Interactive Teaching in Actuarial Science Workshop Survey

Full Name _____

Preferred Name (what would you like me to call you?) _____

Number of years teaching experience _____

How many students are usually in your classes? (give a range) _____

Which topics related to actuarial science have you taught or are likely to teach in the future?

- □ Probability
- □ Statistics
- □ Financial math
- □ Life contingencies
- □ Stochastic processes
- □ Advanced financial math
- □ Advanced life contingencies
- □ Corporate finance/accounting
- □ Forecasting/data analysis
- □ Other: _____

How familiar are you with the following teaching ideas? (check for each one)

Idea	**Never heard of**	**Heard of but never used**	**Have used**
Levels of Learning			
Classroom Response Systems			
Active Learning			
Two-Stage Testing			
Think-Pair-Share			
Flipped Classroom			
Aligning Learning Goals/Assessments			
Discovery-Based Learning			
Rubrics			
Inclusive Teaching			

In a typical course, how often do you use the following teaching techniques? (check for each one)

Technique	**Never**	**Sometimes**	**Almost every class**
Lecturing			
You ask students questions			
Students ask you questions			
Students work on problems individually			
Students work on problems in groups			
Poll the class			
Students present work to the class			
Open discussion			
Peer learning/teaching			
Brainstorming			

How do you typically assess your students' performance in your courses?

Assessment Type	**Never**	**Sometimes**	**Almost Always**
Assignments			
Written Tests			
Computer-based Tests			
Projects			
Presentations			
Participation			
Oral Exams			
Case Studies			

How often do the following types of questions appear on your tests?

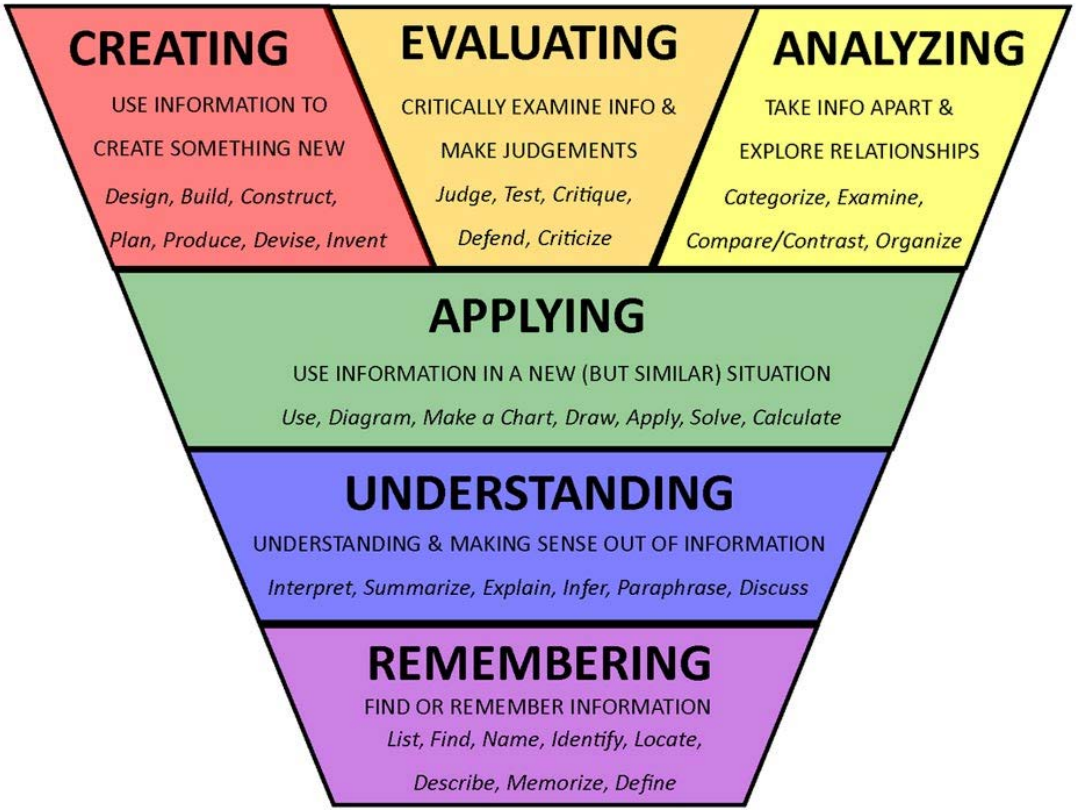
Question Type	**Never**	**Sometimes**	**Almost Always**
True or False			
Multiple Choice			
Short Answer			
Long Answer			
Full Solution (Calculation)			

What are your goals for this workshop? What do you want to learn?

