

# Strategies for Meaningful Interpretation of ATE Evaluation Data

Preconference workshop at the ATE Principal Investigators Conference

October 23, 2013

**EvaluATE**  
EVALUATION RESOURCE CENTER for  
advanced technological education



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**THE EC**  
EVALUATION  
CENTER

**W**  
WESTERN MICHIGAN UNIVERSITY

# EvaluATE Team



**Lori**  
Wingate



**Krystin**  
Martens



**Arlen**  
Gullickson



**Jason**  
Burkhardt



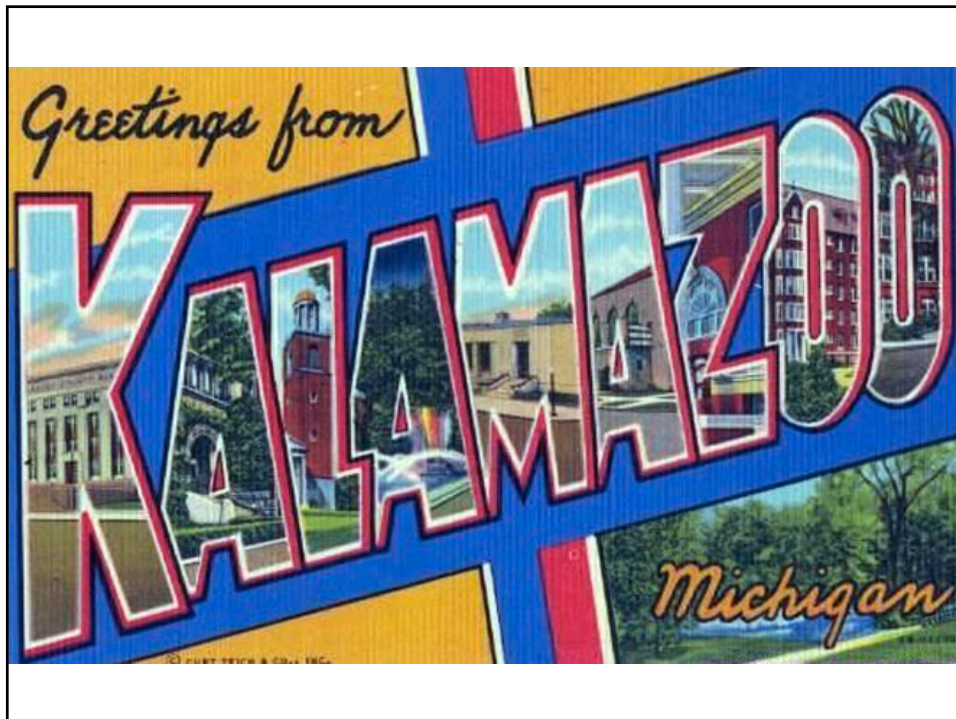
**Corey**  
Smith



**Emma**  
Perk



**Patricia**  
Negrevski



## EvaluATE Mission

To promote the goals of the ATE program by

- partnering with ATE projects and centers to strengthen the program's evaluation knowledge base
- expanding the use of exemplary evaluation practices
- supporting the continuous improvement of technician education throughout the nation

## EvaluATE Activities

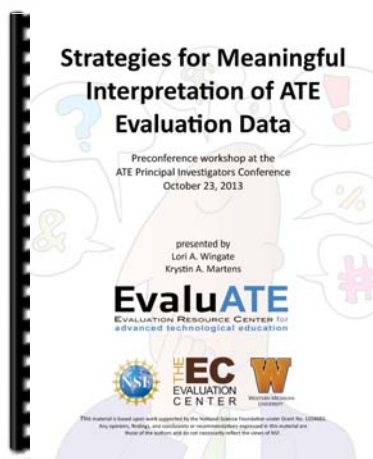
- 6 webinars per year
- Quarterly newsletter
- Website with evaluator directory and digital resource library
- Annual survey of ATE grantees
- **Annual workshop at ATE PI conference**

A red circular callout with white text that reads "You are here".

# Workshop Materials

## Booklet

Most slides  
Supplemental reading  
Feedback survey



## Complete Slide Deck

[evalu-ate.org/events/workshop\\_2013/](http://evalu-ate.org/events/workshop_2013/)

7

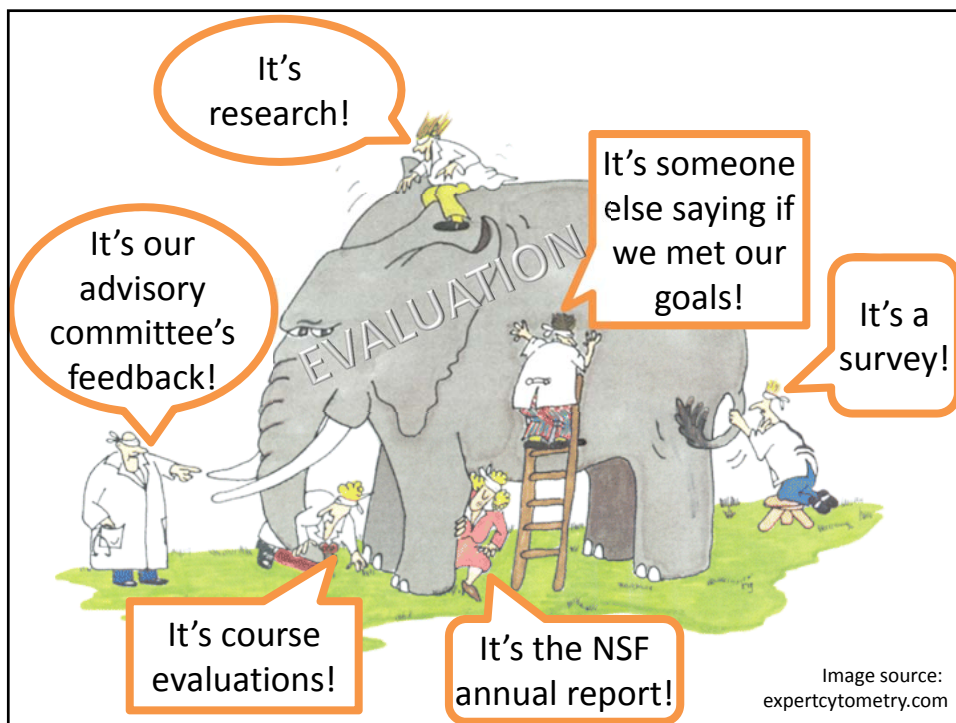
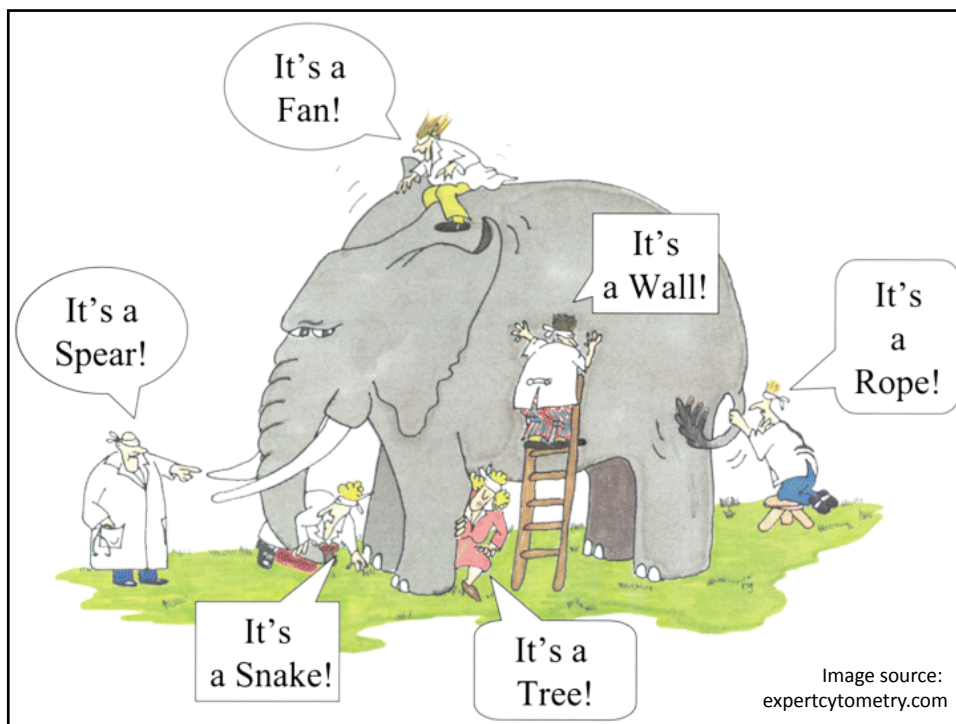


## Workshop Agenda

1:00	Welcome and introductions Hands-on evaluation Evaluation in the big picture Asking questions, gathering data, answering questions
2:15	Break
2:30	The comparative imperative Rubrics Recommendations
3:40	Open question-and-answer
3:50	Feedback survey
4:00	Adjourn







## Paper Towel Evaluation

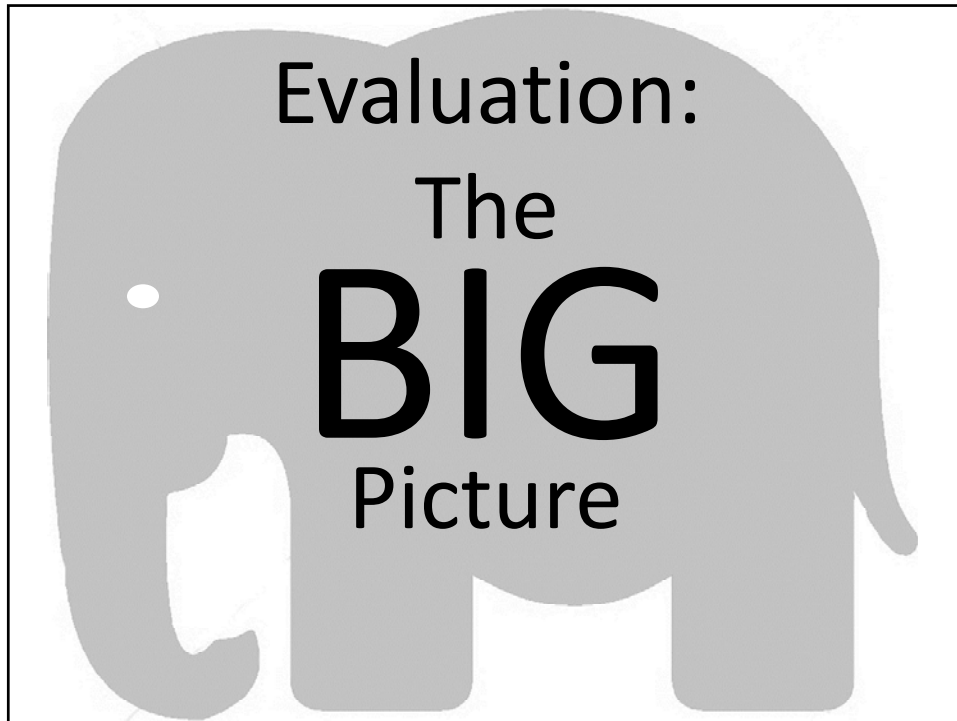
1. In groups of 2-3 people,  
evaluate the paper towels.
2. Report
  - (a) your conclusions
  - (b) how you reached.



