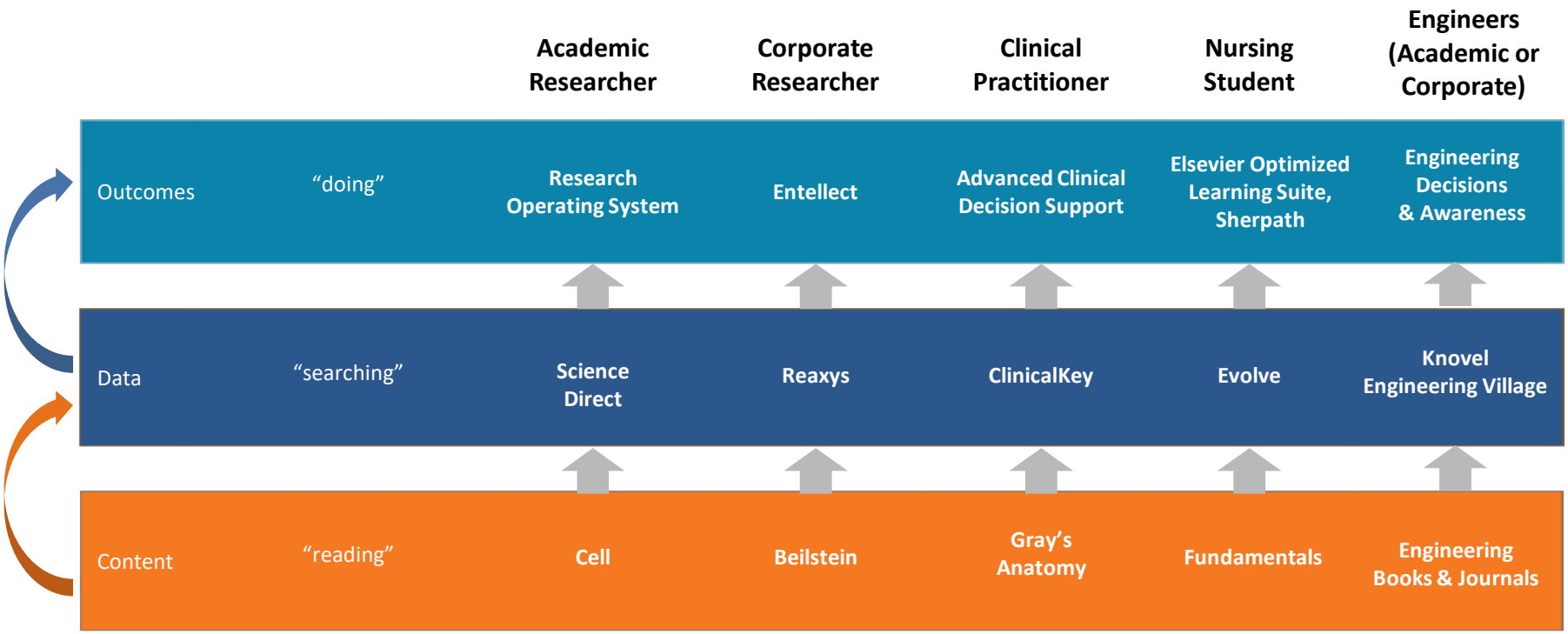
Articles per journal Field Weighted Citation Impact Tier*



** Article share (articles published in 2016) per journal Field Weighted Citation Impact (FWCI) tier. Field Weighted Citation Impact (FWCI) is calculated on the basis of citations in 2012-16 to articles published in 2012-16 and accounts for article type, publication year and subject field. Source: Scopus data*

Elsevier publishes the largest share of articles in the highest-impact end of the journal spectrum, as measured by journal Field Weighted Citation Impact (FWCI)

Combining content with analytics and technology to improve outcomes and awareness



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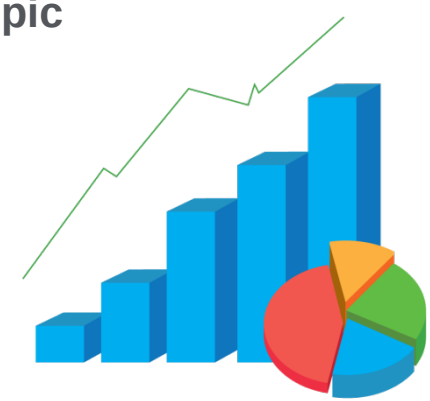
Knovel helps engineers make impact in research and education

