

## **Coaching and Training Module**

### **Evaluation of Interdisciplinary and Collaborative Research**

The Coaching and Training Modules are designed to help individuals and groups learn about key aspects of interdisciplinary research and team science. Individuals may use them as self-tutorials. Program directors, project managers, and advisors may use them for coaching, and they may form the basis for presentations as well as workshops, colloquia, and short courses.

Additional related modules on this website focus on Tenure and Promotion, Barriers and Strategies, and Collaboration.

The urgency of solving complex problems has heightened the importance of interdisciplinary and collaborative approaches in many areas, including health care and medical research, engineering and information science, social and behavioral sciences, and humanities and communication studies. The traditional unidisciplinary and single-PI model, however, favored conventional criteria of evaluation and solo accomplishments. As a result, teams need guidance on how to assess research performance as well as outcomes and impacts.

This Coaching and Training module offers four kinds of guidance:

- (1) definitions and rationales for interdisciplinary and team science evaluations
- (2) "best practices"
- (3) appropriate criteria
- (4) models and tools.

Leaders, teams, and individuals can use the resources to inform planning, design, implementation, and assessment across project and program life cycles. As indicated in annotations of the entries below, some resources are especially useful for common reading and discussion while others provide materials for presentations and review guidelines as well as models that may be adopted or adapted to local needs.

**Note.** Access to article links requires a Wayne State University (WSU) access ID and password. All URLs were accessed 11 June 2014.

## Introductions and Overviews

**Huutoniemi, K. “Research Evaluation.”** In R. Frodeman, J. T. Klein, and C. Mitcham (eds.), pp. 309–320. *Oxford Handbook of Interdisciplinarity*. New York: Oxford University Press

[http://www.researchgate.net/publication/256229253\\_Evaluating\\_interdisciplinary\\_research/file/3deec52ab578c6dff8.pdf](http://www.researchgate.net/publication/256229253_Evaluating_interdisciplinary_research/file/3deec52ab578c6dff8.pdf)

An introduction to the topic of evaluating interdisciplinary research that summarizes functions of evaluation, merits and criteria, and contextual aspects. Incorporates insights from conceptual and pragmatic discussions, empirical studies, and experiences of organizations and social actors.

- The chapter can be used as an introductory reading to frame the task of evaluation.
- Table 21.2 can serve as reference guide for the general question of quality and operational definitions of outcomes.

**Klein, J. T. “Evaluation of Interdisciplinary and Transdisciplinary Research: A Literature Review.”** *American Journal of Preventive Medicine*, 2008, 35(2S), S116–S123.

<http://www.sciencedirect.com.proxy.lib.wayne.edu/science/article/pii/S0749379708004200>

A review of the emerging literature, with seven generic principles highlighting variability of goals, variability of criteria and indicators, integration, interaction of social and cognitive factors in collaboration, management-leadership-coaching, iteration, and effectiveness and impact.

- The seven principles and accompanying table provide a guide for selecting outcomes and specifying criteria for assessment and measurement.

**Note: Also cross-check other articles on evaluation, measurement, and metrics in the same issue on “The Science of Team Science” in this journal.**

**Special Issue on Evaluation of Interdisciplinary Research: *Research Evaluation*, 2006, 15(1), 1–80. For an overview:**

<http://web.a.ebscohost.com.proxy.lib.wayne.edu/ehost/results?sid=d25f91c0-d6fc-435a-9ccb-2102f5182f5a%40sessionmgr4003&vid=2&hid=4114&bquery=JN+%22Research+Evaluation%22+AND+DT+20060401&bdata=JmRiPW9mcyZ0eXBIPTAmc2l0ZT1laG9zdC1saXZlJnNjb3BIPXNpdGU%3d>

An international collection of seven articles on assessment of interdisciplinary research with insights from empirical studies and an expert workshop, along with discussions of the challenges of interdisciplinary evaluation, standards of quality, peer review processes, a procedure for evaluating networks, with an afterword on the literature.

- Individual articles may be used to frame discussion of pertinent topics.