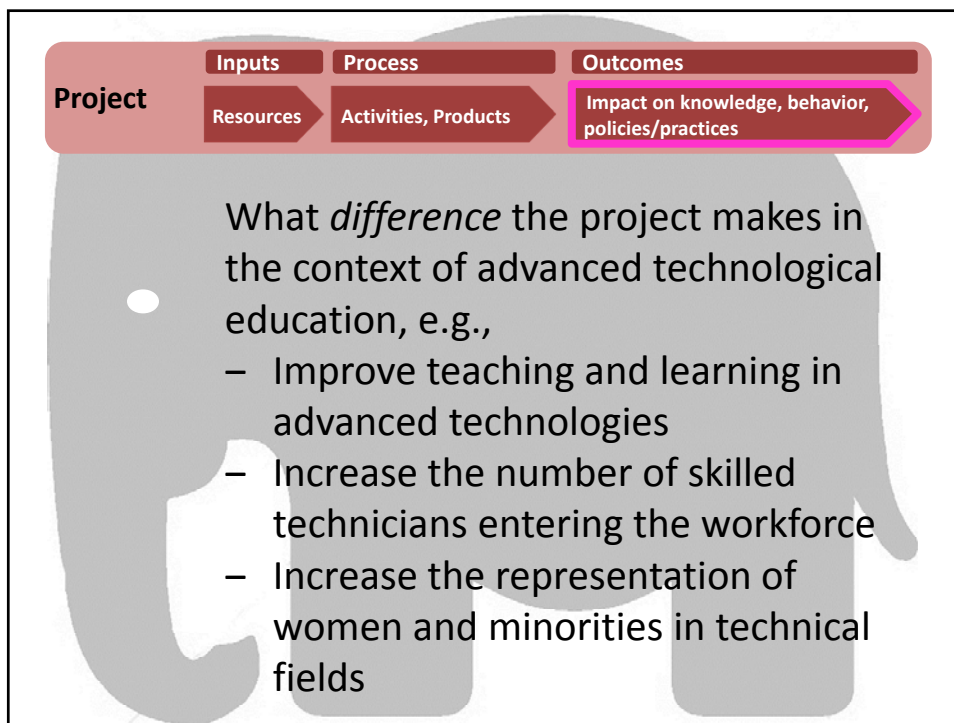
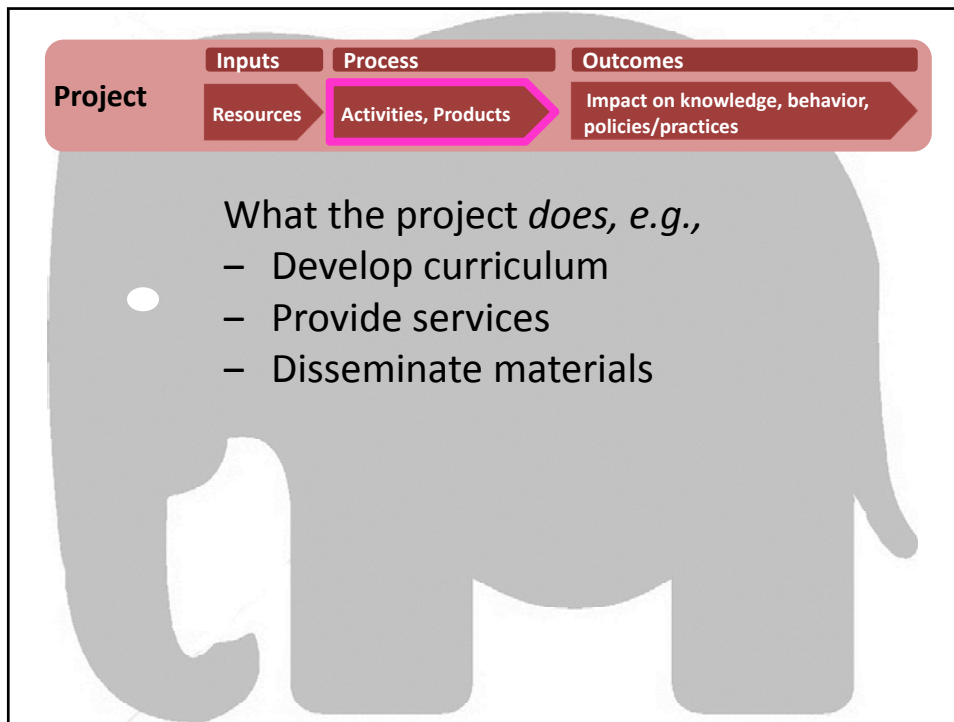
## Paper Towel Evaluation

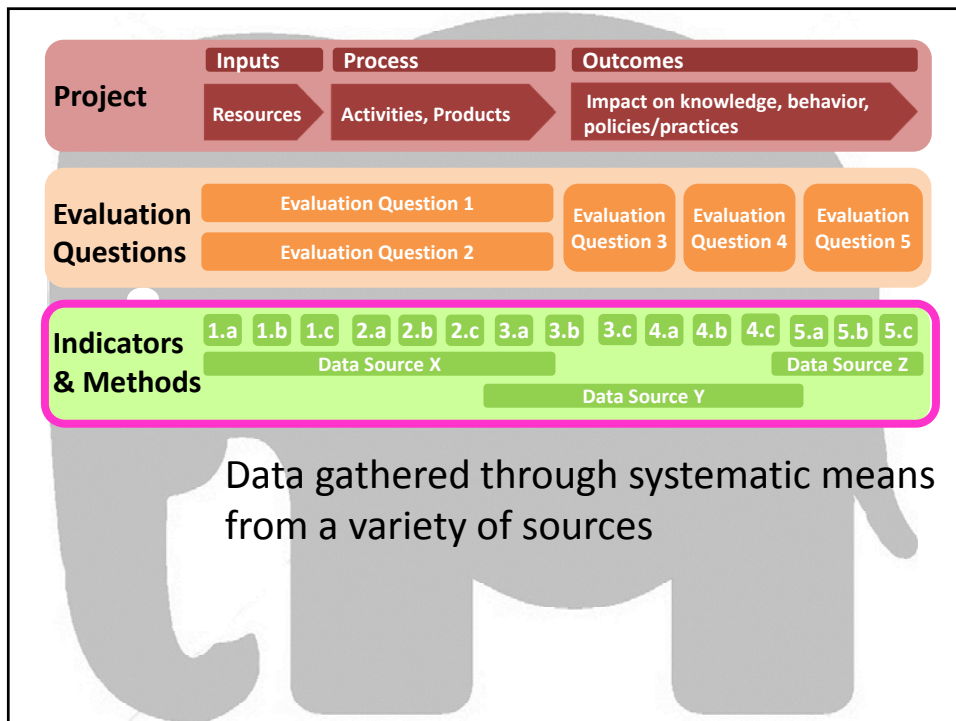
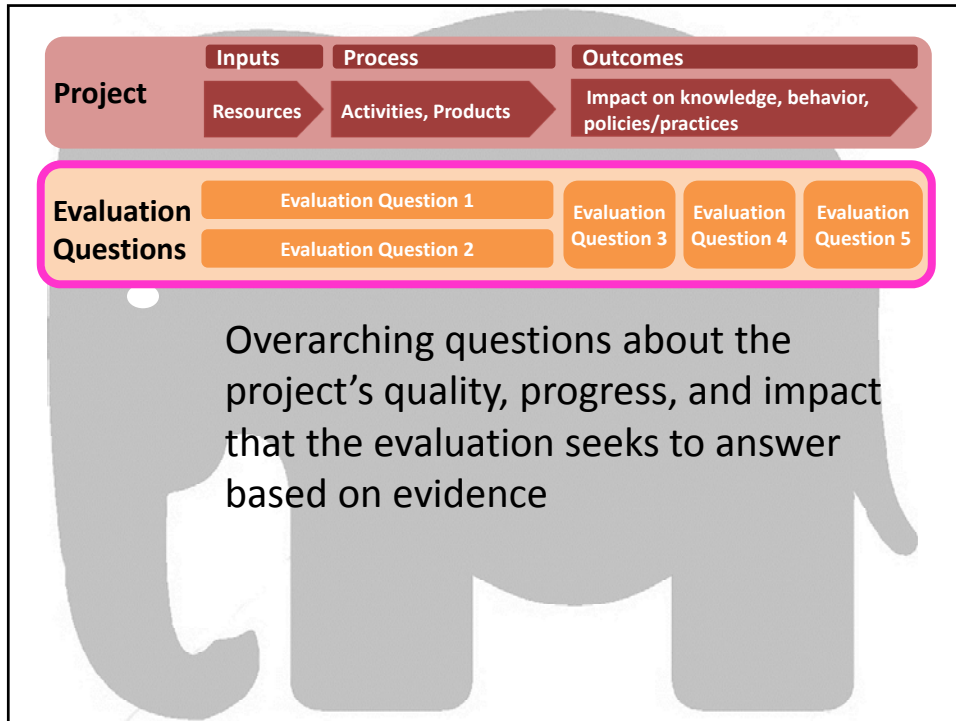
- Small Group Reports:
- a. What are your conclusions?
  - b. How did you reach these  
conclusions?

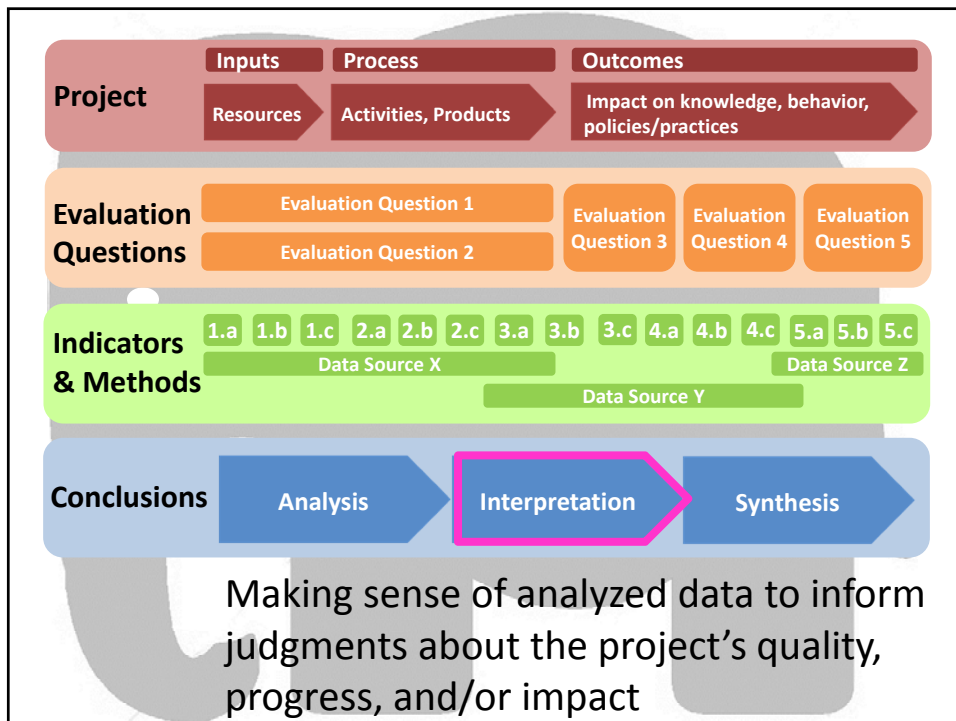
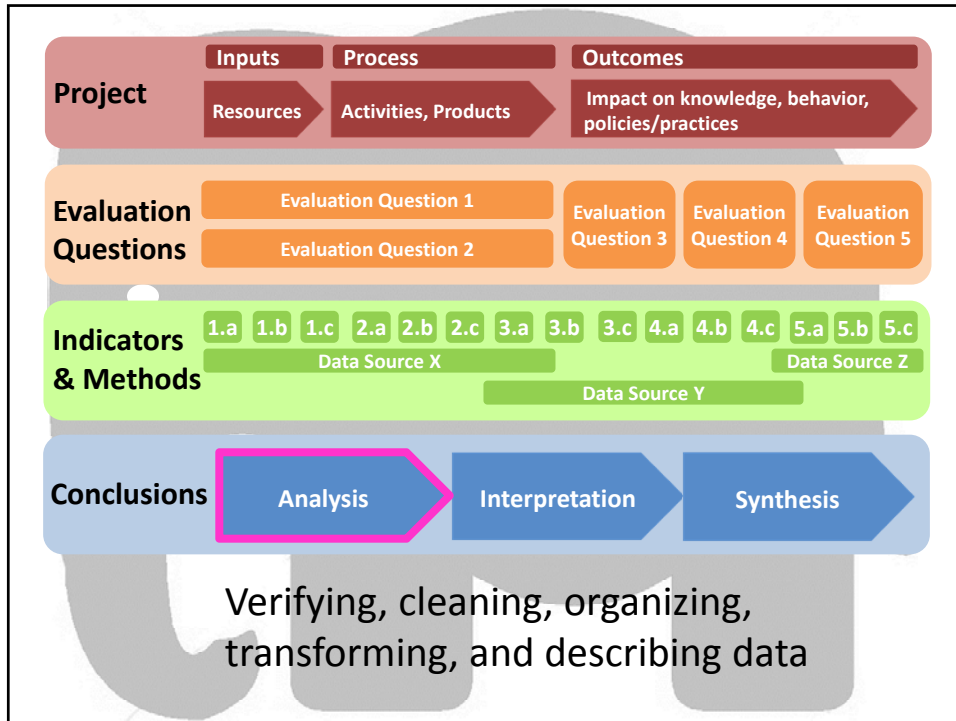


