Breaking Down the Curriculum - Learning Games

Nate Haut
About the following comments:

1. How many of the numbers have
2. The mean is 50.3
3. The number is inside the circle
4. $42 - 2 = 40$

A committee of 4 should be selected.

A committee of Physics and Math.

No, there are 3 possibilities.

A committee of 6 should contain 1 from Physics and 2 from Math.

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<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Assignment</th>
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<tbody>
<tr>
<td>Week 1</td>
<td>Introductions; Introducing the Research Process</td>
<td>First common reading (with reading questions)</td>
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<td>Read and discuss first common reading</td>
<td>Finishing the summary of Reading 1</td>
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<td>Writing summary of first reading</td>
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<td>Week 2</td>
<td>Summary writing and revision</td>
<td>Reading 2 (with reading questions)</td>
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<td>Start to connect ideas in first two readings</td>
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<td>Week 3</td>
<td>Computer lab visit/Library visit</td>
<td>Start thinking about a research paper topic; identify one possible source</td>
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<td>Finding, choosing and annotating research articles</td>
<td>for research paper</td>
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<td>Paper 1 due</td>
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<td>Week 4</td>
<td>Abstracts; paraphrasing; citation</td>
<td>Reading 3</td>
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<td>Week 5</td>
<td>Analysis and argument</td>
<td>First draft of research question/articulation of research topic</td>
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<td>Week 6</td>
<td>Refining a research question/research topic</td>
<td>Research question with partial annotated bibliography</td>
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<td>Connecting the annotated bibliography with the research topic</td>
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<td>Paper 2 due</td>
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<td>Week 7</td>
<td>The research proposal</td>
<td>Detailed research proposal draft due</td>
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<td>Library session</td>
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<td>Connecting course theme and individual research proposal</td>
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<td>Week 8</td>
<td>The Research Paper – sections; citation; quotation, paraphrase, summary, analysis</td>
<td>Looking at successful research papers</td>
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<td>Week 9</td>
<td>Refining the research topic: subtopics</td>
<td>Work on research paper draft</td>
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<td>Week 10</td>
<td>Modelling synthesis, interpretation, connections, use of sources</td>
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<td>Week 11</td>
<td>Research paper Draft #2 due</td>
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<td>Week 12</td>
<td>Final Exam</td>
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Education Waterfall

Unit 1

Unit 2

Unit 3

Unit 4
• Hard to see
• Hard to catch up
• Hard to fail fast
The “Untruths” of Math
The “Untruths” of math

Must subtract [Big Number] – [Small Number]

Truth: Negative numbers are introduced and perfectly acceptable
The “Untruths” of math

Must subtract [Big Number] − [Small Number]

Must divide [Big Number] ÷ [Small Number]

Truth: Fractions are introduced and perfectly acceptable
The “Untruths” of math

- Must subtract [Big Number] – [Small Number]

- Must divide [Big Number] ÷ [Small Number]

- Never divide a number by Zero, it is impossible!
  Truth: Imaginary numbers are introduced and perfectly acceptable
The “Untruths” of math

- Must subtract [Big Number] – [Small Number]

- Must divide [Big Number] ÷ [Small Number]

- Never divide a number by Zero, it is impossible!
Learning Waterfall

- New Hire Checklist
- Training
- User Documentation
What experiences do you have with waterfall learning?

Identify examples in
- Education
- Work
- Personal

Have you been aware of the waterfall in education?
Break Down the Curriculum

Manifesto

- Individuals and Interactions
- Effective Learning
- Student-Teacher Collaboration
- Responding to Change

Over

- Fixed Lesson Plans
- Assignments and Lectures
- Tests and Grading
- Following a Plan
Psychology of Learning
Psychology of Learning
Learning Community

• Shared Experience
• Shared Knowing
• Shared Responsibility
How Do We Learn

Retention Rates

- Lecture: 5%
- Reading: 10%
- Audio Visual: 20%
- Demonstration: 30%
- Group Discussion: 50%
- Practice by Doing: 75%
- Teaching Others: 90%

Source: National Training Laboratories, Bethel, Maine
How Do We Learn

1. Teaching Others
2. Practice by Doing
3. Group Discussion
4. Demonstration
5. Audio Visual
6. Reading
7. Lecture
How Do We Learn

- Lecture
- Reading
- Audio Visual
- Demonstration
- Group Discussion
- Practice by Doing
- Teaching Others
Demo - Math Wrap-Up!

• Real Time Feedback
• Hands on
• Easy!
<table>
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<tr>
<th>Science</th>
<th>Agile</th>
<th>History</th>
<th>Art</th>
<th>Travel</th>
<th>Geography</th>
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Activity – Build a Curriculum

• Pick a Topic
• Identify your audience
• Brainstorm a game
• Build a prototype!
Why make a game?

- Instant Feedback
- Informal
- Fail, Adapt, Overcome
- Energize

- Energize
- Encourage Interaction
- Add Variety
- Have Fun!
Nate Haut

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