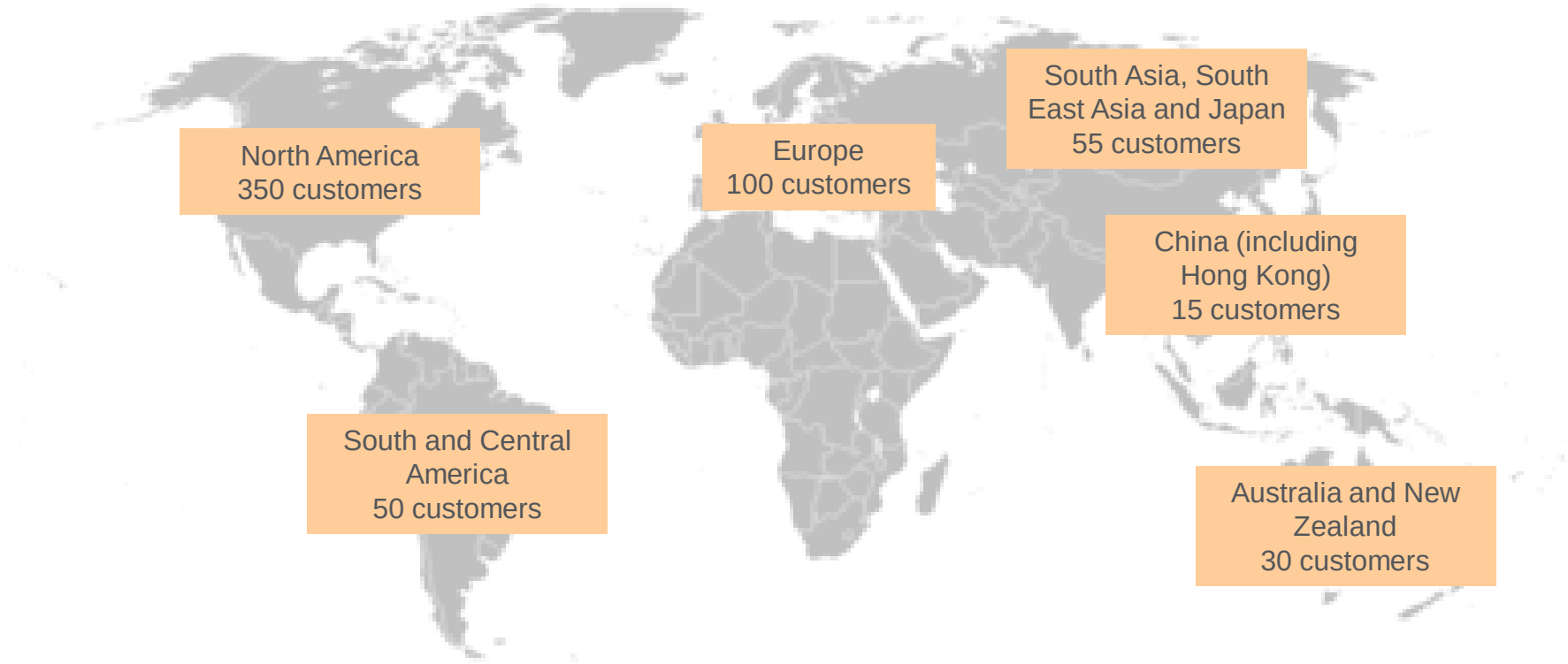
According to our academic users, the top 5 areas that Knovel helps make an impact are in:

- **Gaining background information on an engineering topic**
- **Performing a literature review**
- **Completing assignments for a course**
- **Staying informed about advances in my field**
- **Defining research objectives**



Source: 2018 Survey conducted via TechValidate

Knovel is used by > 700 customers around the world



MASSACHUSETTS INSTITUTE OF TECHNOLOGY
SAMSUNG
THE UNIVERSITY OF MELBOURNE
TESLA
BOEING
NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE

With decades of experience managing and analyzing information, **Elsevier** empowers engineering discoveries and analytics

To advance your work, you ask the right questions. Make sure you get right answers.

