Pedagogy in Interdisciplinary Higher Education: An Investigation of Faculty and Student Perspectives.

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Interdisciplinary Higher Education is the rise of collaborative and boundary work. Meta-themes were selected from a literature review and emergent topics. *The semi-structured interviews and focus groups were audio recorded, transcribed, and iteratively coded for analysis based upon four meta-themes: critical thinking, problem-based learning, uncertainty, and boundary work.*

**Research Questions**
1. Given ASU's emphasis on interdisciplinarity, do students and faculty share a common conception of interdisciplinarity?
2. To what degree are students, faculty, and the academic institution experiencing uncertainty and in what ways?
3. Have faculty members of the New American University embraced interdisciplinarity? Are they still conducting boundary work to ensure their intellectual and disciplinary space?
4. Interdisciplinary education appears to emphasize critical thinking skills and problem-centered learning activities. What challenges does this present for instructors and students?

We surveyed 275 students from 10 courses in SOLS, SOS, and SHESC. Classes were upper level undergraduate and most were in the Sciences. Students represented a wide range of disciplines in interdisciplinary and boundary background (see Table 1). The majority of students indicated that the classes were required for their degree program. Interestingly, only a few of the students had taken a previous interdisciplinary course.

**Learning Activities**
Students with interdisciplinary learning assignments survey questions appear to prefer inquiry-centered learning activities rather than professor-led lectures, which was the preferred learning activity of those students who answered survey questions with non-interdisciplinary learning language.

**Student Surveys Reveal: Preferred Learning Activities, Motivation, and Suggest Learning Outcomes.**

We saw 275 students from 10 courses in SOLS, SOS, and SHESC. Classes were upper level undergraduate and most were in the Sciences. Students represented a wide range of disciplines in interdisciplinary and boundary background (see Table 1). The majority of students indicated that the classes were required for their degree program. Interestingly, only a few of the students had taken a previous interdisciplinary course.

**Learning Outcomes**
Most students agreed that the course they were enrolled in was interdisciplinary. However, not everyone thought that the teaching styles were different than other classes. Students admitted that they did not necessarily see the course to be different than what they would do collaborative, but then you have interdisciplinarity, where you actually work together with various scholars from different fields, but you're really collaborating. So it's this idea of exploratory knowledge, which is a gain a notion from a different field, but where you would really create knowledge through exploration.

**Critical Thinking and Problem-Based Learning Activities**

Uncertainty and Challenges for Undergraduate Students

Students would like to know professors' opinions on some issues, but many also are interested in knowing what is missing from the course and focusing more on critical thinking and the process of forming solutions.

This data is less telling for how to approach problems "paraphrase, focus group.

Some students have a difficult time learning to think critically and moving beyond disciplinary ways of thinking in terms of what's coming to them, or they have to deal with academic comfort levels, in interdisciplinary environments they are not sure about the disciplinary epistemologies.

Naturally, students are also worried about grades, and many of the students we talked to indicated that with interdisciplinary courses, they are able to articulate different sides of an argument rather than reciting facts. (paraphrase, focus group)

**Goals and Challenges for Faculty**
Faculty stated that interdisciplinary courses is one problem because the world's problems are interdisciplinary and we need to give students tools to understand and solve them.

"The world doesn't give you a problem wrapped in a discipline. The current economic meltdown, for example, is not a discipline problem...and particularly when it gets complicated and complex and ethically challenging, people need to be able to work outside of the boundaries, but they don't. And we tend to think. And the fun is the fact that hopefully I've helped some people do that." Faculty member

"One important aspect was normative capacity, normative competence. And this is, we shouldn't be concerned that the students have to be able to think about the complex causes of our political and economic failures; but have the competence, thinking in a critical way and thinking about preferences and values and goals and governance, in guiding our actions, our political actions, our economic actions; they want to be able to do this." - Faculty member articulating the importance of interdisciplinary and the critical thinking and problem solving skills which characterize these types of courses.

A significant point of concern for faculty is trying to help students form a balance of depth and breadth of knowledge as they try to embed their knowledge in real-world issues. Interestingly, students were more focused upon the goal of learning how to work together and worked outside of disciplinary boundaries.

"We're asking them to problem solve and think synthetically and to draw on information they've gotten from other courses. Well, how do I know how much information they [have] I've gotten from another other course?" - Member of interdisciplinary programs because there is not necessarily a common body of knowledge.

**Institutional and Faculty Boundary Work**

Faculty member who is trying to move beyond disciplinary boundaries says, "It's unclear to me - you can not use this against me - whether the departments are really sure how to do it. It is challenging not knowing what will be expected from professors and what they expect from students. All I have is expert opinions to turn to. "It is challenging not knowing what will be expected from the professors and what they expect from students. All I have is expert opinions to turn to."

"Well, I've heard of cases of people who actually got washed out of their PhD program because they didn't have enough of a solid background in becoming interdisciplinary. So, and then that's back to the faculty and how they evaluate students and the programs." - Faculty member concerned that interdisciplinary training does not lead the way of students who want to participate in interdisciplinary knowledge production.

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"We've asked them to problem solve and think synthetically and to draw on information they've gotten from other courses. Well, how do I know how much information they [have] I've gotten from another other course?" - Faculty member frustrated by a lack of cohesion of interdisciplinary programs because there is not necessarily a common body of knowledge.

**When presented with a variety of definitions formed by their peers, students from focus groups generally preferred the following definition for interdisciplinary:**

"Bringing together experts in different fields to solve complex problems that span multiple fields of expertise" - Student definition

"There are a lot of definitions that are very broad and very vague. And then you need to be interdisciplinary, where you actually work together with various scholars from different fields, but you're really collaborating. So it's this idea of exploratory knowledge, which is a gain a notion from a different field, but where you would really create knowledge through exploration.

The vast majority of faculty had a very well-formed view of interdisciplinary, probably best articulated in the following quote:

"You have discipline and disciplinary and disciplinary methods. And then you have this kind of multicultural where you might address a problem that the different disciplines point towards your lives, but you're not really collaborating. And then you have interdisciplinary, where you actually work together with various scholars from different fields, but you're really collaborating. So it's this idea of exploratory knowledge, which is a gain a notion from a different field, but where you would really create knowledge through exploration.

The majority of faculty and student conceptions of interdisciplinary were quite compatible.