Lessons Learned Introducing TRIZ in a Creativity and Innovation Course

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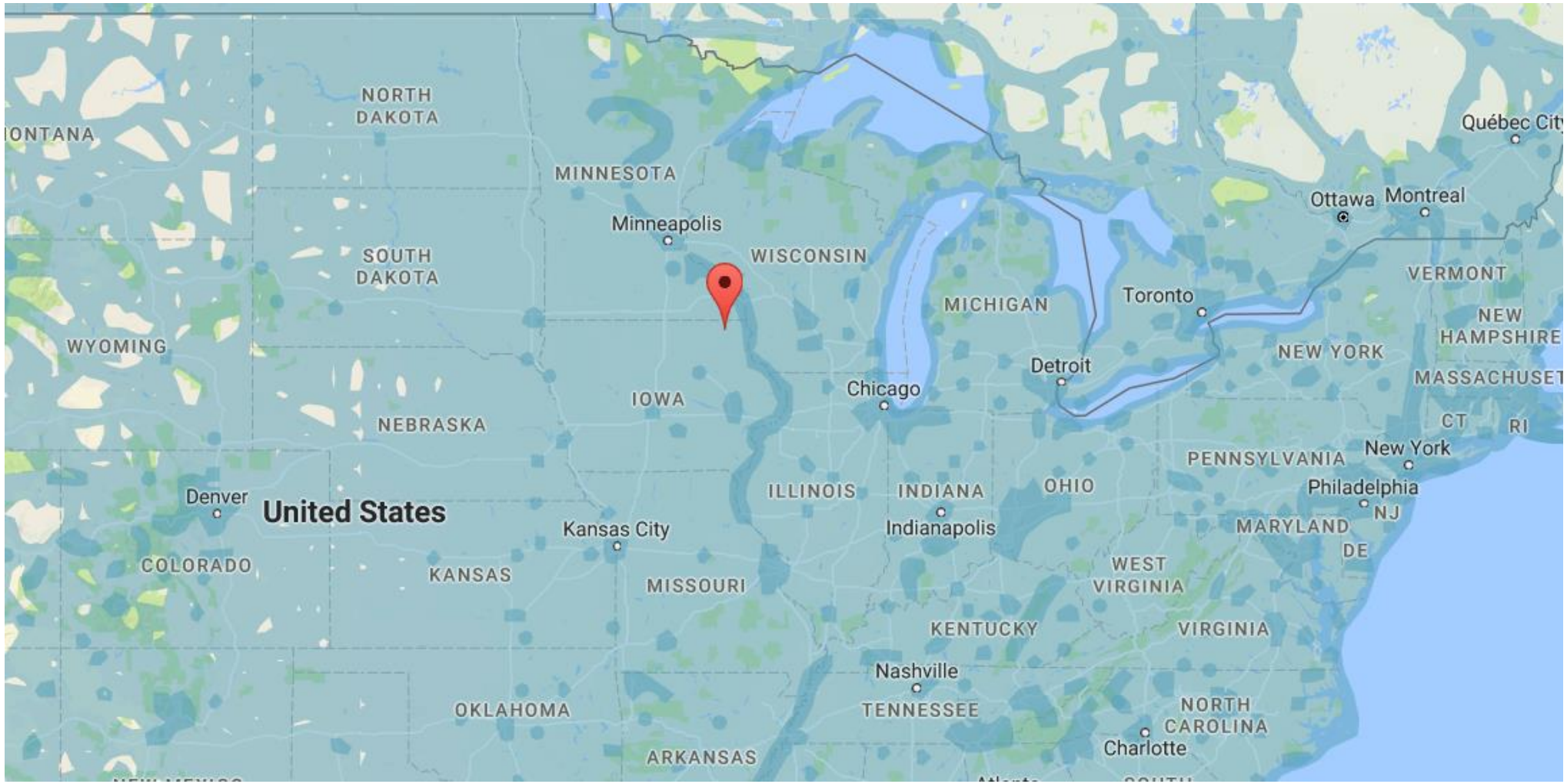
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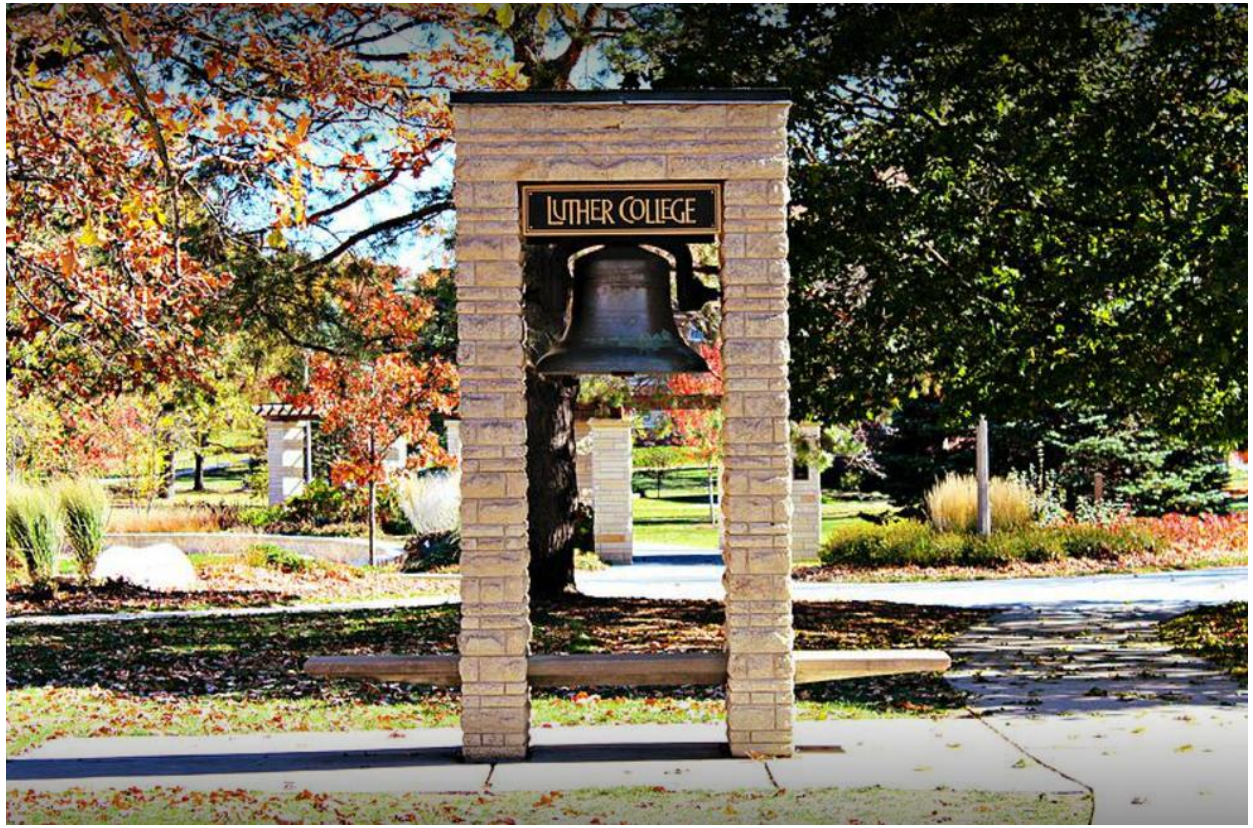
Background and Context