IDEA GENERATION	What's out there?
FEASIBILITY	Can it be done?
DEVELOPMENT	How to do it?
SCALEUP	How to do it effectively?
COMMERCIALIZATION	How to make it profitable?
PROCESS OPTIMIZATION	How to do it better?

Engineering Village

One platform, multiple databases: thorough, multidisciplinary perspective of engineering and unique tools for discovery

Knovel®

A knowledgebase for decisions: content and analysis tools to generate the actionable insights that minimize risk and drive progress

Successful research & teaching programs build on current, relevant information but have **different information needs**

RESEARCH

Search, Discover, Read, Review

Collaborate & Network

Experiment

Synthesize & Analyze

- What are the latest trends and technologies?
- Was research done before? What are my new research opportunities?
- What my peers are doing?
- How do I create a successful funding proposal?
- How do I monitor my competitors?
- How do I find my collaboration partners?
- How do I quickly get a background knowledge on an unfamiliar subject?

TEACHING

Identify Topics

Prepare Course Materials

Allocate Supporting Tools

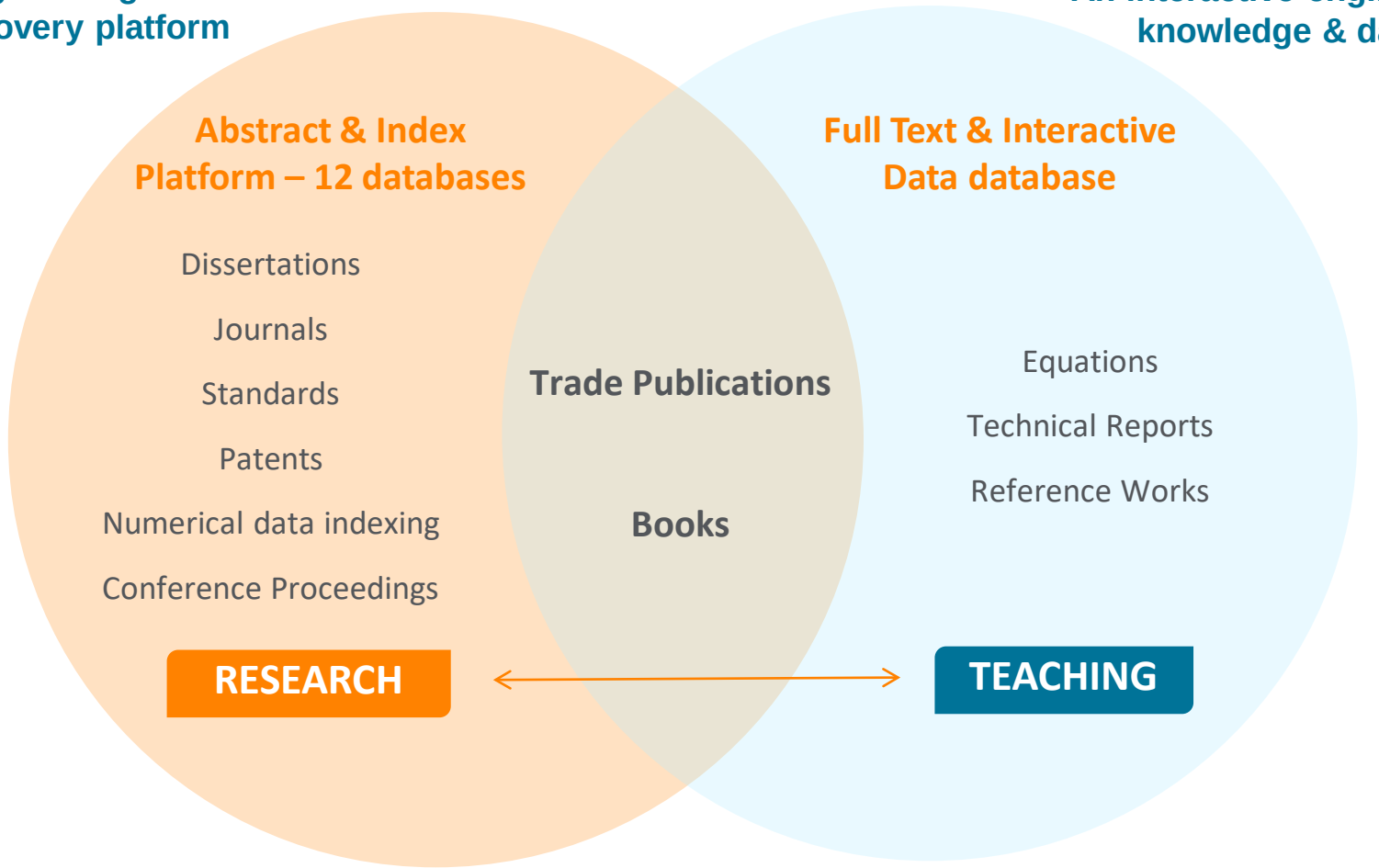
Review & Grade

- How do I keep students engaged/interested?
- How do I ensure students use trusted information sources?
- How do I teach students to write a successful research paper?
- How do I teach students to solve practical open-ended problems?
- How do I prepare my students for the workplace?

Elsevier offers complementary coverage of the full spectrum of engineering information needs at academic institutions

Engineering Village
An engineering search & discovery platform

Knovel®
An interactive engineering knowledge & data hub



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Knovel helps educators train the next generation of engineers

> ***"Knovel helps me find focused articles in my research area.*** *Moreover, the books are very informative for the courses I teach."* **– Professor at U.S. University**

> *"I was looking for graphical enthalpy-concentration data for binary mixture systems other than the only one used in our adopted textbook.* ***Knovel made it easy for me to find data for several other systems.*** *Moreover, the interactive features allow for easier reading of the points of the graph."* **– Professor at U.S. University**

Why?

TRUSTED RESOURCES & DATA

Smart and tailored access to trusted, relevant engineering insights that support research and teaching

CROSS-DISCIPLINARY

Broad disciplinary coverage and intuitive user interface facilitates use across departments and all expertise levels

PREP FOR INDUSTRY

Exposure to industry best practices, trusted references, and dynamic content that promotes learning

