

Setting off the Dominoes

A Theory of Change for Scaled Interdisciplinarity at a Joint Venture
Liberal Arts and Sciences University in China

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The Big Question

What is the relationship between interdisciplinarity and learning outcomes? How is it characterized at DKU?

Summary of key points

- This theory of change defines interdisciplinarity with workplace vocabulary as *purposeful socialization of problem-solving*.
- This definition bridges the discourses on interdisciplinarity and learning outcomes.
- This definition enables a perspective of *mobility* for studying interdisciplinarity.
- Leveraging this mobility allows interdisciplinarity to be scaled.
- The missing link in this theory of change is an incentive mechanism.
- For DKU, this theory of change proposes an incentive mechanism that drives *interdivisional Signature Work co-mentorship*, called *FiFund*.

Towards a common language *through* and *for* interdisciplinarity

- AAC&U renamed itself in January of 2022.
- Warning of an LAS defense strategy drawing solely upon wide applicability of LAS skills (Adams, 2022)
- A persistent lack of common language between stakeholder groups of LAS education (AAC&U, 2021)
- Towards a common language: *OECD Future of Education and Skills 2030* (OECD, 2019) and *New Liberal Arts* (Ministry of Education of the People's Republic of China, 2021)
- ***Taking initiative*** and ***teamwork*** are respectively the most desirable mindset and skill at a workplace increasingly characterized by ***creative problem-solving*** (AAC&U, 2021).
- Interdisciplinarity is a core strength of LAS education but fuzzy...
- Interdisciplinarity is ***deliberate***, ***relational***, and ***problem-based*** (Mansilla & Duraising, 2007).

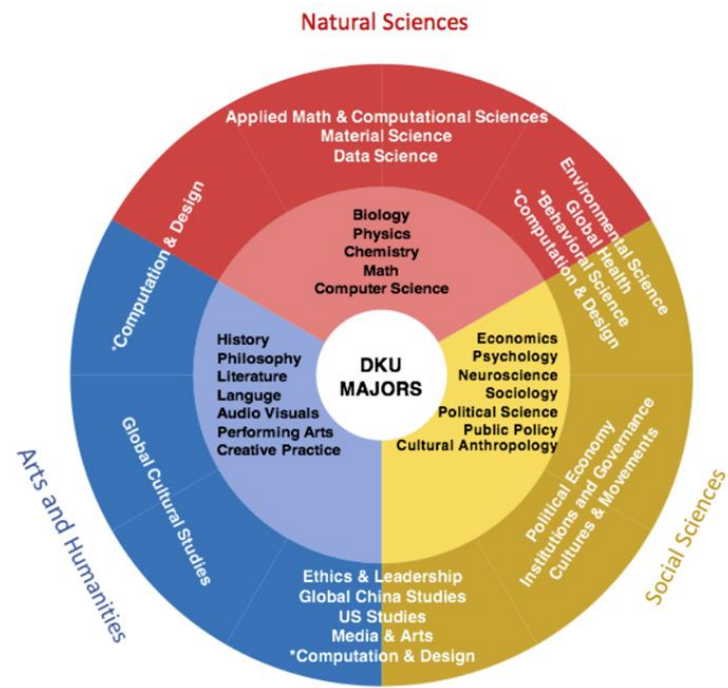
Interdisciplinarity can be defined as purposeful socialization of problem-solving.

Counterbalancing gravitational forces in higher education

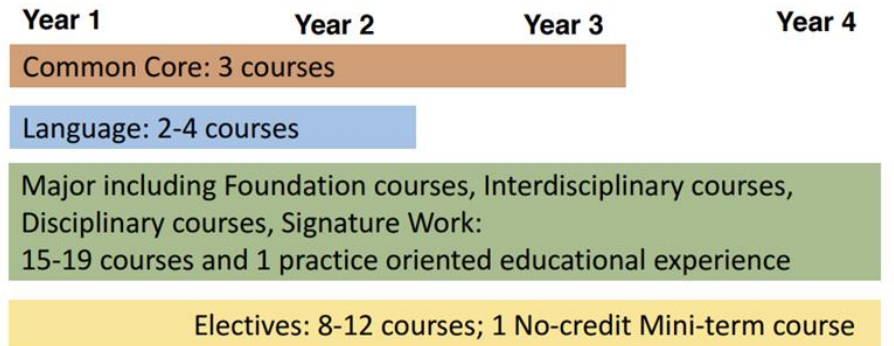
- This definition uses *socialization* as a proxy to empirically examine interdisciplinarity.
- A higher level of interdisciplinarity is characterized by socializing more frequently and/or diversely for academic problem-solving.
- Let's call the tendency to thus socialize *mobility*.
- This mobility lens is useful for navigating strong gravitational forces that are pro-STEM in contemporary higher education and, in the country of China, pro-exam culturally.