Institution and Course Participants



Management 366: Creativity and Innovation

Course Description

Students learn and apply specific creativity and systematic innovation methodologies (lateral thinking, TRIZ, etc.) used for generating ideas, modifying existing products, and solving contradictions that block innovation. Students examine the dynamics associated with developing and sustaining organizational cultures that foster innovation and make ideas a central part of work. Other course topics include collaboration, improvisation, rapid iteration/prototyping, design thinking, reverse innovation, and open innovation. Students learn to create sustainable competitive advantage through entrepreneurial and intrapreneurial innovation.

Course Objectives

- Expose students to different creativity methodologies, tools, and techniques.
- Provide students with opportunities to apply and reinforce what they learn through in-class exercises and out-of-class application assignments.
- Expose students to different forms of disruptive innovation.
- Expose students to different innovation methods and processes (e.g., stage-gate, rapid iteration/prototyping, open innovation).
- Expose students to the theory and practice of Reverse Innovation.
- Introduce students to TRIZ and structured innovation.
- Introduce students to Design Thinking and Human-Centered Design.
- Introduce students to the dynamics associated with developing and sustaining organizational cultures that foster innovation and make ideas a central part of work.
- Provide students with the opportunity to develop their own model or framework of creativity.
- Provide students with the opportunity to develop their own model or framework of innovation.
- Provide students with opportunities to work in groups and teams.