Fostering research-based engineering education through Drexel University's RISE program

The challenge

Raising Interest in STEM Education, or RISE was a three-year collaborative effort between Drexel University and the Community College of Philadelphia to pair minority students with Drexel labs of their choice to embark on mentored research experiences.

In just 10 weeks from start to finish, having no more than an introductory background in science, engineering and math subjects, the students would work with Drexel mentors to produce a final oral presentation, a poster and the equivalent of a conference article.

The solution

Students harnessed Knovel and Engineering Village to formulate research proposals and build the knowledge needed to complete the program:

"Knovel and Engineering Village helped my research through their robust search features. Engineering Village made it easier to find source literature I needed for my project. Knovel has an excellent material property search tool, which I was able to use to incorporate in my finite element simulations."

"Engineering Village and Knovel are some of the most valuable tools I had at my disposal. Scientific research wasn't something any of us were familiar with. But we had to first do just that, research. RISE pushed us to identify the state-of-the-art in our fields and go beyond."

The impact

Students learned how to perform engineering research alongside faculty, staff and industry professionals

Rapid knowledge gain

Several students proceeded to earn prestigious internships at places like the U.S. Department of Energy

Internship opportunities

Several former RISE students are now employed in engineering firms & one student was recently accepted into an engineering PhD program

Employment opportunities

Training undergraduate students to be more effective researchers at the University of Buffalo

The challenge

While the Internet has made information substantially more available to today's students, the validity and usefulness of those sources is often questionable.

Part of the challenge for today's librarians is that, in training students to be more effective researchers, they have to teach the students to become more discerning about that data, as well.

Another challenge is how to reach the students to begin with and make them aware of all the resources at their disposal.

The solution

Librarians at University of Buffalo have come to value Knovel's balance between offering great background information and deeply specific technical content.

"Knovel is very precise, particularly in data searching, where it goes down to the cell level in a table," Ben Wagner says.