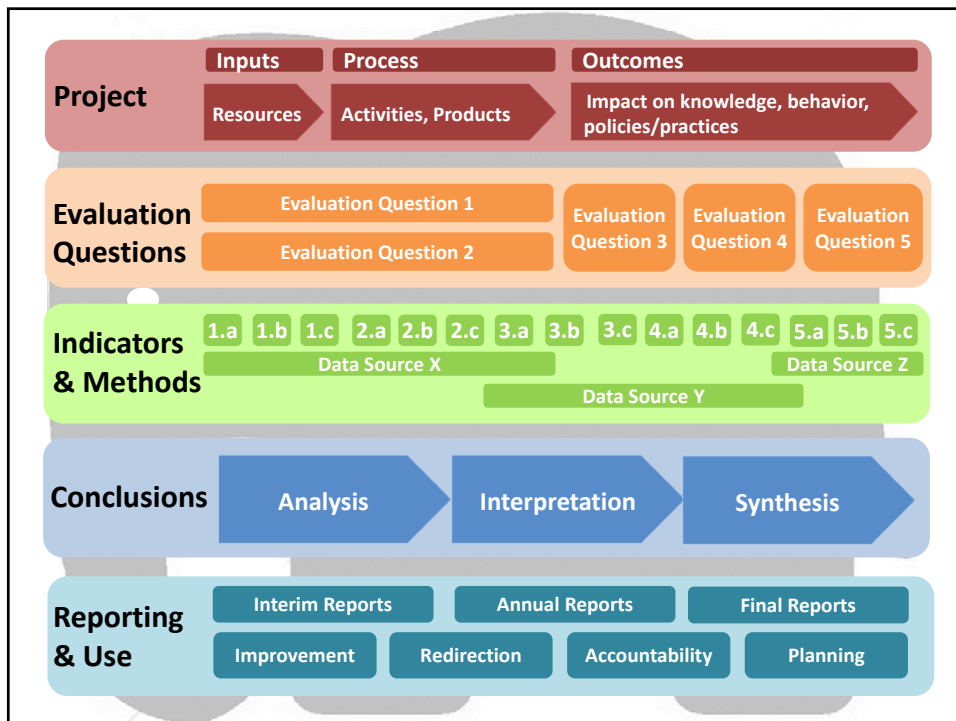
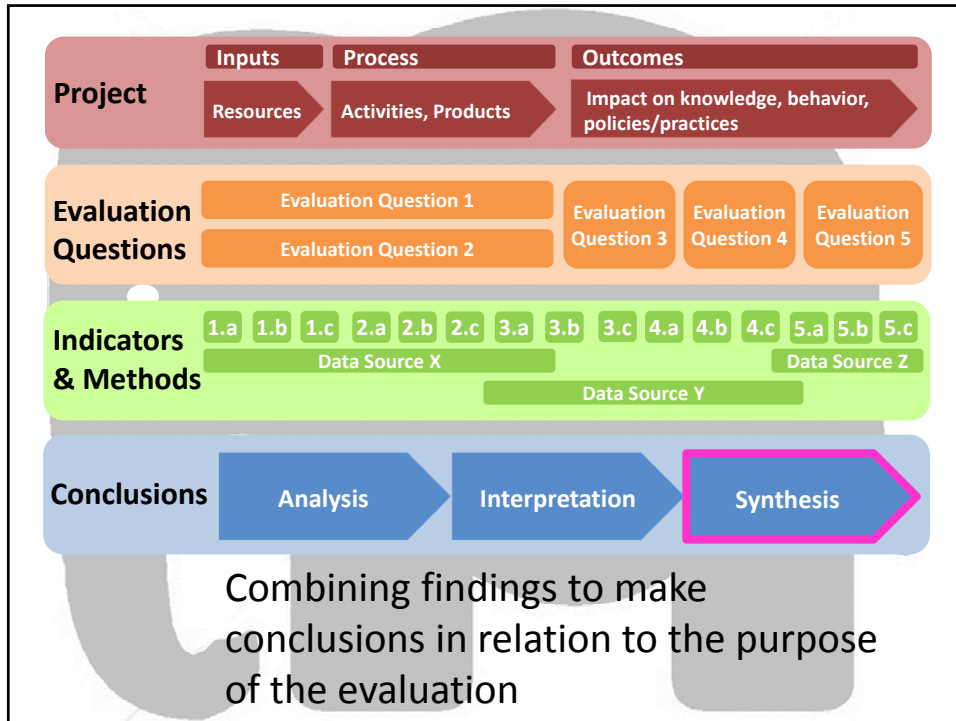
















**How does evaluating a consumer product differ from evaluating an educational project?**






## How does evaluating a consumer product differ from evaluating an educational project?



The slide features a large roll of white paper towels on the right side. On the left side, there is a collection of logos for various ATE organizations and programs, including ATEEC, SpaceTEC, ATECENTRAL, npt2, GeOTECH, MATE, and EvaluATE. The word 'biotechnology' is spelled out in green circles above the logos.

**ASK QUESTIONS**      GATHER DATA      ANSWER QUESTIONS

- Which paper towel is best?
- What is the overall quality of the paper towel?
- How effective is the paper towel for cleaning up typical household spills?
- How durable is the paper towel?
- Is the paper towel worth the cost?



The slide contains three colored boxes at the top: 'ASK QUESTIONS' (orange), 'GATHER DATA' (green), and 'ANSWER QUESTIONS' (blue). Below these is a list of five evaluation questions. On the right side, there is a graphic of a group of four diverse students walking, overlaid with logos for ATECENTRAL, npt2, SpaceTEC, MATE, and EvaluATE. The word 'biotechnology' is also visible in green circles above the logos.

**ASK  
QUESTIONS**

**GATHER  
DATA**

**ANSWER  
QUESTIONS**

- ~~Which project~~ is best?
- What is the overall quality of the **project**?
- How effective is the **project for improving technological education**?
- How  ~~durable~~ **sustainable** is the **project**?
- Is the **project** worth the cost?

**ASK  
QUESTIONS**

**GATHER  
DATA**

**ANSWER  
QUESTIONS**


Brand X Paper Towel...

- absorbs X ounces of water
- holds X rolls of pennies before breaking when dry
- holds X roll of pennies before breaking when wet
- costs \$.0X per sheet

**ASK QUESTIONS**      **GATHER DATA**      **ANSWER QUESTIONS**

Project X Towel...

- absorbs X ounces of water
- holds X rolls of pennies before breaking when dry
- holds X roll of pennies before breaking when wet
- costs \$.0X per sheet




The slide features a collection of logos for various technical education organizations, including ATECENTRAL, ATEEC, npt2, SpaceTEC, STUDENT AND TEACHER TECHNOLOGY TRANSFORMATION FUND, GoTECH, MATE, EvaluATE, and NCMET. At the top, three boxes labeled 'ASK QUESTIONS', 'GATHER DATA', and 'ANSWER QUESTIONS' are arranged horizontally. The 'GATHER DATA' box is highlighted in green. The text 'Project X Towel...' is followed by a bulleted list of four items. To the right of the list is a vertical stack of logos. At the bottom right, there is an image of four diverse students walking together.

**ASK QUESTIONS**      **GATHER DATA**      **ANSWER QUESTIONS**

**Project X ...**

- absorbs X ounces of water
- holds X rolls of pennies before breaking when dry
- holds X roll of pennies before breaking when wet
- costs \$.0X per sheet



This slide is identical to the one above, but the bulleted list is completely obscured by a large, thick red 'X' mark. The 'ASK QUESTIONS' box is highlighted in orange. The same logos and student image are present on the right side.


ASK  
QUESTIONS

GATHER  
DATA

ANSWER  
QUESTIONS

**Project X ...**

- [relevant indicators of quality]




ASK  
QUESTIONS

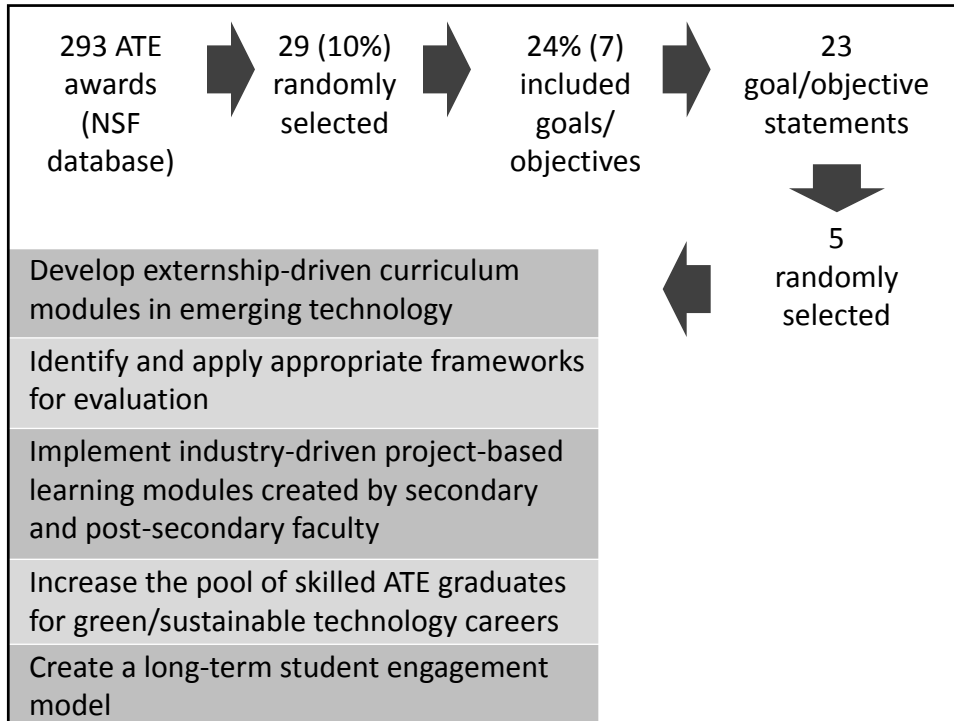
GATHER  
DATA

ANSWER  
QUESTIONS

- The project's overall quality is **very good**.
- The project is **highly effective** in engaging students in problem-based learning.
- The project is **somewhat sustainable**.
- The project's student retention strategies are **cost-effective**.





