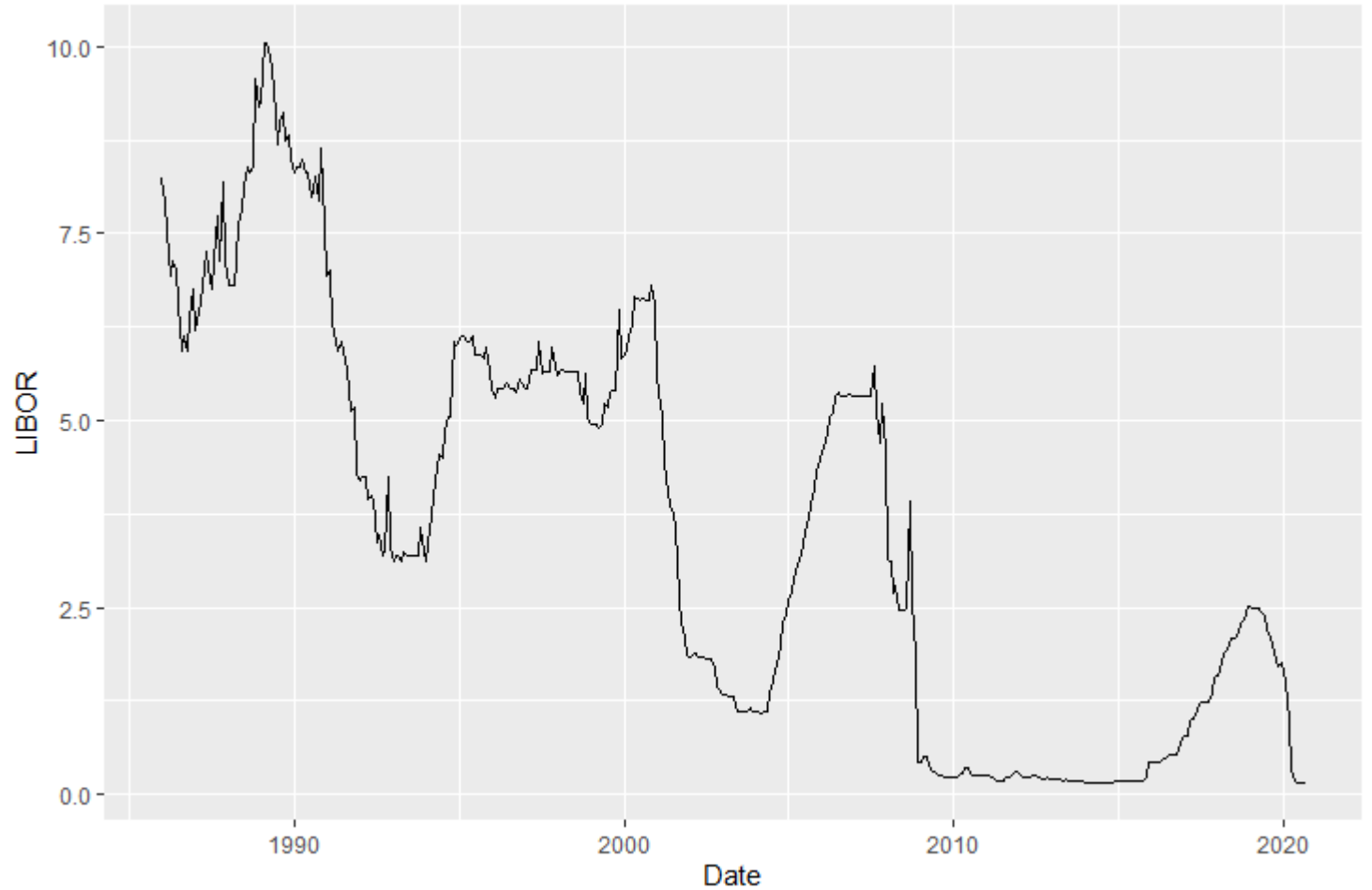


Inquiry-Based Actuarial Science



#DisruptMathFest

Victor Piercey
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#DisruptMathFest

I recognize my privilege as a cis-gendered white man.

In particular, I recognize my privilege to attend this conference in this location without fear for my safety, and without fear of arrest and state violence.

Why Inquiry in Act. Sci.?

