Systems Thinking Hackathon 2025 – Team Report

Team Details

Team Name: Team7

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Problem Domain: Education

Specific Problem Statement: Why do most higher education institutions in India still operate in rigid disciplinary silos, despite the NEP 2020 emphasis on multidisciplinary learning?

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1. Introduction to the Problem

Interdisciplinary learning is critical for addressing complex, real-world challenges - but in India, its adoption in higher education is slow despite policy support from NEP 2020. Structural rigidity, departmental silos, and limited academic flexibility hinder implementation. Faculty lack autonomy, and students often fear interdisciplinary choices may hurt employability.

This is a systemic issue in the Indian context because the traditional education system emphasizes specialization and standardized evaluation, making innovation difficult. Our case study of Shivnagar University reveals how these interconnected barriers reinforce each other, preventing meaningful change. Our Causal Loop Diagram (CLD) maps these dynamics to identify leverage points for intervention.

2. Process Followed

1. Identified the topic: “Interdisciplinary Learning in Indian Higher Education” based on provided case material.
2. Conducted secondary research using reports, academic papers, and NEP 2020.
   Defined system boundaries and key stakeholders.
3. Identified variables influencing interdisciplinary learning outcomes.
4. Built causal loop diagrams (CLDs) to represent system behavior.
5. Identified system archetypes like “Shifting the Burden” and “Limits to Success”.
6. Conducted leverage point analysis based on Donella Meadows’ framework.
7. Synthesized insights and validated loops through feedback from peers/mentors.
8. Finalized documentation with formatted visuals and structured analysis.

3. Causal Loop Diagram (CLD)

Variable Name	Full Form	Definition
ILP	Interdisciplinary Learning Participation (%)	The percentage of students actively engaged in interdisciplinary courses or projects.
FACA	Faculty Autonomy Collaboration	Degree to which faculty members are empowered to collaborate across departments and design interdisciplinary content.
CURF	Curriculum Flexibility	Extent to which the academic curriculum allows students to choose courses across disciplines.
INCT	Incentives for Collaboration	Presence of rewards or recognition systems that encourage cross-departmental teaching or research.
ACAD	Academic Administrative Rigidity	The level of bureaucratic or structural obstacles that limit interdisciplinary curriculum or faculty actions.
DSI	Departmental Silo Intensity	The degree of separation or lack of interaction between academic departments.
REGF	Regulatory Flexibility	The adaptability and openness of regulatory frameworks (like UGC or AICTE) toward interdisciplinary programs.
UGCG	UGC/AICTE Guidelines Enforcement Strength	The strictness with which central regulatory guidelines are imposed on universities.
STF	Student Timetable Flexibility	The extent to which student schedules allow enrollment in courses across departments.
STP	Student Perceived Value of Interdisciplinary Learning	How valuable students consider interdisciplinary education for their personal or career growth.
INF	Infrastructure Support (LMS, Shared Classrooms)	Availability of shared physical and digital resources that support interdisciplinary learning.
FIQ	Faculty Interdisciplinary Qualification (%)	Percentage of faculty who are trained or experienced in more than one discipline.
BUD	Departmental Budget Autonomy	The degree to which departments control their own budgets and spending decisions.
ADM	Administrative Willingness	The openness and supportiveness of university leadership toward implementing interdisciplinary reforms.
EMP	Employability Perception	Employers' and students' views on the career benefits of interdisciplinary education.
PSU	Public Sector University Autonomy Index	A composite score representing the freedom of public universities to design and manage interdisciplinary

Variable Name	Full Form	Definition
		programs.
PRIV	Private University Reform Index	A measure of how proactively private universities adopt interdisciplinary and flexible curriculum structures.
INN	Innovation Culture Index	Level of creativity, experimentation, and openness to change within the university ecosystem.
NPE	NEP 2020 Implementation Fidelity	Degree to which the university's actions align with the interdisciplinary goals of the National Education Policy 2020.
AWR	Awareness Campaign Reach	Extent to which information about interdisciplinary opportunities is disseminated to stakeholders (students, faculty, etc.).
ALUM	Alumni Influence on Curriculum Reform	Degree of alumni involvement in advocating or shaping interdisciplinary academic programs.
EXAM	Exam Structure Flexibility	Openness of the assessment system to interdisciplinary methods, projects, or flexible formats.
DEL	Delay in Implementation	The number of years by which reforms or interdisciplinary initiatives are delayed.
REW	Reward System for Cross-Department Work	Presence of performance-based rewards for faculty engaging in cross-disciplinary activities.

