

Interdisciplinary Education and Research: An Overview

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Abstract

The purpose of this paper is to introduce areas of Interdisciplinary research. This type of research involves different disciplines in order to enhance the understandings of particular issues, or offer an original theory or concept. Over the last several decades new approaches to research and academia have emerged that allow for more flexibility, such as the interdisciplinary approach. The paper has its focus on the attempt in imparting knowledge to the students regarding Interdisciplinary research. The paper would help in understanding of the concept, areas and approaches of Interdisciplinary research and its progress & status at high-level.

KEYWORDS: Interdisciplinary, education, research

Interdisciplinary research allows the students to study by making connections between ideas and concepts across different disciplinary domains. Within this, the students learn to apply the knowledge gained in one discipline to another in enhancing the learning experience.

“Interdisciplinary research is a mode of research by teams or individuals that integrates information, data, techniques, tools, perspectives, concepts, and/or theories from two or more disciplines or bodies of specialized knowledge to advance fundamental understanding or to solve problems whose solutions are beyond the scope of a single discipline or area of research practice” (National Academies' report)

The current need for interdisciplinary education and research-

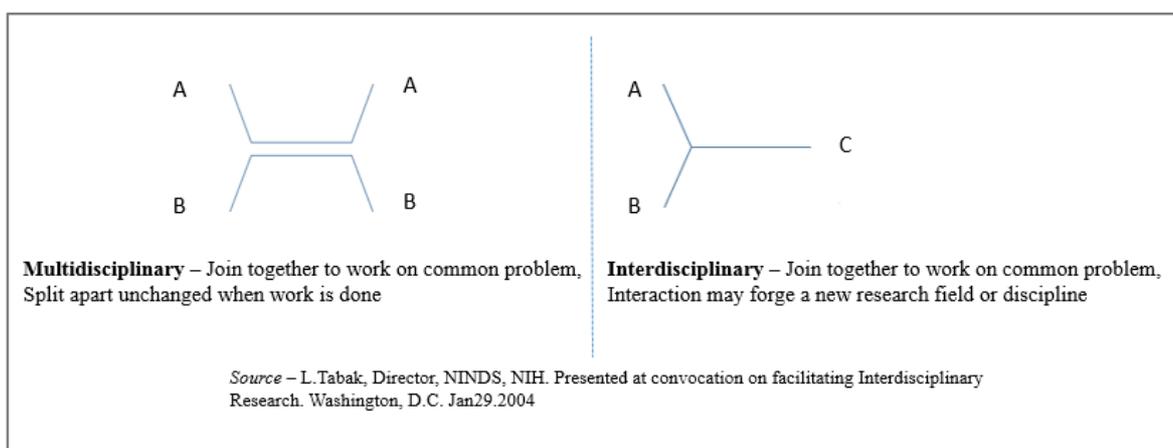
With little exposure to an interdisciplinary educational approach, students may lack the ability to incorporate an interdisciplinary approach later on in their research careers. At some level, interdisciplinary training is being accepted. However, these opportunities are very limited. Due to the lack of such training, students are deprived of knowledge pertaining to other disciplinary domain. Thus, unless students are registered in courses that cut across disciplines, they may well receive little or no training in conducting interdisciplinary research.

The significance of interdisciplinary education and research -

Conventionally, the research students gain specific training in chosen discipline and hardly interact with students & teachers of other disciplines. Traditional academic disciplines covers particular areas of knowledge and try to focus on those domain area as deeply as possible. However interdisciplinary focuses on how these disciplinary understanding can be merged. Interdisciplinary study leverages in acquiring concepts and methods developed through disciplinary research and new explanation of intricate subjects. Largely, interdisciplinary research creates awareness that no individual discipline can create on its own.

