

Transdisciplinary Research - A Paradigm Shift in Research Eco-System

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Abstract

Transdisciplinarity is not a vehicle that we deploy to stay alive or accomplish our projects. It is a way of being alive. It counsels us to revitalize our understandings, to rearrange our prejudices, to undermine the very knowledge that gives us a presumptive leg up of expertise on others, to seek to recombine one's "can't help", and to decentre oneself and seek the marginal. – McDonald (2000)

Global Community of academicians and researchers have entered a new era characterized as transdisciplinary research practices. Over the last few decades, Transdisciplinarity has grown rapidly in medical/health research, environment research, policy research, sustainability research, social research, and educational research. The cumulative impact of transdisciplinary perspective and innovations is a new paradigm shift in research. The primary focus of this article is on Transdisciplinarity research about research questions and design.

Keywords: Continuum, Research design, Questioning paradigm, Genealogy, Fusion

Introduction

Herbert Simon, Nobel Prize recipient has rightly remarked Disciplines, like nations, are a necessary evil that enables human beings of bounded rationality to simplify the structure of their goals. But parochialism is everywhere, and the world Sorley needs international and interdisciplinary travelers who will carry new knowledge from one enclave to another.

The origin of the term "Transdisciplinary" can be traced to the early 1970s and the first international conference on interdisciplinarity (Klein et al.2001). Jean Piaget and Erich Jantsch each pioneered the theoretical conceptualization of Transdisciplinarity. The concept of Transdisciplinarity is attributed to Piaget, who believed that "the maturation of general structures and fundamental patterns of thought across fields would lead to a general theory of systems or structures" (Klein 2004, 515). Jantsch is also credited as one of the first proponents of transdisciplinary. He defined Transdisciplinarity as "the coordination of all disciplines and interdisciplinary in the education innovation system based on a generalized axiomatic and an emerging epistemological pattern (Jantsch 1972, 106).

Transdisciplinarity is an approach to conducting research that involves synergistic collaboration between two or more disciplines with a high level of integration between the disciplinary sets of knowledge. Transdisciplinary research practices are an issue – or problem centered and prioritize the problem at the center of research over discipline-specific concerns, theories or methods. Transdisciplinary research is responsive to public needs. Methodologically, transdisciplinary research follows responsive or iterative methodologies, requires innovation, creativity, and flexibility, and often employs participatory research design strategies. Transdisciplinarity has the potential to greatly enhance public scholarship. Transdisciplinarity is an approach to conducting research. Transdisciplinarity research practices are issue or problem centered and prioritize the problem at the center of research over disciplines- specifics concerns, theories, or methods.

Transdisciplinarity research is responsive to public needs. Transdisciplinary research transcends disciplinary borders and opens up entirely new research pathways. Transdisciplinarity practices new knowledge building practices. It is also clear that Transdisciplinarity grew out of interdisciplinarity or is a particular thread of interdisciplinarity (Austin et al. 2008) further; Transdisciplinarity presupposes that contemporary social issues and problems can only be understood, and solved if, viewed holistically and not artificially broken down into narrow research purposes that suit different disciplinary lenses. (Herbert Simon, 1978)

Definitions of Transdisciplinarity

Perspectives on Transdisciplinarity vary greatly in the literature, and there is little consensus regarding how to define the term.

According to Krimsky “Transdisciplinarity is the transcendence of disciplines for addressing Meta-questions: the interaction of two or more disciplines for explicating problems; and the combination of methods/techniques theory for several disciplines in the framing or testing of a hypothesis”

Hardon and Colleagues (2008, 29.) set four criteria for Transdisciplinarity research

- ❖ First the focus on the life world problems
- ❖ Second the transcending and integrating of disciplinary paradigms
- ❖ Third participatory research
- ❖ And fourth the search for the unity of knowledge beyond disciplines

Klein (2000, 4). Defined Transdisciplinarity as “a holistic vision: a particular method, concept or theory; a general attitude of openness and capacity for collaboration; as well as an essential strategy for solving complex problems “

Later he further suggests, “Transdisciplinarity vision, which replaces reduction with a new principle of relativity, is transcultural, transnational, and encompasses ethics, spirituality and creativity” (2004, 516).

