ENGINEERING DEANS' PERSPECTIVES ON FACULTY DEVELOPMENT IN ENGINEERING EDUCATION

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BACKGROUND

Research Need: Little literature has explored deans' perspectives on faculty development

Purpose: To explore engineering deans' perspective on various aspects of faculty onboarding and career development

RESEARCH QUESTIONS

RQ1: According to engineering deans, what are junior engineering faculty's most salient professional development needs?

RQ2: What cultural and structural elements of Colleges of Engineering exist or need to be implemented to support junior faculty's professional development?

DATA COLLECTION

- Sampling strategy
  - Diversity of institutional types
  - Targeted R1 & R2 schools with largest student population
  - Contacted 44 Deans
- **23 interviews** with engineering deans representing different types of institutions:
  - R1 Public (8)
  - R1/R2 Private (6)
  - Primarily undergraduate-focused (9)
- Information on interviews
  - Semi-structured
  - ~30-35 minutes
  - One on one interviews

INSTITUTIONS

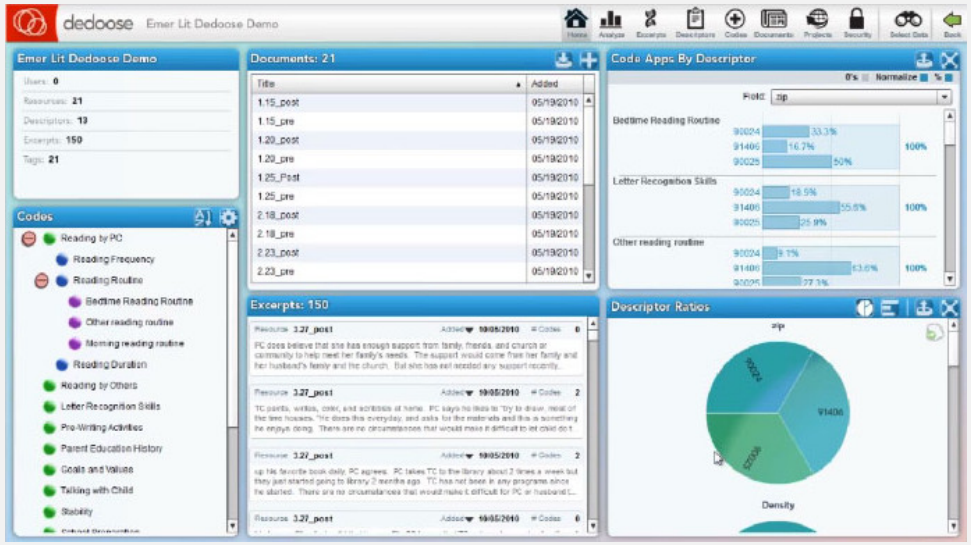
R1 Public	R1/R2 Private	Primarily Undergraduate focused
Arizona State University	Cornell University	Arkansas State University
Iowa State University	Dartmouth University	California State University, Northridge
Michigan State University	Lehigh University	James Madison University
North Carolina State University	Northeastern University	Marquette University
Ohio State University	Saint Louis University	Ohio Northern University
Oregon State University	University of Notre Dame	Olin College of Engineering
University of Illinois Urbana-Champaign		Smith University
University of Texas at Austin		University of New Haven
		Worcester Polytechnic Institute

INTERVIEW PROTOCOL TOPICS

- Hiring and onboarding new faculty
- Mentorship models
- Faculty areas of need
- Institutional resources and support structures
- External resources
- Top priorities and values of the institution
- How mid-career/senior faculty are supported
- How entrepreneurial mindset can support faculty