**Stokols, D., Fuqua, J., Gress, J., Harvey, R., Phillips, K., Baezconde-Garbanati, L., & Trochim, W. (2003). Evaluating transdisciplinary science. *Nicotine & Tobacco Research*, 5(Suppl 1), S21-S39.**

[http://ntr.oxfordjournals.org.proxy.lib.wayne.edu/content/5/Suppl\\_1/S21.short](http://ntr.oxfordjournals.org.proxy.lib.wayne.edu/content/5/Suppl_1/S21.short)

Based on the Transdisciplinary Tobacco Use Research Centers (TTURC) initiative, lays out an approach to evaluation with common barriers and factors in large multi-site initiatives.

- Specific measures and tools can be incorporated into a proposal or formal design.
- The reference set of findings can help inform the process and impact of local evaluations serving as a comparison for individual reviews at the institutional level.

### International Models from Major Evaluation Projects

**Evaluating Transdisciplinary Research. Special issue of *PANORAMA*, 1 (1999). Swiss Priority Program Environment, Swiss National Science Foundation Newsletter.**

[http://www.google.ca/url?sa=t&ret=j&q=&esrc=s&source=web&cd=1&ved=0CCcQFjAA&url=http%3A%2F%2Fwww.ikaofe.unibe.ch%2Fforschung%2Fip%2FSpecialissue.Pano.1.99.pdf&ei=PzYVU5PrI8bz0gGykYDgBw&usq=AFQjCNHfsrtZN1u-CfnJiWBTanSGIqd7\\_g&sig2=IIfOqP74gccG-EnADAKrGg&bvm=bv.62286460.d.dmQ](http://www.google.ca/url?sa=t&ret=j&q=&esrc=s&source=web&cd=1&ved=0CCcQFjAA&url=http%3A%2F%2Fwww.ikaofe.unibe.ch%2Fforschung%2Fip%2FSpecialissue.Pano.1.99.pdf&ei=PzYVU5PrI8bz0gGykYDgBw&usq=AFQjCNHfsrtZN1u-CfnJiWBTanSGIqd7_g&sig2=IIfOqP74gccG-EnADAKrGg&bvm=bv.62286460.d.dmQ)

Report on an evaluation project commissioned by the Swiss National Science Foundation. Takes a modular approach to a catalogue of questions in multiple categories and stages of inter- and trans-disciplinary projects.

- The model may be used for both coaching the research process and formal evaluation.
- Definitions and evaluation factors can be extracted for presentation to a team unfamiliar with the nature of inter- and trans-disciplinary research and appropriate criteria.

**Spaapen, J., Dijstelbloem, H., and Wamelink, F. (2007). Evaluating Research in Context [ERIC]: A Method for Comprehensive Assessment. 2<sup>nd</sup> Edition. The Hague, Netherlands: Consultative Committee of Sector Councils for Research and Development (COS). Materials from the ERIC project are available from the Rathenau Instituut at**

<http://www.rathenau.nl/en/themes/theme/project/eric-evaluating-research-in-context.html>

A method for assessing quality and relevance of research for science and society based on evaluation experiences in the fields of agricultural sciences and pharmaceutical sciences. The Research Embedment and Performance Profile (REPP) is a quantitative reconstruction of a group's activities and performance based on analysis of the missions and/or profile of a research program or group, stakeholder analysis, and feedback and discussion.

- The REPP is adaptable to many contexts, enabling groups to depict in a graphic radar plot a broad range of indicators of research performance and outcomes across multi-, inter-, and trans-disciplinary projects, programs, and fields.

## Resources with Useful Tables, Figures, and Logic Models

**Wagner, C. S., Roessner, J. D., Bobb, K., Klein, J. T., Boyack, K. W., Keyton, J., & Börner, K. (2011). Approaches to understanding and measuring interdisciplinary scientific research (IDR): A review of the literature. *Journal of Informetrics*, 5(1), 14-26.**  
<http://www.sciencedirect.com.proxy.lib.wayne.edu/science/article/pii/S1751157710000581>

A literature review of quantitative and qualitative approaches to evaluation of interdisciplinary research incorporating input and output as well as short-, -middle-, and long-term impacts. Argues for broadening beyond narrow concepts of measurement and bibliometrics to include dynamic and combined indicators.