According to Pohl and Hardon Transdisciplinarity deals with problem fields in such a way that it can:

- ❖ Grasp the complexity of problems
- ❖ Take into account the diversity of lifeworld and scientific perceptions of problems,
- ❖ Link abstract and case-specific knowledge, and
- ❖ Develop knowledge and practices that promote what is perceived to be the common good. (2008,20).

Finerman and his colleagues have explained the concept of Transdisciplinarity in the following way. “Transdisciplinarity as a specific form of interdisciplinarity in which boundaries between and beyond disciplines are transcended and knowledge and perspectives from different scientific disciplines as well as non-scientific sources are integrated ... in Transdisciplinarity research, widely differing forms of knowledge are integrated to produce an overall integral knowledge” (2008, 257).

Major Characteristics:

Transdisciplinarity should address the following types of inquiries. Span of Transdisciplinary research should not be monolithic but it should have a mega span. Hermeneutics plays a vital role in Transdisciplinarity research. It is about construction, over construction, and not reconstruction, not about subjugating any discipline. Productive questioning is needed in Transdisciplinarity research. Knowledge growth, Knowledge potential, and knowledge horizon should be increased. Communicative competence must be part of the Transdisciplinarity inquiry. Reviewing is the core part of Transdisciplinarity. Questions or inquiries, which are gap feelers, should be inquired in the Transdisciplinarity research. Transdisciplinarity inquiry is about knowing the discipline of truth and not the truth of discipline. Creation of System Knowledge, Target knowledge, and transformational knowledge is part of the Transdisciplinarity inquiry.

The D.M.I.T. Continuum:

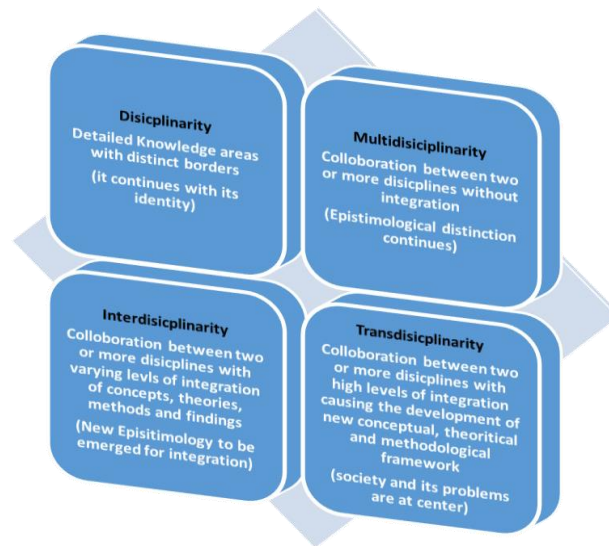


Figure 1 DMIT Continuum

A Comparison of Disciplinarity, multidisciplinary, Interdisciplinarity, and Transdisciplinarity can be understood with the following diagram.

Disciplinarity

Disciplines are detailed knowledge areas with distinct borders. Disciplines have common research objects, questions, methodological tools, and exemplary cases (Greckhamer et al, 2008), each subject continues with its identity. It can be understood from the following diagram.

