INTRODUCTIONS

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MATERIALS

- Handout
- Slides
- Recording

Available from evalu-ate.org/events/march_2013

or the Recent Additions section of our homepage (through next month)
OBJECTIVES
By the end of the webinar, you will
1. Understand the role of evaluation questions as a basis for interpretation and visualization
2. Be aware of strategies for strengthening the linkages between evaluation data and conclusions
3. Be able to apply data visualization techniques to enhance reporting
4. Be inspired to learn more on your own about valuing and visualization

EVALUATION QUESTIONS
LORI
EVALUATION QUESTIONS

Overarching questions about the project’s merit, worth, or significance that the evaluation seeks to answer based on evidence.
COMMON PITFALLS

- Failing to define the boundaries of the evaluation with evaluation questions or objectives
- Making judgments without explicitly linking them to evidence
- Conveying results from a data perspective rather than an interpretive or use-oriented perspective
EVALUATION QUESTIONS

Overarching questions about the project’s merit, worth, or significance that the evaluation seeks to answer based on evidence.

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EVALUATION QUESTIONS ≠ GOALS

Ideally, project goals statements are about intended project outcomes.

(i.e., what is going to be different in the context of advanced technological education because of the project)

- Typically, they are stated in terms of activities.
EVALUATION QUESTIONS ≠ GOALS

Project ATE-3D Goals:
1. Establish a process to solicit and implement 3-D printing projects from the community
2. Develop and implement an interdisciplinary 2-course sequence on the application of 3-D printing technology
3. Provide students with support for continued professional growth

OPTIONS FOR FRAMING EVALUATION QUESTIONS

“Develop and implement an interdisciplinary 2-course sequence on application of 3-D printing technology”

What are some evaluative questions we might ask about this aspect of the project? (type your suggestions in the chat box)
**OPTIONS FOR FRAMING EVALUATION QUESTIONS**

Align evaluation questions to a logic model

![Diagram showing options for framing evaluation questions]

**Activities**
- Establish and implement process to solicit 3-D printing projects from community members
- Develop an interdisciplinary 2-course sequence on application of 3-D printing technology
- Provide students with support for continued professional growth

**Outputs**
- 20 projects per semester for diverse applications
- 60 students enrolled per semester from engineering, architecture, manufacturing, industrial design

**Short-term**
- Students gain soft skills by working on teams to meet a client need (teamwork, communication, problem solving)
- Students gain competence in applying 3-D printing technology to real-world problems

**Mid-term**
- Students persist in their advanced technology programs (improved retention and completion)
- Students further apply and develop their skills through experiential learning (e.g., internships, independent study, clubs/competitions)

**Long-term**
- Graduates obtain employment related to their certification or degree and/or
- Graduates continue on to a 4-year degree in a STEM discipline

1. To what extent do the community projects meet criteria for high-quality, problem-based learning?
Activities | Outputs | Short-term | Mid-term | Long-term
---|---|---|---|---
Establish and implement process to solicit 3-D printing projects from community members | 20 projects per semester for diverse applications | Students gain soft skills by working on teams to meet a client need (teamwork, communication, problem solving) | Students persist in their advanced technology programs (improved retention and completion) | Graduates obtain employment related to their certification or degree and/or graduates continue on to a 4-year degree in a STEM discipline
Develop and implement an interdisciplinary 2-course sequence on application of 3-D printing technology | 60 students enrolled per semester from engineering, architecture, manufacturing, industrial design | Students gain competence in applying 3-D printing technology to real-world problems | Students further apply and develop their skills through experiential learning (e.g., internships, independent study, clubs/competitions) | |
Provide students with support for continued professional growth | | | | |

2. To what degree did the courses engage the intended students?

3. What is the effectiveness of the course in terms of the gain in soft skills and technical competence?
### Activities
- Establish and implement process to solicit 3-D printing projects from community members
- Develop and implement interdisciplinary 2-course sequence on application of 3-D printing technology
- Provide students with support for continued professional growth

