

# Redefining Learning: Interdisciplinary Curriculum in Higher Education

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## Abstract:

This research paper examines the rise of interdisciplinary curricula in higher education, focusing on its benefits and challenges. It underscores the shift from traditional disciplines to integrating knowledge across fields, which enhances critical thinking, creativity, and problem-solving by addressing real-world issues holistically. The study highlights how interdisciplinary approaches foster collaboration and a broader understanding of societal challenges. However, it also acknowledges challenges, such as faculty resistance, the need for institutional support, and the difficulties in designing and assessing such courses. Through literature reviews and case studies, the research provides insights and practical recommendations for educators, administrators, and policymakers aiming to implement interdisciplinary education. The study ultimately argues that interdisciplinary curricula better prepare students for modern complexities by promoting a more interconnected, holistic approach to learning.

**Keywords:** Interdisciplinarity, Integration, Curriculum, Learning, Higher education

## I. INTRODUCTION

Disciplines form the core structure of academic departments and curricula in higher education, serving as the foundation for major fields of study and the training of future faculty. Upon completing their doctoral degrees, most faculty members continue reinforcing this disciplinary divide, perpetuating the notion that disciplines are fixed and normative. This structure, rooted in the specialization and diversification of knowledge over the past two centuries [1], has enabled institutions to focus resources on segmented units. While disciplines have evolved—such as the shift from home economics to family and consumer sciences or the creation of physical education from multiple fields—the overarching structure remains dominant. This system offers benefits, including concentrated resources, scholarly communities, and alignment between student education and industry [2].

However, interdisciplinary curricula challenge the limitations of disciplinary structures. Interdisciplinary efforts in colleges and universities

encourage knowledge sharing across boundaries, offering students opportunities to engage in diverse scholarly conversations [3]. Traditional disciplinary compartments can hinder the exploration of connections between areas of knowledge and the resolution of complex problems, such as climate change or poverty. This paper discusses the history and definition of interdisciplinary curricula and examines their relationship to disciplines, learning outcomes, and the challenges of managing interdisciplinary programs.

## II. DEFINING INTERDISCIPLINARY CURRICULA

The conversation around interdisciplinary curricula in higher education begins by defining key terms, including crossdisciplinary, multidisciplinary, and transdisciplinary approaches. These differ in the level of interaction, integration, and the presence of a guiding theme or problem [4]. Crossdisciplinarity refers to borrowing concepts from one discipline to enhance another, without integrating the fields. For instance, political science concepts may be used to analyze literature without merging the two

disciplines [5]. Multidisciplinarity involves juxtaposing disciplines without synthesizing them, such as examining geopolitical conflict from social, economic, and religious perspectives without integrating these views [6].

Transdisciplinarity goes beyond individual disciplines, focusing on overarching frameworks like systems theory or sustainability, and often involves co-production of knowledge with societal stakeholders [5]. Mode 2 knowledge production, which emphasizes complexity and nonlinearity, exemplifies this approach [7]. Interdisciplinarity, by contrast, involves the integration of knowledge from multiple disciplines to address problems that a single discipline cannot [8]. Campbell's fish-scale model illustrates how interdisciplinary approaches fill gaps between clustered disciplines [9].

Lattuca [10] identified four forms of interdisciplinary curricula:

1. Informed Disciplinarity incorporates insights from other disciplines.
2. Synthetic Interdisciplinarity integrates theories and methods from multiple fields while maintaining distinct boundaries.
3. Transdisciplinarity engages students in real-world tasks that cut across disciplines.
4. Conceptual Interdisciplinarity focuses on frameworks like postmodernism, unrelated to a specific discipline.

Interdisciplinary curricula vary widely across institutions, taking place in traditional structures like interdisciplinary departments or nontraditional settings such as MOOCs or consortia [11]. However, not all programs labeled 'interdisciplinary' achieve true integration, with many remaining multidisciplinary [12]. This diversity reflects the evolving nature of interdisciplinary curricula and the challenges of integrating knowledge across traditional academic boundaries.