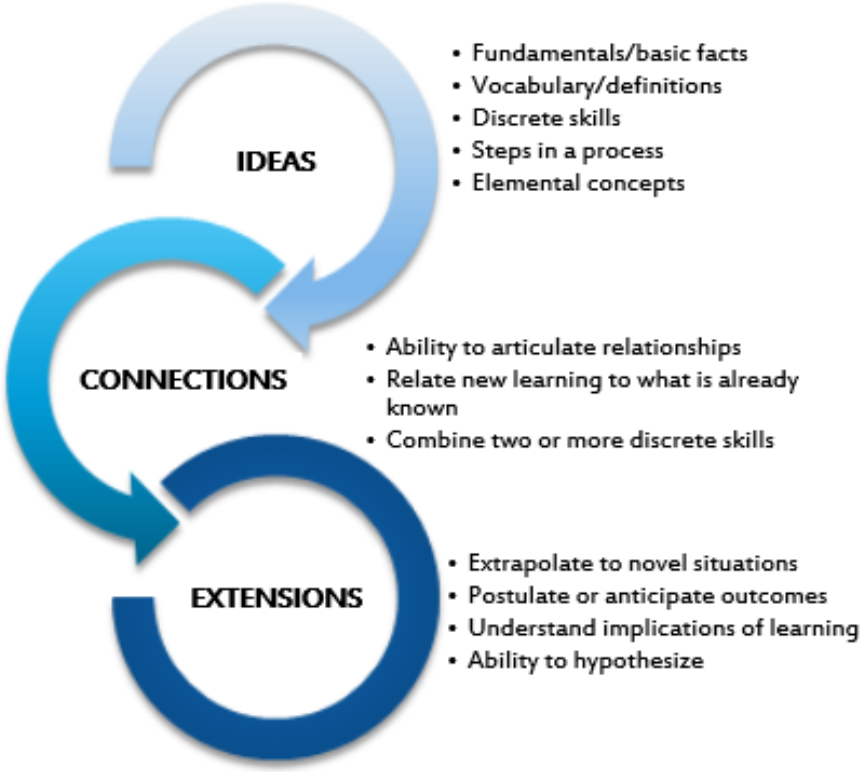
Is there anything else you want me to know?

Interactive Teaching in Actuarial Science Workshop 2: Levels of Learning

Bloom's Taxonomy of Learning:



ICE Learning Framework:



Pick a topic: _____

Write a question about it:

Which level is this question testing at? _____

Try to test the same topic at a higher level:

Pick a topic: _____

Write a question about it:

Which level is this question testing at? _____

Try to test the same topic at a higher level:

Interactive Teaching in Actuarial Science Workshop 3: Motivating Students

Is your course…
Required, elective, or a mix?

Restricted to students in certain programs or open?

Relevant to the students' programs? Their careers? Their personal interests?

Related to their other courses, past or future?

How can you gradually make additions to your course?
One change you can make in your course right away

One change you can think about making in the future

Who or what can you use for inspiration?
One person you can go to for ideas

One resource you can consult for ideas

How will you know it is working?
One goal you have

One idea for measuring the success of your changes

Ideas for improving student motivation:

- Tailored material to match student passions
- Applications to real-world problems
- Challenging questions with multiple reasonable answers
- Case study competition
- Allow students to choose their own topics

Pick an idea you think can work for your course and sketch out some ideas for how you can use it

Remember to avoid demotivational practices, but instead:

- Use a variety of techniques
- Give meaningful assessments
- Include interaction in every class
- Show your passion and knowledge for the subject and care for the students
- Give and receive respect
- Review previous class, keep on track with learning goals

Is there a demotivational practice you sometimes use? How can you change it?

