

"So you want to develop a training grant?"
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Table 1. Definitions and examples of scientific orientations⁶⁰

Scientific orientation	Definition	Example
Unidisciplinarity	Unidisciplinarity is a process in which researchers from a single discipline work together to address a common research problem.	A team of pharmacologists collaborate on a laboratory study of the relationships between nicotine consumption and insulin metabolism.
Multidisciplinarity	Multidisciplinarity is a sequential process whereby researchers in different disciplines work independently , each from his or her own discipline-specific perspective, with a goal of eventually combining efforts to address a common research problem.	A pharmacologist, health psychologist, and neuroscientist each contribute sections to a multi-authored manuscript that reviews research in their respective fields pertaining to the links between nicotine consumption, changes in brain chemistry and caloric intake induced by nicotine, and physical activity levels.
Interdisciplinarity	Interdisciplinarity is an interactive process in which researchers work jointly , each drawing from his or her own discipline-specific perspective, to address a common research problem.	A pharmacologist, health psychologist, and neuroscientist conduct a collaborative study to examine the interrelations among patterns of nicotine consumption, brain chemistry, caloric intake, and physical activity levels. Their research design incorporates conceptual and methodologic approaches drawn from each of their respective fields.
Transdisciplinarity	Transdisciplinarity is an integrative process in which researchers work jointly to develop and use a shared conceptual framework that synthesizes and extends discipline-specific theories, concepts, methods, or all three to create new models and language to address a common research problem.	A pharmacologist, health psychologist, and neuroscientist conduct a collaborative study to examine the interrelations among nicotine consumption, brain chemistry, caloric intake, and physical activity levels. Based on their findings, they develop a neurobehavioral model of the links among tobacco consumption, brain chemistry, insulin metabolism, physical activity, and obesity that integrates and extends the concepts and methods drawn from their respective fields.

Stokols, D., et al. (2003). "Evaluating [TD] science." *Nicotine & Tobacco Research*, 5 (Suppl. 1), S21–S39.

Core definitions and citations: <http://research.wayne.edu/idre/Definitions.php>

Multidisciplinarity juxtaposes, adding breadth and available knowledge, information, and methods. Disciplinary inputs speak as separate voices in an encyclopedic alignment, ad hoc mix, or mélange of identities.

Interdisciplinarity integrates separate disciplinary data, methods, tools, concepts, and theories in order to create a holistic view or common understanding of a complex issue, question, or problem.

- Consulting and partnering modes, not multidisciplinary contracting of services
- Coordinated and collaborative inputs and organizational framework
- Formation of a new community of knowers with a hybrid interlanguage
- Generation of new insights, perspectives, relationships, revised hypotheses.

Transdisciplinarity transcends the narrow scope of disciplinary worldviews through overarching synthesis, such as systems theory, sustainability, and concept of 'transdisciplinary science' in cancer research as "transcendent interdisciplinary research."

* Nash, J. M. (2008). "Transdisciplinary training: Key components and prerequisites for success." *American Journal of Preventive Medicine*, 35, S133–S140.