Research Question:

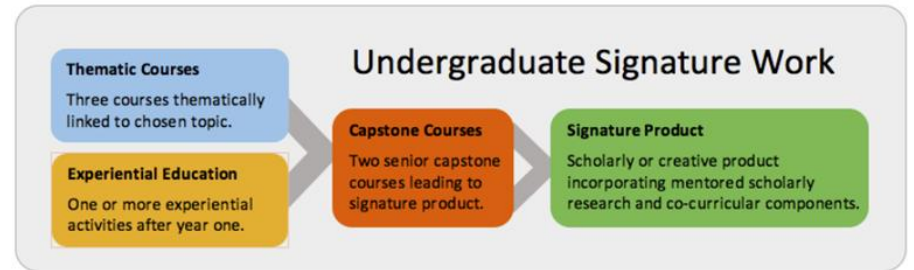
What can be done at DKU to scale interdisciplinarity so that it is characteristic of a higher mobility?



Degree Requirements



Signature Work



Study participants and methodology

- This study proposes a theory of change for scaled interdisciplinarity which claims that *interdivisional Signature Work co-mentorship* is the linchpin.
- Data in the forms of a Qualtrics survey and online interviews were collected for statistical and thematic analyses in the summer of 2021 from the inaugural undergraduate class of DKU ($N = 244$) as well as all faculty from the three academic divisions of undergraduate education ($N = 93$).
- 54 percent of the students and 82 percent of the faculty participated in the survey.
- About 60 hours of interviews were recorded.

Mobility

Being department-free is not the end of silos.

A student interviewee:

I used to see Data Science as just another major, but then I realized it is a very deep field and I need to learn so many different things. I also need to pick a direction, but there is not much guidance about it. So, it is a huge major, and people are scattered all over it.

Another student interviewee:

I do not feel a lot of interdisciplinary connections even within the same branch of one big major like molecular bioscience. There is not a lot going on between students who study biophysics with those who study cell biology or genetics or biogeochemistry. Once we pass the sophomore year and become juniors, we all just go apart.

Higher mobility

Interdivisionality has a cascading effect upon interdisciplinarity.

A student interviewee:

My Signature Work project is about warfare and environmental history. My mentor is a history professor who is very helpful. But I feel like I also need help from professors who know about environmental science and specifically military history.

A faculty interviewee:

If you look at the requirements of the Data Science major, while it has technically different disciplines, they are very close. There is nothing from any other division, for instance, and it is only Natural and Applied Sciences. Some majors, like Global Health, have requirements from another division such as Social Sciences, which I think is much more interdisciplinary.

Higher mobility missing link

It is time to focus on a bottom-up approach.

Towards rigorous interdisciplinarity requires

- Counterbalancing a gravitational pull of disciplinary specialization (Frodeman & Mitcham, 2007) by going wide
- Refraining from excessively top-down approaches because interdisciplinarity is not everyone's cup of tea

Who is more versed in a specific interdisciplinary research, teaching, or learning activity than the person presently at it?

Two linchpins of a bottom-up approach

- Measuring existing interdivisional mobility
- An incentive mechanism to boost interdivisional mobility

The second linchpin: An incentive mechanism

Results show strong thematic findings about Signature Work co-mentorship. Already,

- 16 percent students have at least one co-mentor.
- 27 percent Signature Work mentors are co-mentors.

Interdivisional collaboration is one rationale behind co-mentorship.

- 35 percent co-mentored projects are interdivisional in nature.
- 60 percent co-mentors supervise together with a colleague from another academic division.