Interactive Teaching in Actuarial Science Workshop 4: Planning Interactive and Effective Teaching

1. "Me, We, You" Structure

    - Active Learning
    - Use a mix of practical and theoretical content
        - Discussion of background
        - Simplified practice
        - Larger more complex challenge
    - Benefits students by scaffolding knowledge
    - "Me, We, You" framework
    - State learning goals every lecture

2. Asking Questions

    - Plan to ask at least 1 question every 5 minutes of class time
    - They don't just happen, you must plan for it
    - Best questions are high level, divergent, structured, single
    - E.g. ask for:
        - The next step in a proof
        - The notation needed for an actuarial benefit
        - Which would be higher or lower
        - What information we're given means in a question
        - Why a result makes logical sense

3. Think-Pair-Share

    - Fantastic way to encourage more participation
    - Keeps class engaged and interested
    - Pose a question or ask for ideas, then:
        - Give time for students to think on their own and write down ideas
        - Pair with a partner and compare ideas
        - Share with the class
    - Students are much more likely to share an idea someone else also has

4. Polling Class

    - Can do formally or informally
    - Identify misconceptions, fix early
    - How to do it:
        - Ask question
        - Vote
        - Discuss in pairs
        - Re-Vote
    - Useful to get class going at start with review or warm-up question

5. In-Class Assignments

    - Questions focusing on topics from class
    - Particular focus on confusing concepts
    - Threshold concept: something that transforms your understanding of a subject and once learned cannot be unlearned
    - Instructor actively assisting
    - Graded (mostly for effort) and returned
    - Solutions posted promptly

6. Jigsaw

    - Phase 1:
        - Divide into groups and assign each group a topic
        - They summarize the key points
    - Phase 2:
        - Create cross-sectional groups
        - Students take turns presenting the summaries to their peers
    - Benefits students by
        - Opportunity to learn through teaching
        - Providing additional perspectives on material

7. Exploratory Activities

    - When approaching a new topic or threshold concept
    - Allow students to discover knowledge on their own
    - Examples:
        - Multinomial distribution
        - Markov Chain communication
        - Brownian Motion derivation

8. Facilitated Class Discussion

    - Professor acts as facilitator instead of instructor
    - Unstructured student debate
    - Guidance and directed questions
    - Summarize and review
    - Benefits students by
        - Allowing them to reach conclusions on their own
        - Increasing agency and ownership of the ideas

Bonus idea: Teaching Communication Strategies with Lego

Interactive Teaching in Actuarial Science Workshop 5: Developing Interactive Teaching Activities

Choose an activity _____

Choose a topic _____

How can you use it in a specific course? What material will you need? Plan how it would go.

Choose an activity _____

Choose a topic _____

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Choose an activity _____

Choose a topic _____

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Choose an activity _____

Choose a topic _____

How can you use it in a specific course? What material will you need? Plan how it would go.

Interactive Teaching in Actuarial Science Workshop 6: Teaching Large Classes

1. Clickers (Classroom Response Systems)
   - Options: iClicker, TopHat, Kahoot, Socrative, PollEverywhere, Acadly, etc
   - Benefits:
     - Students try out techniques instantly
     - Feedback on student understanding
     - Collect data for examples
     - Increase student engagement
     - NOT simply to increase attendance
   - Drawbacks
     - Creating questions – question banks
     - Time asking questions in class – replace some examples
     - Administrative work – it gets easier
     - Cost to students – free options

2. Brainstorming
   - Choose a topic carefully – introducing a new idea or summarizing
   - Give time to write individually
   - Can use Think-Pair-Share to get things going
   - Don't reject anything, write everything down, only categorize at the end

3. Debate
   - Describe background context
   - Decide on two or more "sides" and physically group students
   - Moderate as necessary but do not judge
   - Summarize/reflect at end on what was said

4. Ungraded Quiz/One-Minute Paper
   - Give a question or prompt
   - Students answer it on a paper in a limited time
   - Collect (anonymous or with names)
   - Can have students swap and "grade" each other's informally
     - Variation: IF-AT cards

5. Blank Index Card Activity
   - Give all students a blank index card
   - Ask them to write their answers, e.g.
     - The "muddiest point" – a lingering question or uncertainty
     - Most important ideas from that class
     - What people want to learn most from the course
   - Collect and analyze, summarize next class

6. Discussion Board/Twitter
   - Continue the learning outside of class
     - Discussion questions
     - Challenge problems/extensions of in-class problems to work on
     - Get suggestions for topics
   - Considerations: Assign topics? Required or optional? Moderation? Smaller groups or full class?