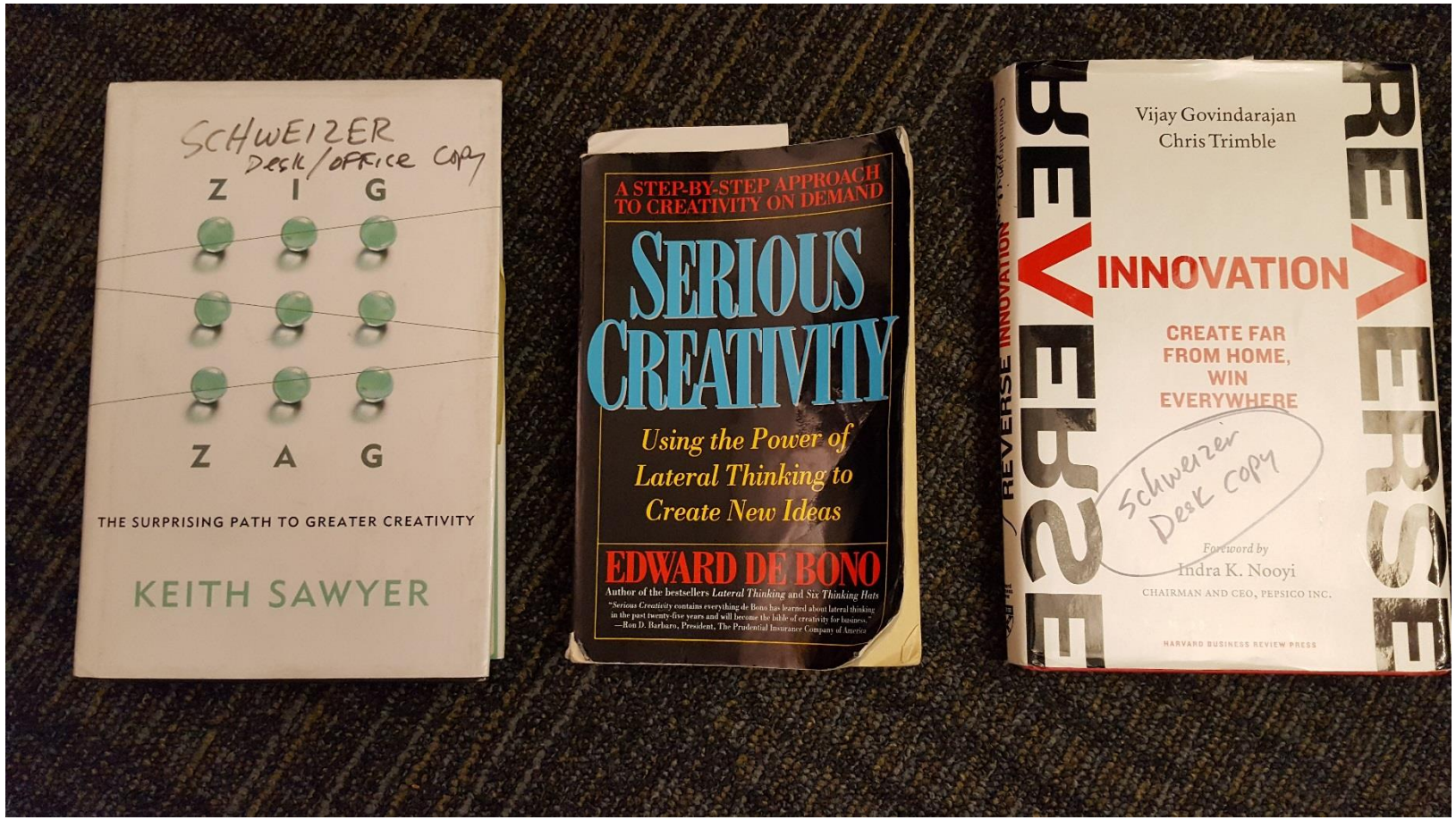
Learning Goals

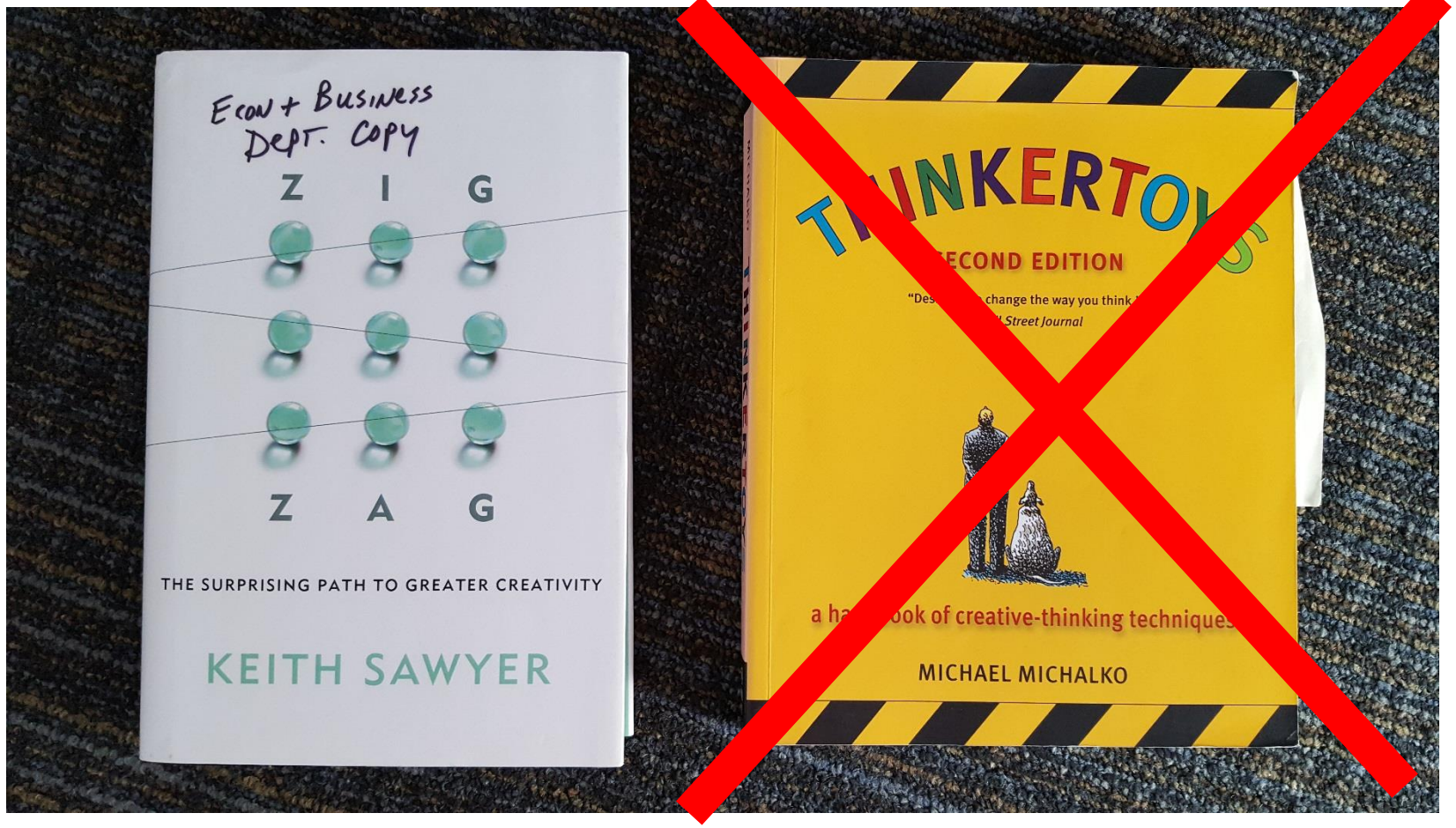
- Apply specific creativity techniques to generate, capture, and assess new ideas.
- Apply creativity techniques to generate ideas in order to solve problems.
- Present to the class a formal analysis of a potentially disruptive product.
- Select the correct innovation method to match situational factors.
- Develop and present to the class a Reverse Innovation product example.
- Apply TRIZ to problem formulation and resolving contradictions.
- Apply Design Thinking to a scenario.
- Describe factors that lead to organizational cultures in which innovation thrives.
- Explain one's own model or framework of creativity in writing.
- Explain one's own model or framework of innovation in writing.
- Participate in a variety of group and team activities, both inside and outside of class.