The problem is, there is no dedicated mechanism to leverage these numbers for driving and supporting higher interdivisional mobility. This bottom-up approach is presently missing the *up* part!

There are also gap issues which may be synergistically addressed by this proposed incentive mechanism centering on Signature Work co-mentorship...

Two birds with one
stone: Using
interdivisional
Signature Work co-
Mentorship to scale
interdisciplinarity
and shore up
capacity gaps

Signature Work co-mentorship naturally brings in richer faculty perspectives to facilitate interdisciplinarity.

- Already, 27 percent Signature Work mentors are co-mentors.
- Co-mentors show a high propensity for interdivisional and intercultural collaboration.

However, there are capacity issues.

- While 44 percent Signature Work mentors supervise a project which is interdivisional with his or her expertise (suggestive of interdisciplinarity), at least 27 percent do it alone.
- 30 percent students chose an interdivisional Signature Work topic, with two-thirds being supervised by one mentor.

Is this ideal? How well can a Signature Work mentor supervise interdivisionally *alone*?

The capacity issue can be further characterized by an uneven distribution of Signature Work mentors from the lens of academic divisions, showing a gravitational pull towards Natural and Applied Sciences.

- A counterbalance mechanism is needed in the form of interdivisional Signature Work Co-mentorship.

Not just expertise

A multidimensional understanding of interdisciplinarity and Signature Work co-Mentorship

There are a few ways to respond to the concern about available faculty expertise to allow for interdivisional Signature Work co-mentorship.

- Interdivisional Signature Work co-mentorship is already happening in some cases at DKU!
- Faculty expertise can be multidimensional between content and methods.
- Co-mentorship is not solely about cumulation of expertise.
- There are always student interests and aspirations that go beyond the scope of faculty expertise.

FiFund: A theory of change for scaled interdisciplinarity at DKU

- FiFund is all about the big/broad/wide IF at the interdivisional level at DKU.
- FiFund incentivizes two things: interdivisional mobility and early initiation of Signature Work projects.
- There are four principles to guide configuration of FiFund:
 - FiFund is a recurring competitive award open to student applicants.
 - FiFund has three core eligibility requirements.
 - Interdivisional nature of the proposal
 - One interdivisional faculty co-mentor at minimum
 - Alignment with present or future Signature Work project
 - FiFund encourages teamwork with fellow students, though not required.
 - FiFund has a mix of fixed amount and full coverage awards to attract both need and merit.
- FiFund can either be a dedicated fund or be incorporated into existing funding programs that seek to promote interdisciplinarity more generally.
- Measurable impact of FiFund include:
 - Higher mobility at the interdivisional level
 - Earlier initiation of Signature Work projects
 - Cascading effects upon non-awardees
 - Lower faculty non-participation in Signature Work mentorship
 - Facilitated sampling for continuous correlational studies of interdisciplinarity and learning outcomes
 - **Overall scaled interdisciplinarity at DKU**

Conclusion and lingering thoughts

- Interdisciplinarity is a noisy buzzword which does not always make sense at the operational level.
- *Doing* interdisciplinarity in China faces additional boundary challenges due to strong gravitational forces that are national, historical, and increasingly from between college and workplace.
- Robust interdisciplinarity may require a higher magnitude (e.g., interdivisionality at DKU) and constant enabling mechanisms (e.g., FiFund) to balance out strong gravitational forces.
- This theory of change for scaled interdisciplinarity goes beyond DKU and recommends a roadmap with four signs:
 - **A definition** of interdisciplinarity rooted in institutional values (e.g., the Animating Principles of DKU) and with a vocabulary common to college and workplace
 - **A mobility lens** for measuring and leveraging different and especially higher magnitudes of interdisciplinarity (e.g., interdivisionality at DKU)
 - **A linchpin mechanism** for energizing this mobility (e.g., FiFund) so that interdisciplinarity is more entwined with other institutional facets of teaching, learning, and research
 - **An awareness** of the potential of interdisciplinarity for counterbalancing various gravitational forces of higher education at local and historical levels

Interdisciplinarity requires *setting off* after setting up the dominoes!

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