Pick a large course you teach _____

Choose a technique you think will work for you _____

How could you incorporate it into your large class?

Pick a large course you teach _____

Choose a technique you think will work for you _____

How could you incorporate it into your large class?

Interactive Teaching in Actuarial Science Workshop 7: Assessment Design for Learning

What do you want your students to learn/do?

You should test them on those things!

1. High Level Questions on Traditional Assessments

    - Start with a simple calculation → Then some more complex calculations → Conceptual question
    - Prove/Disprove instead of True/False
    - Graph something
    - Apply models to a completely new situation
    - Translate between symbols and words
    - Identify similarities and differences
    - Discuss whether assumptions would hold, if model is appropriate
    - Justify mathematical results logically, comment on interpretation
    - State conclusions/recommendations in context

2. Two-Stage Testing

    - After writing test individually, students complete a blank copy of the test in small groups
    - Use consistent groups, get buy-in, groups must get consensus on answers
    - How to grade: 80% individual, 20% group, other options
    - Time for deliberation and debrief afterward

3. Projects & Reports

    - The best way to learn is to actually do!
    - In-class presentation, report, peer evaluation
    - Develops skills of communication, working with real data, research, teamwork
    - Life Contingencies: summarize papers on recent Actuarial research
    - Stochastic Processes: pick a topic and model it with a Markov chain
    - Experimental Design: design, conduct, and analyze an experiment
    - Forecasting: pick a topic, find data, and forecast using models
    - Other: Persuasive presentations, Re-presenting material from a conference based on slides and audio recording, Short presentations of news articles

4. Pre- and Post-Course Questionnaire

    - Answer questions about course material and rate confidence in answers
    - After course, give the same questions
    - Show students how their confidence and knowledge have grown

5. Oral Exams

- Essential point: two-way oral communication
- Small classes for upper year students, sufficiently conceptual material
- Questions: define _, discuss advantages and disadvantages of _, compare _ vs _, describe the process for _, how would _ change if _
- Drawbacks
    - Language barrier
    - Nerves
    - Not as objective (the “halo” effect)
    - Time
    - Academic dishonesty
- Solutions
    - Give students time/practice to prepare
    - Have it not worth an extremely large %
    - Allow students to bring in notes
    - Have a clear marking scheme/rubric
    - Only use when class size permits
    - Have a bank of questions and randomize

6. Video Assignments
    - Students create videos in groups, explaining a course concept in a fun, interesting way
    - Learning through teaching
    - Grade for: Correctness / Accuracy, Creativity / Passion, and Communication / Quality
    - Uses: Review material, inspiring the next term

Pick a Course you teach _____

How can you assess them on the skills you want your students to learn?

Skill	Assessment plan

Interactive Teaching in Actuarial Science Workshop 8: Inclusive Education

Universal Design = spaces/products designed to be used by as many people as possible

Universal Design for Learning = course design/delivery/assessment so diverse students can participate to the best of their ability

Improving Cognitive Access

- Use a range of instructional techniques
- Activities, small groups, peer learning
- Use different kinds of assessment
    - Take-home vs in-class
    - Multiple-choice vs short answer vs full solution vs writing
- Representative practice tests
- Study guide – clear expectations of what they should know
- Provide flexibility e.g. answer X of Y questions, choose a topic and…

Improving Content Access

- Begin classes with learning goals, summarize key points
- Repeat questions before answering
- Clear grading criteria for assessments ahead of time
    - Rubric
    - Examples of good/poor work
    - Checklists
- Make notes of common errors and report back to students
- Allow re-writes, important to see growth

Improving Communication Access

- Build a community of learners
- Explicitly state community values, introduce students to each other
- Promote interaction and group work
- Prepare for the workplace

Improving Physical Access

- Includes both classroom and online
- Make resources easy to find
- Due dates on dropboxes
- Course calendar with all dates of tests/assignments

Consider a learning objective _____

How do you assess it? _____

Is there only one way to assess it? Is every aspect of your assessment necessary?