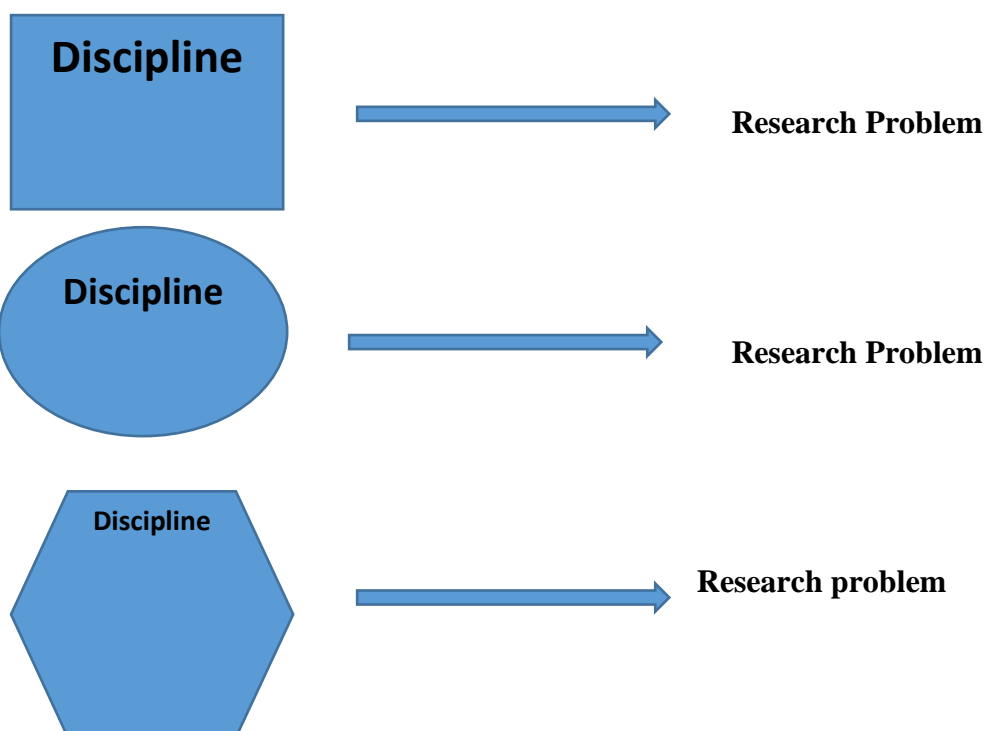




Figure 2 Disciplinary Research

Multidisciplinarity

Multidisciplinary studies a topic from the perspective of several disciplines at one time but does not attempt to integrate their insights. Multidisciplinary approaches tend to be dominated by the method and theory preferred by the home discipline.

Multi-disciplinary approaches to research involve collaboration between two or more disciplines on a research project; however, each discipline maintains its assumptions, values, and methods. In other words, each discipline maintains its autonomy during the collaboration (Wickson, Carew, and Russell 2006) and epistemological distinction continues. The following diagram represents Multidisciplinary research.