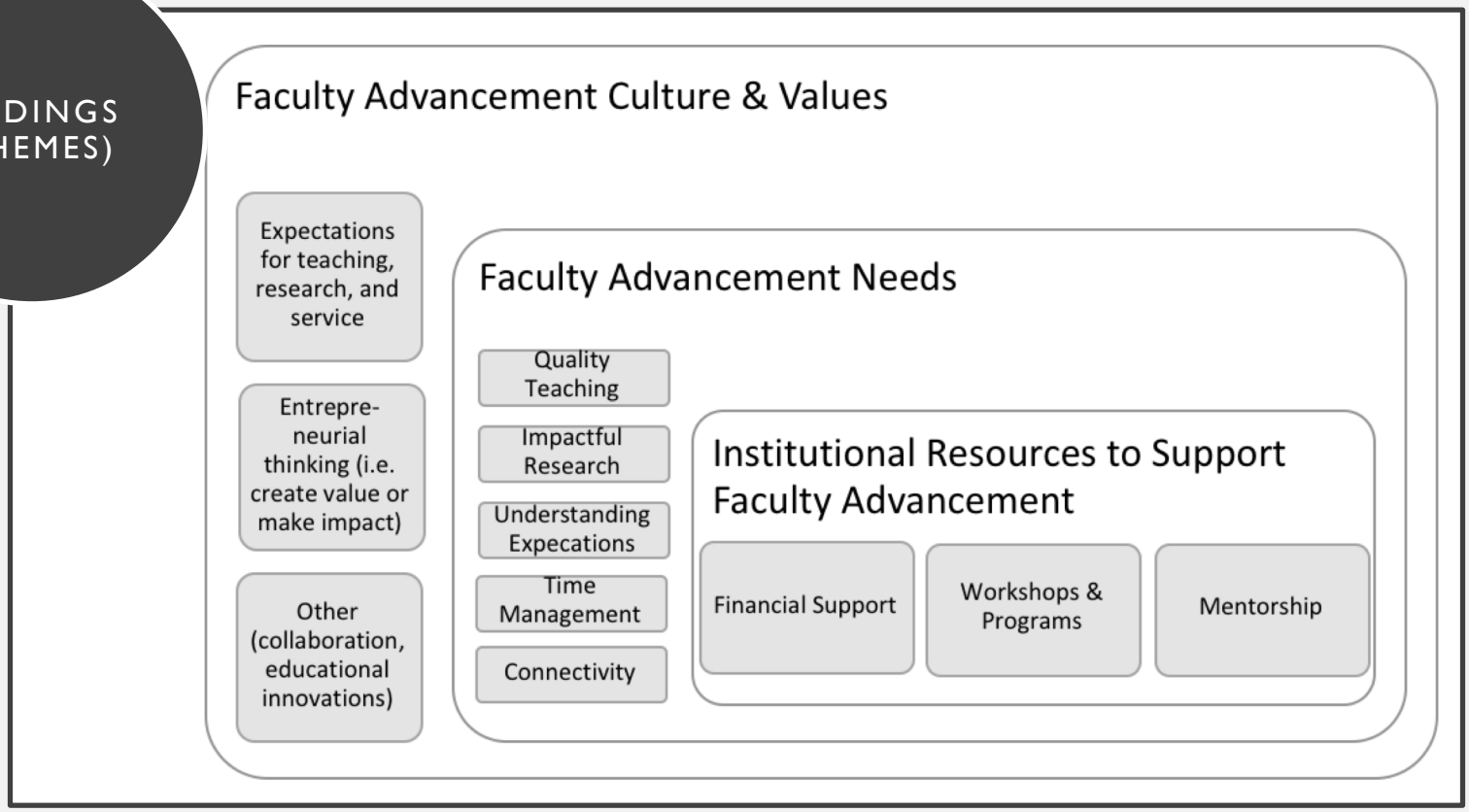
DATA ANALYSIS

- A **thematic analysis** was used to analyze the reflections
  - Transcripts read multiple times
  - Multiple iterations on codebook
    - 36 codes → 10 codes
  - Inter-rater reliability tests on Dedoose until strong agreement



dedoose
Great Research Made Easy

FINDINGS (THEMES)



FACULTY ADVANCEMENT CULTURES & VALUES

EXPECTATIONS FOR TEACHING, RESEARCH, & SERVICE

- High-quality teaching and research are valued at all types of institutions
  - Variations in priorities (e.g. course load, research expectations)
- Mentorship also valued
  - Faculty at R1 institutions expected to graduate PhD students
- Expectations are higher for faculty now?
  - Acquisition cost higher
  - Must balance course load, research expectations, with higher expectations

COLLABORATION

One change we made to the promotion and tenure guidelines, is to say that multi-author proposals, multi-author grants, multi-author papers, conference proceedings, journal papers, multi-author book chapters, all of the forms of publishing your work, are equally valuable...it's time to change that emphasis...because the problems today require multiple researchers from multiple disciplines to address the serious problems that we face in engineering.

