



# **Transdisciplinary Problem-Solving in the Innovation and Discovery Studios at Virginia Tech**

Innovations in Curriculum, Pedagogy, and Assessment

HERU 2019

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# Transition from program to college

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- Contribute to university efforts to attract high-achieving students
- Flexible and customizable diploma options
- "... encourage interdisciplinary and innovative study..."
- "... balance **deep disciplinary knowledge** with breadth in a variety of topic areas, along with **experiential**, hands-on learning and a commitment to **service** through *Ut Prosim* (That I May Serve)."





# VT Honors College Core Values

- Meaningful and sustained relationships with faculty
- Independent learning
- Undergraduate research
- Place-based and problem-focused experiences
- Intellectual engagement in global contexts

# VT Honors College Courses

- Undergraduate Research Practices
- Reading Seminars
  - The Lessons of Steinbeck: Understanding Difference
  - The What, Why, and How of Gender
  - Conspiracy Theories: Forget Everything You Think You Know
  - Fact versus Fiction: Trendy Topics in Health and Nutrition
- Peer Education
- Service Learning
- Biomedical Ethics



# Topics in Innovation and Discovery Studios

- Define real-world problems
- Transdisciplinary collaboration
- Design thinking
- Experimentation
- Individual problem solving
- Collective problem solving
- Communicate solutions to stakeholders
- Iterative design
- Engagement in research

# Course structure

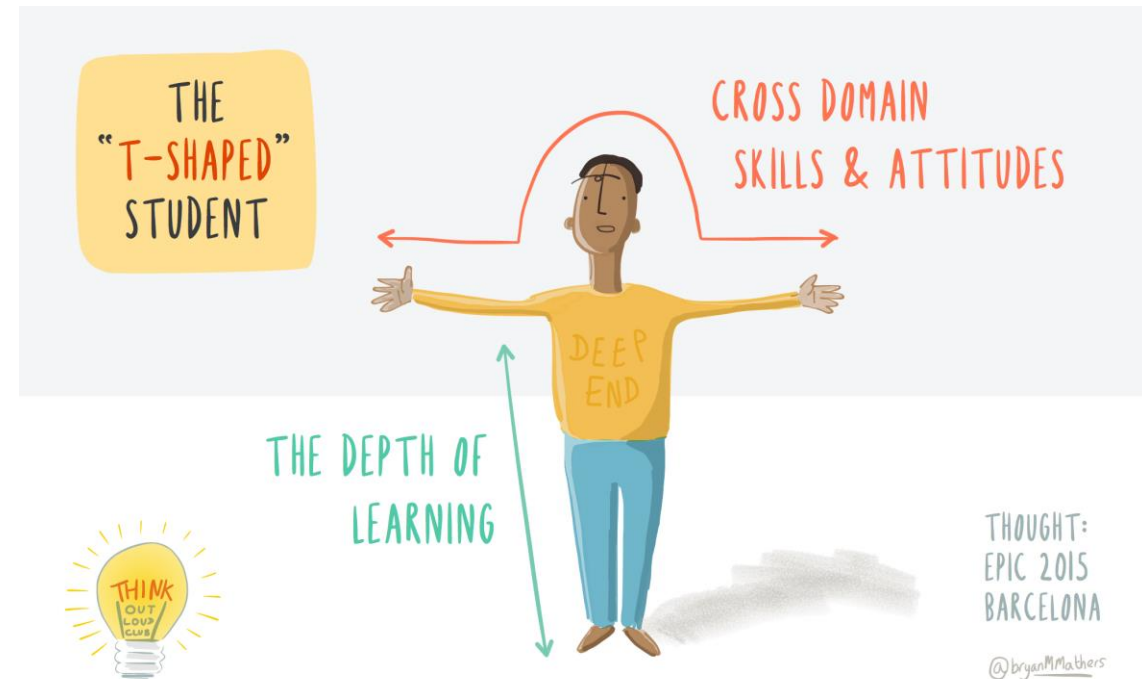
- Transdisciplinary topics
- Designed for topic novices
- Exploration of global topics
- Open-ended, inquire-based projects
- Promote engagement in research process
- Practice critical thinking

# Course offerings

- What a Disaster: Examining the Interaction of Human and Natural Systems
- Aging is Hard: Decision-Making with Geriatric Health Data
- Robots: AI, Algorithms, and the Smart Machines (R)evolution
- Wall Street
- Drug Discovery and Design in the Digital Age
- Cybersecurity and Public Policy
- Wal-Mart vs. Amazon: Innovative Business Models in Global Production Networks
- FinTech

# Employer expectations for graduates

- Oral and written communication
- Working effectively with others in teams
- Ethical judgment and decision-making
- Critical and analytical thinking
- Applying knowledge and skills to real-world problems



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(Hart and Associates, 2017)



# Assessment process and tools

- Pre and post course questionnaire
  - All Honors College offerings
  - Topics courses only
- Teamwork evaluation
- Mid-semester ethical reasoning assessment

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# Scope of case study

- 8 sections, Spring and fall, 2018
- Diverse majors/degrees represented
- 5-point Likert Scale + free response
- Pre-course survey: 60 respondents (88% response rate)
  - 38% Female, 51% Male, 11% Not reported
  - 10% Sophomores, 20% Juniors, and 65% Seniors
- Post-course survey: 30 respondents (43% response rate)
  - 57% Female and 43% Male
  - 6.7% Sophomores, 30% Juniors, and 63.3% Seniors

# Collective core value strengths

- All responses between "neither agree nor disagree" (3) and "strongly agree" (5)
- Fostering meaningful relationships between students and faculty

"All of my [honors] courses have challenged me to step outside my comfort zone and explore meaningful topics and relationships with my faculty. They have helped refine my passions and interests. Some of the best parts of my education have been in my [honors] courses."