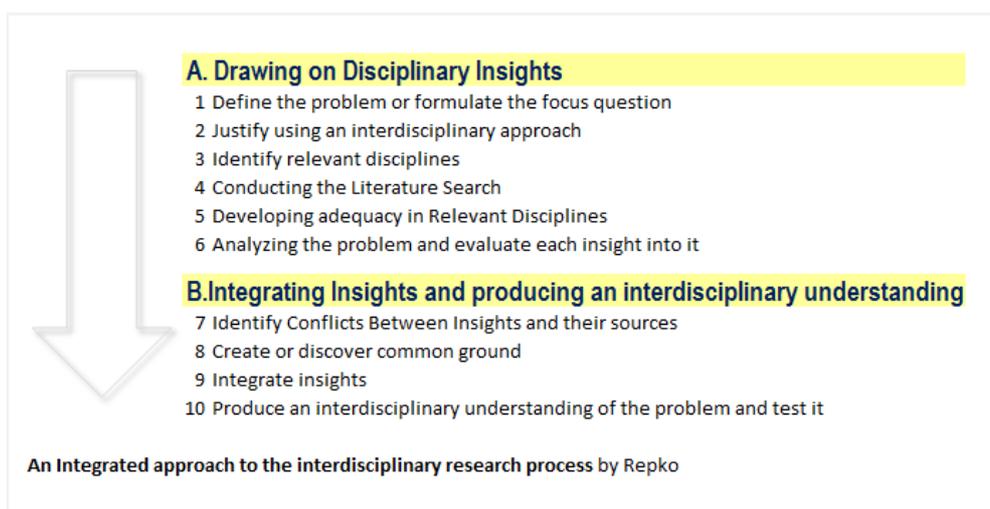
In *Interdisciplinary: History, Theory, and Practice*, Julie Thompson Klei stated the need of interdisciplinary study as,

1. To answer complex question
2. To address broad issues
3. To explore disciplinary and professional relations
4. To solve the problems beyond the scope of any discipline
5. To achieve unity of knowledge whether on a limited or a grand scale.



According to the experts, the research is truly interdisciplinary when it is not just presenting two disciplines together to one product but rather it is an integration and synthesis of ideas and mythologies. The above diagram shows the real integration of two disciplines into substantial new research discipline.

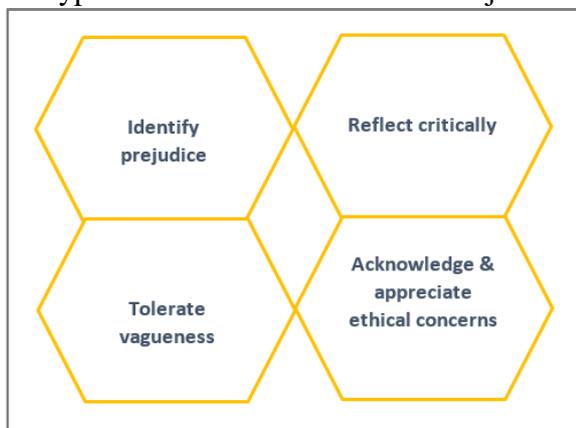
Processes for creating interdisciplinary research -



Allen F. Repko has developed guidelines based on earlier works such as Newell (2007) and Szostak (2002), steps those need to perform interdisciplinary research. These guidelines could be flexible according to interdisciplinary research topic, also be iterative as the researchers may revisit earlier stages while performing later stages.

Approaches in interdisciplinary education –

Interdisciplinary Teaching Supports Students to develop knowledge, insights, problem solving skills, self-confidence, self-efficacy. Interdisciplinary education and study promotes realization of these objectives.



Identify prejudice - It help students manage to overcome preference towards pre-defined concepts. Having said that it supports students to understand and develop the ability to integrate concepts and ideas from these disciplines into a broader conceptual framework of analysis. When students keep apart their pre-existing ideas, they learn facts more freely and are more flexible in adopting new methodologies that promote interdisciplinary understandings.

Reflect critically - Interdisciplinary teaching benefits critical thinking and cognitive development. According to the experts, Interdisciplinary research help students to enhance their cognitive abilities - brain-based skills and psychological processes. Allen Repko (2009) identifies a number of cognitive attributes that interdisciplinary learning nurtures. It helps students to achieve standpoints to develop the capacity to understand multiple viewpoints. This suggest a wider understanding of the problem under investigation. It also improve declarative knowledge and procedural knowledge. Within this, students learn to integrate conflicting insights from other disciplines.

