



Lessons Learned from the Professional Science Master's Initiative

“the gold standard and shining model for professional skills and development in graduate education”

Daniel D. Denecke, Vice President, Best Practices and Strategic Initiatives, Council of Graduate Schools, NPSMA 6th National Conference, November 12, 2015

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The PSM Concept: the best graduate programs for STEM workforce development are designed collaboratively between educator and employer communities.

Professional Science Master's degrees feature:

- A majority of graduate-level STEM courses, often including research experience.
- A professional skills component.
- Experiential learning (typically an internship or capstone project).

Known as “**PLUS**” courses and components, the latter two are developed in concert with employers.

Different points of emphasis.....

PLUS Workforce Readiness Training

- ▶ Concise Business Resume
- ▶ Working as part of a team of diverse members
- ▶ Comfort with changing and short-term projects and goals
- ▶ Speaking/writing for a heterogeneous team that will include non-scientists
- ▶ Internships, capstone projects, thesis or other experiential learning with direct employer involvement

Traditional Science Training

- ▶ Academic Curriculum vitae
- ▶ More of a “self-contained” or homogeneous team experience
- ▶ Long-term commitment to area of investigation
- ▶ Presentations/abstracts/papers/ grant applications for specialized audiences that share expertise
- ▶ Thesis with supervision by academic faculty

REGULAR STUDENT AND PROGRAM CONTACT WITH EMPLOYERS, INCLUDING MANDATORY ADVISORY BOARD

EXAMPLES OF DESIRABLE PLUS CONTENT IDENTIFIED BY EMPLOYERS

Communication Skills

Team/Laboratory/Project Management

Economics/Finance/Accounting

Regulatory Issues/Ethics/Responsible Conduct

Marketing/Web design/Graphics

Statistics/Data Analytics

Information Technology/Systems/Cyber Security

Global Understanding and Collaboration

Entrepreneurship/Innovation/Technology Transfer/Intellectual Property

Health Care Administration/Clinical Trials

Strategic/Critical Thinking & Decision Making

problem-solving

Critical-thinking

Communication-skills

Strategic-planning

Information-technology

Quantitative-analysis

Software

management

Systems

Business

Teamwork

Leadership

Strategic

Analytical-thinking

manufacturing

information

knowledge

Technical

project

Lean

Supply

culture

Innovation

focused

education

Decision-making

Risk

Initiative

Critical-thinking

Creative

Dependable

troubleshooting

Clinical

Business

chain

Strategic

Flexible

Efficient

Systems

What do employers mean by “communication skills”?

- Think, communicate, and act across boundaries: level of technical expertise, job functions, disciplines, cultures.
- Communicate verbally with people inside (co-workers, management) and outside (investors, customers, clients, media) of the employer organization.
- Ability to pull together and effectively make an oral presentation.
- Ability to create and/or edit written reports.
- Ability to organize and communicate thoughts, and influence others.
- Willingness to actively share knowledge and coach co-workers.