### **III. A HISTORY OF INTERDISCIPLINARY CURRICULA**

Curricula in higher education are designed to organize knowledge into courses, reflecting faculty and institutional decisions about how to present knowledge [13]. These designs are influenced by disciplinary communities, institutional priorities, and broader educational systems. As societal needs changed, so did higher education curricula. In the late 1800s, land-grant institutions emphasized science, engineering, and agriculture, while specialized study programs emerged in the mid-1900s [14]. The introduction of the undergraduate major through an "elective system" allowed for disciplinary specialization but drew criticism for sacrificing general knowledge [15].

Debates about general education have continued, with some institutions developing integrative frameworks to foster interdisciplinary skills. Yale pioneered this approach in 1901, introducing core courses across social sciences, natural sciences, and humanities. The University of Chicago followed in the 1930s, creating divisions and gateway courses to promote interdisciplinary learning [16]. These interdisciplinary general education programs prepare students to tackle complex global issues, although many programs remain multidisciplinary.

In the mid-20th century, institutions like the University of Wisconsin at Green Bay, the University of California, Santa Cruz, and Evergreen State College emerged with interdisciplinary missions [17]. Internationally, universities like Linköping in Sweden and Sussex in England also adopted interdisciplinary curricula. However, external factors like state funding and job market demands have sometimes shifted institutional focus away from interdisciplinarity.

The rise of interdisciplinary fields like area studies, gender studies, and race/ethnic studies further transformed academia. Organizations such as the Association for Asian Studies (1948) and the National Women's Studies Association (1977) fostered interdisciplinary collaboration. While interdisciplinary programs are now common, their

structure varies, ranging from departmental specializations to independent schools. Larger institutions often offer more interdisciplinary opportunities, particularly in the humanities and social sciences [18].

#### **IV. THE RELATIONSHIP BETWEEN THE DISCIPLINES AND INTERDISCIPLINARITY**

Academic disciplines are organized into programs, departments, and schools, characterized by unique features like peer review, flagship journals, and professional associations, which maintain research quality and unify knowledge domains [3]. In contrast, interdisciplinary fields often lack these markers, as they are usually in early stages or evolving, making it challenging to define cultural symbols and establish a unified knowledge base or community.

Not all interdisciplinary fields develop at the same rate. For example, molecular biology, emerging from physics, genetics, and chemistry in the early 1900s, is now a recognized discipline. Cognitive science, although newer, spans multiple fields like psychology, neuroscience, and linguistics. Repko and Szostak [19] argue that disciplines evolve by continually adjusting their epistemological foundations and pushing boundaries, making them increasingly interdisciplinary. Frank and Gabler [20] highlight how changes in knowledge domains impact the academic core, rearranging disciplines.

Klein [21] introduces the concept of "federated" disciplines, such as anthropology, where subdivisions like archaeology and cultural anthropology branch into niche areas. Klein also emphasizes that interdisciplinarity fosters a pluralistic academic community, addressing complex social, cultural, and economic issues, and promoting collaboration across fields to address societal needs.

#### **V. LEARNING EXPERIENCES AND OUTCOMES FOR INTERDISCIPLINARY CURRICULA**

Klein [22] identified key elements of the interdisciplinary learning process, including

defining problems, identifying relevant knowledge, developing integrative frameworks, evaluating epistemological concepts, and synthesizing them into interdisciplinary understanding. Defining problems outside disciplinary boundaries can be challenging, as disciplines often disagree on what constitutes a problem. Determining relevant bodies of knowledge is also difficult, given each discipline's unique epistemological approach [23].

Graduate and undergraduate interdisciplinary curricula differ due to prior learning experiences. Graduate students bring deeper knowledge of specific fields, while undergraduates start at a foundational level. Boix Mansill [24] outlined four cognitive processes essential for interdisciplinary work: establishing purpose, weighing disciplinary insights, building integrations, and maintaining a critical stance. These processes guide learners in selecting, integrating, and critically assessing knowledge. Boix Mansilla and Duraisingh [25] provided examples of integrative strategies, such as combining scientific and sociological contexts, using art to explore themes, and developing practical solutions like organ donation strategies.

