Mono-, Multi-, Inter-, and Transdisciplinarity (MMIT) Definitions

Introduction

We define different types of collaboration ranging from monodisciplinary to transdisciplinary. The definitions are followed by a discussion about whether or not researchers from different fields agree with the definition and an example on collaborating in the context of climate change.

These definitions are based on our research and work created by past classmates. We have used their work on The Compendium of Interdisciplinarity to reference other definitions. You will see these hyperlinked.

Monodisciplinary Collaboration

Monodisciplinary collaborations take place within one academic discipline. An academic discipline is a branch of knowledge that is defined by a specific set of research areas, questions, assumptions, methods, and worldviews which form common paradigms. Experts in a discipline have an extensive understanding in a particular research area that would not be found in another discipline.

Monodisciplinary collaborations tend to be easier and more common because projects are in one research area. Collaborators in these projects share disciplinary expertise, including a shared disciplinary language and ideas about how to do good research. Disciplinary research contributes to studies within the discipline and furthers the depth of knowledge.

Disciplines typically:

- Focus on one particular object of research
- Have a distinct set of specialized knowledge that identifies core features of the research object and is not shared with other disciplines
- Organize their specialized knowledge using their unique theories and concepts
- Speak a technical language with terms that are used in discipline-specific ways
- Use discipline-specific research methods
- Are formally recognized as professions and in institutions such as universities and colleges

Definition Variation

Experts from different disciplines agree with the definition of monodisciplinarity.

Climate Change Example

An example of a monodisciplinary collaboration about climate change would be a team of biologists who study the effects of climate change on geese migration patterns.

Multidisciplinary Collaboration

Multidisciplinary collaborations occur when experts from different disciplines work together on a project without integrating their concepts or methods. The disciplinary experts value the contributions of the other collaborating disciplines. Each expert makes their contribution only using their own disciplinary perspective. Those contributions are brought together after the **monodisciplinary** research is completed. As a result, a new *method* of understanding does not emerge. Instead, contributions are made with an understanding from multiple disciplines. The result of multidisciplinary collaborations is like looking at a picture from multiple lenses.

Multidisciplinary projects are advantageous because they use diverse disciplinary perspectives. Multidisciplinary collaborations can occur relatively quickly because collaborators work from their own field and do not need to use the paradigms and methods of their collaborators.

Definition Variation
The definition of multidisciplinary collaboration tends to be agreed upon between different researchers. The key elements include respecting disciplinary boundaries and having integration occur at the end of the collaboration.

Climate Change Example
An example of a multidisciplinary collaboration about climate change would be a team of marine biologists, political scientists, and meteorologists who compare their findings on blue whale populations, poverty rates, and global temperature rise. Their collaboration occurs after their original research.

Interdisciplinary Collaboration

Interdisciplinary collaborations bring together the knowledge, insights and methods of multiple disciplines at the beginning of the collaboration. Perspectives from multiple disciplines create the basis of the interdisciplinary work. However, just drawing on different disciplines does not make a project interdisciplinary; it must also integrate insights and methods from the disciplines.

In an interdisciplinary project, collaborators discuss how they work within their home disciplines and attempt to find common ground for the particular project. An interdisciplinary project creates a unique perspective that wouldn't be possible with knowledge from only one discipline. In interdisciplinary work, even though knowledge from different disciplines is brought together to create new perspectives, each expert functions as a member of their own respective discipline. The result of the project will be more than the sum of its parts.

Definition Variation
For the most part, researchers agree on the definition of interdisciplinary collaboration. However, there has been some disagreement about who counts as an expert, and which experts can contribute in interdisciplinary collaborations.

An interactional expert (IE) can 'speak the technical languages' of multiple fields, but do not contribute to the development of the fields themselves. In some definitions of interdisciplinary collaborations, the contributions of IEs are recognized, and in others, they are not. Regardless, it is important in interdisciplinary collaborations for all collaborators to have an understanding of the language, methods, and assumptions.

Climate Change Example
An example of an interdisciplinary collaboration about climate change would be a team of marine biologists, political scientists, and meteorologists who develop a research project on the effects of global temperature rise on coastal economies. They integrate their own methods early in the project development.

Transdisciplinary Collaboration

Transdisciplinary collaborations transcend disciplinary boundaries. The research areas, questions, methods, and expertise are created for a specific problem by the collaborators. Transdisciplinary projects focus on solving real world problems. Collaborators can include project stakeholders from outside of academia.

When transdisciplinary collaborations are successful, new methodologies, understandings and theoretical frameworks emerge. Transdisciplinary collaborations are the most time consuming and work intensive because they require collaborators to build everything uniquely for the project. That being said, they are the most helpful in solving complex problems.

Definition Variation
Like in interdisciplinary collaborations, the definition for transdisciplinarity does not agree on who can contribute to the research. Some include professional experts outside of academia who consult on the solution, whereas others restrict contributions to researchers.

Climate Change Example
An example of a transdisciplinary collaboration about climate change would be a team including marine biologists, political scientists, meteorologists, and fishermen who are tasked with solving the economic crisis in coastal populations due to lowering global temperatures and salmon populations. The team creates a unified method to solve the problem.

Comparisons

Analogy

We have found it helpful to relate the different models of collaboration to different foods! This idea came from a paper by Nissani titled, *Fruit Salads and Smoothies: A Working Definition of Interdisciplinarity*.

Monodisciplinary: an apple
Multidisciplinary: a fruit bowl
Interdisciplinary: a fruit salad
Transdisciplinary: a smoothie

Chart

The levels of collaboration can be presented in increasing levels of integration from monodisciplinary to transdisciplinarity. Other common features are compared below.

	Monodisciplinary	Multidisciplinary	Interdisciplinary	Transdisciplinary
Level of Integration	N/A	None. Knowledge will be compared, but not integrated.	In depth. The purpose of the research is to bring together existing knowledge in order to create new knowledge.	The highest level of integration. This work transcends disciplinary paradigms.
When integration occurs	N/A	Different disciplinary perspectives are brought together at the end of the collaboration.	At the beginning of the collaboration.	At the beginning of the collaboration.
Disciplinary location	Within the discipline.	Within the respective disciplinary boundaries.	At the disciplinary boundaries.	Outside the disciplinary boundaries
Extent assumptions and methods are changed	Not at all. All work is done within the discipline's	Not at all. All work is done within the different disciplines'	Partially. Collaborators will discuss their methods and	A significant amount. Collaborators may work within

	paradigm.	paradigms.	paradigms and choose what fits the research the best.	a new paradigm and are forced to create new methods and address new assumptions.
Who are the experts?	Researchers trained in the discipline.	Those coming from each of the disciplines are experts in their own discipline.	Those coming from their own disciplines and those with interactional expertise.	Those coming from their own disciplines, those with interactional expertise, and stakeholders in the project outside of academia.
Who is the new knowledge for?	Researchers within the same discipline.	Researchers and those interested in cross-disciplinary research.	Researchers and those interested in cross-disciplinary research.	Researchers interested in cross-disciplinary research, people addressing real-world problems in which the research will support.

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