Current Course Design

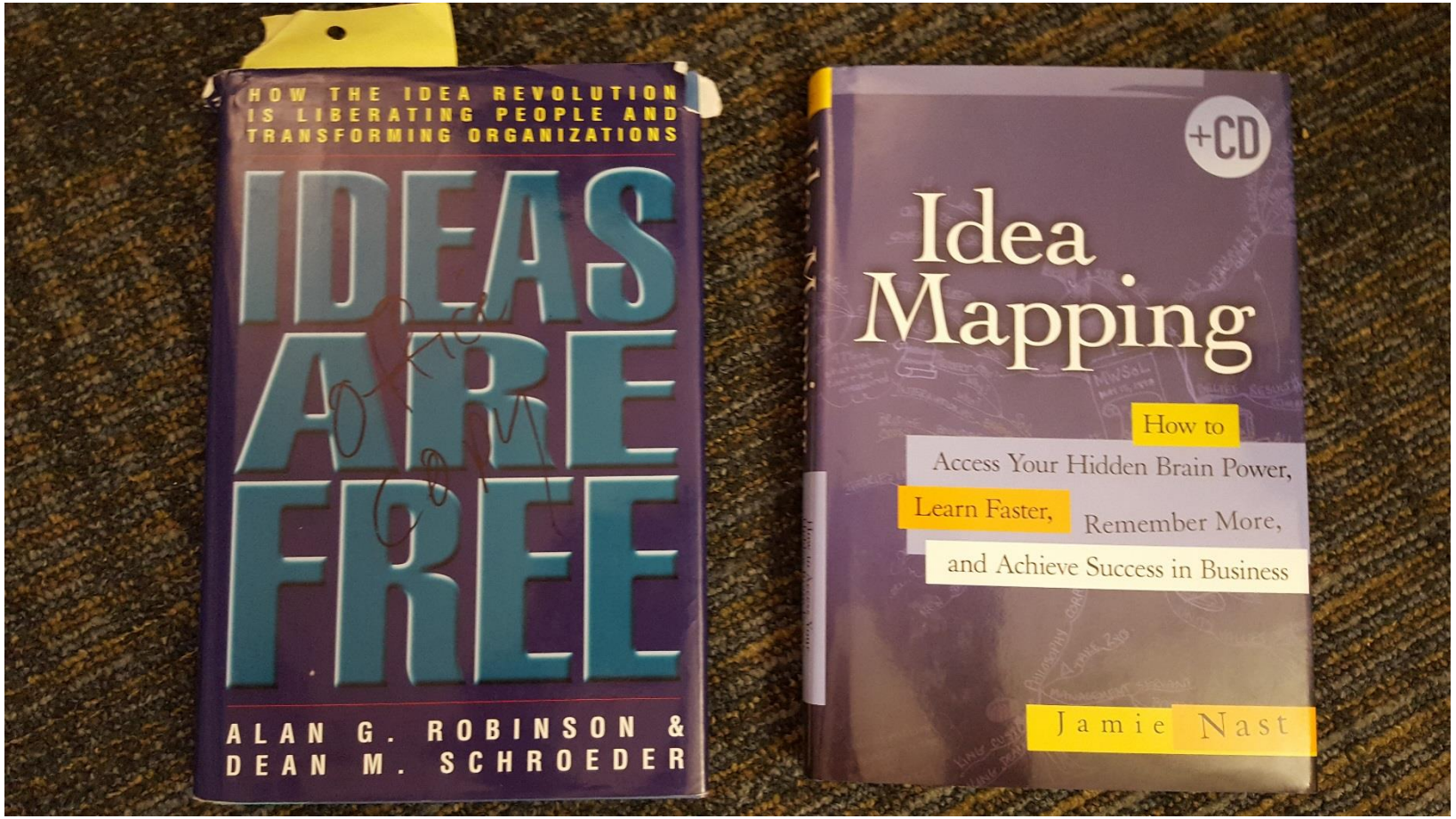
- One Semester
- Monday nights
- 3 Hour Format
- Readings
- Reading Check Quizzes
- In-Class Activities (learn and practice the tools)
- Application Exercises (apply the tools)

Main Non-TRIZ Texts




Econ + Business
Dept. Copy
Z I G
Z A G
THE SURPRISING PATH TO GREATER CREATIVITY
KEITH SAWYER
THINKERTOYS
SECOND EDITION
MICHAEL MICHALKO

Supplemental Non-TRIZ Texts

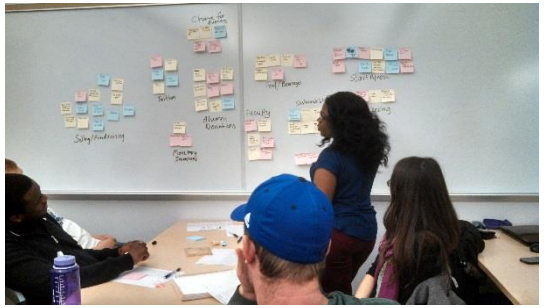


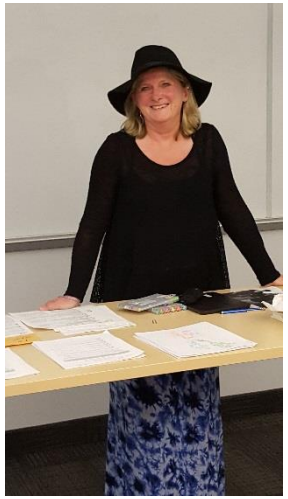
Non-TRIZ Course Content

- Zig Zag Toolkit (Phoenix, 5 Whys, RCA, Idea Log, Long Arrow, SCAMPER, Affinity Diagram, PMI, etc.)
- Mind mapping
- Six Thinking Hats
- Lateral Thinking
- NGT
- Human Centered Design
- Improv
- Reverse Innovation
- Assessments

Things That Worked

Monday Night 3 Hour Format





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Moodle (On-Line Learning Platform)

Reading Check Quizzes

These are <u>not</u> open book quizzes. All aspects of the Luther College Honor System apply to these quizzes, whether given online or in class.

The online quizzes should be completed on campus with a reliable internet connection (one that will not disconnect). Do not take the online quizzes off campus. The response time for Katie quizzes is much, much slower off campus, so you may not finish the quiz before it closes. Off campus connections are also more likely to drop the connection. If the quiz closes or you lose your connection, your quiz score is calculated based on what you had completed up to that point.

- Serious Creativity Introduction and pp. 3-42 - This quiz will be given in class on Monday, Sept. 4
- Zig Zag Introduction pp. 1-18 - This quiz will be given in class on Monday, Sept. 4
- Serious Creativity, pp. 43-73 - Due Thursday, Sept. 7 by 11:30 pm
- The Ideal Result, Introduction-Chapter 3 - Due Sunday, Sept. 10 by 11:30 pm
- Zig Zag Step One: ASK, pp. 19-48 - This quiz will be given in class on Monday, Sept. 11
- Serious Creativity, pp. 77-103 - Due Thursday, Sept. 14 by 11:30 pm
- The Ideal Result, Chapters 4-8 - Due Sunday, Sept. 17 by 11:30 pm

Application Assignments Turned in for Credit or Evaluated During Class (may include some in-class work)

Creatrix Instrument Results - Complete by Friday, Sept. 1

Complete the Creatrix instrument by Friday, Sept. 1, using the instructions sent by email. Print a copy of your results and bring the printed copy to class. You must complete the assignment online by Friday, Sept. 1. Bring the printed copy to class on Monday to receive credit for the assignment.