-Dean from R1 Institution

ENTREPRENEURIAL MINDSET (EM)

I am really speaking about using research funding to develop technologies that have, generally, commercial application, but that could be put to broader use beyond an individual laboratory. One of the descriptors I've used is, "science that doesn't stop at the laboratory door." Meaning, publishing the paper is wonderful, but that's what society expects of scientists. For engineers, they are looking for us to take the next step to be the implementers, to refine it, develop it, and put it to use to improve the human condition. That's what engineering was about 75 years ago, and then I will argue that we fell in love with this notion of engineering science, where engineers published papers in Science and Nature in a university environment, the same as scientists did, and that was the mark of prestige. That's great, and we want our faculty to publish in those places, but what we really value is putting it to use. We talk about lives touched, and the way to touch the greatest number of lives, which is what society asks of us as engineers, is to have your development, your creation, your invention, be commercialized and put to broad use. I see it, as fundamental to what engineering is asked by society to do, fundamental to why we became engineers.

-Dean from R1/R2 Institution

Create value through *nontraditional* activities

Commercialize technologies

Focus on impact of research work

Value educational and pedagogical innovation

FACULTY ADVANCEMENT NEEDS

QUALITY TEACHING

I would say my experience in general of my 26 years in academia has been that many of our faculty, well, very few of our faculty members are actually trained educators.

-Dean from R1/R2 Institution

Variations in initial ability

Expectation of improvement

Identifiable and addressable

Some are natural teachers and others are not and need a lot of help.

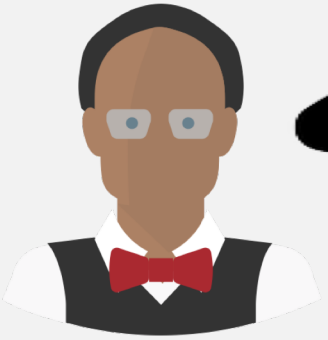
-Dean from Undergraduate-focused Institution

IMPACTFUL RESEARCH

- Developing grant proposals
  - *Oftentimes, too, they're sending their proposals out the door, and no one's really read them. A lot of them, I think, are really afraid to have people read them, but want the harsh criticism now, because when it gets down to Washington DC, or wherever it's going, it's going to really be torn apart.* –Dean from undergraduate institution
- Recruiting and managing/mentoring graduate students
- Building a research identity and vision – transitioning from PhD research
- Recruiting and supervising graduate students
  - "For the first time, you're the boss of students. That has a whole set of challenges that you've not encountered in the past." – Dean from R1/R2 institution

I think where they need the most guidance is mentoring grad students. And I will say that from where I've seen faculty guide get in trouble. Where I've seen people get in trouble is that their only experience in mentoring is how their advisor mentored them. And so if they had a jerk as an advisor, that's what they know. I think mentoring the graduate students is also, kind of the most hidden aspect of the promotion and tenure process. It is very easy to look at how many grants that you bring in. For better or worse, it's very easy at least to see how you're doing in the classroom from the evaluation scores. But the mentoring of the grad students is kind of hidden from almost everybody. I think what compounds that problem is it's something they're not really trained for in graduate school, for the most part. But secondly, it's something that is not apparent until mid-tenure review where problems start creeping up, or at tenure. Cause you know, the relationship between an advisor and their student is pretty closed. There's a power differential there. Students are fearful to complain; the students don't know any better.

-Dean from R1/R2 Institution



IMPACTFUL RESEARCH

OTHER NEEDS

Connectivity

Time Management

Understanding Expectations

Personal connectivity is really, I think is really important, to a certain extent, a little bit beyond the professional. And a second aspect to not underestimate the importance of nitty gritty conversations. I'd said at our institution we do have some faculty that suffer from Imposter Syndrome when they walk in and, at least in the teaching area that we have, they perceive us to have unreasonable ... or them impose on themselves sort of unreasonable expectations. We have a tendency sometimes to just make assumptions or talk about sort of big picture, philosophical issues when the newer faculty are really being challenged by the what do I do today or next week.

-Dean from undergraduate-focused institution

TENURED FACULTY NEEDS

- Main focus is on incoming faculty and not necessary newly tenured faculty
- Little to no support mechanisms for mid/senior faculty
- Identify and cultivate potential leaders
- How to support research mid career
  - Bridge funding or new startup package?
  - Encourage involvement in collaborative research projects?
  - Focus more on teaching instead?
  - Encourage commercialization of technologies?

I don't think we talk about it enough but I think it's another population that needs help, and I think they need some funding. They often use bridge funding between, switching from one area to another or one grant to another. Maybe they need a re-startup package or something. I don't know how to do that. They have to know in advance there's going to be expectations for it, but maybe giving them a re-startup.