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- 20 projects per semester for diverse applications
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- Graduates obtain employment related to their certification or degree and/or
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---

### 4. What is the effectiveness of the project in improving student retention?

### Activities
- Establish and implement process to solicit 3-D printing projects from community members
- Develop and implement an interdisciplinary 2-course sequence on application of 3-D printing technology
- Provide students with support for continued professional growth

### Outputs
- 20 projects per semester for diverse applications
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- Graduates obtain employment related to their certification or degree and/or
- Graduates continue on to a 4-year degree in a STEM discipline

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### 5. What is the project’s effect on employment and/or continued education?
SUMMING UP

A prerequisite to reaching evaluative conclusions (valuing) is asking evaluation questions.

Question?

Answer.

Evaluation questions should align with project goals, but are not the same as project goals.
COMMON PITFALLS

Failing to define the boundaries of the evaluation with evaluation questions or objectives

Making judgments without explicitly linking them to evidence

Conveying results from a data perspective rather than an interpretive or use-oriented perspective

“Divine judgment”
—Jane Davidson, 2010

“I looked upon it and saw that it was good.”
—Jane Davidson, 2010
DIVINE JUDGMENT-TYPE CONCLUSIONS

DATA
observations
interviews
documents
institutional data
surveys

CONCLUSIONS
“The project seems to be making good progress.”
“The project has developed an effective problem-based learning.”

COMMON PITFALLS

Failing to define the boundaries of the evaluation with evaluation questions or objectives
Making conclusions without explicitly linking them to evidence
Conveying results from a data perspective rather than an interpretive or use-oriented perspective

“Rorschach inkblot”
—Jane Davidson, 2010
RORSCHACH INKBLOT-TYPE RESULTS

Figure it out.

—Jane Davidson, 2010

RORSCHACH INKBLOT-TYPE RESULTS

“Data dump” with little or no interpretation or conclusions

descriptions of context

descriptions of activities

survey data

focus group data

interview data

advisory board feedback

enrollment data

GPA
Is the Data Café a good restaurant?

- It takes an average of 7.3 minutes to be seated
- 75% of wait staff are courteous
- 58.6% of customers are highly satisfied
Failing to define the boundaries of the evaluation with evaluation questions or objectives

Making conclusions without explicitly linking them to evidence

Conveying results from a data perspective rather than an interpretive or use-oriented perspective

Need an interpretive framework
**Analysis**
The process of cleaning, organizing, transforming, and describing data

**Interpretation**
Making sense of analyzed data so that conclusions can be made about a project’s quality, progress, and/or impact

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**INTERPRETATION TOOLS**

- **Criterion-based interpretation**
  - Holistic rubrics
  - Indicator-specific rubrics

- **Norm-based interpretation**
  - Comparison with past performance
  - Comparison with other sites, groups
**GENERAL RUBRIC**

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

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

**HOLISTIC RUBRICS**

Aids in reaching defensible evaluative conclusion in less-than-ideal evaluation situation, e.g.,
- evaluator brought in late in the project
- little or no data have been collected
- evaluation budget is negligible and/or client mainly wants an “external perspective”
## Holistic Rubric