Personal Creativity Assessment scores from Zig Zig, pp. 13-18 - Due Monday Sept. 4 before class

Complete the Google form that was sent to your Luther email address. The form allows you to enter your 8 Personal Creativity Assessment scores as well as your Last name and First name. You need to complete and submit the form to receive credit for the assignment. You must complete the assignment *before* class on Monday, Sept. 4.

Mindmap Assignment - Due Monday, Sept. 4 at the end of class

Turn in your "Who Am I?" mind map at the end of class.

Mindmap Assignment - Due at the end of class.

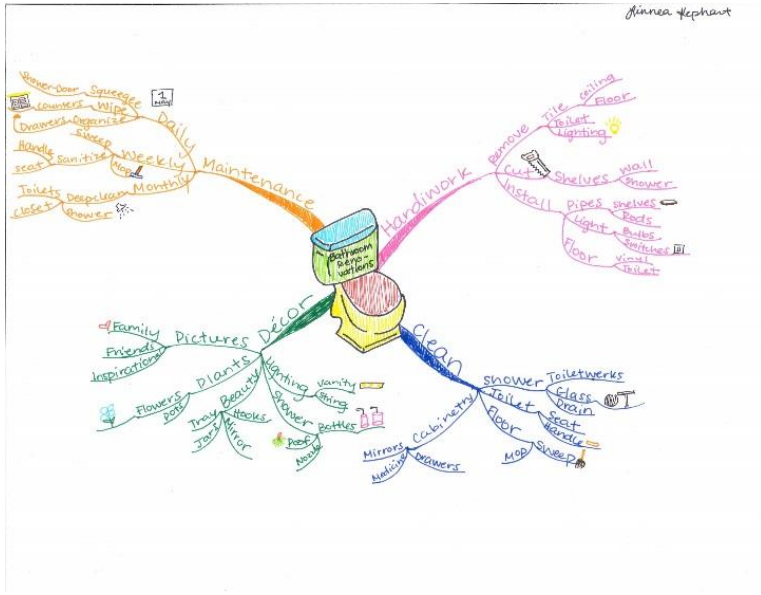
Mind Map called "Who Am I?"

Note: The map should follow the Idea Mapping guidelines we discussed in class and that appear on the handout you received.

1. Make sure your name is clearly legible on the front side of the map.
2. On the back of the map, write "permission to share" only if I have permission to scan your map and share it with Jamie Nast, who may post it on her blog.

General Methods of Instruction

- Readings
- Reading Check Quizzes
- Lectures to clarify reading (iPad with GoodNotes)
- Experiential learning
- Practice tools in class
- Apply tools outside of class