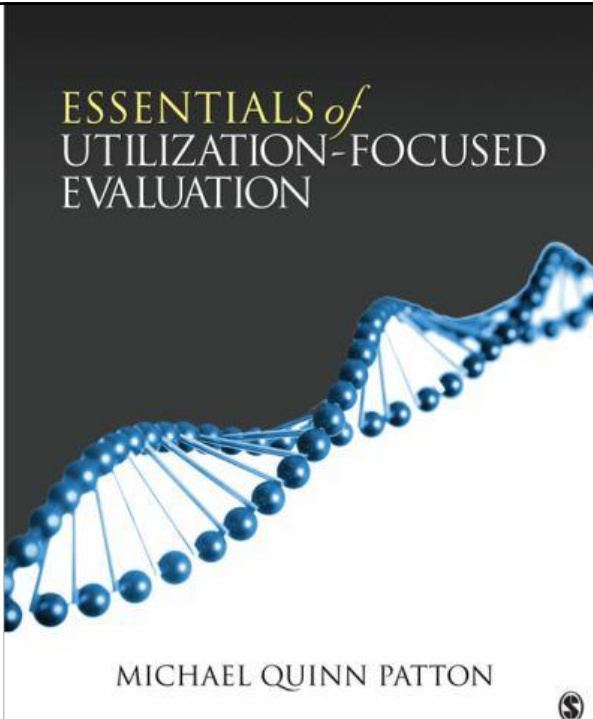


<b>Are these ATE goal/objective statements focused on project PROCESS or OUTCOMES?</b>	<b>PROCESS</b> - Activities - Products - People reached	<b>OUTCOMES</b> Changes in - knowledge - behavior - broader conditions
Develop externship-driven curriculum modules in emerging technology	<input type="checkbox"/>	<input type="checkbox"/>
Identify and apply appropriate frameworks for evaluation	<input type="checkbox"/>	<input type="checkbox"/>
Implement industry-driven project-based learning modules created by secondary and post-secondary faculty	<input type="checkbox"/>	<input type="checkbox"/>
Increase the pool of skilled ATE graduates for green/sustainable technology careers	<input type="checkbox"/>	<input type="checkbox"/>
Create a long-term student engagement model	<input type="checkbox"/>	<input type="checkbox"/>



For more on the role of goals in focusing an evaluation, read *Essentials of Utilization-Focused Evaluation*, pp. 205-208

**in your workshop booklet**




ESSENTIALS *of* UTILIZATION-FOCUSED EVALUATION

MICHAEL QUINN PATTON

ATE project evaluation should include, *but not be limited to*, assessing whether goals were met.

**ASK QUESTIONS** **GATHER DATA** **ANSWER QUESTIONS**

How did you **translate** your paper towel evaluation data into evaluative conclusions?



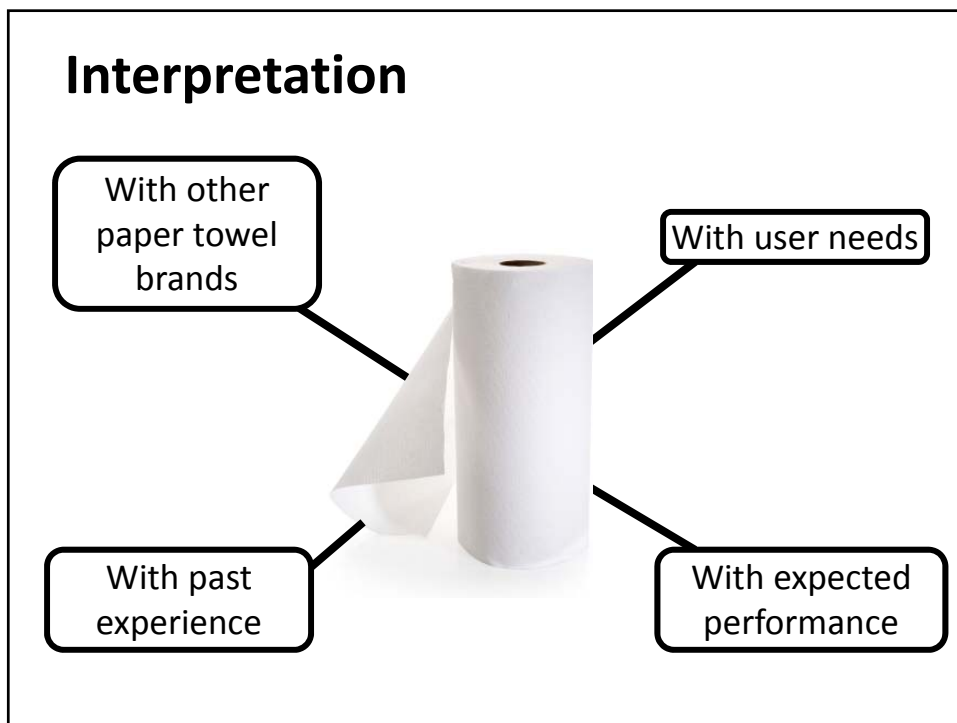
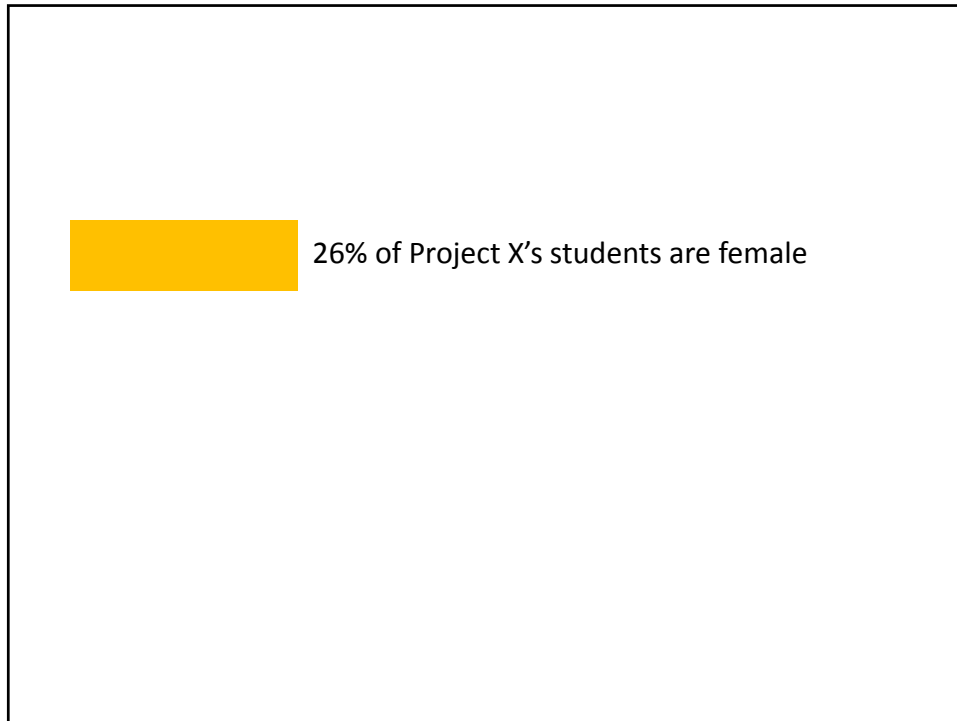
**ANSWER QUESTIONS**

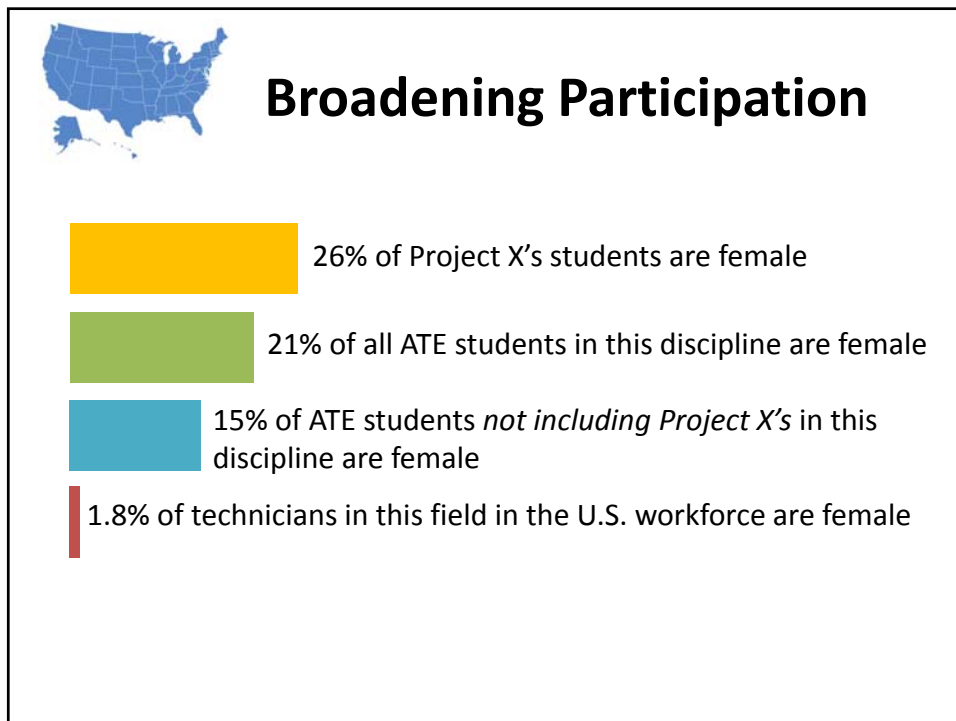
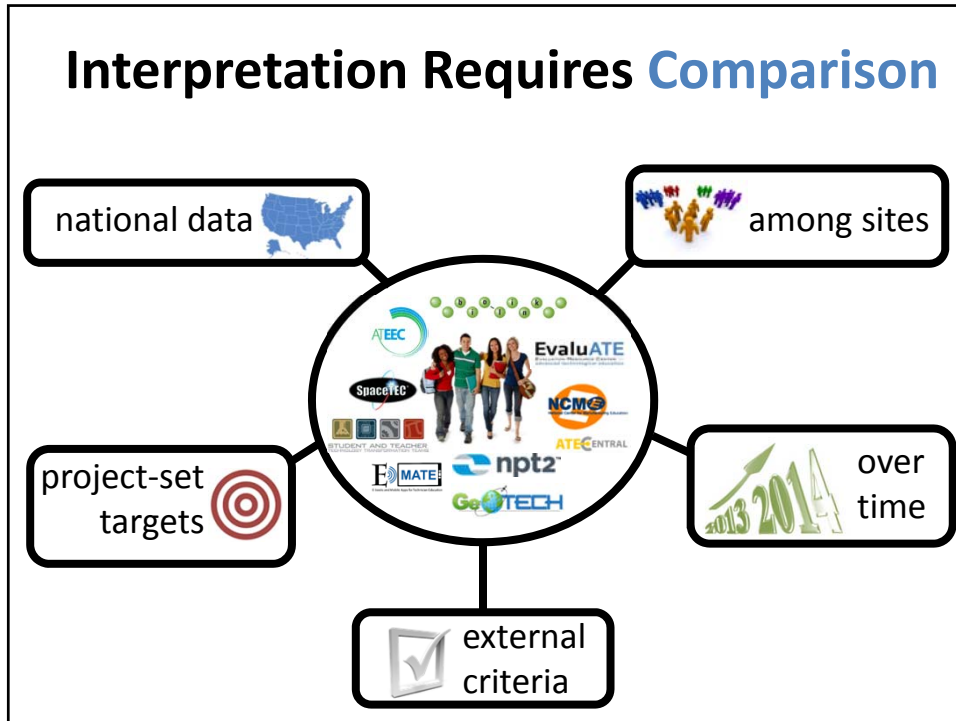
**Analysis** **Interpretation** **Synthesis**

Verifying, cleaning, organizing, transforming, and describing data	Making sense of analyzed data to inform judgments about the about a project's quality, progress, and/or impact	Combining findings to make conclusions in relation to the purpose of the evaluation (i.e., answer evaluation questions)
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The image shows the cover of the NSF Strategic Plan for Fiscal Years (FY) 2011-2016. The cover features a colorful, abstract background of vertical bars in various colors (blue, green, yellow, red, purple) against a dark blue background. The text on the cover reads: "EMPOWERING THE NATION THROUGH DISCOVERY AND INNOVATION" in white serif font, followed by "NSF STRATEGIC PLAN FOR FISCAL YEARS (FY) 2011-2016" in a smaller white font. At the bottom, there is the NSF logo (a blue sunburst with "NSF" in the center) and the text "National Science Foundation". To the right of the cover, a quote is displayed in black text: "NSF is committed to broadening participation." The quote is enclosed in yellow quotation marks.