4. Leverage Points Analysis

Leverage Point	Thinking in Systems	Why Important	Expected Impact
Curriculum and Timetable Flexibility	Rules of the System (#5)	Alters institutional constraints that limit interdisciplinary course access.	Enables students to pursue combinations across disciplines more freely
Faculty Incentives and Autonomy	Rules of the System (#5)	Changes internal motivation structure and encourages interdisciplinary teaching	More faculty offer innovative and cross-cutting courses
Awareness Through Success Narratives	Information Flows (#6)	Shifts mental models and student demand by highlighting benefits of interdisciplinarity	Builds a reinforcing loop of visibility, interest, and institutional support

Leverage Point	Thinking in Systems	Why Important	Expected Impact
Academic Advising Reform	Information Flows (#6)	Helps students make informed academic choices early on	Improves uptake and planning of interdisciplinary pathways
Evaluation Metric Redesign	Rules of the System (#5)	Aligns institutional rewards with interdisciplinary teaching and learning outcomes	Promotes system-wide adoption and long-term sustainability of interdisciplinary education

5. Systems Archetypes

a. Shifting the Burden

Institutions apply superficial fixes - like offering a few interdisciplinary electives - without addressing deeper barriers like departmental silos or rigid schedules. These symptomatic solutions delay systemic reforms and reinforce the idea that interdisciplinarity is non-essential.

b. Success to the Successful

Well-established departments continue receiving support and visibility, while interdisciplinary initiatives struggle for resources. This self-reinforcing dynamic widens the gap, keeping newer programs on the margins.

6. Event → Pattern → Structure Analysis

Layer	Your Analysis
Event	Interdisciplinary programs introduced (e.g., in Shivnagar University) fail to attract students or sustain faculty engagement. Timetabling clashes, low enrollment, or inadequate institutional support are common complaints.
Pattern	Repeated underperformance of interdisciplinary initiatives across institutions. Initial enthusiasm fades; programs are sidelined or dissolved. Students prefer established disciplines with clearer career outcomes.
Structure	Fragmented governance across departments, rigid curricula, lack of incentives for faculty collaboration, hierarchical academic culture, and inadequate alignment between policy and institutional operations. Accreditation and funding mechanisms favor traditional departments.

7. Additional Insights

- **Mismatch Between Policy and Institutional Reality**: While national education policies strongly advocate interdisciplinary learning, universities often lack the structural capacity or motivation to implement these changes effectively. This disconnect creates policy-practice gaps that are difficult to bridge without systemic alignment.
- **Informal Networks Matter**: Despite institutional barriers, some interdisciplinary collaborations have emerged informally through personal networks of faculty and students. These bottom-up efforts suggest the potential for informal leverage points that can be supported more intentionally.
- **Interdisciplinary ≠ Interdepartmental**: The term "interdisciplinary" is often used interchangeably with "interdepartmental," but true interdisciplinary learning requires integration of perspectives, not just co-teaching or cross-listing courses. This subtle difference is frequently overlooked in program design.
- **Vicious Cycle of Low Demand and Low Supply**: The lack of visible outcomes (like job placements) from interdisciplinary programs discourages students, which in turn leads to reduced offerings and support — a classic reinforcing loop contributing to system inertia.
- **Potential Role of Technology and AI**: Emerging tech tools can serve as enablers for interdisciplinary education — for instance, through integrated digital platforms, collaborative simulations, or AI-driven curriculum mapping. This could offer a new lever for system innovation.
- **Key Question Raised**: Is it feasible to embed interdisciplinary thinking *within* existing disciplinary structures (e.g., through problem-based learning or thematic courses), instead of building standalone programs that struggle to survive?

8. References

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