# Core value strengths, College level

- Encouragement of independent learning
- Providing problem focused experiences
- Intellectual engagement in global contexts

# Core value strengths, Course level

- Real-world problem-focused experiences
  - "...researched the problems with **Dodd-frank** and examined the **Financial Choice Act**"
  - "We looked at areas where **policy** has failed [and] what to do about it"
  - "We examined **NEPA** and how the **new administration** has come into play"
  - "Learned about and explored the **issues of aging** in US society"
- Engagement in problem solving and innovation
  - "We have been reading about technology innovation and asking important ethical questions"
  - "Had to problem solve while creating our own sections and meshing the group effort parts"

# Core value strengths, Course level

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	H1. Honors courses have allowed me to develop meaningful relationships with faculty. (End) - IDSH1. <b>This section of 4504 allowed me to develop meaningful relationships with faculty.</b>	-.321	.612	.116	-.559	-.084	-2.780	27	<b>.010</b>
Pair 2	H2. Honors courses have allowed me to develop sustained relationships with faculty. (End)) - IDSH2. <b>This section of 4504 allowed me to develop sustainable relationships with faculty.</b>	-.391	.783	.163	-.730	-.053	-2.398	22	<b>.025</b>

# Areas of refinement

## College-level

- Fostering sustained relationships with faculty
- Development of strong undergraduate research skills

## Course-level

- Ties to undergraduate research
- Ties to place-based experiences



# Strategies for improvement

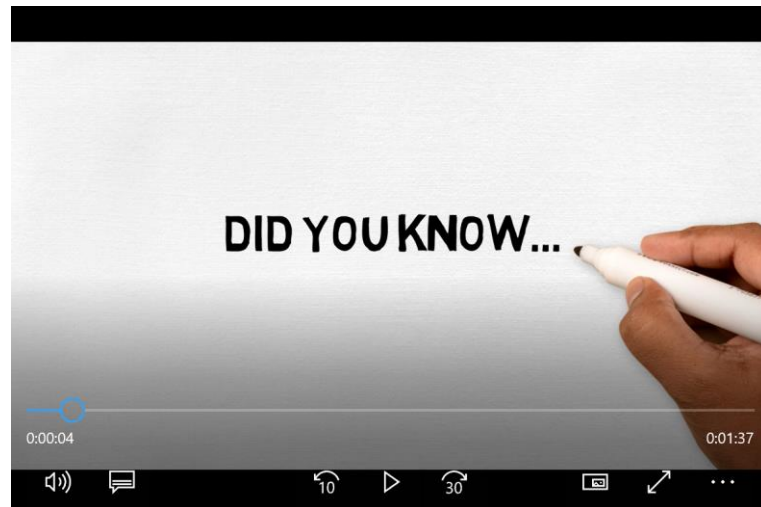
- Update curriculum to strengthen research skill development and recognition
- Include conversations/reflections about transferrable skills
- Include conversations/reflections about place-based learning
- Provide college-level opportunities to connect students with faculty after conclusion of course

# Challenges

- Initial low enrollment
- Non-traditional course structure and progression
- Assessment tool development for diverse section topics

# Successes

- Variety of topics offered
- Initial course offering collection for course iteration testing
- Student products



## Increasing Equity and Decreasing Costs for Medicare Access and Treatment

Kira Bourret, Katie Cironi, Max Guzinski, Jonathan Huaman, P'rice Jones, Shannon Mitchell, Reilly Scott, Neil Slinde, Brett Smith, Robert Wear, Stephanie N. Lewis\*

\*Student names listed in alphabetical order. All students contributed equally to work. Instructor listed last.

UH 4504  
Honors Topics in Discovery and  
Innovation Studios: Medicare

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# Future assessment work

- Pre and post course questionnaire
- Teamwork evaluation
- Mid-semester ethical reasoning
- Oral and written communication
- Working effectively with others in teams
- Ethical judgment and decision-making
- Critical and analytical thinking
- Applying knowledge and skills to real-world problems

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# AAC&U VALUE Rubrics

Association of American Colleges and Universities

Valid Assessment of Learning in Undergraduate Education

## Ethical Reasoning

- Self-awareness
- Different perspectives
- Issue recognition
- Application
- Evaluation

## Teamwork

- Contributions
- Facilitation
- Constructive climate
- Response to conflict



# Thank you!

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# Reflection questions

Successes: Problem-focused experiences  
Independent learning  
Meaningful relationships  
Global contexts

Refinement: Sustained relationships  
Place-based experiences  
Undergraduate research

**What are ways in which your institution does any of these well?**

**Can any of these ideas contribute to more than one value?**