

Looking at Learning

NSF CCLI Meeting
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Cynthia J. Atman, University of Washington

Jennifer Turns, University of Washington

Lorraine Fleming, Howard University

Center for the Advancement of Engineering Education

Robert Mathieu, University of Wisconsin

Center for the Integration of Research and Teaching



Looking at Learning

An Interactive Workshop

Goals:

1. describe what we want to know about our learners
2. describe your innovation with respect to the research findings from “How People Learn”
3. develop a list of research questions we would like the answers to about our learners

Workshop Process

Workshop process: Think/Pair/Share

Think – individually think about some topic

Pair – discussion with a colleague

(someone not in your own discipline, preferably someone you do not know)

Share – group discussion

Thinking about learners

Think: create a list about what you would like to know about the learners in your classrooms (1 min)

Pair: discuss your list with a colleague (2 mins)

Share: generate group list (6 mins)

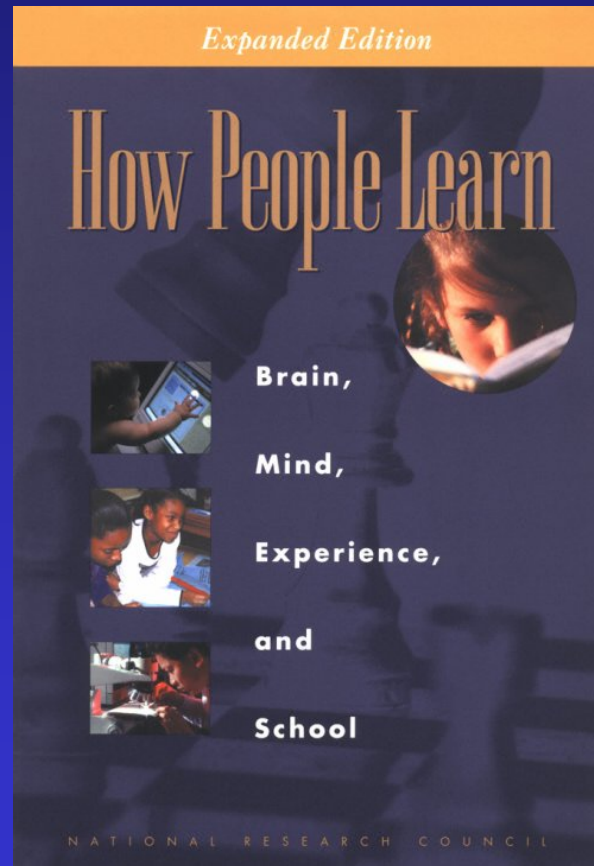
Thinking about your innovation

Think: create a list about what you know about the learners in **your CCLI innovation** (1 min)

Think: create a brief description about **your CCLI innovation** (1 min)

Pair: discuss your list with a colleague (4 mins)

Thinking about your innovation from the *“How People Learn”* Perspective



Describing our innovations in terms of Key Findings *“How People Learn”*

Why?

1 – Credibility

2 – Flexibility

3 - Adaptability

“How People Learn”

Three main findings:

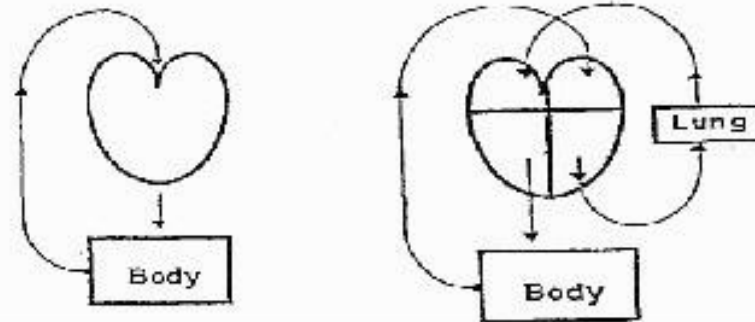
- Students have preconceptions
- Knowledge organization matters
- Students benefit from a “metacognitive” approach to instruction

Preconceptions

1. “Students come to the classroom with preconceptions about how the world works.

If their initial understanding is not engaged, they may fail to grasp the new concepts and information that are taught, or they may learn them for purposes of a test, but revert to their preconceptions outside the classrooms.”