## Regional Center for Nuclear Education & Training



26% of **RCNET's** students are female <sup>a</sup>

21% of all ATE students in energy **production** are female<sup>a</sup>

15% of ATE students *not including RCNET's* are female<sup>a</sup>

1.8% of **power plant operators, distributors, dispatchers** are female<sup>b</sup>

Data Sources:  
<sup>a</sup> 2013 ATE Annual Survey  
<sup>b</sup> U.S. Department of Labor




## National Data

Bureau of Labor Statistics  
*Women in the Labor Force:  
 A Databook*

[www.bls.gov/cps/wlf-databook-2012.pdf](http://www.bls.gov/cps/wlf-databook-2012.pdf)







# National Data

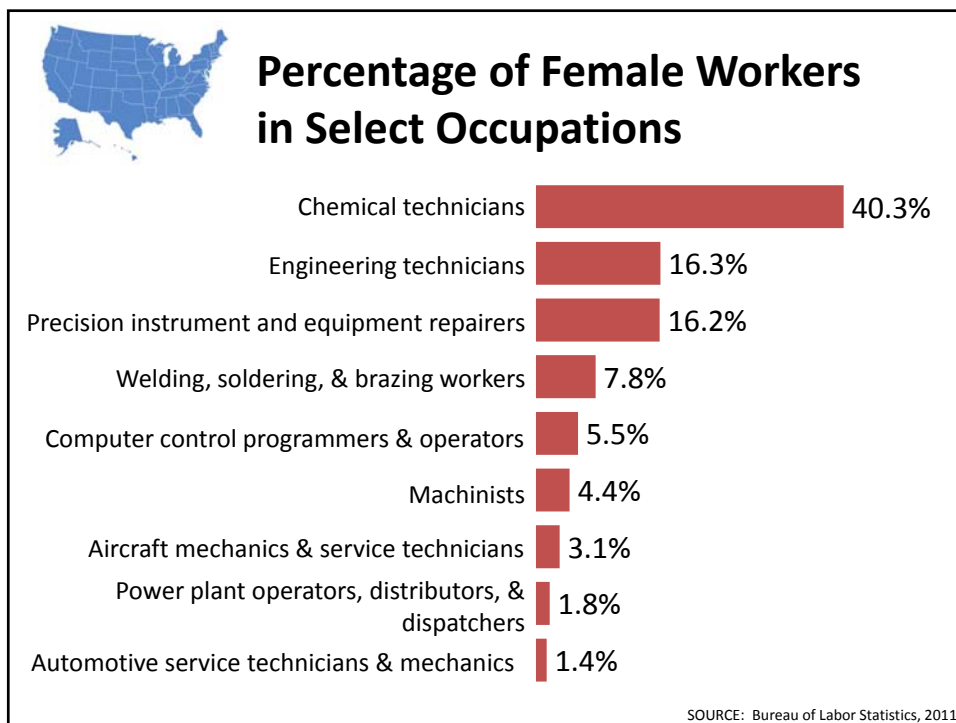
Bureau of Labor Statistics:  
*Labor Force Statistics from the Current Population Survey*

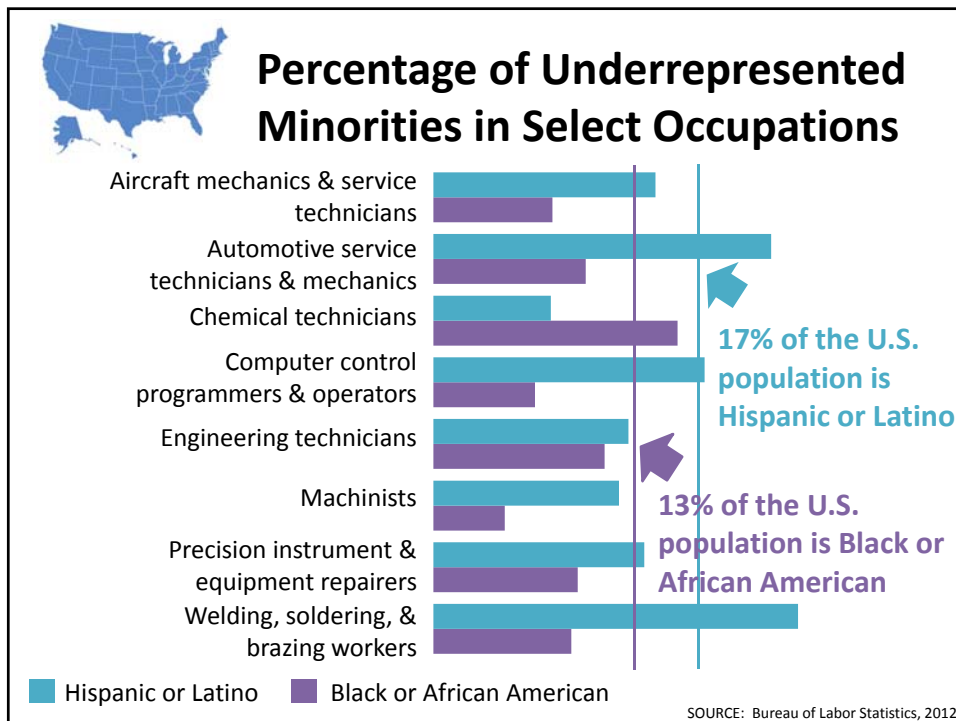
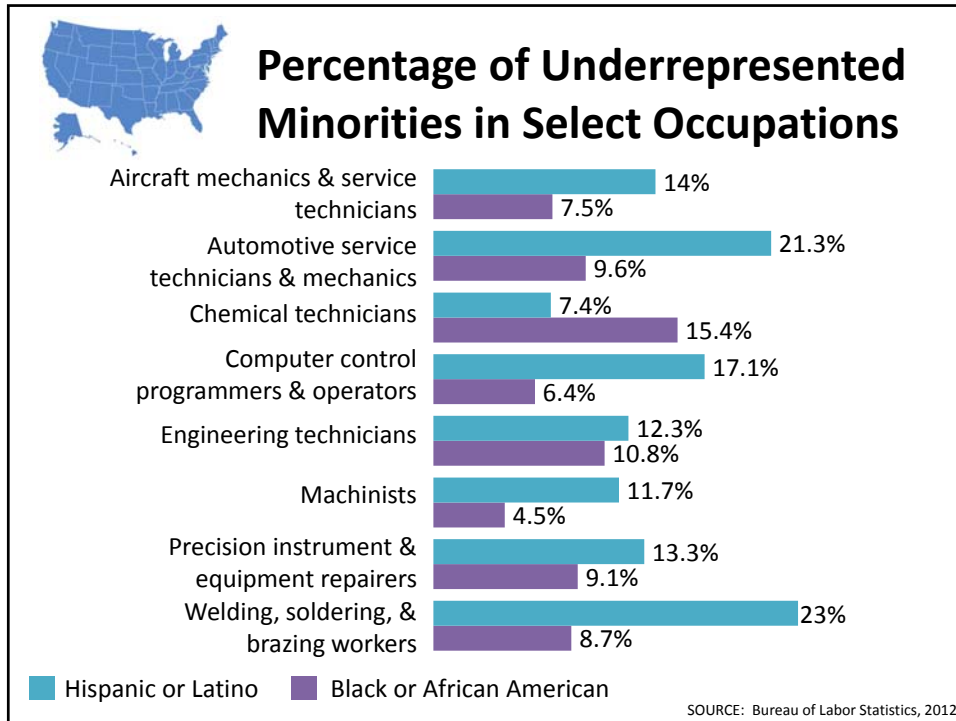
UNITED STATES DEPARTMENT OF LABOR  
**BUREAU OF LABOR STATISTICS**

Labor Force Statistics from the Current Population Survey

Total employed	2012 Percent of total employed			
	Women	Black or African American	Asian	Hispanic or Latino
Legislators	28.1	6.2	4.7	6.2
Advertising and promotions managers	49.4	6.7	4.3	10.0
Marketing and sales managers	45.2	4.2	6.0	6.1
Public relations and fundraising managers	69.3	5.8	3.4	8.8
Administrative services managers	44.1	6.4	4.4	9.5
Computer and information systems managers	26.8	5.6	14.5	5.8
Financial managers	53.5	8.6	5.7	10.3
Compensation and benefits managers	-	-	-	-
Human resources managers	72.7	11.2	3.4	9.2
Training and development managers	-	-	-	-
Industrial production managers	-	-	-	-
Purchasing managers	-	-	-	-

[www.bls.gov/cps/wlf-databook-2012.pdf](http://www.bls.gov/cps/wlf-databook-2012.pdf)





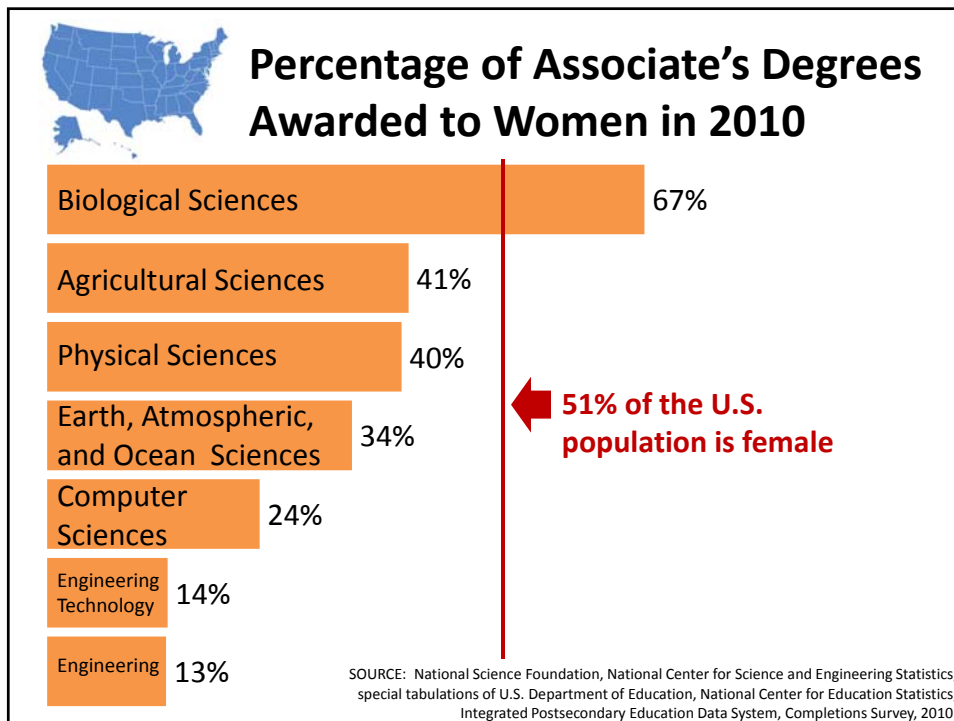
**ies** NATIONAL CENTER FOR EDUCATION STATISTICS  
Institute of Education Sciences  
U.S. DEPARTMENT OF EDUCATION  
NCES 2012 001