Assessments with Debriefing Sessions

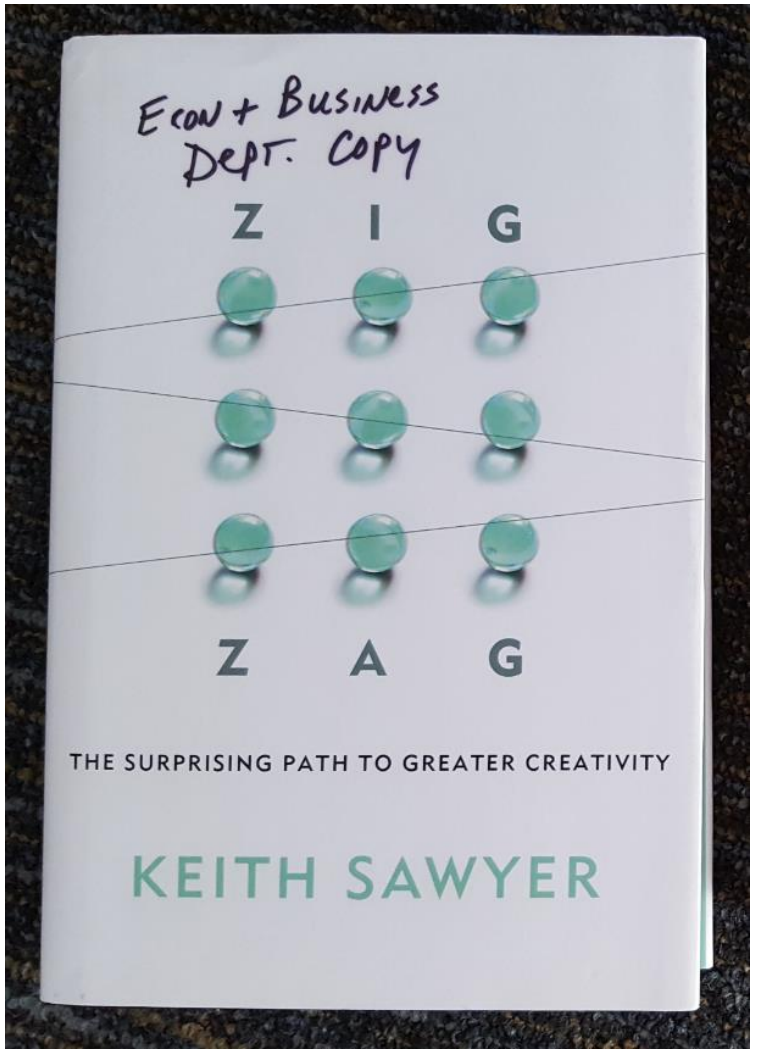
In-Class Exercises

Application Exercises

- Practice (repetition)
- Check for Understanding/Gaps

Zig Zag Framework

1. Ask
2. Learn
3. Look
4. Play
5. Think
6. Fuse
7. Choose
8. Make



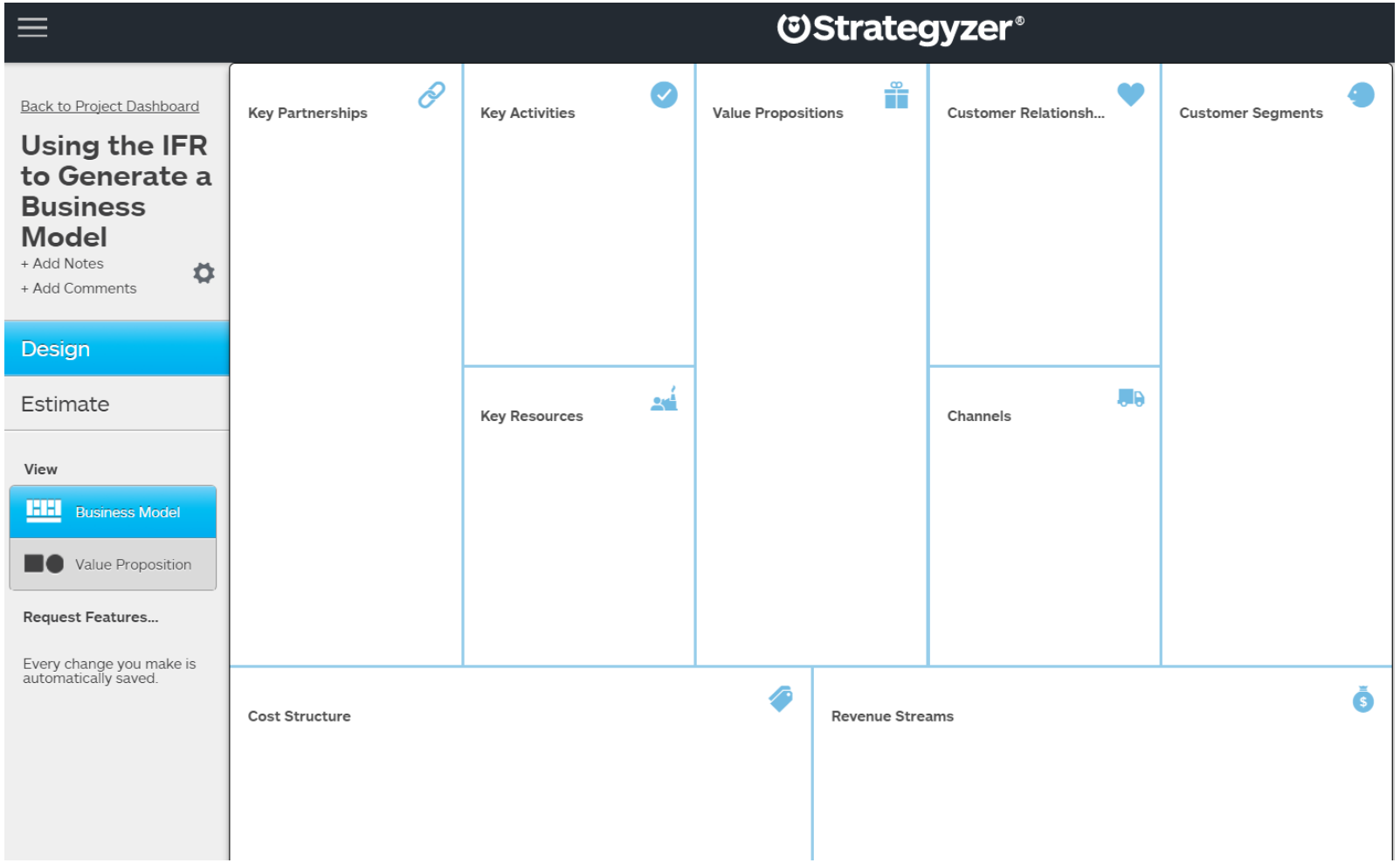
Specific TRIZ Methods of Instruction

- Readings
- Weekly lectures to clarify readings
- Reading Check Quizzes
- Demonstrations
- In-class exercises
- Application exercises (done out of class)

40 Principles Applied to a Hobby

- Think of one of your favorite hobbies/activities. For that one hobby/activity, select only five of the 40 Inventive Principles that you can see have already been applied to that hobby/activity. (Use the same hobby/activity for each of the five principles.)
- For each of the five principles you select, explain how the principle is already used in that hobby/activity.
- For each of the five principles you select, explain what problem(s) that principle solves by being applied to the hobby/activity.
- Summary: So, your answer will look like this (you will do this 5 times).
- Principle:_____
- Your explanation or description of how the principle is used:_____
- The problem the principle solves is:_____
- Please use proper language and grammar.
- Upload your file containing the principles as you see them applied to your hobby/activity.
- Upload your file using a common file format (Word, Open Office, pdf, etc.). Remember to put your name on the top of the document.

IFR Applied to Business Model Innovation



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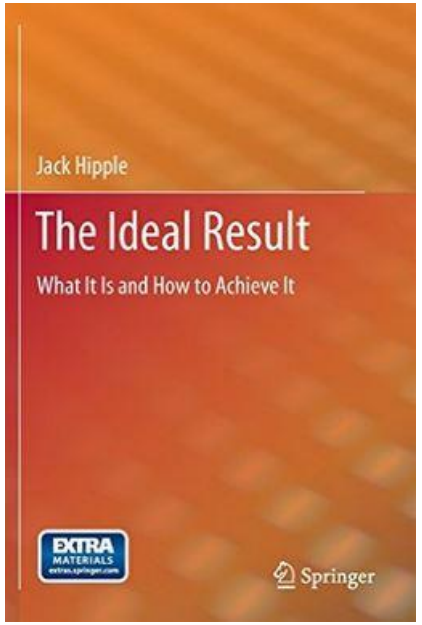
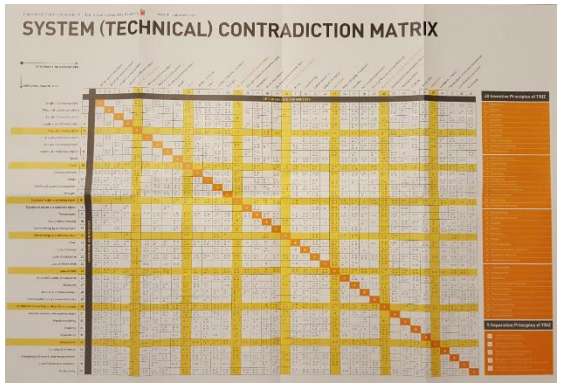
TRIZ Course Resources