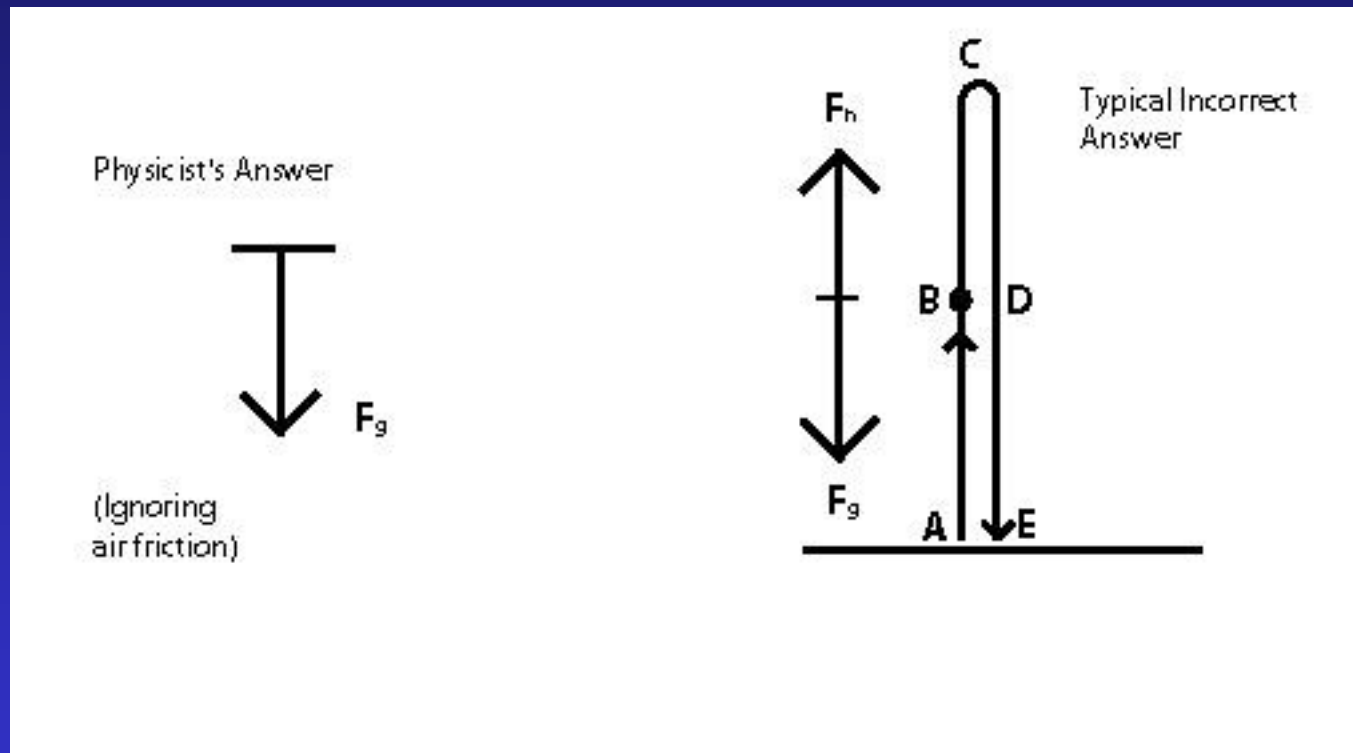
Student Preconceptions



Assumptions	Single Loop	Double Loop
Source of oxygen	Heart	Lungs
Purpose of lungs	Destination of oxygen	Site of O_2 - CO_2 exchange
Number of Lungs	One	Two

Figure 1. Differences in the assumptions between a flawed single loop mental model and the correct double loop model.

Student Preconceptions



Student preconceptions: Applying to your innovation

Think: in what ways does your innovation take into account student preconceptions?
(2 min)

Pair: discuss with a colleague (4 mins)

Share: discuss as a group (6 mins)

Organization of Knowledge

2. “To develop competence in an area of inquiry, students must:
 - a) have a deep foundation of factual knowledge,
 - b) understand facts and ideas in the context of a conceptual framework, and
 - c) organize knowledge in ways that facilitate retrieval and application”
- > Draws on research on expert/novice differences

Expert/Novice differences in physics

Novices' explanation for their grouping of two problems

Problem 7 (23) Problem 7 (35)