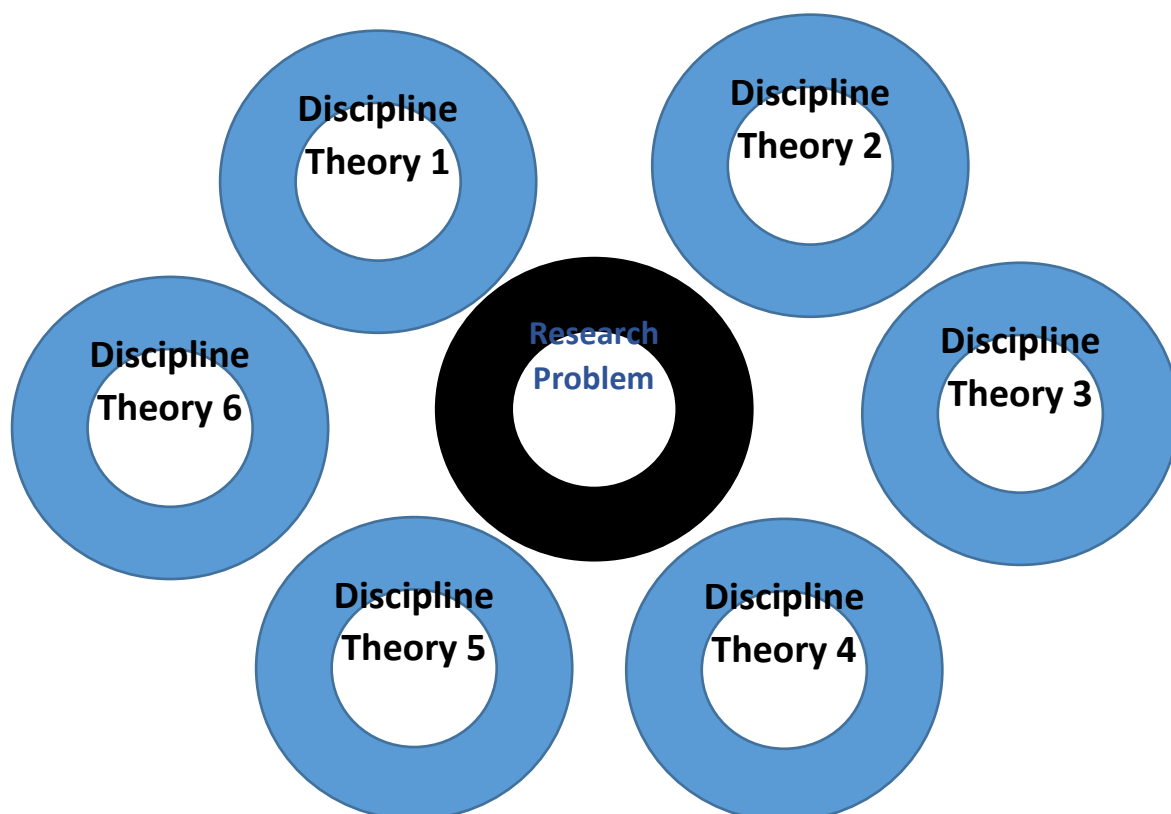


Figure 3 Multidisciplinary Research

There are three important aspects of Multidisciplinarity

1. It studies a topic from the perspective of several disciplines at one time.
2. No attempt to integrate their insight
3. Dominated by the method and the theory performed by the home discipline.

Interdisciplinarity

Interdisciplinary studies a complex problem (including mega ones) by drawing on disciplinary insights (and sometimes stakeholder views) and integrating them. By employing a research process that subsumes the methods of the relevant disciplines, interdisciplinary work does not privilege any particular disciplinary method or theory. Interdisciplinarity approaches to research also involve collaborations between researchers from two or more disciplines. It generally understood that there is a greater level of interaction between the disciplines in interdisciplinarity research; however, it is not surprising that the literature on interdisciplinarity presents a wide array of views on how interdisciplinarity works, and how much interaction and integration is fostered in these partnerships. In interdisciplinarity new epistemology to have emerged for integration and concepts, theories and methods are newly emerged. The concept is depicted in the flowing diagram.