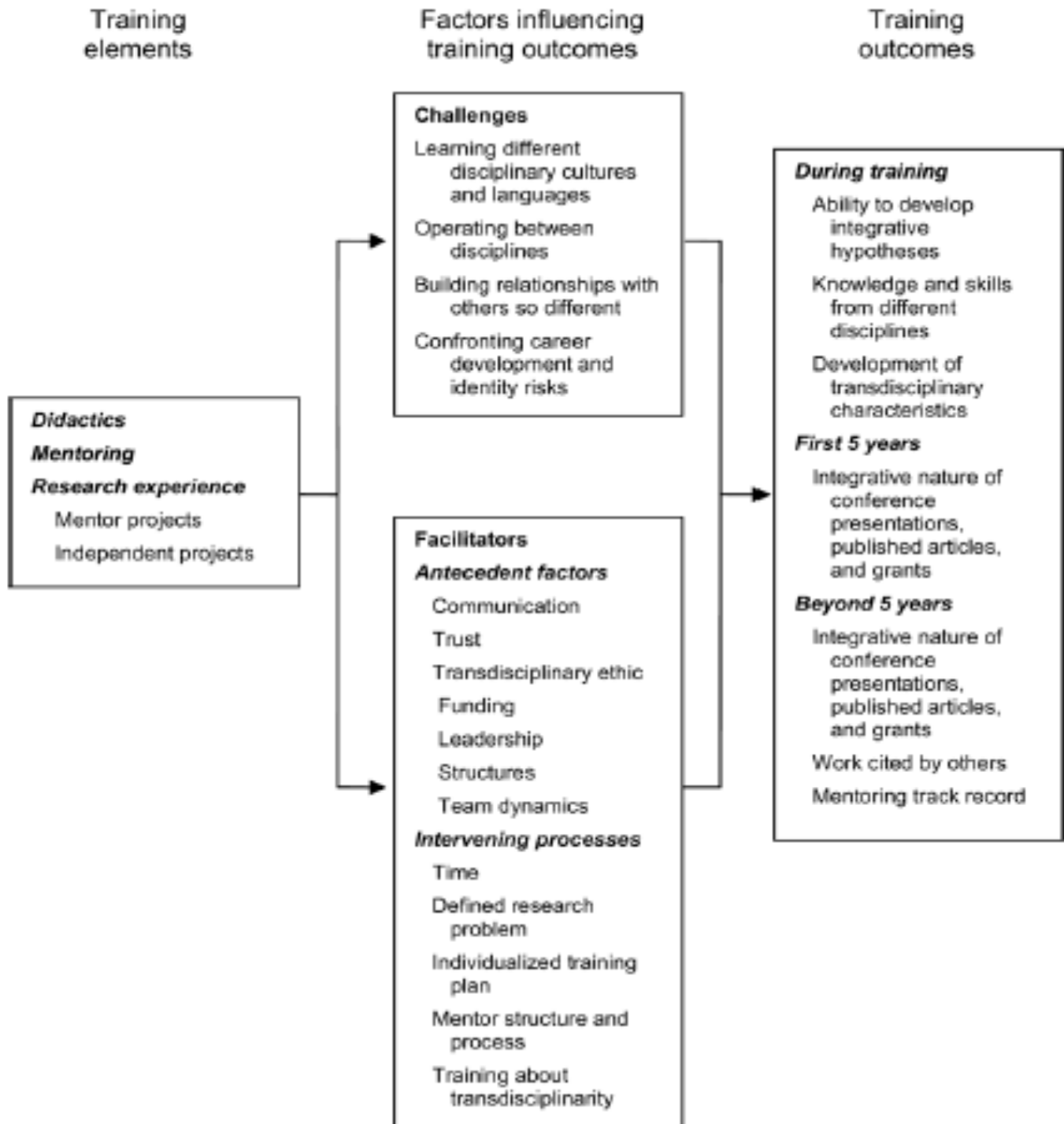


Figure 1. Transdisciplinary training elements, facilitating and challenging factors, and outcomes

* Nash, J. M. (2008). "Transdisciplinary training: Key components and prerequisites for success." *American Journal of Preventive Medicine*, 35, S133–S140.

Table 2. Components of an individualized training plan

- I. Trainee
 - II. Programmatic research objective
 - III. Mentoring team
 - A. Primary mentor
 - B. Secondary Mentor 1
 - C. Secondary Mentor 2
 - D. Advisor
 - IV. Competencies to attain
 - A. Transdisciplinary training and research process
 - B. Content knowledge (Discipline 1, Discipline 2, Discipline 3)
 - C. Research methods (Discipline 1, Discipline 2, Discipline 3)
 - D. Manuscript writing
 - E. Grantsmanship/grantwriting
 - F. Research ethics
 - V. Methods to attain competencies
 - A. Didactics
 - 1. Courses
 - 2. Seminars
 - 3. Journal clubs/brown bags
 - B. Mentored research experiences
 - 1. Mentor projects
 - a. Primary mentor project (project aim, trainee role)
 - b. Secondary Mentor 1 projects (project aim, trainee role)
 - c. Secondary Mentor 2 projects (project aim, trainee role)
 - 2. Independent research projects (project aims, trainee roles)
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Table 1. Characteristics consistent with the transdisciplinary ethic

Openness and respect for different disciplinary approaches
Desire to work in collaborative teams involving multiple disciplines
Broad-gauged contextual thinking
Interest in using multiple methodologic tools
Intellectual curiosity and willingness to take intellectual risks
Tolerance for uncertainty
Self-assuredness and non-defensiveness when not knowing
Assertiveness in seeking clarification
Optimism, tenaciousness, and willingness to operate without clear, immediate rewards
Ability to lead and foster mutual respect and trust in others

Gebbie, K. M., et al. (2008). "Training for interdisciplinary health research defining the required competencies." *Journal of Allied Health*, 37(2), 65–70.