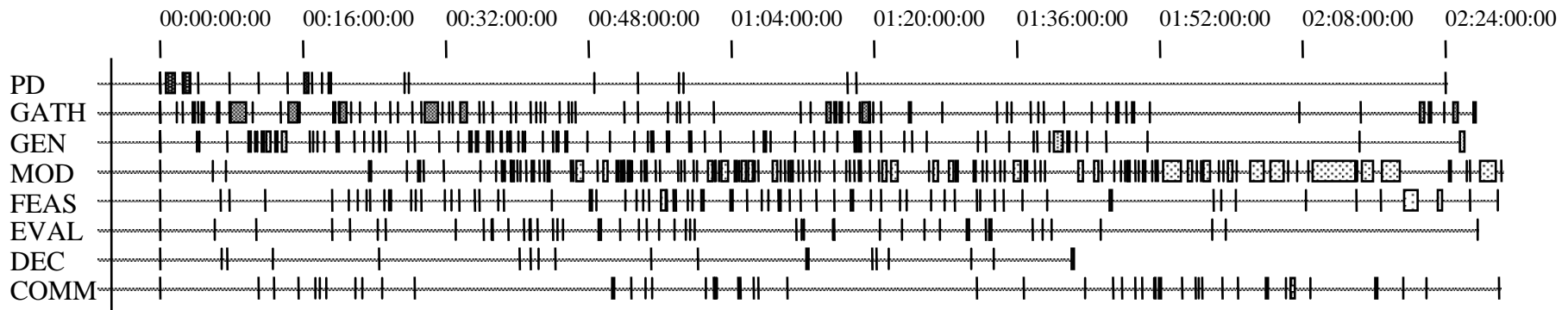
Experts' explanation for their grouping of two problems

Problem 6 (21) Problem 7 (35)