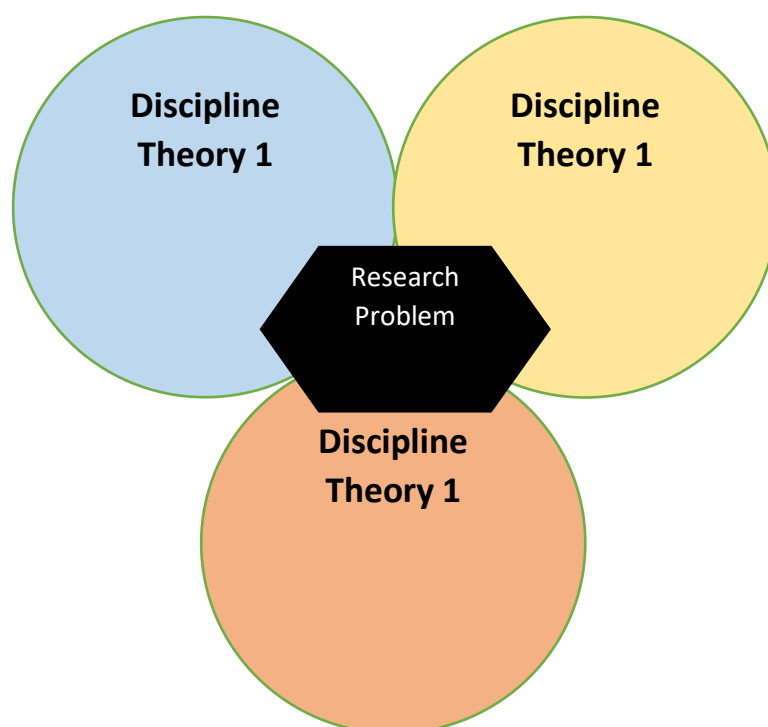


Figure 4 Interdisciplinary Research

There are three important aspects of interdisciplinarity studies

1. Complex problems by disciplinary insights and integrating them
2. Its subsumes the method of relevant disciplines
3. Nonprivilege to any single disciplinary method or theory

Transdisciplinarity

Transdisciplinary is best understood as a type of interdisciplinarity that stresses team research, a case study approach, and especially integrating not just across disciplines but also beyond the academy.

It is articulated and non-articulated knowledge in disciplinary and non-disciplinary structure. Society and its problems are at the center. The public domain is operated in Transdisciplinary research which is the basic essentiality of it. Following are the major points to understand the concept of Transdisciplinarity

- ❖ Insight generated outside the academy
- ❖ A team approach to research
- ❖ Active involvement of participants in research design

The case study over and above interdisciplinarity

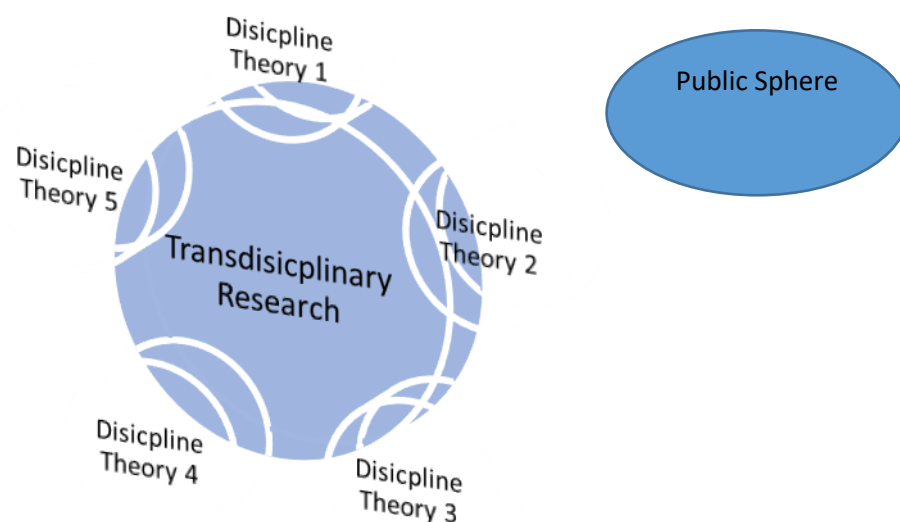


Figure 5 Transdisciplinarity Research

Genealogy of Transdisciplinarity

Interdisciplinarity is the next stage in the evolution of Disciplinarity via Multidisciplinarity en route to Transdisciplinarity. This evolution in knowledge is not just about content, methods, and techniques but is a morphogenetic one as well. “A Process of answering a question, solving a problem, of addressing a topic that is too broad or complex to be dealt with adequately by a single discipline or profession” the above-mentioned quote concludes two points

The first is Popperian one just as science commences from problems and not theories, interdisciplinarity and interdisciplinary fields emerge out of the attempt to solve problems and are retrospectively constituted as interdisciplinary fields.

Second is not just that complexity of science concurrently emerges with interdisciplinarity and in the latter half of the 20th century. Both the complexity of science and interdisciplinary field co-evolved.