PSM DEGREE PROGRAMS SPAN DIVERSE FIELDS OF STUDY IN STEM

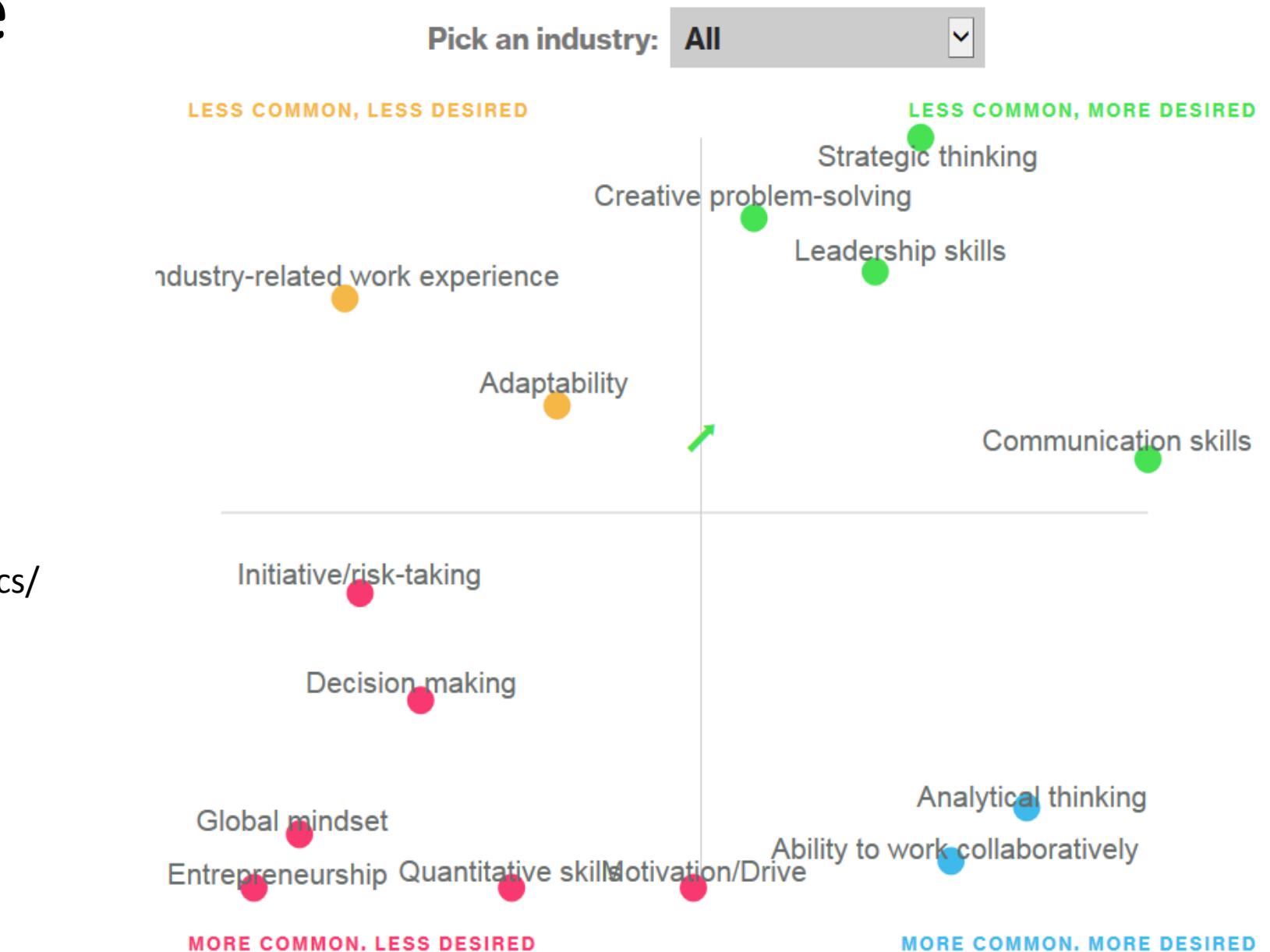
- ▶ Agricultural Science/Food Science/Nutrition
- ▶ Biotechnology/Biomedical/Pharmaceutical
- ▶ Environmental Science/Ocean Science/Sustainability/GIS
- ▶ Computer Science/Analytics/ Big Data /Statistics
- ▶ Physical/Chemical Sciences

Caveat: Skills are industry-specific

Bloomberg Interactive by Industry

<http://www.bloomberg.com/graphics/2015-job-skills-report/>

The skills gap
That's the overall picture. But the qualities employers want change from industry to industry. Use the drop-down menu to explore the skills gap in different parts of the job market.