Usual Reasons

Developing professional skills

Equity (if done well and with intentionality)

Confidence

Problem Solving

Specific Reason

Improvise in solving exam problems

Context

Ferris State – mid sized public, relatively open admissions

Me – Teach Financial Math, Passed 5 Exams (so far ...)

The Journey

Taught Financial Math in Fall 15, 17, 19, and 21 (and 23... soon)

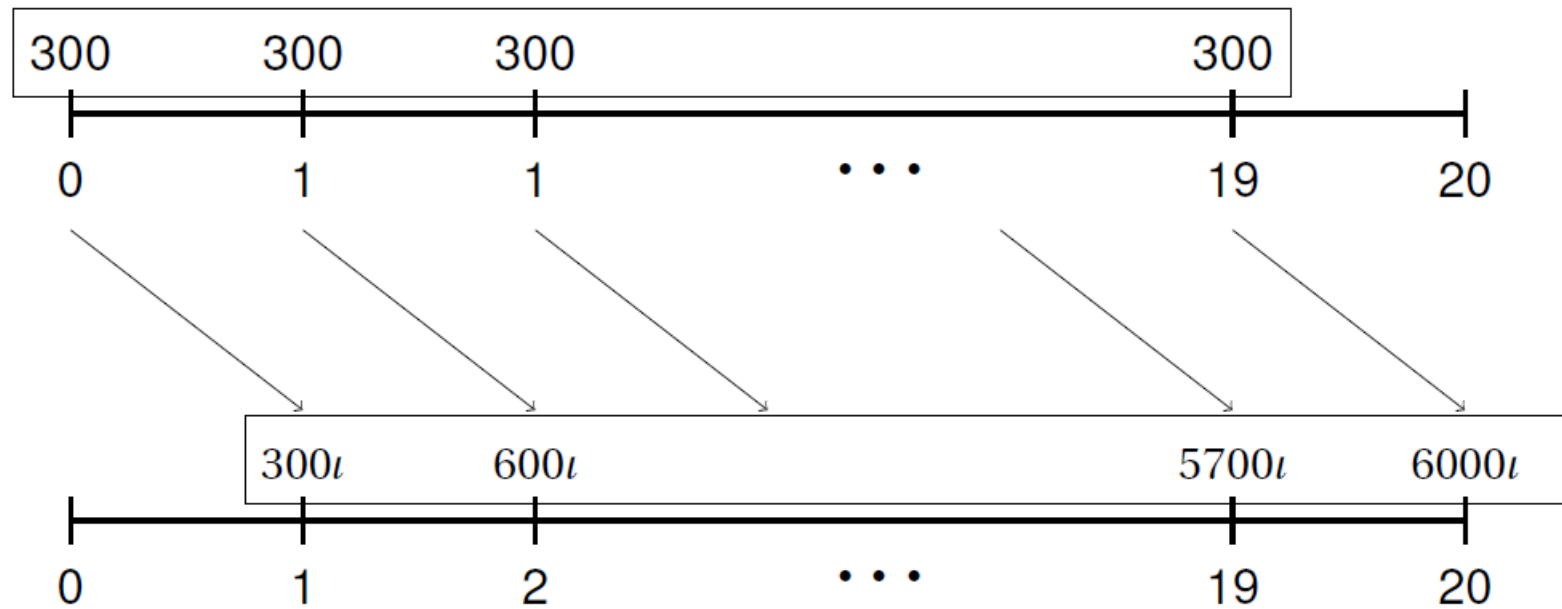
Started with lecture – didn't know subject well enough for inquiry