- **Table 1** definitions of key terms provide the basis for a shared conception and assessment of differences in multi-, -inter-, and transdisciplinary approaches.
- **Figure 1** lays out a logic model of antecedents, processes, and outcomes for collaboration around which the full evaluation can be framed.
- Descriptions of spatial mapping and diversity assessment as tools for organizing bibliometric data may be used to instruct evaluators and to educate team members on how to think about bibliometric data.

**Wooten, K. C., Rose, R. M., Ostir, G. V., Calhoun, W. J., Ameredes, B. T., & Brasier, A. R. (2013). Assessing and Evaluating Multidisciplinary Translational Teams: A Mixed Methods Approach. *Evaluation & The Health Professions*, 1-17.**  
<http://ehp.sagepub.com.proxy.lib.wayne.edu/content/early/2013/09/09/0163278713504433.full.pdf>

An introductory reading on program evaluation in general and for team science in particular. Can also form basis of a presentation on appropriate criteria and components of quality.

- **Table 1** covers multiple lines of evaluation running concurrently in a quality evaluation.
- **Table 2** guides the planning process of an evaluation.
- **Figure 1** and **Figure 2** illustrate mixed methods data and their value for a research team; may be used as templates by program evaluators.

**Hall, K. L (2012). Science of team science: Understanding and facilitating transdisciplinary teams [PowerPoint slides]. Retrieved from the National Cancer Institute Website.**  
[http://www.ncsu.edu/iucrc/Jun'10/Hall%20SciTS%20for%20NSF%20IUCRC%20Evaluator%20Meeting%202010\\_0602.pdf](http://www.ncsu.edu/iucrc/Jun'10/Hall%20SciTS%20for%20NSF%20IUCRC%20Evaluator%20Meeting%202010_0602.pdf)

A set of slides that may be used in whole or in part for to evaluation in the context of collaboration, with tips on defining criteria of quality for program evaluation.

- Several slides address how to develop evaluation logic models around which an evaluation design or proposal can be structured, **especially slides 26, 27, and 28**

- **Slides 33-36** illustrate the kinds of data team science evaluations can provide to core program researchers and administrators, including social network data that helps funders, administrators and program directors visualize outcomes as empirical, quantifiable data.

### Curriculum Models and Learning Assessment

**Haire-Joshu, D. and T. McBride (Eds.). *Transdisciplinary Public Health: Research, Education, and Practice*. San Francisco: Jossey Bass.**

<http://books.google.com.proxy.lib.wayne.edu/books?hl=en&lr=&id=CI63CaTt9o0C&oi=fnd&pg=PP1&dq=Transdisciplinary+Public+Health:+Research,+Education,+and+Practice.+&ots=P1nDM4rhGg&sig=pT04QKl4nQmOsZ45THah9WqD3ug#v=onepage&q=Transdisciplinary%20Public%20Health%3A%20Research%2C%20Education%2C%20and%20Practice.&f=false>

A collection of essays on transdisciplinary research and education in public health, including lessons from practice, teaching, and policy. Part I is an overview of concepts and practices for designing education programs. Part 2 explores cross-cutting themes. Parts 3 and 4 present domestic and international case studies.

- Many chapters include discussion of related competencies and skills that both students and career professionals need, and some have replicable evaluation frameworks and pedagogical approaches. See especially chapters 2, 3, 4, 8, and 9.

**Studies of Assessment in Interdisciplinary Research and Interdisciplinary Studies on the Harvard Interdisciplinary Studies Project website at Project Zero:**

<http://www.interdisciplinarystudiespz.org/>

An overview of research on interdisciplinary education at four levels:

Expert: The Santa Fe Institute, MacArthur Foundation, Canadian Institute for Advanced Research;

Collegiate: Harvard School of Business, Interdisciplinary Honors Program at the University of Miami Ohio;

Pre-Collegiate: St. Paul's School, Illinois Math and Science Academy

Global Initiatives: Interdisciplinary approaches to understanding global issues

- Linked online publications provide models of empirical approaches to developing process outcomes related to training and education.