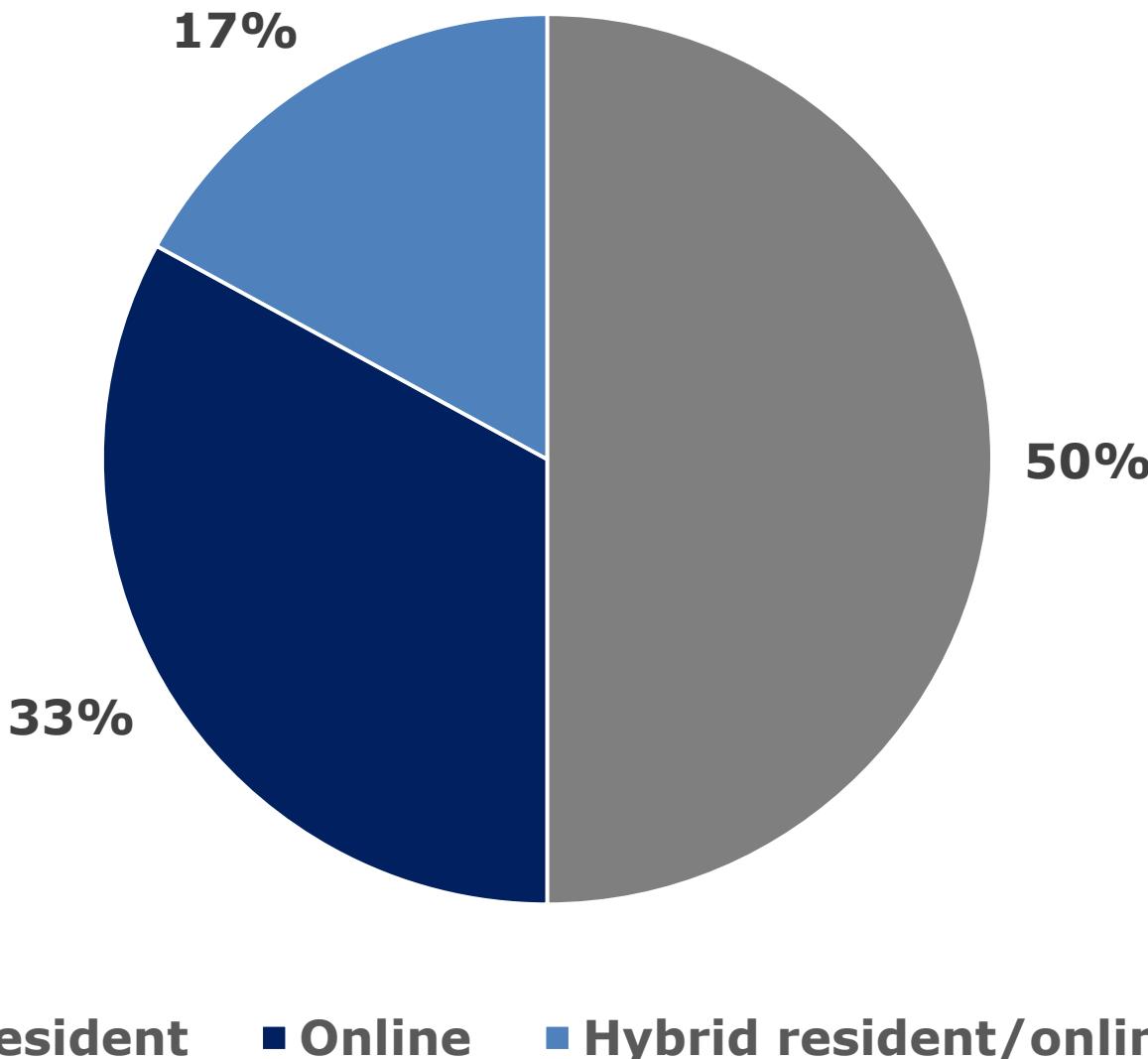


Skill set	Chemical	Energy	Financials	Healthcare	Pharma	Technology	Manufacturing
<u>Communication Skills</u>	✓	✓	✓	✓	✓	✓	✓
<u>Leadership Skills</u>	✓	✓		✓	✓	✓	✓
Strategic Thinking	✓	✓	✓	✓	✓	✓	✓
Creative Problem Solving					✓		✓
<u>Teamwork</u>	✓	✓	✓	✓	✓	✓	✓
Analytical Thinking	✓	✓	✓	✓	✓	✓	✓
Quantitative Skills		✓					
Motivation/Drive		✓	✓				✓
Adaptability					✓		