Conduct research

1. Use theories and methods of multiple disciplines in developing integrated theoretical and research frameworks
2. Integrate concepts and methods from multiple disciplines in designing interdisciplinary research protocols
3. Investigate hypotheses through interdisciplinary research
4. Draft funding proposals for interdisciplinary research programs in partnership with scholars from other disciplines
5. Disseminate interdisciplinary research results both within and outside his or her discipline

Communicate

6. Advocate interdisciplinary research in developing initiatives within a substantive area of study
7. Express respect for the perspectives of other disciplines
8. Read journals outside his or her discipline
9. Communicate regularly with scholars from multiple disciplines
10. Share research from his or her discipline in language meaningful to an interdisciplinary team
11. Modify his or her own work or research agenda as a result of interactions with colleagues from fields other than his or her own
12. Present interdisciplinary research at venues representing more than one discipline

Interact with others

13. Engage colleagues from other disciplines to gain their perspectives on research problems
14. Interact in training exercises with scholars from other disciplines
15. Attend scholarly presentations by members of other disciplines
16. Collaborate respectfully and equitably with scholars from other disciplines to develop interdisciplinary research frameworks
17. Author publications with scholars from other disciplines

Reference for Page 5 (below):

Mitrany, M., & Stokols, D. (2005). "Gauging the transdisciplinary qualities and outcomes of doctoral training programs." *Journal of Planning Education and Research*, 24, 437–449.

- a. Every method used is assigned one point. The points are then summed. The higher the number of points, the more inclusive and diverse the research methods.
- b. The points for temporal, spatial, and sociocultural scope are summed. The higher the number of points, the more contextual the research.

Table 1.
Composite scale for assessing the transdisciplinary (TD) qualities of doctoral dissertations.

<i>Component</i>	<i>Level</i>	<i>Rating</i>
Transdisciplinary scope of research topic and its conceptualization		
Degree of TD integration	No TD integration	1
	Some/moderate integration	2
Number of fields brought together in the research	Several fields integrated to create a new model	3
	1 field being cited	1
	2 fields being cited	2
	3 fields or more cited	3
Multidisciplinary composition of the dissertation committee		
Multidisciplinary of the committee	All members of the committee trained in the same discipline	1
	At least two disciplines are represented in the committee	2
	Three or more disciplines are represented in the committee	3
Diversity of research methods^a		
Qualitative versus quantitative	Used one or both	1 or 2
Experiment versus quasi experiment versus nonexperiment	Used one, two or all three	1, 2 or 3
Laboratory versus field observation	Used one or both	1 or 2
Contextual scope of the author's conceptualization of research topic		
Scope ^b	Temporal scope: narrow	1
	Temporal scope: medium	2
	Temporal scope: broad	3
	Spatial scope: narrow	1
	Spatial scope: medium	2
	Spatial scope: broad	3
	Sociocultural scope: narrow	1
	Sociocultural scope: medium	2
	Sociocultural scope: broad	3
Objective versus subjective aspects of the research topic addressed		
	Used either	1
	Brought in both	2
Levels of analysis bridged by the dissertation research		
Number of levels mentioned	The levels of analysis are (1) molecular/cellular, (2) organismic/individual, (3) group/inter-personal, (4) organizational/institutional, (5) community, (6) regional, (7) social/national, and (8) global	1 to 8
Number of analytic levels integrated within the dissertation	If the answer to the previous one was higher the 1	1 to 7
Translation of research concepts, methods, and findings into community problem-solving strategies		
Community problem solving	No mention of it	1
	Some mention of possible policy intervention implication in the future	2
	Proposed policy/intervention that is not carried out	3
	Evaluate an existing one	4
	Propose and evaluate a new intervention/ policy	5

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See also

- Sample definitions and citations for applications: <http://research.wayne.edu/idre/Definitions.php>
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