Interdisciplinarity was an outcome of the limitations and incapability of a single discipline to solve problems. According to François Taddai, “No disciplines know more than all disciplines”. It concludes that growth of knowledge is transgressive, In Transdisciplinarity, growth of knowledge is an innovation within an iterative praxis and emerges from a critique of contemporaneous scientific and social theory, confronting their methods, scope, and borders and in this sense, it is transgressive – it keeps gatekeepers of the orthodoxy on their guard. Dictionary meaning of transgressive nature is

1. A Violation of law, command or code
2. To go beyond the limits imposed by laws, command, and codes.

According to the author of rethinking science, Transdisciplinarity is therefore about transgressing boundaries institutions still exist and have a function. Because interdisciplinarity compels to transgress laws, command and codes of discipline and institution.

Following are the essential components for the formation of Transdisciplinarity

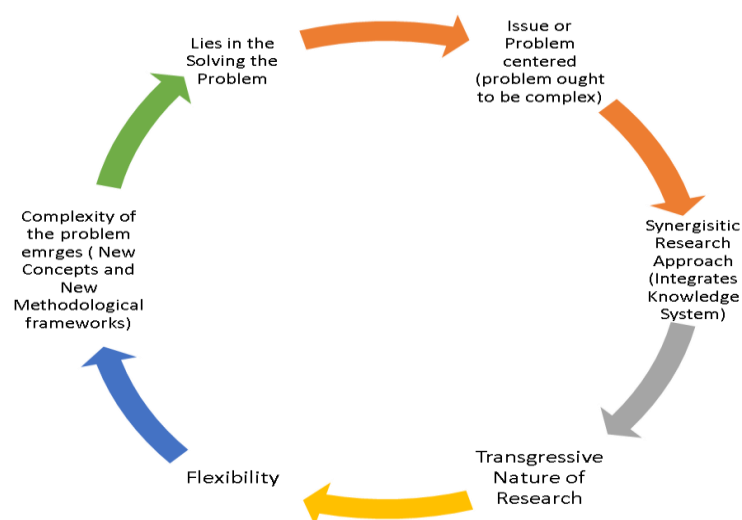


Figure 6 Formation of Transdisciplinarity Research

Questions, which can be part of Transdisciplinary research

Academically hidden thrust for emancipation should be part of transdisciplinary research. Emancipatory research is in the structure of it. Horizon and fusion are made to solve the problem and to overcome limitations. It has a transcendental thrust of knowledge. Interdisciplinarity opens a necessity of the future of horizons for knowledge where the fusion of horizon is and transdisciplinary opens a necessity of the future of horizon for knowledge and where fusion and horizon accepted, but it is for betterment or emancipation or some value creation/ value management. Fusion has intentionality; emancipation is the core of transdisciplinary research. Transdisciplinary research inquiry is based on fusion to which are addressed for/to the public. It has a referent point. It refers to something. The problem is at the top of the research; therefore, it is problem-based research. Destabilization of traditional position is a common phenomenon between interdisciplinary research and transdisciplinary research and obsolete practices are a common factor. The rationale of Transdisciplinary research is

- ❖ the complexity of the problem
- ❖ The complexity of the existing problem which compels to transcend disciplines with public participation.

Therefore, Transdisciplinary research is

Public knowledge/ Public Understanding + Interrelated disciplinary Collusion/ fusion

The following are the types of questioning/ inquiry in transdisciplinary research.

- ❖ What is the problem area, and decide how to read out the complexity of the area?
- ❖ What is the status of public knowledge, public ignorance?
- ❖ How fusion can be made (fusion of discipline)
- ❖ What is the reason for going for a fusion of discipline?
- ❖ How to accommodate Public knowledge and interdisciplinary knowledge or fusion of both
- ❖ How both can be in a communicative structure
- ❖ How to cover biases of two domains and how to control it.
- ❖ Do we require new epistemology to be constructed for new knowledge construction?
- ❖ Is it a problem-solving device can it become an academic enterprise?
- ❖ Is it possible to create new epistemology to create fusion?
- ❖ What should be the methodology for fusions of horizons
- ❖ Does it require or have rational, critical, and creative enterprise?
- ❖ How to make a distinction between knowledge and non-knowledge
- ❖ Is it making a distinction between public research and non-public research?