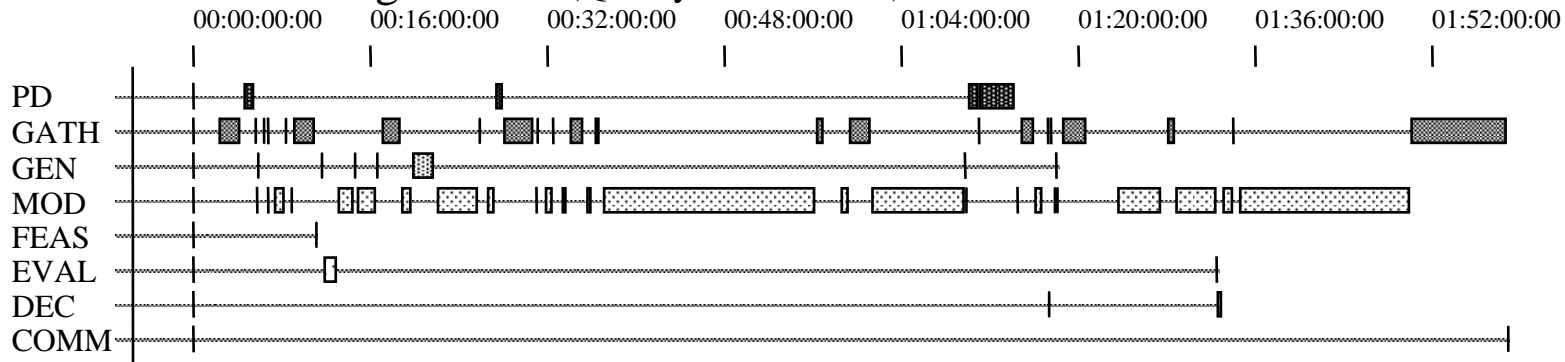


Senior/Freshmen differences in design processes

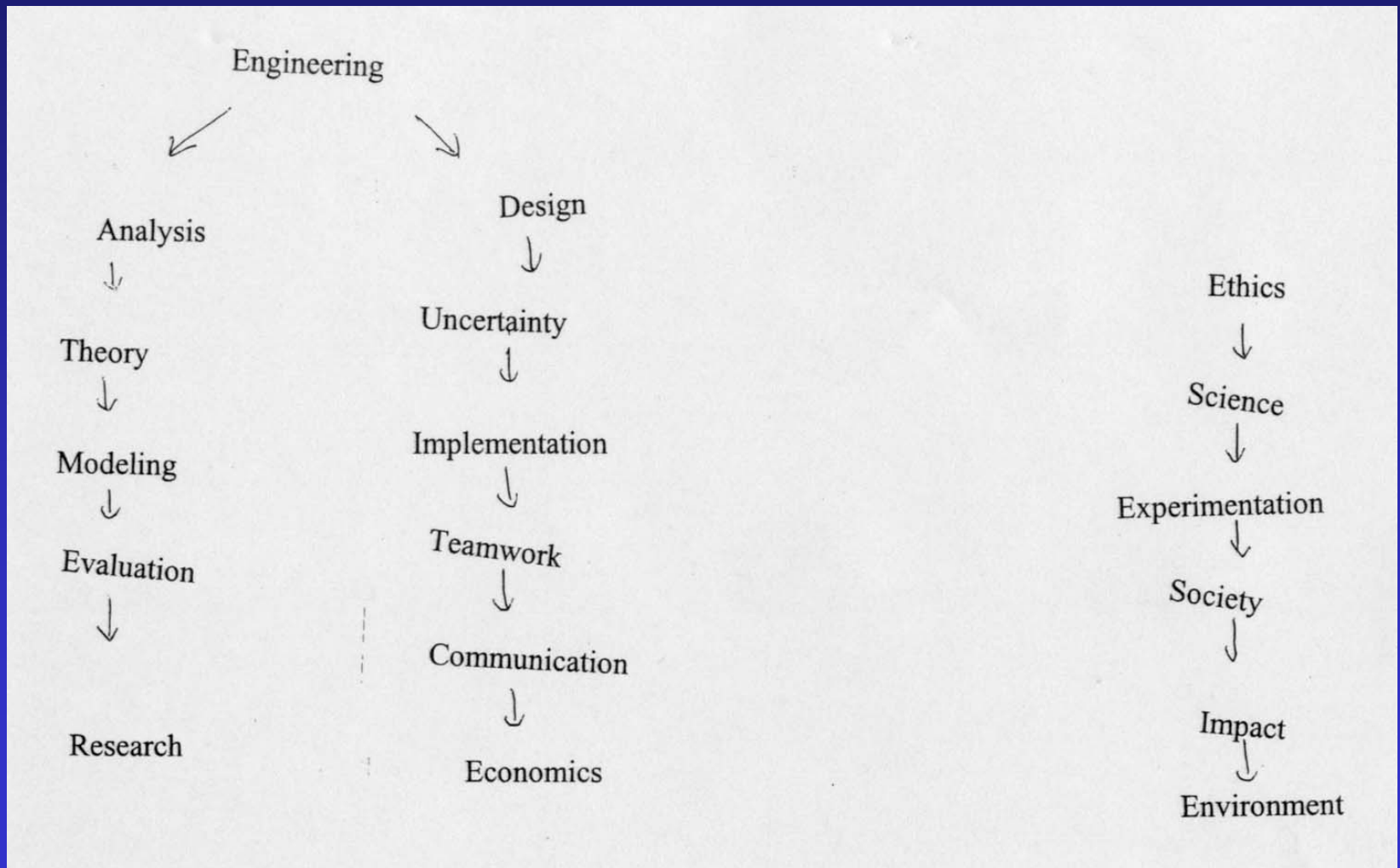
Successful Graduating Student (Quality Score = 0.63)