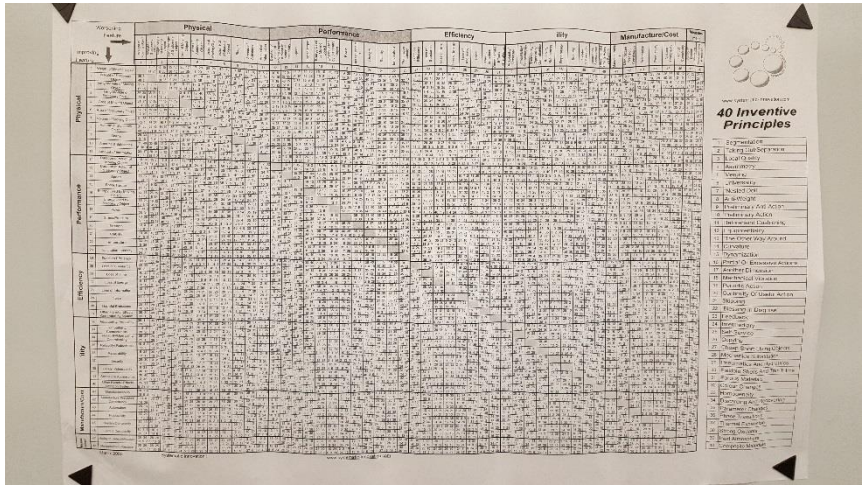
- Books
- TRIZ E-zines
- “Innovation” E-Newletters
- Websites
- My TRIZ Files



SPRING WISE

MORE INSPIRATION





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Problems Encountered

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SCOPE?

Selecting Correct Resources

Selecting Topics

- Nine Screen Vision of System Evolution
- Laws and Stages of System Evolution
- Ideality
- Technical and Physical Contradictions
- 40 Inventive Principles
- Resource Analysis
- Scientific Effects and Knowledge Databases
- Su-Field Modeling and 76 Standard Inventive Solutions
- MATCHEM plus Information
- ARIZ 85-C
- IFR
- Tools for Overcoming Psychological Inertia
- STC/DTC, MMD/SLP
- Reverse TRIZ
- Function Modeling
- Trimming

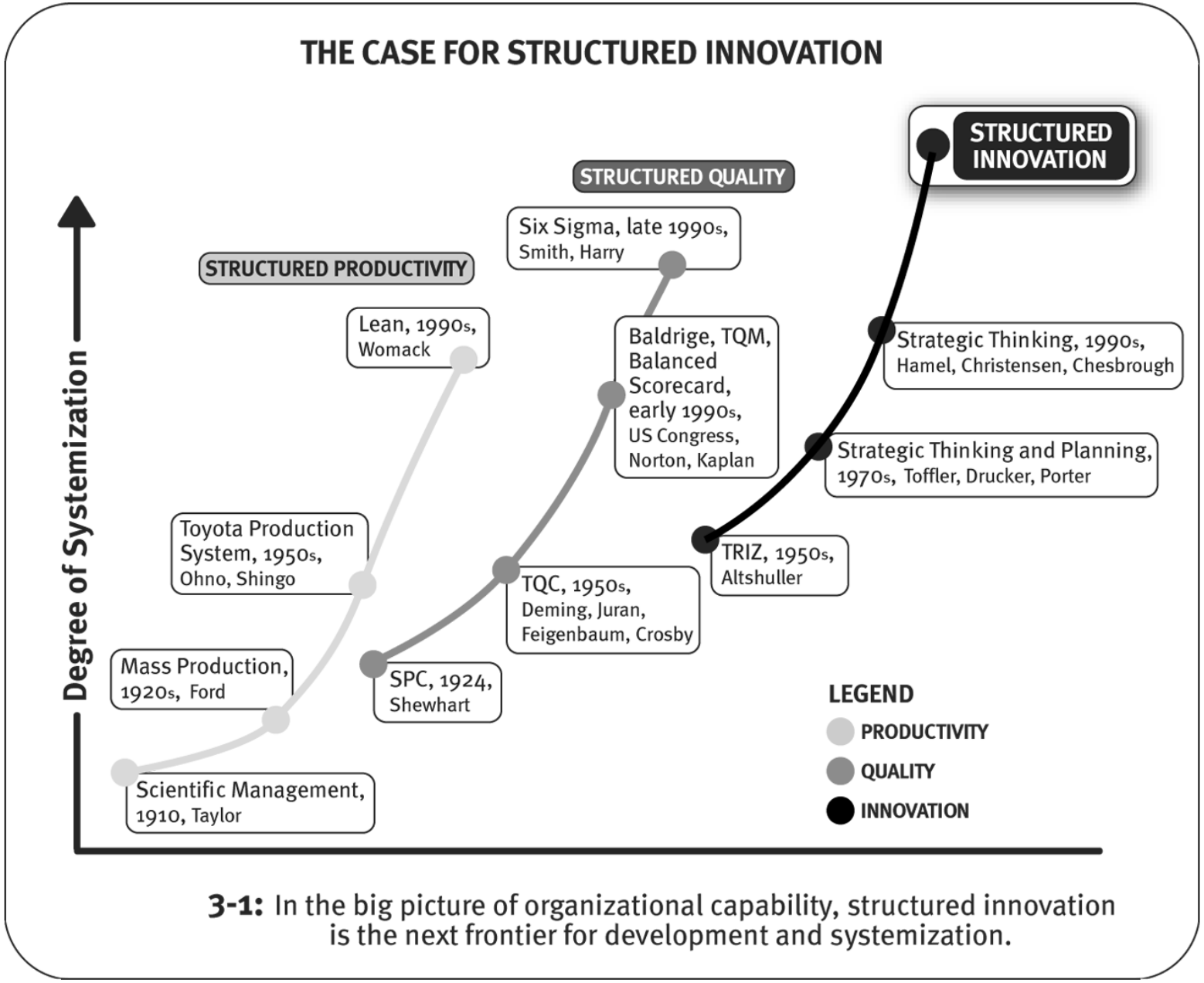
Application Assignments

- Pitched at the correct level
- “Over Students’ Heads”
- Resonate with individuals
  - Hint: Have them select the problem

Benefits of Introducing TRIZ in This Academic Setting

Permanently Change Thinking

Generating Awareness of TRIZ



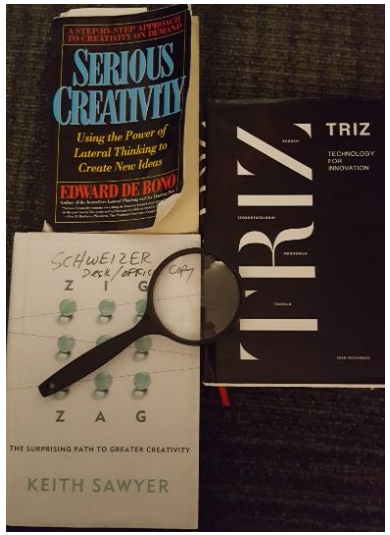
3-1: In the big picture of organizational capability, structured innovation is the next frontier for development and systemization.