Can it be adapted to be more inclusive? Think of different ways you can assess or provide choices

Alignment / Course Mapping

- What do you want your students to learn? – Learning Objectives
- What will you use to teach it? – Activities, Materials, Notes
- How will you test them on it? – Assessment
- How does it relate to the overall course goals? – Course Objectives

What are your overall course goals?

Learning Objective	Activities/Materials	Time	Assessment	Weight

Interactive Teaching in Actuarial Science Workshop 9: Getting and Using Feedback from Students

Formative Feedback

- Middle of term
- Can make changes immediately
- Used for personal growth

Summative Feedback

- End of term after course is over
- May make changes but students will not see
- Used for evaluation

Anonymous Survey

- What should the instructor stop doing?
- What should the instructor start doing?
- What should the instructor continue doing?

Suggestion Box

- Students can submit suggestions any time

Class Ambassador

- A student the other students can go to with concerns

Peer review

- Have a colleague come observe your class
- Talk about your goals for the class and what you want them to watch out for
- Meet afterwards to discuss how it went

Analysis

- Look for trends/patterns, not individual responses
- Look for the "why" – what is the source of the concern
- Consider having someone else summarize results for you

Responding to Feedback

- Summarize the results – transparency
- Most important is to respond to it as soon as possible
- Communicate what changes you will be making and what you won't
    - Things you can change right away
    - Things you will change next term
    - Things you will not change and why
- Will get more quality summative feedback at the end

Mid-Term Feedback Form

The objective of mid-semester feedback is to offer constructive information to your instructor BEFORE the end of the semester. Only the instructor will see this feedback. Your answers and comments will remain anonymous.

1)	The pace of the lectures is…?	Too slow				Too fast
Comments:		☐	☐	☐	☐	☐
		Agree				Disagree
2)	The instructor presents course materials in an organized fashion.	☐	☐	☐	☐	☐
Comments:						
3)	The instructor stimulates student interest in the course.	☐	☐	☐	☐	☐
Comments:						
4)	The instructor explains difficult concepts effectively.	☐	☐	☐	☐	☐
Comments:						
5)	The instructor responds well to questions and comments.	☐	☐	☐	☐	☐
Comments:						
6)	The instructor provides enough practical examples.	☐	☐	☐	☐	☐
Comments:						
7)	The material I am learning will be useful to me.	☐	☐	☐	☐	☐
Comments:						
8)	I am satisfied with my ability to communicate with the instructor outside of the classroom.	☐	☐	☐	☐	☐
Comments:						

What other useful feedback can you offer to your instructor, which might help improve the course?

Interactive Teaching in Actuarial Science Workshop 10: Getting Students to Think Like Actuaries

Ideas for "Think Like an Actuary" elements:

- Brainstorming
  - Insurance products that exist
  - Factors that affect mortality
  - Sources of expenses for insurer
- Explaining
  - Why variance/mean is higher/lower for different products
  - Why mathematical results make sense
  - Insurable interest
  - Would assumptions hold in real life?
  - Effect of age on impaired mortality reduction
  - Guaranteed/simplified issue products
- Ethics/gray areas
  - Charity as beneficiary
  - Debate on genetic testing
  - Concerns with high commissions
  - Professionalism/integrity
- Considering external forces – laws, technology, longevity, etc
  - Impact of self-driving cars
  - Relationships between values
  - Risk Management - Covariance between PVRVs
  - Discuss advantages, disadvantages, and considerations of including certain rating factors in mortality models
- Writing up work professionally
  - Compare choice of two different actual insurance policies for a theoretical client
- Reflect on all the "Think Like an Actuary" questions – what was most interesting?

Choose a topic _____

How can you incorporate "thinking like an actuary" to it?

Choose a topic _____

How can you incorporate “thinking like an actuary” to it?

Choose a topic _____

How can you incorporate “thinking like an actuary” to it?

Choose a topic _____

How can you incorporate “thinking like an actuary” to it?

Interactive Teaching in Actuarial Science Workshop: Exit Survey

	Agree				Disagree
Was the content of the workshop applicable to your teaching?	☐	☐	☐	☐	☐
Did you spend enough time developing ideas for your courses?	☐	☐	☐	☐	☐
Would you recommend this seminar to other Lecturers?	☐	☐	☐	☐	☐

What were the most interesting ideas you will take away from this workshop?

Were there any topics you wanted to hear more about?

Any other comments?