Added a little inquiry in Fall 17

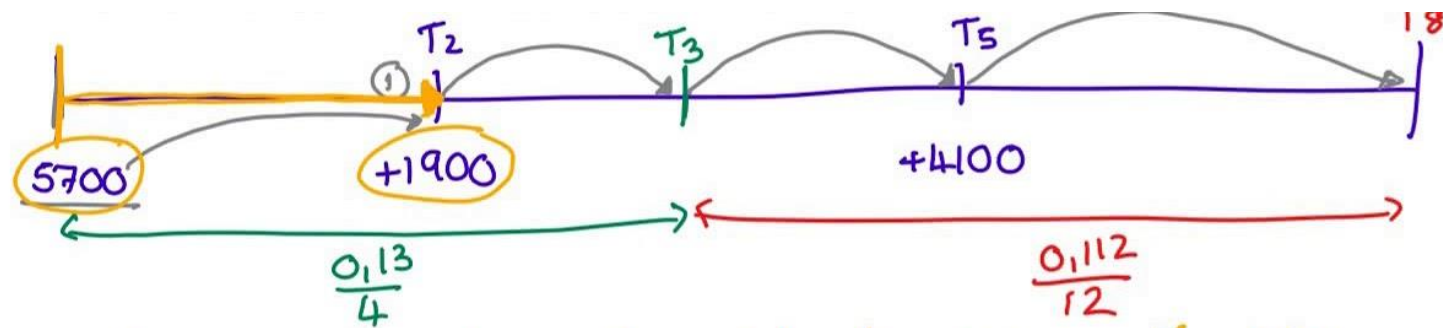
Full inquiry in Fall 19

Inquiry textbook in Fall 21

Single Core Idea: TVM



Early Inquiry: Develop Intuition



- ⊕ You can add and subtract money if you know what is worth @ the same time.
- ⊗ Treat each investment separately and find out what they are individually worth at the end. Then add tog

Example of Approach: Valuation of Annuities

1. Given definition – identify annuities and lump sum in problems
2. Introduce notation – then write equations
3. Derive formulas – use the timeline!!
4. Solve the problems

Later Inquiry: Experiment, Conjecture, Test, Apply



Successful Exam Problem Solving

1. Explore the problem
2. Formulate Strategy
3. Attention to Detail
4. Communicating Results

Key: Expect errors and iteration!

The Coverage Issue



Program Assessment:

