

# Reflect and Illustrate STEM Assessment Faculty Mental Models to Help with Intentional Classroom Assessment Decisions

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9.30am – 10.30am

# Session Agenda

- Overview of research and findings (20 minutes)
- Reflection and drawing personal assessment mental model (20 minutes)
- Think, pair, share of outcomes of the reflection (10 minutes)
- Wrap up (5-10 minutes)

# Session Outcome

- Review brief research findings on engineering faculty assessment mental model
- Reflect on and illustrate personal assessment mental model

# Brief Background of Research

- Situated in engineering education context, where assessment research is scarce, but can have transferability value to STEM in general
- Faculty views, thoughts, beliefs have been shown to influence pedagogical practices
- Understanding mental models can potentially help understand faculty decision making on assessment (ongoing)

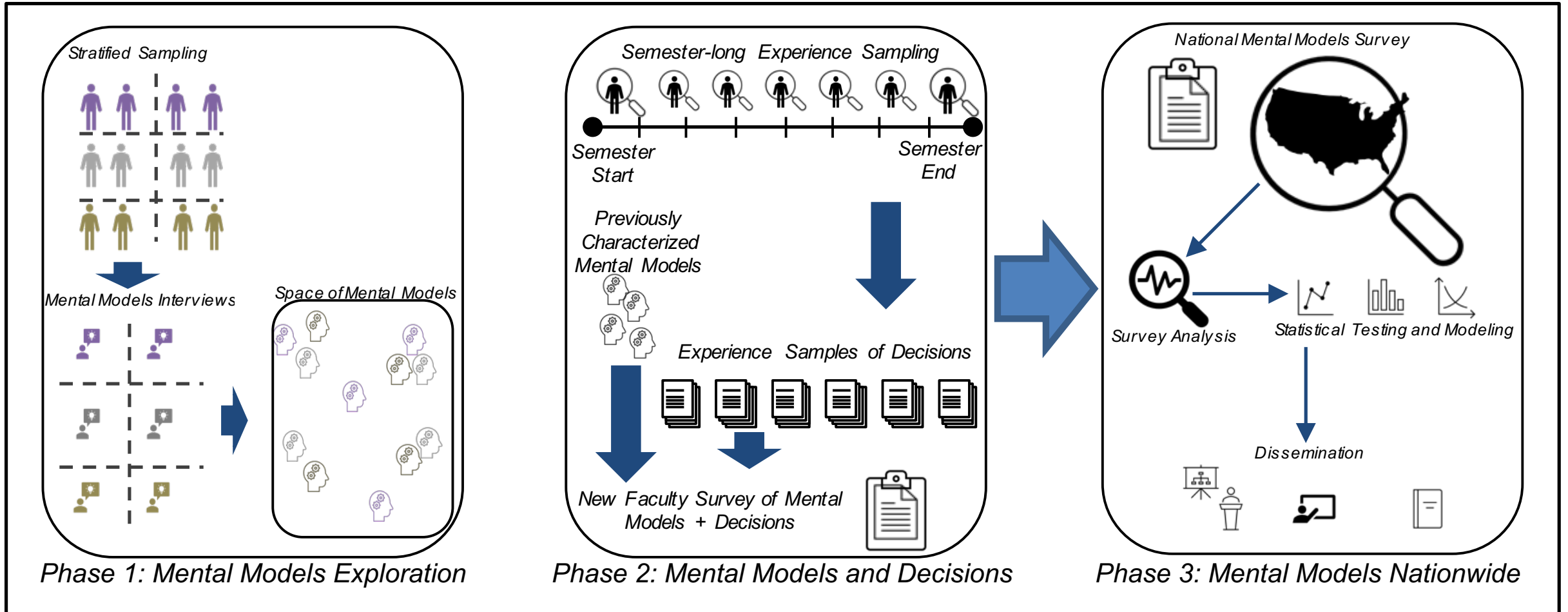
# Research Questions

**RQ1:** What are the mental models that engineering faculty members have of assessment in undergraduate engineering education?

**RQ2:** How do faculty member mental models affect decisions that they make in their courses over the duration of a semester?

**RQ3:** How are demographic characteristics, personal experiences, course characteristics, and institutional factors associated with different mental models?