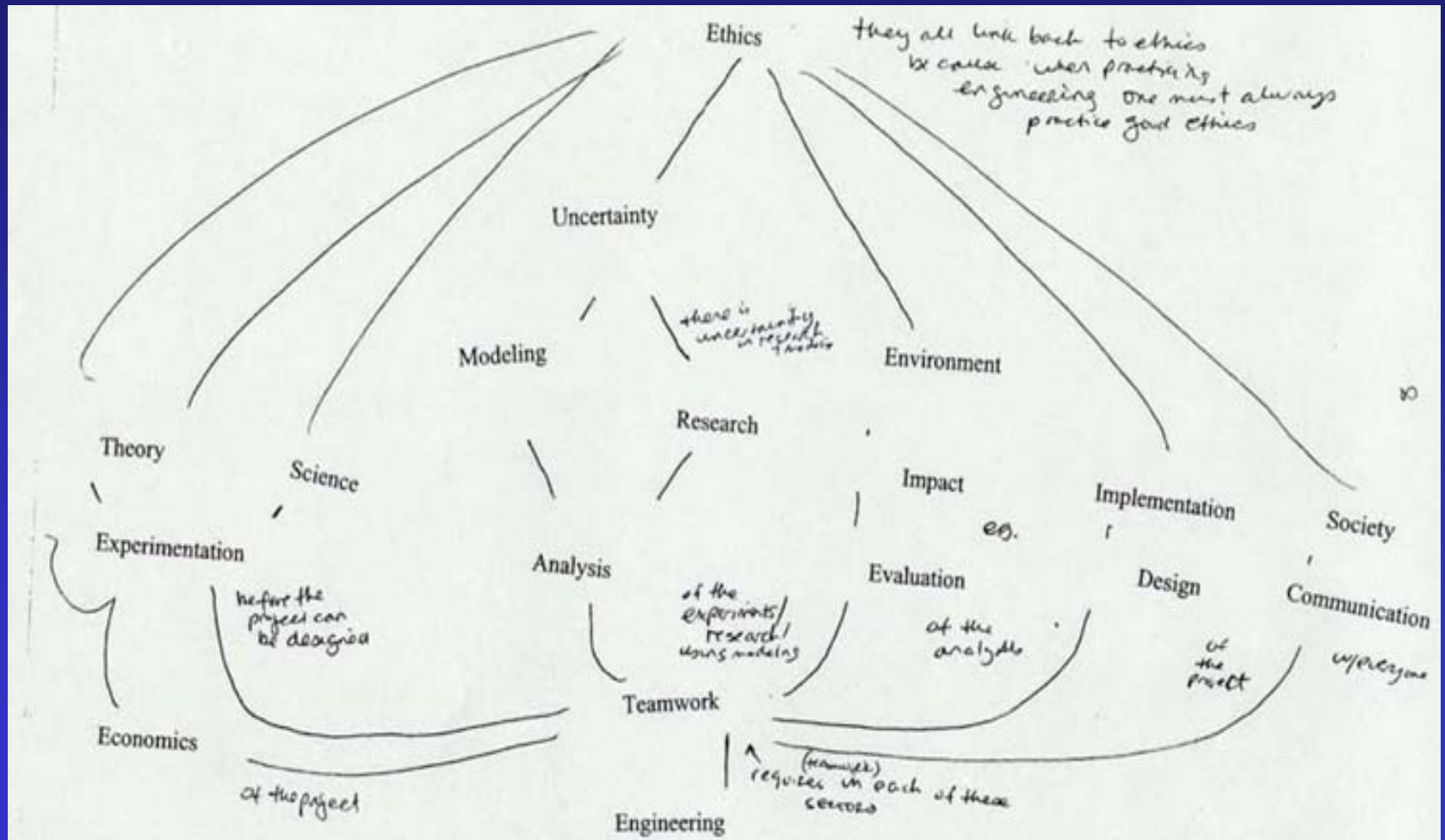
Canonical Entering Student (Quality Score = 0.37)