Who could be the user of Transdisciplinary research?

Primary question is that who could be the user of transdisciplinary research? Can it be a submissive user of Critical and Innovative user or both? Answer to this question is Innovative and critical.

Review of Literature in Transdisciplinary research

A literature review is a search and evaluation of the available literature in your given discipline or chosen topic area. It forms the state of the art concerning the subject or topic you are writing about.

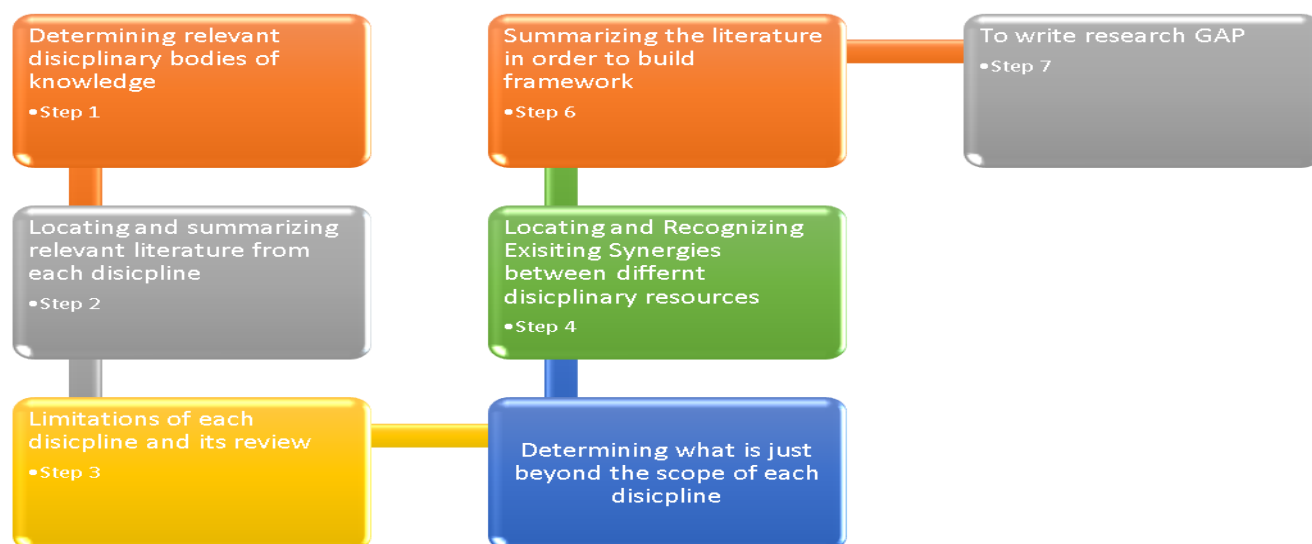
A literature review has four main objectives:

- ❖ It surveys the literature in your chosen area of study
- ❖ It synthesizes the information in that literature into a summary
- ❖ It critically analyses the information gathered by identifying gaps in current knowledge; by showing limitations of theories and points of view; and by formulating areas for further research and reviewing areas of controversy
- ❖ It presents the literature in an organized way

A literature review shows your readers that you have an in-depth grasp of your discipline; and that you understand where your research fits into and adds to an existing body of agreed knowledge.

A literature review can also be practiced following way.

- ❖ Demonstrates familiarity with a body of knowledge and establishes the credibility of your work;
- ❖ Summarises prior research and says how your project is linked to it;
- ❖ Integrates and summarises what is known about a subject;
- ❖ Demonstrates that you have learnt from others and that your research is a starting point for new ideas.



Above methodology for reviewing existing literature is widely used in disciplinary, interdisciplinarity and Multidisciplinarity. However, the methodology for conducting review of literature in transdisciplinary research must require following steps.