<table>
<thead>
<tr>
<th>Impact</th>
<th>Poor</th>
<th>Fair</th>
<th>Good</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Student</strong></td>
<td>No set plan for how to engage students either through coursework or</td>
<td>Students engaged at least sporadically in experiential learning activities; there is talk of a certificate or degree program.</td>
<td>Students engaged in a systematic way in experiential learning or a degree/certificate program, but may need further development.</td>
<td>Clear strategy for engaging students under the auspices of the UP project through both experiential learning and a degree/ certificate program.</td>
</tr>
<tr>
<td><strong>Impact</strong></td>
<td>experiential learning under the auspices of the project</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Scholarship</strong></td>
<td>No established plan for obtaining external grants or contracts; no evidence of activity in this area</td>
<td>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</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>External</strong></td>
<td>No set plans for external engagement</td>
<td>Some ideas for external engagement, but few have been implemented yet</td>
<td>External engagement, either through service or collaborations, is an important part of the project</td>
<td>Project has a strong external focus that is central to its mission, with demonstrable impacts on the community attributable to the project/institution</td>
</tr>
<tr>
<td><strong>Impact</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sustainability</strong></td>
<td>No clear plan for supporting the center by grants, contracts, and/or fees</td>
<td>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</td>
<td>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</td>
<td>Very likely that grants, contracts, and/or fees will be a significant and stable source of support for the project</td>
</tr>
</tbody>
</table>

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## INDICATOR-SPECIFIC RUBRIC

What is the effectiveness of the course in improving student retention?

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Not at all effective (1)</th>
<th>Minimally Effective (2)</th>
<th>Moderately Effective (3)</th>
<th>Very Effective (4)</th>
<th>Data</th>
<th>Score</th>
<th>Weight</th>
<th>Weighted Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of students who self-report that the course positively influenced their decision to continue in their programs</td>
<td>≤9%</td>
<td>10-29%</td>
<td>30-49%</td>
<td>≥50%</td>
<td>55%</td>
<td>4</td>
<td>.3</td>
<td>1.2</td>
</tr>
<tr>
<td>Difference in retention rates between course participants and matched group</td>
<td>Decrease or less than 10% increase</td>
<td>11-20%</td>
<td>21-29%</td>
<td>≥30%</td>
<td>22%</td>
<td>3</td>
<td>.7</td>
<td>2.1</td>
</tr>
</tbody>
</table>

**Conclusion:** Moderately Effective

**Sum:** = 3.3 on a scale of 1-4
**EVALUATION QUESTION & ANSWER**

**Question**
What is the effectiveness of the project in improving student retention?

**Answer**
- 25% of students said the course positively influenced their decision to continue in their program.
- Retention rate of course participants is 22% better than that of a matched group.

---

**EVALUATION QUESTION & ANSWER**

**Answer**
- 25% of students said the course positively influenced their decision to continue in their program.
- Retention rate of course participants is 22% better than that of a matched group.

*This is a description, not an evaluative conclusion.*
EVALUATION QUESTION & ANSWER

Question
What is the effectiveness of the project in improving student retention?

Answer
The course was moderately effective in improving student retention, according to the criteria established for the project.*

*Criteria and specific results also provided to substantiate answer.

COMPARE WITH BASELINE

50%

2012
NORM-BASED INTERPRETATION

- Comparison with past performance
- Comparison other sites, standards

COMPARE WITH BASELINE

Baseline trend

35% 34% 37% 50% 65% 73% 82%
**COMPARE WITH NATIONAL DATA**

Representation of Women in 3 Disciplines

- **Information and Communications Technologies**: 43%
- **Engineering Technologies**: 23%
- **Agriculture and Natural Resources**: 31%

*Source: National Center for Education Statistics*

**COMPARE WITH NATIONAL DATA**

Representation of Women in 3 Disciplines

- **Information and Communications Technologies**: 36% (All 2-Year Colleges*), 43% (ATE-Supported Programs)
- **Engineering Technologies**: 13%
- **Agriculture and Natural Resources**: 26%

*Source: National Center for Education Statistics*
WHY VISUALIZE?

Enhance and expedite understanding of results
Different scales hinder visual comparison

Number of students enrolled in 3-D PRINTING 201 & 202 on three campuses
Number of students enrolled in 3-D PRINTING 201 & 202 on three campuses

Information in these graphs:

- # students enrolled in 3-D PRINTING 201 & 202
- across 3 years
- and 3 campuses

Which outcome evaluation question could these data help us answer?
POLL: Which outcome evaluation question could these data help us answer?