# A Multi-Phase Study



# Phase 1 Findings

## **Assessment events: The Different Components of Assessment Decisions**

- **Assessment event** - higher level umbrella that categorizes the assessment decisions where we ask the participants to focus on one component in details within that event
- **Assessment Decisions** - descriptions by the participants of their assessment actions along with explanations that guided that actions

# Phase 1 Findings

**Eight events** emerged from the data

- Assessment Type
- Assessment Weights
- Assessment Grading
- Assessment Design
- Process on Assessments
- Assessment Tools and Technology
- Assessment Feedback
- Personnel on assessments



Now let's use some of the findings to get reflective of our assessment decisions

Please refer to the handouts to guide you on the process.

Summary of findings

Reflection questions

Please note that the outcome of this activity can be in any form (concept map, process diagram, list and many others!)

# Now let's use some of the findings to get reflective of our assessment decisions

Please use the following questions to list/map/draw out your mental model

- What STEM courses do you typically teach? What are some of their characteristics (concept heavy, lab, project-based, etc.)?
- How are you evaluated in terms of performances in your department/institution (tenure-track faculty would focus a lot more on research, for example)?
- What are assessments?
- How do you design and implement assessments in the STEM courses you are now thinking of?
- What are some ideal assessments you would like to use in your STEM courses?

# Discussion

What have you learned about your assessment mental model during this process?

How can what you have learned help with you with future decision making on assessments?

# NSF Acknowledgement



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## Reflect and Illustrate STEM Assessment Faculty Mental Models to Help with Intentional Classroom Assessment Decisions

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for the 2022 Assessment Institute (10/11/2022)

### Phase 1 Research Findings

Assessment Event	Definition	Non-exhaustive Example from Taxonomy
Assessment Type	Decisions made on what type of assessments to use, and sometimes involved the bigger picture of the structure of the course	Reports, Labs, Quiz, Exam, Midterm, Final, Homework, Participation, Reflections, Projects, Presentations
Assessment Weights	Decisions made on how different assessment types should be weighted to form the overall student grades	Labs, reports, grade weight, homework, exams, extra credit assignments, project
Assessment Grading	Decisions made on grading individual assessments	Group grading, Rubrics, Revisions, Curve, Partial credit, Autograding, Benchmarking
Assessment Design	Decisions made on how to design assessments or how assessments are used; defined broadly from the type and difficulty of questions in the exam to deadlines of assessments, components of individual assessments are considered as an assessment design event (within an assessment event); include design caused by the Covid-19 pandemic	<b>Descriptions of assessment:</b> Verbal, Real time assessment, Take home, Summative, Formative <b>What is measured:</b> Understanding, Takeaways, Effort, Quality control, Knowledge <b>Factors to consider:</b> Time, Quantity, Outcomes, Online solutions, Improvement, Grade distribution, Consistency between sections, Class size
Process on Assessments	Decisions made on the process of modifying assessments, addressing cheating, or considering fairness of assessments	Time, Quantity, Outcomes, Online solutions, Improvement, Grade distribution, Consistency between sections, Class size
Assessment Tools and Technology	Decisions that involve using tools and technology (defined with the positionality of not using pen and paper or text manager) for assessments	Top Hat, Gradescope, Flipped classroom/ videos, Course reading/ course book, Canvas, 1-1 help
Assessment Feedback	Decisions made on 1) feedback the instructors get from the assessments, 2) feedback the students get from the assessments, 3) use of the feedback from assessments by the instructors for various reasons	Peer feedback, Feedback for students, Feedback to inform teaching changes (common misconceptions/mistakes), Post solutions, Review in class common misconceptions/mistakes
Personnel on assessments	People, groups (generally entities) that involve making decisions on assessment	Instructor, upper administration, teaching assistants, students, department, program director, accreditation, companies/industry, colleagues



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Using the findings and the reflection questions below, please **illustrate your assessment mental models on this page**. Feel free to **be creative in how you visualize this for your own benefit** to understand how you have been viewing and using assessments, and how you have been making decisions on assessments.

**Reflection Questions:**

1. What STEM courses do you typically teach? What are some of their characteristics (concept heavy, lab, project-based, etc.)?
2. How are you evaluated in terms of performances in your department/institution (tenure-track faculty would focus a lot more on research, for example)?
3. What are assessments?
4. How do you design and implement assessments in the STEM courses you are now thinking of?
5. What are some ideal assessments you would like to use in your STEM courses?



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