Graduate interdisciplinary curricula, particularly in STEM, emphasize teamwork and communication. Borrego and Newswander [26] found that successful interdisciplinarians reflect on the integration of disciplinary perspectives, often focusing on systems theory or similar models. Research on interdisciplinary learning in the humanities and social sciences is limited, though interdisciplinary learning is known to foster flexible thinking, cognitive skills, and improved critical thinking [27].

Students in interdisciplinary courses develop unconventional thinking, sensitivity to bias, and enhanced listening skills [8]. These skills emerge from integrating diverse perspectives, encouraging novel thinking and critical assessment of disciplinary assumptions [28]. Interdisciplinary students also connect existing and emerging knowledge in innovative ways [29].

Interdisciplinary courses promote structural

knowledge, helping students relate and organize information, which aids in memory and understanding [30]. Spelt et al. [31] emphasized that balancing disciplinary and interdisciplinary content enhances positive learning outcomes by progressively building a complex knowledge base.

## **VI. LONG-TERM CHALLENGES TO THE ORGANIZATION AND ADMINISTRATION OF INTERDISCIPLINARY CURRICULA**

The organization of interdisciplinary curricula is shaped by institutional context, culture, and history. Duke University stands out as one of the first American research universities to make interdisciplinarity central to its mission, investing heavily in interdisciplinary teaching, research, and service. In contrast, Bard College, rooted in its liberal arts mission, prioritizes interdisciplinary learning for undergraduates, offering unique programs like the first human rights major in the U.S. and a required Citizen Science course to enhance scientific literacy. The availability of human and financial resources also influences interdisciplinary curricula, with some focused on integrating knowledge across disciplines, while others emphasize social justice or innovative learning approaches, such as honors or capstone courses.

Interdisciplinary programs often face financial challenges, depending on their structure and institutional hierarchy [4]. Some rely on initial investments and must secure future funding independently, while others are sustained by tuition or faculty grants. Certain institutions, like Wellesley College, embed interdisciplinarity in their core curriculum, while others, like Case Western Reserve University, fund interdisciplinary efforts as part of their strategic plans. However, interdisciplinary programs that do not offer degrees struggle with funding based on degree production, requiring alternative evidence of their value.

Interdisciplinary learning also requires adaptable spaces that foster collaboration and innovation. These spaces may be newly constructed or

repurposed to reflect institutional commitment to interdisciplinary work [32]. Cultural spaces, such as learning communities or university-industry partnerships, further support interdisciplinary collaboration.

Sustaining interdisciplinary efforts depends heavily on faculty. Faculty with dual or joint appointments often faces conflicts regarding which department to prioritize. Cluster faculty hiring, where faculty are recruited across disciplines based on institutional priorities, is a recent strategy to promote interdisciplinary work, especially in emergent fields of study [4]. Although this method's effectiveness is still debated, many research universities have adopted it, initially emphasizing STEM but later expanding to social sciences and humanities, such as postcolonial studies.

## **VII. CONCLUSION**

This research highlights the growing importance and potential of interdisciplinary curricula in higher education, emphasizing its ability to foster critical thinking, creativity, and problem-solving by integrating knowledge across disciplines. Interdisciplinary approaches are increasingly seen as essential for addressing complex societal challenges and promoting a holistic understanding of global issues. The study identifies key advantages, such as enhanced collaboration and the development of diverse perspectives, but also acknowledges the significant challenges, including faculty resistance, institutional support, financial constraints, and the difficulty of designing and assessing interdisciplinary programs.

Through case studies and literature reviews, the research shows that successful interdisciplinary curricula require clear institutional commitment, adaptable spaces, and strategic faculty involvement. Despite challenges, institutions like Duke University, Bard College, and others have embedded interdisciplinary learning in their missions, supporting its growth through innovative programs and funding mechanisms. Ultimately, interdisciplinary curricula provide students with the skills needed to navigate the complexities of the

modern world, offering a more interconnected and comprehensive approach to education that transcends traditional disciplinary boundaries.

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