Source: *Insourcing Innovation*, p. 13. Silverstein, DeCarlo, Slocum. Used with Permission.

Compare and Contrast Methods/Tools

Understand Differences

- Having different content in same course can be good
- Differences are magnified
- “Focus on the Difference”



Examples of Differences

- TRIZ versus “generating lots of ideas”
- TRIZ provides stronger problem definition (more likely to be working on the right problem)
- TRIZ based on science versus methods based on psychology
- Identifying contradictions versus setting up provocations

Discover Similarities Among Tools

- Avoid use of jargon
- Structured/systematic approaches
- Role of Perception and Psychological Inertia
- Why/C and trimming
- OPV = Different IFRs based on stakeholders
- Rise to the Occasion (based on CIA Phoenix checklist) item 8 is the same as “parallel universe”
- Stretch and Squeeze can direct thinking is ways similar to the Principle of Solution by Abstraction
- Reverse is similar to Reverse TRIZ
- Go Back from the Future (BFF) similar to IFR
- Exaggeration Provocation similar to STC Operator
- Wishful thinking provocation and IFR
- Divergent and Convergent thinking

Challenges of Introducing TRIZ in My Academic Setting

Time Constraint – One Semester

Lack sufficient time

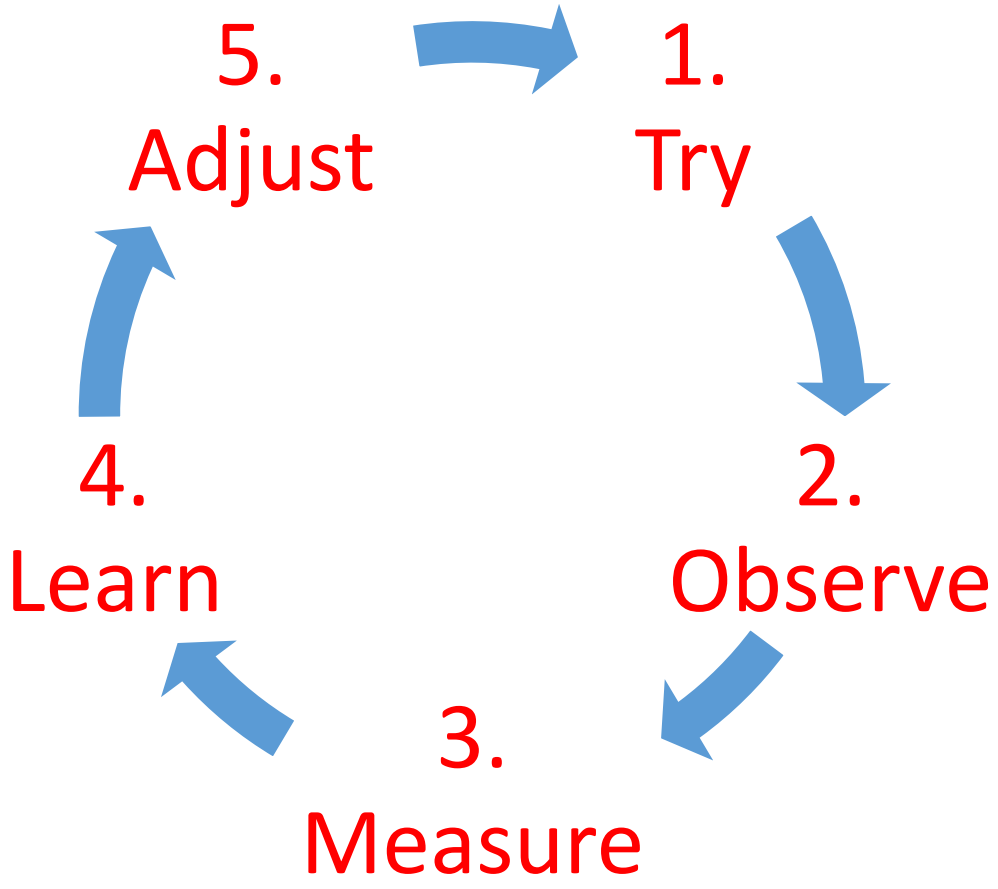
Non-Technical Students

Mixed Methods/Tools

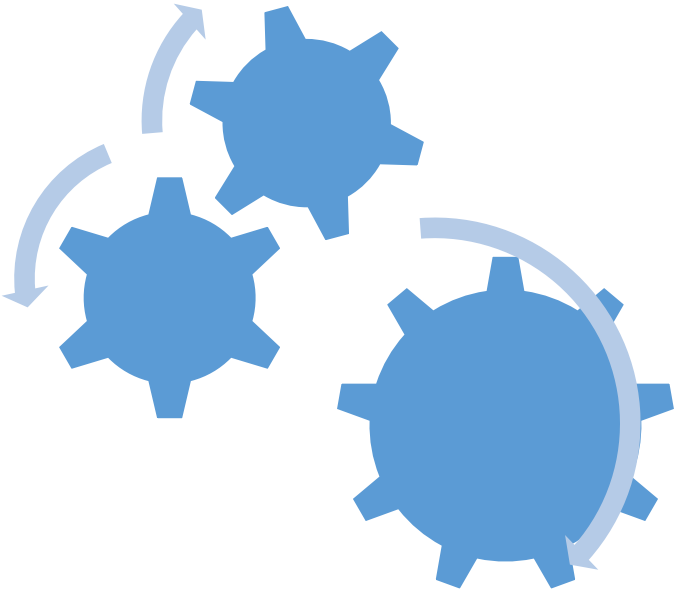
- Possibility of confusion
- Possibility content overwhelms students
- Risk that students will gravitate towards tools that are easiest to understand, rather than the most useful or powerful tools

Implications/Directions for Future Research

More iterations



Sharing Experiences in Academic Settings



Conclusion

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Questions

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