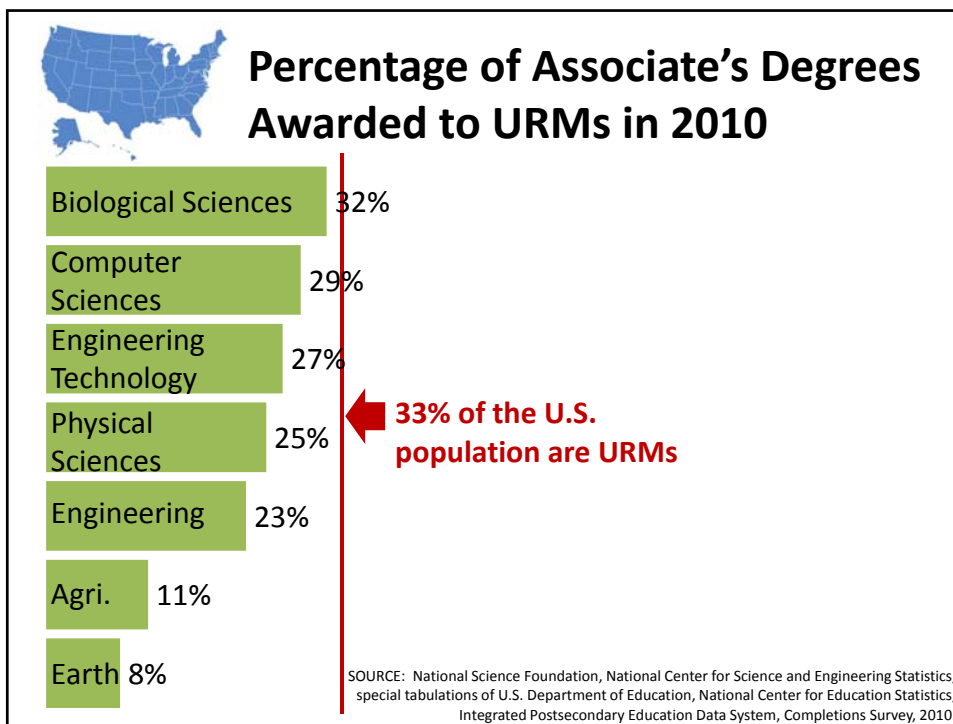
# Digest of Education Statistics 2011

**Data from K-16 institutions**

- Enrollments
- Degrees awarded
- Student demographics
- Faculty demographics

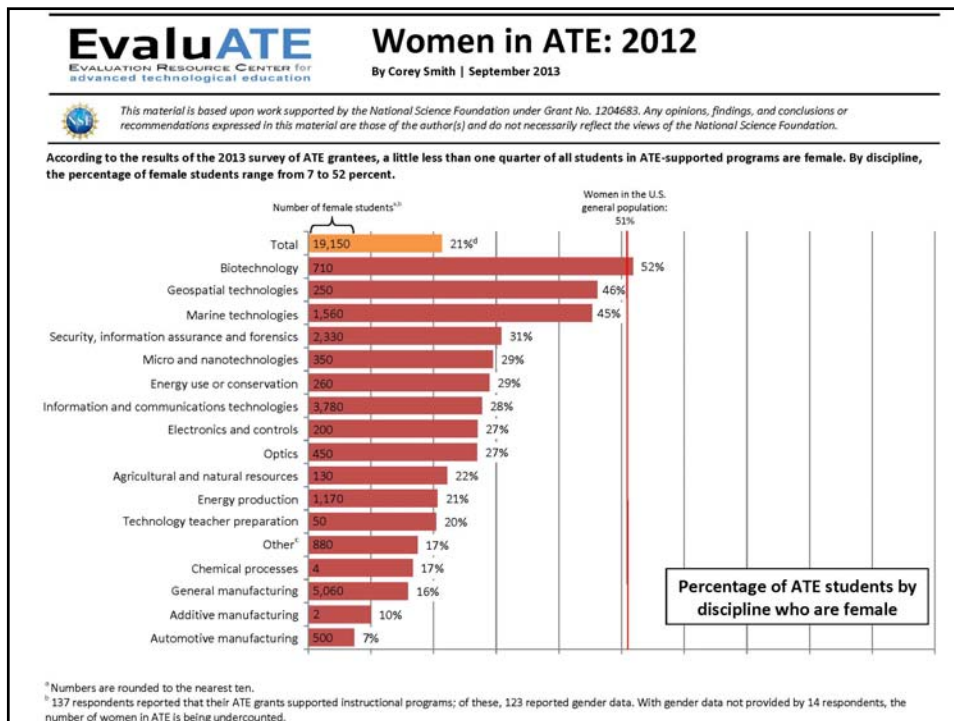
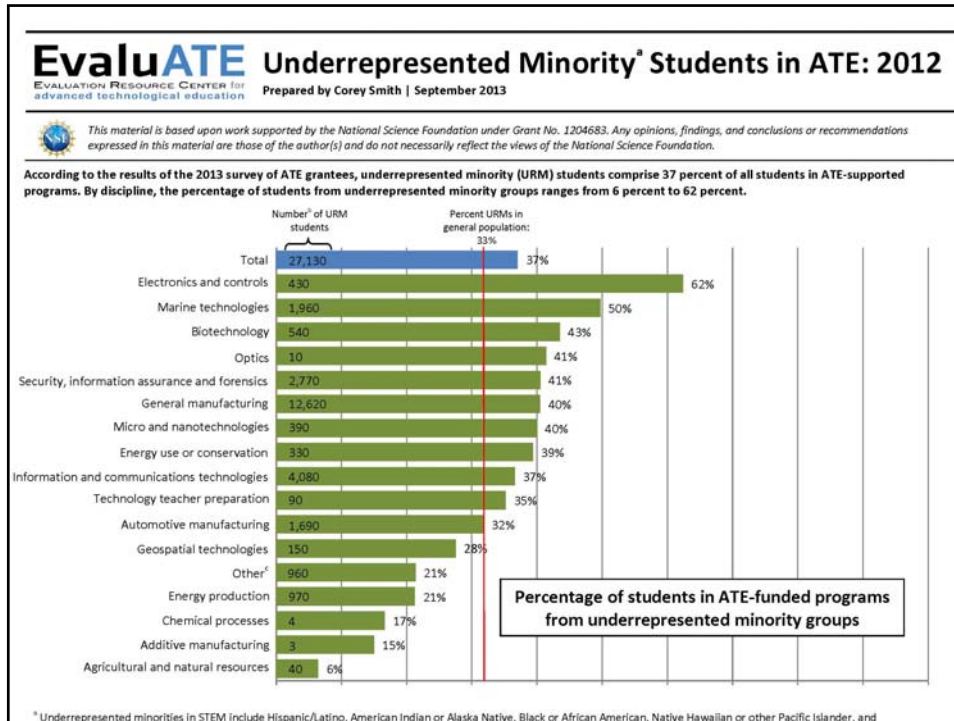
[nces.ed.gov/programs/digest/](http://nces.ed.gov/programs/digest/)





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Annual survey of ATE Grantees  
2000 - present





## Project-set Targets

May or may not be reflected in project goal statements.

Examples:

- Place 20 students per year in internships
- Increase graduation rates of first-generation students from 50% to 75%
- Engage a cadre of at least 20 faculty members from diverse fields in a community of practice to improve online teaching




## External Criteria

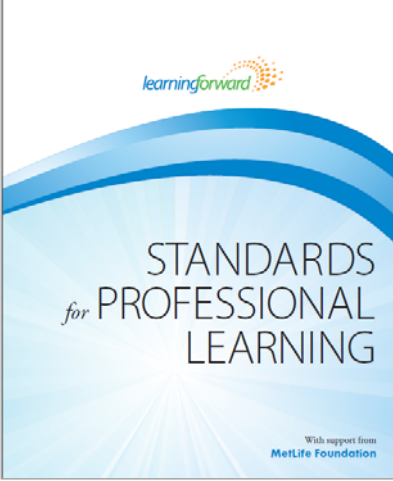
- Research-based
- Authoritative
- Generally accepted quality standards




Especially useful for assessing quality for process evaluation (implementation, content, products)



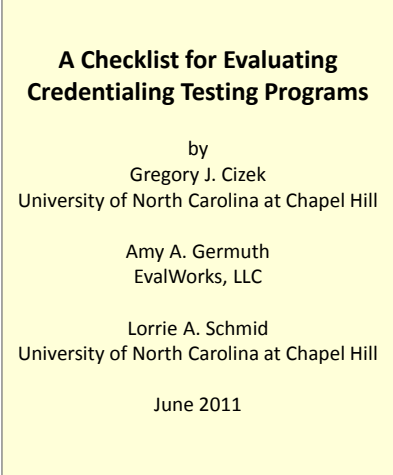
## Professional Development for Educators



[www.learningforward.org](http://www.learningforward.org)



## Credentialing Programs



**A Checklist for Evaluating  
Credentialing Testing Programs**

by  
Gregory J. Cizek  
University of North Carolina at Chapel Hill

Amy A. Germuth  
EvalWorks, LLC

Lorrie A. Schmid  
University of North Carolina at Chapel Hill

June 2011

[www.wmich.edu/evalctr/checklists/](http://www.wmich.edu/evalctr/checklists/)





## Curricula and Programs

Criteria established by accrediting organizations, e.g.,



National Automotive Technicians Education Foundation



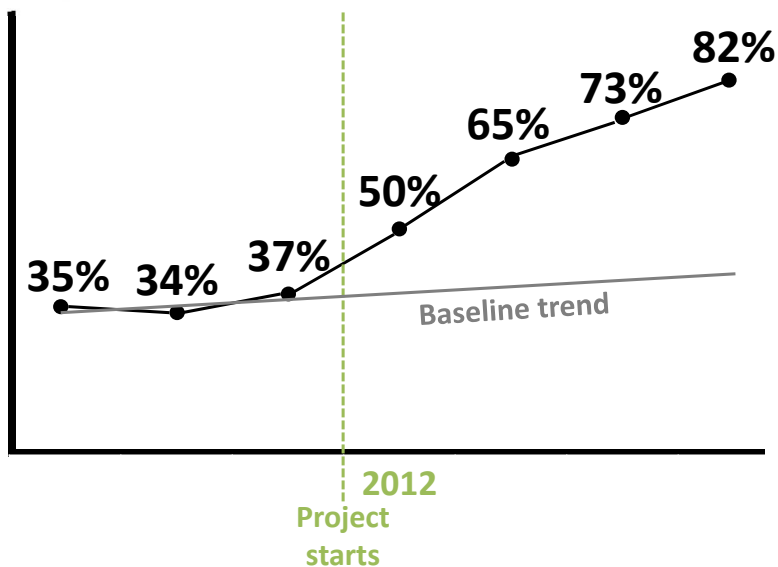
[formerly: Accreditation Board for Engineering and Technology]