Delivery Mode

**SURVEY OF PLUS
COURSES IN PSM
PROGRAMS NATIONWIDE**

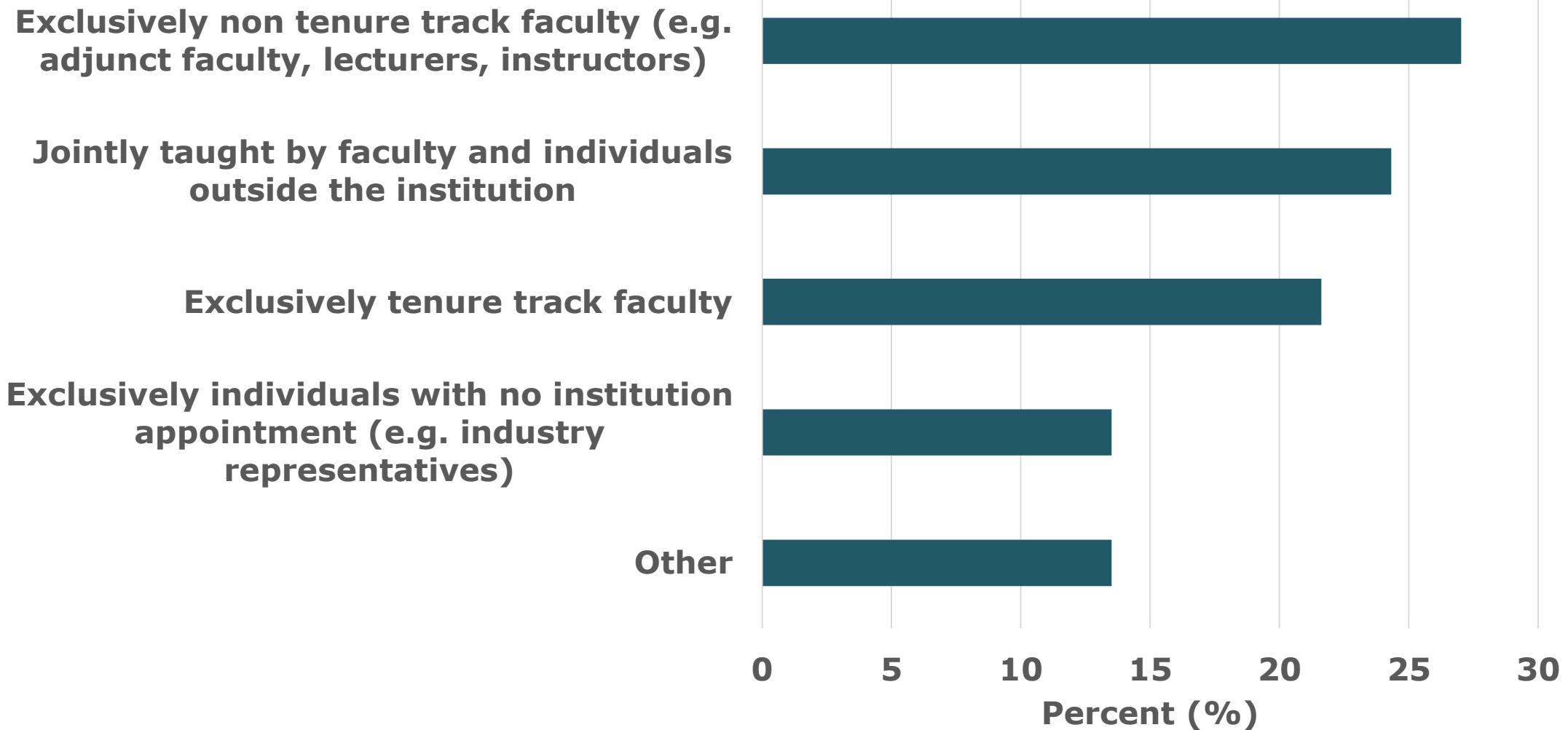
**HEIDI HARKINS
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CAROLINA**



SCHEDULING MODES

- Semester long
- **Half Semester**
- **Executive Format (days-weeks)**
- Academic Year
- **Summer**
- **Wintersessions**
- Meets once per week
- Meets multiple times per week
- **Offered in the evening**
- Offered in the day

Who is teaching?



THANK YOU FOR YOUR
ATTENTION

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www.professionalsciencemasters.org