Three Finger Summary & Issue Trees

TH!NK Faculty Workshop
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Goals For Today’s Workshop

At the end of this workshop you should be able to…..

- Create a “3 finger summary”
- Develop an Issue Tree
- Identify a potential (in/out of class) assignment that can utilize one of these techniques
What the research tell us.....

- Experienced professionals:
  - Spend more time understanding and defining “the problem”
  - Spend more time in problem scoping & information gathering
  - Think broadly about “the problem’s” constraints
  - Consider assumptions and perspectives of others
  - Evaluate many alternatives

- Undergraduate students:
  - Sacrifice quality for speed
  - More prone to bias
  - Struggle to identify constraints
  - Consider less alternatives
Defining the Problem Using the Three Finger Summary Technique

What steps do your students typically take at the outset of an assignment to define their problem or develop their hypothesis?

What challenges have you observed during this process?

Spend 99% of the effort defining the problem and 10% solving it – Albert Einstein
Articulating the Who, Why, and How: 3 Finger Summary

Given a case study, research problem, societal issue.....define

The Situation
- What is the problem setting?
- What defines the situation?

The Complication
- Why does something need to change now?
- “Recently,...”

The Key Question
- What issue are we trying to resolve?
- What are we focusing on?
Classroom Example: Nail Polish Manufacturing Downtime

“Changeovers between different shades of nail enamel at the Revlon facility are taking much longer than the machine manufacturer claimed, causing an increase in time that the production line is down. Management at the facility has recognized that lost production is a problem but has not had the resources to come up with a solution. How can the current process be optimized to reduce changeover time and thus reduce time that the line is not running?”
TH!NK Skills and Behaviors

3 Finger Summary

- Raising Questions
- Formulating problems

Issue Tree

- Gathering and assessing relevant information
Two Types of Issue Trees

Issue tree (scoping)

- Use early in the project when the problem is new
- Use to help structure the project plan and analysis

Statement tree (policy analysis)

- Use when you can propose a hypothetical solution to your problem
- Use it to help structure the conclusions, recommendations and storyline
3 Steps to Developing an Issue Tree

Step 1: Start with the project question

Step 2: Then ask what questions do I need to answer in order to be able to answer the first question?

Step 3: Iterate and evaluate
Simple Example: Student Savings Plan

How can I have more money at the end of the month without going into debt?

- Increase income
  - Receive a windfall
  - Receive more $ from investments
- Reduce expenses
  - Pay less
  - Buy less

How?

- Legally
- Illegally
- Work more hours
- Make more per hour
- Buy lower quality
- Shop for sales
  - Food
  - Clothing
  - Entertainment
  - Travel
  - Other
Head Quarters Taxidermy is a leading manufacturer of molds and habitats used for taxidermy purposes. Recently, their demand has exceeded the capacity of their current production facility leading to long customer lead times. How can our team create a more efficient process to allow HQ to mass produce their habitats?
Classroom Example: Taxidermy Process Improvement Senior Project

Level 1
How can our team create a more efficient process to allow HQ to mass produce habitat materials?

Level 2
How does the floor layout affect process?
- How does space require limit productivity?
- How can we automate order system?

Level 3
- Does increasing and rearranging the Habitat station layout affect productivity?
- Does applying ES to workstation affect productivity?
- Could new facility yield better streamlined process?
- Can current facility be used?
- What software solutions exist based on company scale?
- What is the budget they are willing to spend?
Classroom Example: Autoethnography Research Project

Autoethnography is a genre of writing that explores the researcher's personal experience and connects this autobiographical story to wider cultural, political, and social meanings and understandings through qualitative research.

There is a disproportionate number of undergraduate STEM majors with respect to gender; males are graduating with degrees in STEM fields at a higher frequency than their female counterparts. Recently, there has been an increase in national concern on this issue. How can the retention rates of female STEM majors be increased?
Classroom Example: Autoethnography Research Project

How can the retention rates of female STEM majors be increased?