Figure:7 Process of reviewing literature in Transdisciplinarity research

Research Design in Transdisciplinary research

The universe of Data for Transdisciplinary Research

We have seen many techniques in the case of Multidisciplinary and Interdisciplinarity research. In transdisciplinary research, also there are two different ends.

Receiving end and creative end. Receiving end helps to collect data from various disciplines while receiving data-creative end helps to create data. Data generation in the field of value, when the phenomena are subjective, in such case what is to be done?

- ❖ Qualitative data is to be used for this purpose.
- ❖ What about Complexity – How it can be addressed
- ❖ What is the Order and disorder of knowledge?

Method of Research in Transdisciplinary Research

The method is the tool of knowledge. It presupposes two things

- ❖ The object of knowledge and
- ❖ Method of knowledge (Ways of doing – Ways of Knowing)

Ways of knowing are the tools of knowledge, through which knowledge of the object is made possible.

Objects can be divided into two parts

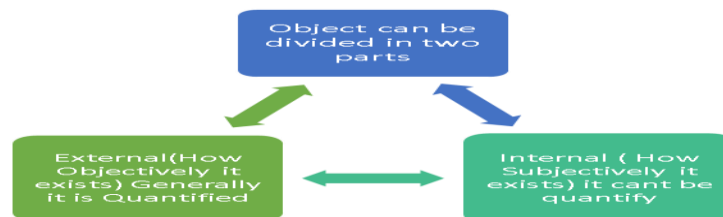


Figure 8 Objects Division

The above figure represents, Objective knowledge can be quantifiable; however, subjective knowledge cannot be quantifiable. Quantification does not apply to the subjective domain; the qualitative method is the ground for the subjective domain. When things cannot be measured or can be seen such reasons and causes of that can be identified but cannot be quantified.

Causality can be identified but it cannot be quantified. Therefore, the qualitative method is also needed. There is a difference between Look and see. The look is sensing and seeing is interpreting. Looking is objective it is mere sensing while seeing is subjective it is interpreting.

To look is to sense and to see is to interpret

Through seeing, one can provide meaning to an object. We can say seeing is constructing meaning. All-seeing is interpreting. Therefore, we require the method of interpretation, which is known as hermeneutics. It is a science of creating meaning. To give meaning is to interpret an object.

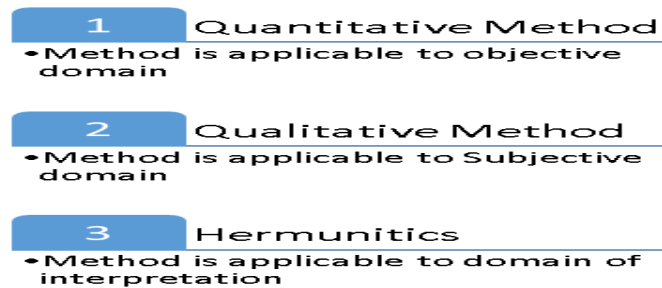


Figure 9 Method and Application

The domain of the problem, which contains objective, subjective, and interpretive. As the problem domain is non-singular, that is the reason why we require all three methods in transdisciplinary research, Complexity of the domain must be answered in transdisciplinary research, which is the rationale of research of transdisciplinary research. Only one frame of technology would not be sufficient to analyze, interpret, and to solve. Therefore, bordering of the discipline should not be considered as Sacrosanct. Transdisciplinary research must respect the fusion of various disciplines to solve a complex problem. Therefore, the Fusion of the horizon is mandatory in transdisciplinary research.

For conducting effective research by using a transdisciplinary, approach the following points must be followed.

- ❖ To set the problematics
- ❖ Construction of a new epistemological fusion is necessary.
- ❖ The singular claim must be suspended
- ❖ Functionary agents – State and its functionaries, various disciplines, and the public ought to develop Comprehensive fusion.
- ❖ The cohesive structure is created by blending functionary agents, which will enable them to perform transdisciplinary research.
- ❖ The fusion of discipline should be addressed to solve the problem.

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