-Dean from Undergraduate-focused institution

TENURED FACULTY NEEDS

INSTITUTIONAL RESOURCES TO SUPPORT FACULTY ADVANCEMENT

FINANCIAL SUPPORT

- Competitive startup packages
  - Discretionary funding (~$2,500-$3,000) within startup package for professional development, etc.
  - Course relief
  - Summer salary
  - Student funding
  - Lab equipment
- Grants ($500-$100,000) to support educational innovations and other research initiatives

INSTITUTIONAL WORKSHOPS & PROGRAMS

- Onboarding/Orientation
  - 1/2 day to 1 week
  - University/college/department levels
  - Topics covered
    - Institutional policies, cultures & values, expectations, resources available, research (e.g. setting up lab, goals, recruiting students), teaching (e.g. how to manage a large class), collaboration, diversity
- Workshops
  - Teaching
    - Building a syllabus, teaching pedagogies, student learning theories, pedagogies, etc.
  - Research
    - Grant writing, developing research agenda, managing students
- Teaching & Learning Centers
- Offices of Research & Proposal Development
- Sending faculty to meet with funding agencies

MENTORSHIP MODELS

- **Formal**
  - Mentor is assigned by department chair or hiring committee
  - One institution assigns mentor in offer letter to support transition
  - Another institution assigns internal and external mentor
  - Another institution offers mentorship program but optional
  - College wide vs department
  - Initial mentor can be viewed as onboarding mentor – relationship should not be forced
- **Informal**
  - Dean or associate dean meet with faculty and provide recommendations on who to connect with
  - Monitor teaching evaluations
  - Research collaborations and/or co-teaching

MENTORSHIP

- Support research and teaching
  - E.g. review and provide feedback on teaching proposals and/or teaching evaluations
- New faculty should feel like they can ask questions they need to ask
  - Trust, openness, and honesty important
  - Feedback important and ability to handle constructive criticism
  - Should not feel like "dumb" questions affect tenure
- New faculty may not want to "waste time" of more senior faculty
  - Senior faculty should coordinate with newer faculty?
- More structure needed?

The department chairs are tapped to offer a mentor for each incoming faculty member. Now, I'm not so sure that that's the best way to do it. I feel like there ought to be, we talked about this a couple of weeks ago at an Associate Dean for Faculty Affairs meeting across the university, because this happens across every college, that you show up and you're sort of assigned to a mentor, but we also thought that maybe that should be an onboarding mentor and that the faculty member might do better by landing on the ground, getting the landscape, knowing who's who, and then deciding together with somebody else who is going to be a good fit for a mentor. Right now, the process is that the chairs should assign someone, and in most cases I'm sure that that's appropriate and it works out, but in some cases it might be awkward if someone, if it's not a good match, or if the new faculty member desires some kind of change.

-Dean from R1/R2 Institution

UNCERTAINTY IN BEST MENTORSHIP PRACTICES

I will say that one thing this conversation has made me think about is whether my interactions or the school's interactions with the mentors should be more structured and formal, because I think that would lead to a more effective program, whether there is a way to acknowledge or reward mentor service in a way that would make that more meaningful. Because you know, it's kind of like student advising in a sense, that providing incentives, whether it's pay, committee release, or an award, isn't going to make someone who's not an effective student advisor suddenly become an effective student advisor. I think the same thing is true with mentorship. But what else should be in place? You know, maybe there should be more regular and formal check-in from the mentor. Maybe once a year we should ask the mentor as well to go through a checklist that has some very specific questions to ask about teaching progress and research progress and plans, because it would be less threatening than it is coming from the dean or the department chair.

MENTORSHIP W/ MORE STRUCTURE NEEDED?

DISCUSSION POINTS

- Non-traditional activities (e.g. creating educational/pedagogical innovations, commercializing research, helping a graduate student start a company, creating a makerspace, etc.) appear to be valued by deans
- Are engineering deans' expectations increasing? Should faculty be expected to create value through these non-traditional activities? Collaboration becoming more important?
- Mentorship is a valued activity but little research on how to most effectively create institutional structures to support this at different stages of faculty career

FUTURE WORK

- How do we create institutional structures that maximize the success/impact of faculty?
  - We are piloting a new faculty mentorship model at ASU that integrates the findings from this customer discovery.
- We will build on lessons learned from the pilot to explore how to fully institutionalize a mentorship model that enables faculty to achieve success through a career of meaningful impact.
- A lot of uncertainty and little data that drives institutionalization of faculty development → can we collaborate on related research initiatives?

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- Contact Information

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