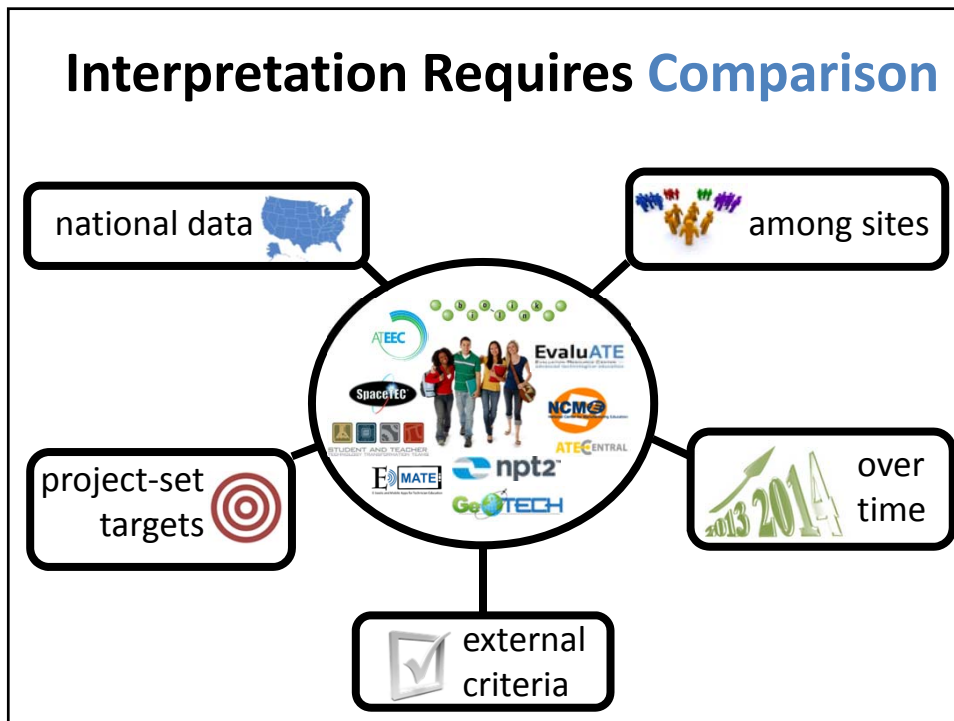
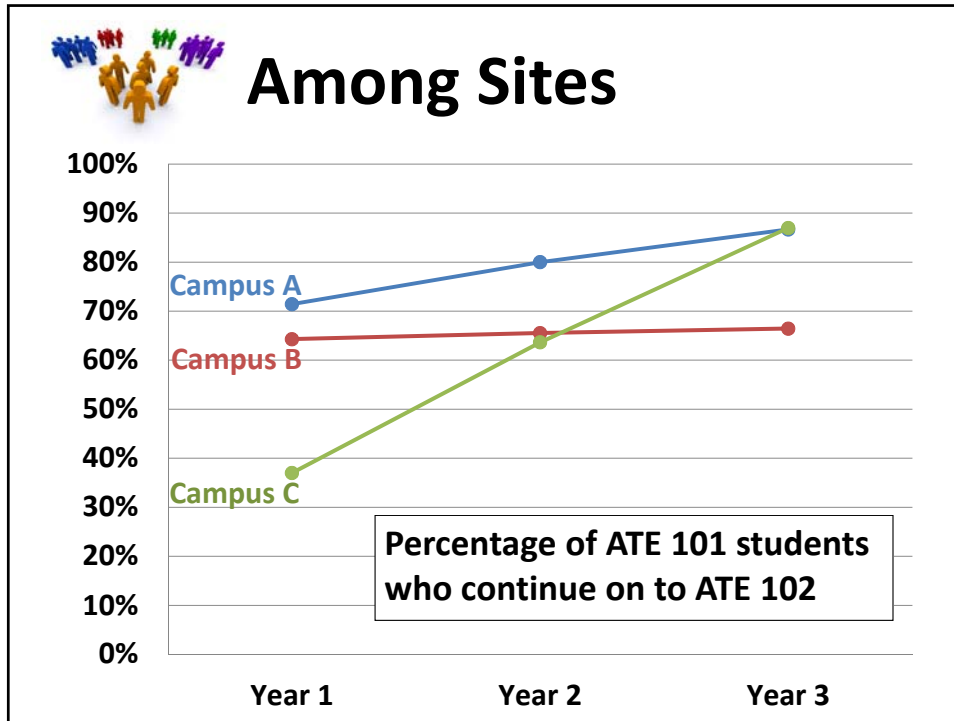


United States National Security Agency Information assurance Education and Training Program




## Over Time







**ru·bric** *noun* \ 'rū-brik



a guide listing specific criteria for grading or scoring ~~assignments, papers, or~~ projects, or tests

## All-Purpose Holistic Rubric

<b>Excellent</b>	Clear example of exemplary performance or best practice in this domain; no weaknesses
<b>Good</b>	Very good or excellent performance on virtually all aspects; strong overall but not exemplary; no weaknesses of any real consequence
<b>Adequate</b>	Reasonably good performance overall; might have a few slight weaknesses but nothing serious
<b>Marginal</b>	Fair performance, some serious (but nonfatal) weaknesses on a few aspects
<b>Poor</b>	Clear evidence of unsatisfactory functioning; serious weaknesses across the board or on crucial aspects

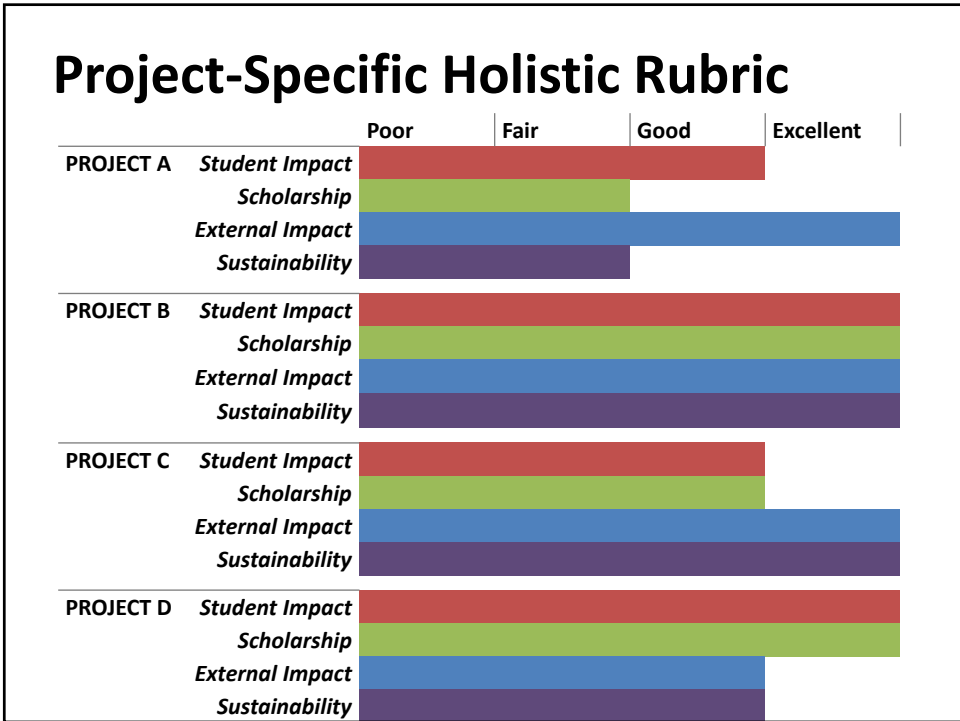
Source: Table 8.2 from *Evaluation Methodology Basics* by Jane Davidson (2005)

## Project-Specific Holistic Rubric

	Poor	Fair	Good	Excellent
<b>Student Impact</b>	No set plan for how to engage students either through coursework or experiential learning under the auspices of the project	Students engaged at least sporadically in experiential learning activities; there is talk of a certificate or degree program	Students engaged in a systematic way in experiential learning or a degree/certificate program, but may need further development	Clear strategy for engaging students under the auspices of the project through both experiential learning and a degree/ certificate program
<b>Scholarship</b>	No established plan for obtaining external grants or contracts; no evidence of activity in this area No evidence of advancing scholarship Not clear how the project contributes to enhancing perceptions of college	Minimal plans for obtaining external grants or contracts; some proposals submitted Evidence of some scholarship, but may not be obviously related to project Potential to raise the institution's stature in national rankings or perceptions if successfully implemented	Clear plan for obtaining external funding; proposals have been submitted Evidence of some scholarship directly related to the project Could bring national attention to college through exceptional performance in its focus area	Success in obtaining external grants and contracts in focus area Strong record of substantial scholarship directly related to the project Likely to attract national attention through its distinctive focus, assets, or innovation
<b>External Impact</b>	No set plans for external engagement	Some ideas for external engagement, but few have been implemented yet	External engagement, either through service or collaborations, is an important part of the project	Project has a strong external focus that is central to its mission, with demonstrable impacts on the community attributable to the project/institution.
<b>Sustainability</b>	No clear plan for supporting the center by grants, contracts, and/or fees	Some ideas for becoming partially self-sustaining but need to be further developed	Grants or contracts may bring significant external support to the project, but it depends on forces beyond the control of the project; fees or other revenue streams are likely to provide stable income	Very likely that grants, contracts, and/or fees will be a significant and stable source of support for the project

## Project-Specific Holistic Rubric

Poor	Fair	Good	Excellent
No set plan for how to engage students either through coursework or experiential learning under the auspices of the project	Students engaged at least sporadically in experiential learning activities; there is talk of a certificate or degree program	Students engaged in a systematic way in experiential learning or a degree/certificate program, but may need further development	Clear strategy for engaging students under the auspices of the project through both experiential learning and a degree/ certificate program



## Quantitative Weight-and-Sum Rubric

**How effective is the mentoring program for improving student retention?**

	Not at all effective (1)	Minimally Effective (2)	Moderately Effective (3)	Very Effective (4)	Data	Score	Weight	Weighted Score
% of students who self-report that mentoring positively influenced their decision to continue in their programs	≤9%	10-29%	30-49%	≥50%	55%	4	.3	<b>1.2</b>
Retention rate of mentoring participants compared with matched group	Lower or less than 10% higher	11-20% higher	21-29% higher	≥30% higher	22%	3	.7	<b>2.1</b>
<b>Sum = 3.3</b>								
<b>on a scale of 1-4</b>								

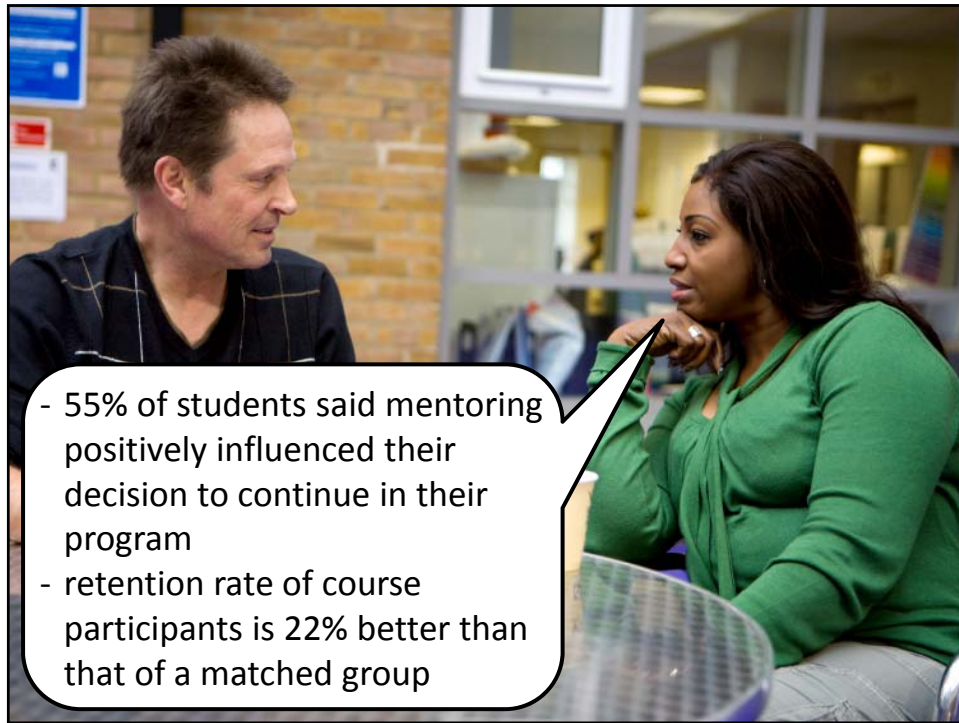
## Quantitative Weight-and-Sum Rubric

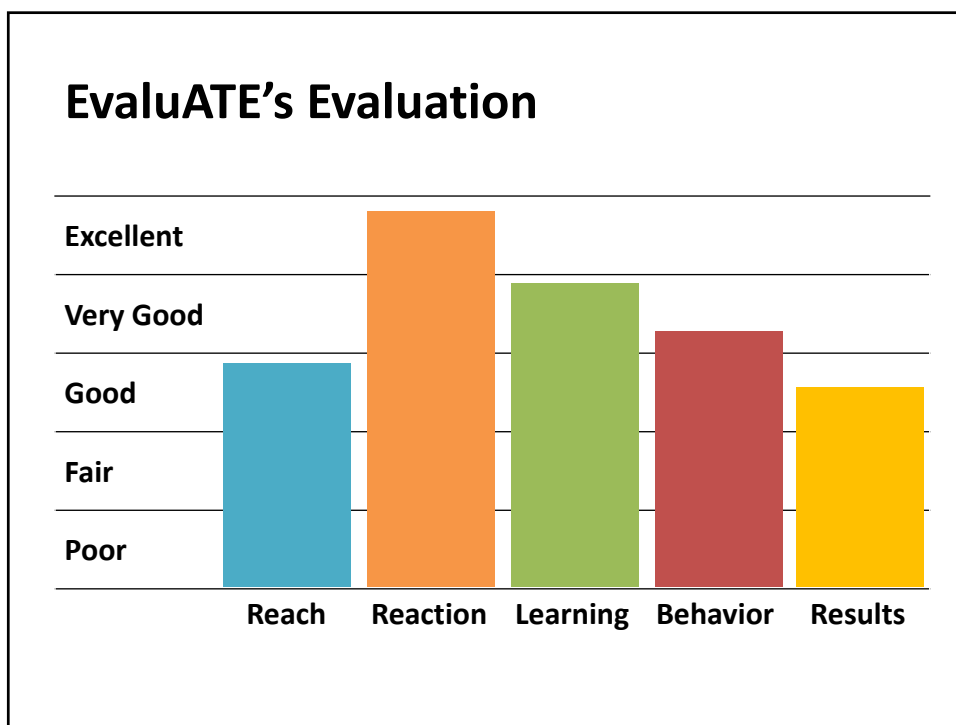
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<b>Moderately Effective</b>								