This wide range of utility is one of the reasons why they continue to actively promote Knovel to both students and faculty. Wagner and the other librarians constantly move around campus teaching students about tools like Knovel that help them in the classroom.

The impact

With Knovel, Wagner, Schiller and their colleagues are able to prepare their students for successful careers inside and outside of academia.

Prep for industry

"Knovel operates more like a utility, with productivity tools and software programs running inside."

Data & productivity

"I can't imagine living without Knovel in answering reference questions."

Reference and more

Uses of Knovel in Education

- Increase critical thinking skills.
- Emphasize course concepts.
- Course content repository.
- Improve student resiliency toward open problem-solving.
- Provide more active and engaging educational experiences.

Source: Chemical Engineering professor at the University of Mississippi (2019)

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Knovel can be part of first-class engineering programs that keep pace with real-world engineering issues

Strengthen institutional reputation through impactful research and teaching programs

- Train students with state-of-the-art research tools and information literacy
- Impart up-to-date knowledge, problem-solving and efficiency skills
- Collaborate with external private and public partners
- Engage in international grant acquisition, patent applications, technology transfers
- Boost talent recruitment by fostering a modern, multidisciplinary work environment

Knovel: foundational knowledge and answers for product design in applied engineering

Total Resources 9600+

Total Data Points 70M

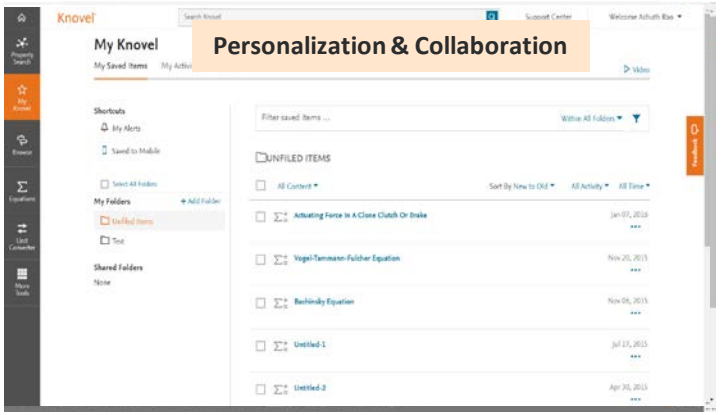
Total Equation Worksheets 2500+

% Content from outside N. America 30%

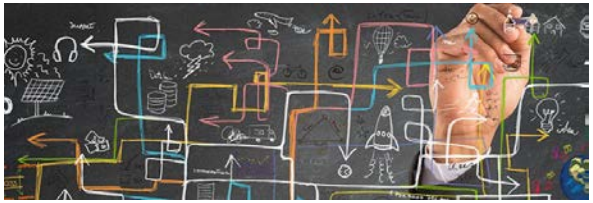
Engineering Topics 36+

Technical Reference Use Cases

- Getting up to Speed on Topics …
- Answers to Solve Problems …
- Researching Best Practices & Prior Examples …
- Gathering Data for Design …
- Identifying Design Constraints …



Engineering Trends driving Knovel



Industry trends: Creating materials complexity

- Advanced & new materials demand specialized knowledge
- Aging infrastructure creates more risk of high-cost failures
- Increased design complexity requires more than one expert for any given product

Technology trends: Forcing multi-faceted data optimization

- Digitization of engineering processes and knowledge is accelerating
- IoT is integrating data from physical and virtual worlds
- 'Big data' and AI drives institutional pressure for new insights and value

Professional trends: Demanding T-shaped competency

- Growing graduate population with different expectations
- Aging & retiring workforce, driving a loss of institutional knowledge
- Need for 'T-shaped' skill composition: deep disciplinary knowledge + adaptability to work across disciplines and systems

Engineers today require more comprehensive decision support tools and analytics to make sense of an rich, but often fragmented ecosystem of knowledge

Engineering Village & Knovel: engineering information for academics, engineers and their collaborative projects

Position research for the right funding

Boost research with strong collaborators

Use curated, high-quality content as the foundation of research and teaching

Prepare students with essential engineering skills based on real-world problems

Discover, integrate and share engineering information across disciplines

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