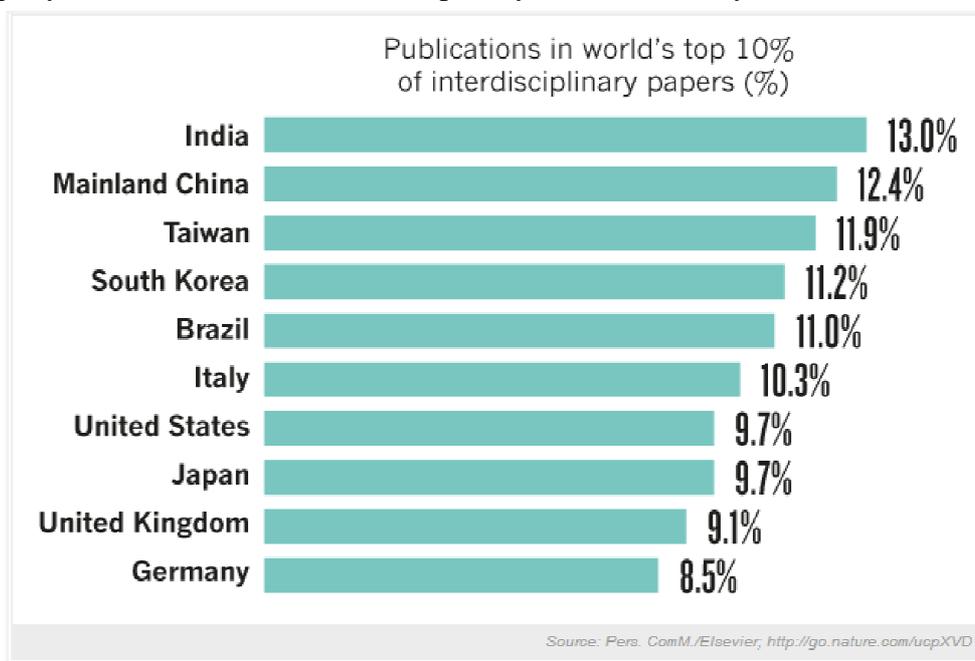
Tolerate or Embrace Ambiguity - Interdisciplinary education helps students to understand a reason of conflicts commonly arise over; the causes and effects of an issue. Interdisciplinary instruction supports the concept that ambiguity results from alternative perspectives on issues that are advanced by different disciplines rather than a shortcoming of a specific discipline. Thus, students obtain a better understanding of the complexity of problems of interest and the associated challenges of resolving them.

Acknowledge and appreciate ethical concerns - Interdisciplinary instruction also helps students understand that ethical views to most issues of the concerns in the discussion. Ethical considerations involve moral concerns which means accounting for insights of right vs. wrong, good vs. bad. In addition to that it encourages the integration of ideas from related disciplines including moral philosophy.

Implementation of Interdisciplinary research program -

Considering the benefits of interdisciplinary research, many educational institutions have started encouraging researchers for it. And they have seen prolific outcome of the programs. The Georgia Institute of technology introduced interdisciplinary program in the 1980 for different departments by collaborating them into new building (named IBB). The IBB building has a central atrium, core facilities, a vivarium for animal research, cafe to promote interaction, monthly social events to build community. Many other researchers fascinate its interdisciplinary environment, which has created communities of researchers who easily self-assemble into productive teams. Such models were implemented across the globe later and proved to be most emerging concepts in many countries.

Recent, a 2015 study by researchers with the publisher Elsevier defined interdisciplinary papers as those that research journals that are rarely cited together. The report is considered only countries that routinely publish more than 30,000 papers per year to find the most interdisciplinary countries for a year 2013.



The situation in India for interdisciplinary research is changing as innovative research demands knowledge of multidisciplinary areas. Similar, data analysis on interdisciplinary research works indicates that awareness about interdisciplinary research is gaining importance in recent years. According to the data published by Richard Van Noorden in his research paper, interdisciplinary as a word in a title has fluctuated, perhaps reflecting the priorities of funders, but the twenty-first century saw that proportion reach an all-time high.

IISc, Bengaluru is the first in-situation in India to recruit faculty in multidisciplinary areas. Following that pioneering trend most of universities have set up infrastructure facilities as a common pool to cater to the needs for inter-and cross-disciplinary research similar to Europe and USA in order to promote interdisciplinary research.

When it comes to a number of India in submission of interdisciplinary papers, those are impressive, also institutes are showing interest in introducing interdisciplinary studies. In future more innovative ideas and its outcome are expected in critical thinking, communication, creativity, pedagogy and collaborative ways of academia with the use of interdisciplinary techniques.

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