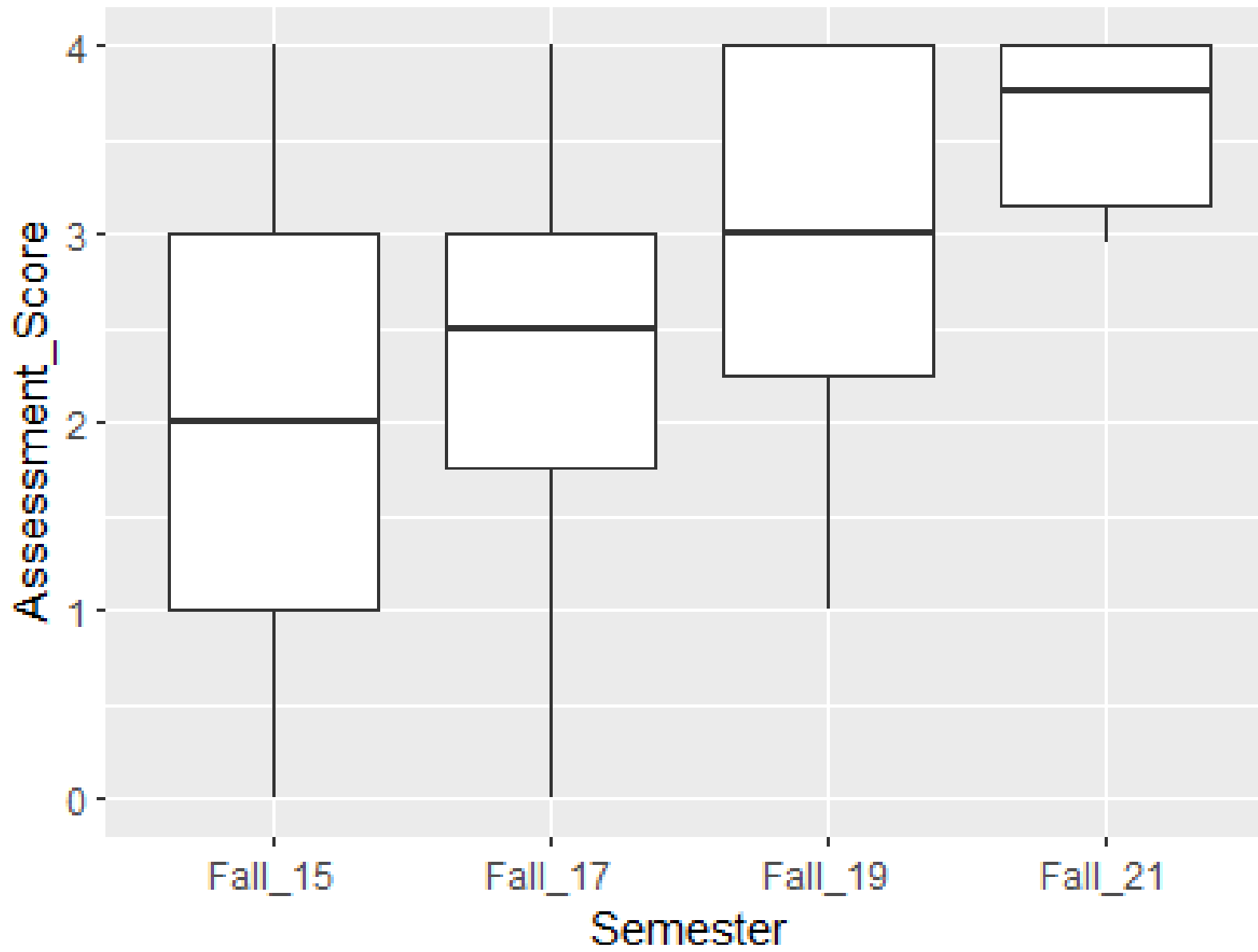
Solve discipline-specific problems

| Score | Interpretation |
|-------|--|
| 10 | Perfect |
| 7 – 9 | Errors in details/minor computations |
| 4 – 6 | Reasonable strategy but didn't work |
| 1 – 3 | Figured something out, but no significant progress |
| 0 | No progress |

Program Assessment:

Solve discipline-specific problems

| Avg. | Assessment Score | Assessment Category |
|--------|------------------|---------------------|
| 9 - 10 | 4 | Advanced |
| 7 - 9 | 3 | Proficient |
| 4 - 7 | 2 | Progressing |
| 1 - 4 | 1 | Beginning |
| 0 | 0 | Unsatisfactory |



Exam Passes/Attempts/Total

2015-16: 3 passes, 4 attempts, 15 total students

2017-18: 3 passes, 3 attempts, 12 total students

2019-20: 4 passes, 4 attempts, 22 total students

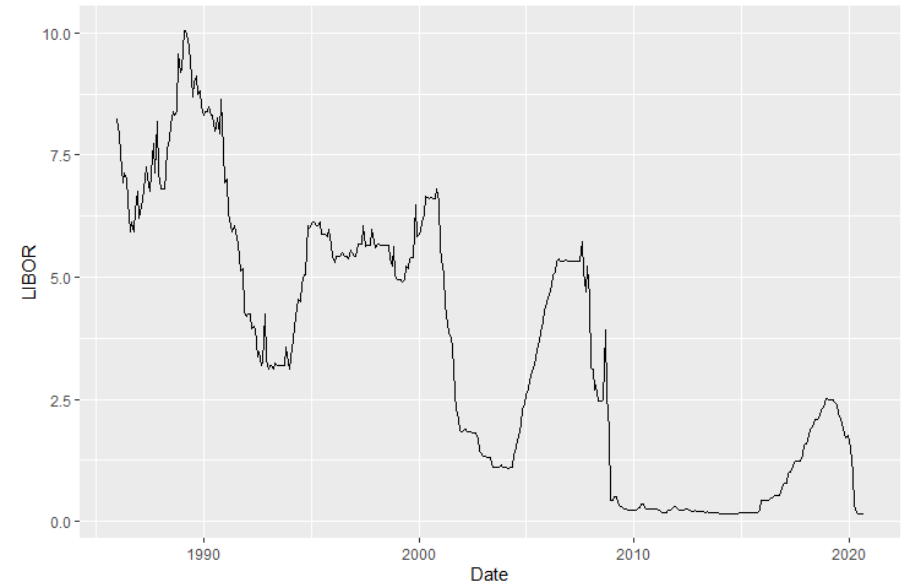
2021-22: 6 passes, 7 attempts, 8 total students

Free Text:

- Ethics/Social Justice
- Attention to Problem Solving
- Integrated Calculator Support
- Exercises (On-Ramp to Problems)
- Just-in Time Review

Future Updates:

- PreTeX
- Integrated Coding
- Correct the Errors



Questions? Comments?

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