Why are females discouraged from pursuing?

Why do females abandon STEM disciplines?

What support structures are in place?

What is the impact of secondary ed on students' choice of major?

What kinds of activities are targeted at females that promote STEM?

Does curriculum influence?

Does the university promote STEM?

Are there role models?

Are there communities?
• **Problem solving effectiveness**
  – Helps identify and focus on critical issues, analyse specific key questions
  – Helps to avoid major issues being missed

• **Problem solving/Research efficiency**
  – Avoids duplication of, or unnecessary work
  – Helps structure work pieces of manageable size and complexity
  – Helps explicitly prioritise pieces of work

• **Project management**
  – Disaggregate question/problem into pieces that can be tackled separately by different team members or pairs, or at different points in time
  – Issues tree branches can help to plan workstreams or modules

• **Team building**
  – Strong sense of direction and clarity of roles
  – Common mental model and aspirations
  – Facilitates team contributions

• **Communication**
  – Clarifies team’s thinking to the stakeholders
  – Provides common language across the project
  – Acts as starting point for the story line
  – Shows the shape and direction of work and can communicate the broad outline of the project
  – Tool to focus attention on part of a problem, for example to bound the scope of a meeting
- Quick check of problem understanding
  - During the project proposal phase
  - Prior to data collection/extensive research
- Used during active learning sessions as it is conducive to group related work
- 3 finger summary is a great opener to a presentation
- Issue tree provides a framework for creating a (persuasive) story board
3 FINGER SUMMARY + ISSUE TREE ACTIVITY
Further information & References


3. The Pyramid Principle, Barbara Minto – useful book on using logic to structure thinking, arguments and communication

4. Scoping SDD Projects: Part II: Issues Trees provided by the Australian Government’s Dept of the Prime minister and cabinet
Decomposing the Problem: From Key Question to Work Plan

- Start with the smallest sub-questions of the issue tree—these are the start of your work plan
- Generate a hypothesis for each sub-question
- Envision analysis or research to answer each question—how can you prove/disprove each hypothesis?
- What information is needed?
Common Issue Tree Myths & Limitations

Myths

• Building an issue tree is easy!
• There is just one “right” tree
• Building an issue tree is delaying me from solving the problem

Limitations

1. Often it is important to consider the interrelationships between branches of an issues tree
2. Issues trees do not (by themselves) give a sense of priorities
• Use the MECE principle, trying to ensure that the branches of the tree are Mutually Exclusive and Collectively Exhaustive, so that the problem space is covered efficiently
• All elements at the same level should be of the same nature (consistent)
• Elements should be necessary and sufficient for supporting the previous level (relevant)
• There’s no single correct answer, there are many ways to break up any problem
• Can you break the question down by cohort, by barrier, by action, or some other categorization?
• Branches of the issues tree can correspond to modules or streams of work in a project plan
## More characteristics of good issue analyses

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| **1.** Mutually exclusive, collectively exhaustive | - No gaps, no overlaps  
- Includes a complete and comprehensive list of issues  
- Issues disaggregated into separate “branches”  
  that can be considered independent of the others |
| **2.** Practical and actionable | - Readily provides a plan for splitting up the work among team members  
- Allows sequencing of analysis, as pieces not dependent on each other  
  (or flow of dependency known) |
| **3.** Logical and hierarchical | - Subparts flow into parts that flow into the whole  
- Same level issues at the same level of the hierarchy - abstract and detailed concepts not mixed  
- Order of issues based on some commonly accepted logic (e.g., chronological, importance, size, convention) |
| **4.** Clear and consistent | - Concepts at same level of the hierarchy are parallel, i.e., members of the same class of things or steps in the same process  
- Language used is simple and preferably familiar too  
- All statements phrased as “How” or “What” questions (issue trees) or statements (hypothesis trees) |