Engineering Student Knowledge Networks

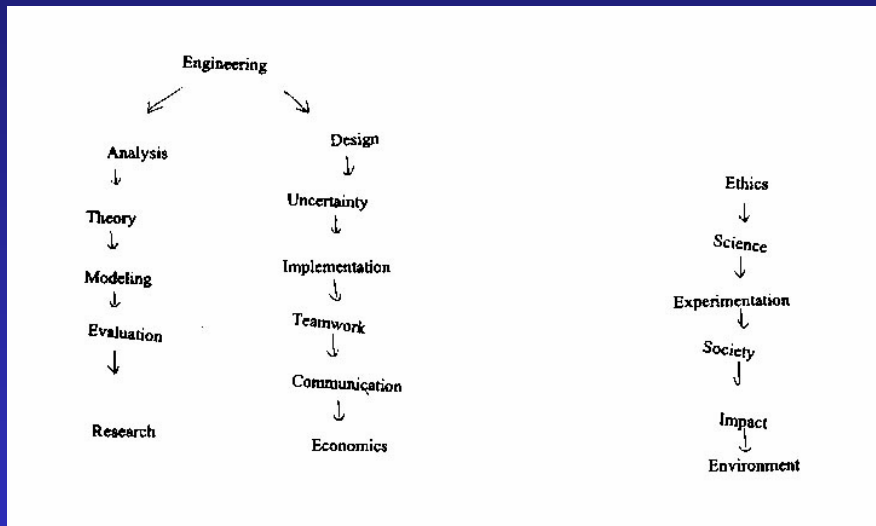


Engineering Student Knowledge Networks

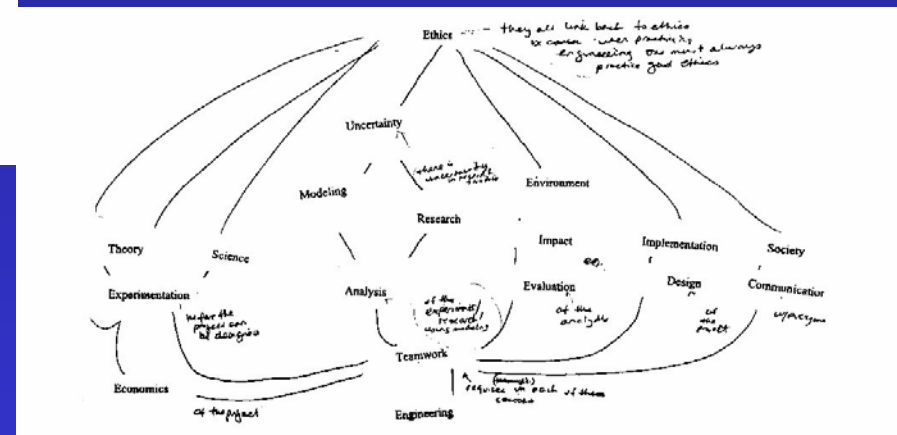


Engineering Student Knowledge Networks

Student One:



Student Two:



Knowledge organization: Applied to your innovation

Think: in what ways does your innovation
take into account knowledge organization?
(2 min)

Pair: discuss with a colleague (4 mins)

Share: discuss as a group (6 mins)

Metacognition

3. “A ‘metacognitive’ approach to instruction can help students take control of their own learning by defining learning goals and monitoring their progress in achieving them”

Metacognition

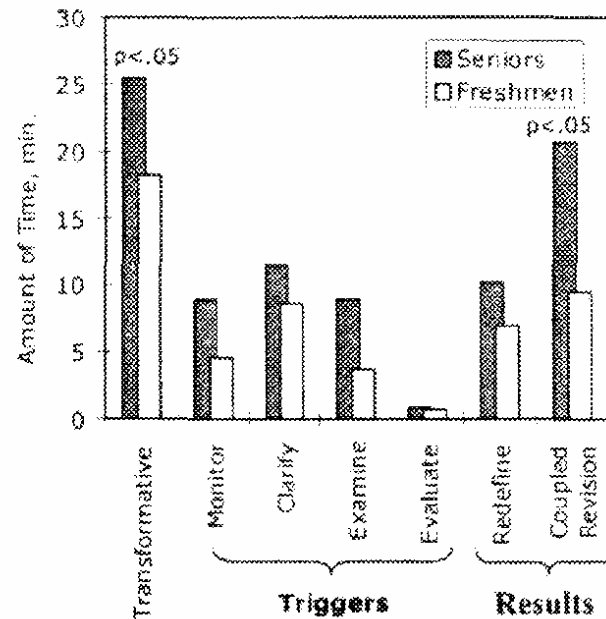


Figure 5. Differences in time spent in cognitive activities and processes in iterative activity for Freshmen and Seniors designing a playground

Metacognition

Table 14.2
Planning Cues for Opinion Essays
(From Scardamalia et al., 1984)

<i>New Idea</i>
<i>An even better idea is ...</i> <i>An important point I haven't considered yet it ...</i> <i>A better argument would be ...</i>
<i>Improve</i>
<i>I'm not being very clear about what I just said so ...</i> <i>I could make my main point clearer ...</i> <i>A criticism I should deal with in my paper is ...</i>
<i>Elaborate</i>
<i>An example of this ...</i> <i>This is true, but it's not sufficient so ...</i> <i>My own feelings about this are ...</i>
<i>Goals</i>
<i>A goal I think I could write to ...</i> <i>My purpose ...</i>
<i>Putting it Together</i>
<i>If I want to start off with my strongest idea I'll ...</i> <i>I can tie this together by ...</i>

Metacognition: Applied to your innovation

Think: in what ways does your innovation take into account metacognition? (2 min)

Pair: discuss with a colleague (4 mins)

Share: discuss as a group (6 mins)

How is this useful?

Revisiting:

1 – Credibility

2 – Flexibility

3 - Adaptability

Burning research questions?

Pair: develop two research questions about specific things you would like to know about the learners in your innovation (2 mins)

Share: discuss with group

Looking at Learning

Revisiting the workshop goals:

1. describe what we want to know about our learners
2. describe your innovation with respect to the research findings from “How People Learn”
3. develop a list of research questions we would like the answers to about our learners

Looking at Learning

Dedicated to Mom

My mom is helpful she protects us and makes sure
everything is all right if there's love she calls the fire
department and she loves everyone especially her kids and
husband she helps everyone and she's an engineer

helpful

by Tobyn Skye Meyer