A. What is the effectiveness of the course in terms of the gain in soft skills and technical competence?

B. What is the effectiveness of the course in improving student retention?

C. What is the project’s effect on employment and/or continued education?

INDICATOR: Percentage of ATE 201 students who continue on to ATE 202

Percentage of ATE 201 students who continue on to ATE 202 on three campuses
Percentage of ATE 201 students who continue on to ATE 202 on three campuses

SCALE MATTERS
SCALE MATTERS

ATE Survey Response Rates: 2000-12
From Valuing to Visualization: Data Interpretation and Reporting

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PIE IS HARD TO DIGEST

American Indian/Alaska Native
Native Hawaiian/Pacific Islander
Multiracial
Asian
Black/African American
Hispanic/Latino
White
**PIE IS HARD TO DIGEST**

Your eyes have to move back and forth between legend and chart to link data to category.

**PIES IS HARD TO DIGEST**

Moving labels to the chart area solves some problems, creates others.
**PIE IS HARD TO DIGEST**

It is difficult to judge differences in area.

- White: 37%
- Hispanic/Latino: 30%
- Black/African American: 15%
- Asian: 9%
- Multiracial: 5%
- Native Hawaiian/Pacific Islander: 2%
- American Indian/Alaska Native: 2%
From Valuing to Visualization: Data Interpretation and Reporting

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PIE IS HARD TO DIGEST

BARS ARE BETTER
BARS ARE BETTER

- Underrepresented Minorities
- Whites
- Asians

THIS PIE IS EASIER TO DIGEST

- Underrepresented Minorities 54%
- White 37%
- Asian 9%
3-D IS FOR MOVIES

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Number</th>
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<tbody>
<tr>
<td>White</td>
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<tr>
<td>Hispanic/Latino</td>
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<tr>
<td>Black/African American</td>
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<tr>
<td>Asian</td>
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<tr>
<td>Native Hawaiian/Pacific Islander</td>
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<tr>
<td>American Indian/Alaska Native</td>
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</tbody>
</table>


### VISUALIZING EVALUATIVE CONCLUSIONS

<table>
<thead>
<tr>
<th>Category</th>
<th>Poor</th>
<th>Fair</th>
<th>Good</th>
<th>Very Good</th>
<th>Excellent</th>
</tr>
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<tbody>
<tr>
<td>Reach</td>
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<tr>
<td>Reaction</td>
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<tr>
<td>Learning</td>
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<td>Behavior</td>
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<td>Results</td>
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</table>

#### Unweighted vs. Weighted

<table>
<thead>
<tr>
<th>Projekt A</th>
<th>Student Impact</th>
<th>Scholarship</th>
<th>External Impact</th>
<th>Sustainability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>Excellent</td>
</tr>
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<td>Projekt C</td>
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<td>Scholarship</td>
<td>External Impact</td>
<td>Sustainability</td>
</tr>
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<td>Projekt D</td>
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<td>Scholarship</td>
<td>External Impact</td>
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### VISUALIZING EVALUATIVE CONCLUSIONS

**Problem-based learning projects**

1. To what extent do the community projects meet criteria for high-quality, problem-based learning?

**Reach**

2. To what degree did the courses engage the intended students?

**Learning**

3. What is the effectiveness of the course in terms of the gain in soft skills and technical competence?

**Retention**

4. What is the effectiveness of the course in improving student retention?

**Student Outcomes**

5. What is the project’s effect on employment and/or continued education?

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#### VISUALIZING EVALUATIVE CONCLUSIONS

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<td>Retention</td>
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IMPLICATIONS FOR REPORTING

- Organize results by evaluation question, impact level, or project component rather than by data source
- Show linkages between conclusions and evidence
- Use high-quality charts to support key points

EvaluATE EVENTS

The Nuts and Bolts of ATE Evaluation Reporting
May 15 | 1-2:30 p.m. ET

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