## Evaluative Terms/Performance Levels

Poor – Fair – Good – Excellent

Not at all effective – Minimally effective – Moderately  
effectively – Very Effective

Below target – On target – Above target

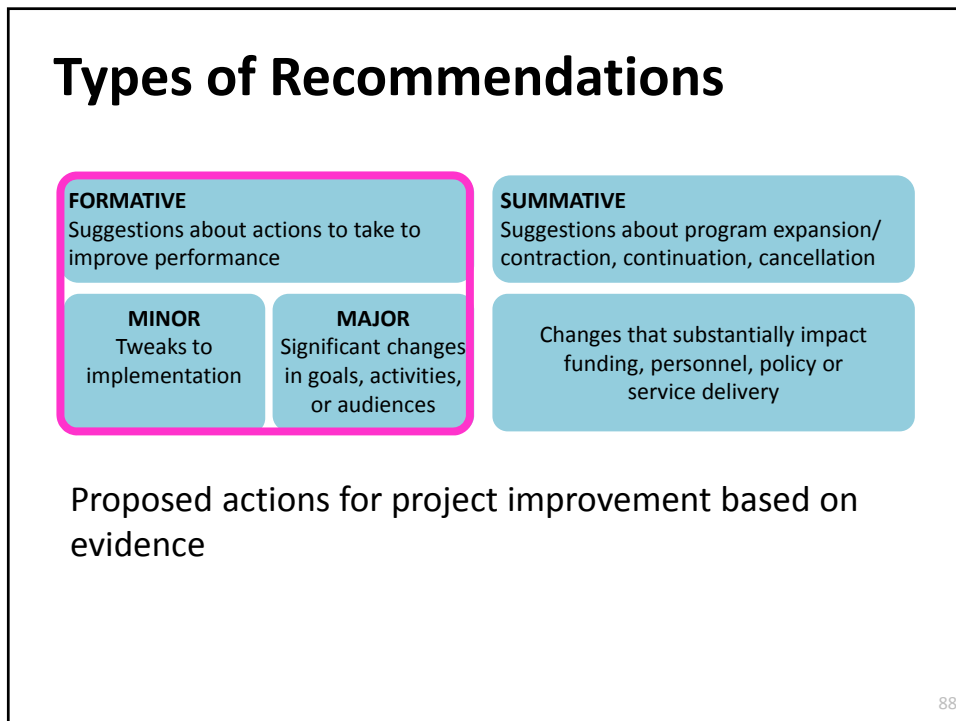
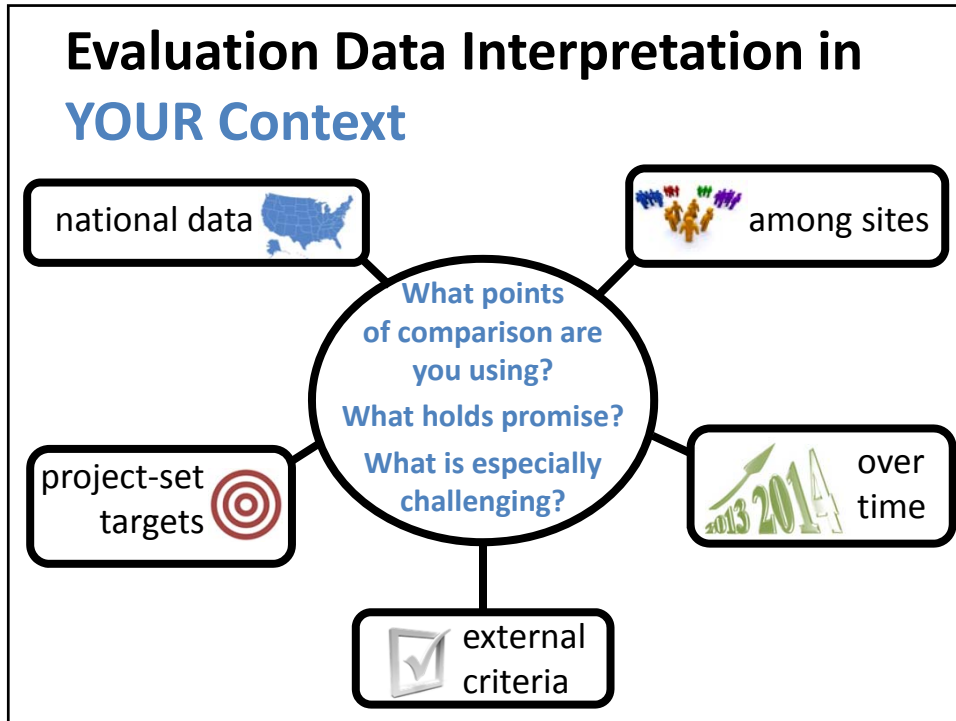
Needs improvement – Developing – Proficient

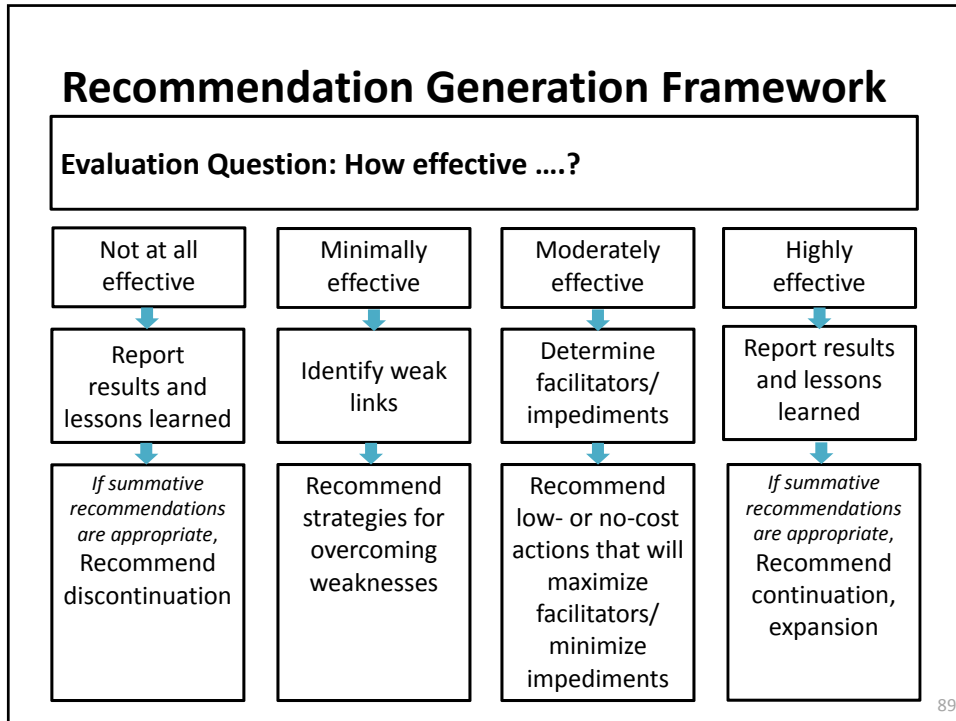
Unsatisfactory – Satisfactory

Below expectations – Meets expectations – Exceeds  
expectations

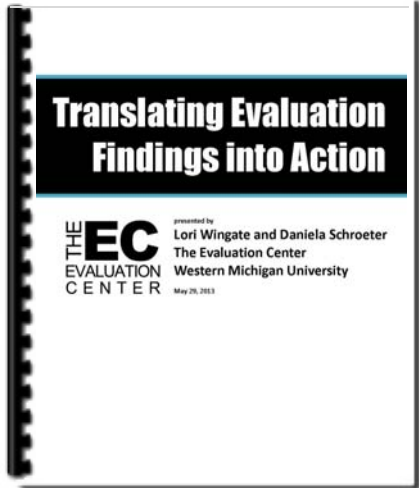


Small group work





### Want to Know More about Evaluation Recommendations?

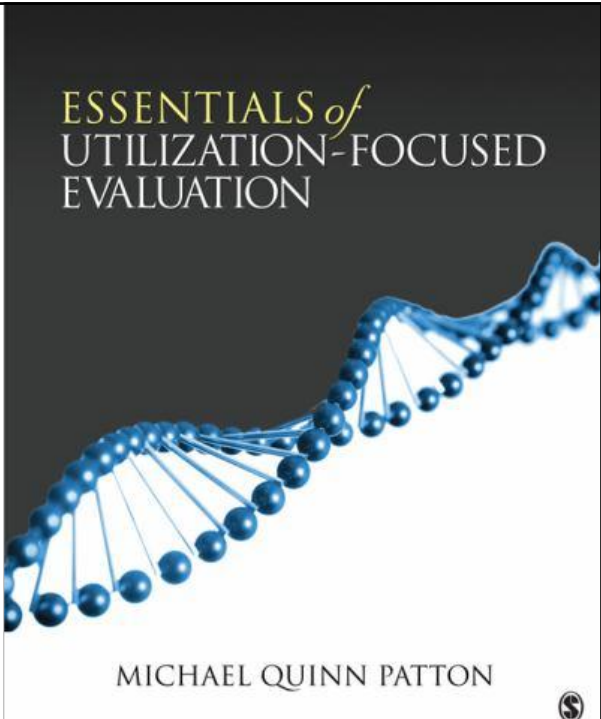


[www.wmich.edu/evalctr/2010/06/lori-wingate-ph-d/](http://www.wmich.edu/evalctr/2010/06/lori-wingate-ph-d/)

90

For more on interpretation, conclusions, and recommendations in evaluation, read *Essentials of Utilization-Focused Evaluation*, pp. 349-365

**in your workshop booklet**




**ESSENTIALS** *of*  
**UTILIZATION-FOCUSED  
EVALUATION**


MICHAEL QUINN PATTON

# Questions?





<h1>Program Evaluation Standards</h1> <p>Utility Feasibility Propriety Accuracy Accountability</p>	<p>Joint Committee on Standards for Educational Evaluation</p> <h2>The Program Evaluation Standards</h2> <p>A Guide for Evaluators and Evaluation Users</p> <p>3<sup>rd</sup> Edition</p> <p>Donald B. Yarbrough • Lyn M. Shulha Rodney K. Hopson • Flora A. Caruthers</p> 
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Questions → Data → Conclusions → Recommendations

### Connecting the Dots for an Effective Evaluation

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# EvaluATE

EVALUATION RESOURCE CENTER for advanced technological education



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