

Pursuing an Academic Career Webinar Series

Learning to learn: What will they remember in five years?
February 15, 2012

Audio access: Call in 1-800-704-9804

Access code:

*Alternate number: 1-404-920-6604 (**not** toll-free)*

Please **mute your phone** by pressing *6

Technical problems?

Contact Monica: mbruckne@carleton.edu

Program begins at:

2 pm Eastern | 1 pm Central | 12 pm Mountain | 11 am Pacific

You can find information about the event at

http://serc.carleton.edu/NAGTWorkshops/careerdev/AcademicCareer2012/feb_2012.html

Pursuing an Academic Career

Series conveners and moderators



Prof. Rachel Beane
Bowdoin College



Prof. Mike Williams
University of Massachusetts, Amherst



Monica Bruckner
Science Education and Resource Center
(SERC)



Learning to learn: What will they remember in five years?

Presenter

Prof. Karl Wirth
Macalaster College



LEARNING TO LEARN:

What Will They ~~Remember~~ Know in Five Years?

Karl Wirth
Macalester College

SERC Webinar
15 February 2012

Webinar Goals

Workshop participants will:

- understand the concepts of metacognition and self-regulation
- know how to target different stages of the self-regulated learning cycle using reflective activities
- begin planning a metacognitive activity for a course



Reflective Prompt

- What thinking and learning skills/habits do you want your students to develop?



Participant Responses

- “I want to help students become **independent and responsible learners.**”
- “**critical thinking** [and] **self-managed** learning skills”
- “**Inquiry** and **critical thinking** skills.”
- “**thinking and learning independently**”
- “I want my students to **learn how they as an individual learn** most effectively...”
- “I want my students to be **problem solvers.**”
- “I hope to help my students **develop reflective skills...**”

Solving a Problem

[illegible]

Novices

Experts

Elapsed Time (mins)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Read	Black	Gray	White	Gray	White	Gray	White	Gray	White	Gray	White	Gray	White	Gray	White	Gray	White	Gray	White	Gray
Analyze	Gray	Black	Black	White	Gray	White	Gray	White	Black	Black	Black	Black	Black	Black	Black	White	Gray	White	Gray	White
Explore	Gray	Gray	White	White	Gray	White	Gray	White	Gray	White	Gray	White	Gray	White	Black	Black	Black	White	Gray	White
Plan	Gray	Gray	White	Black	Black	Black	Black	White	Gray	White	Gray	White	Gray	White	Black	White	Gray	Black	White	Gray
Implement	Gray	Gray	White	Black	Black	Black	Black	White	Gray	White	Gray	White	Gray	White	Black	White	Gray	Black	White	Gray
Verify	Gray	Gray	White	White	Gray	White	Gray	Black	White	Gray	White	Gray	White	Gray	Black	White	Gray	White	Black	White

Schoenfeld (1987)

Reflections on Problem-Solving

Elapsed Time (mins)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Read																				
Analyze																				
Explore																				
Plan																				
Implement																				
Verify																				

- What kind of problem is this?
- What is the best strategy for solving it?
- How will I know if I solved it?
- How could I do it better next time?
- What additional information do I need?
- What use is this new information?
- How can I use my new understanding to solve different kinds of problems?

Self-Directing Learners

Self-directing learners are highly motivated, independent, and strive toward self-direction and autonomy. They take the initiative to diagnose their learning needs, formulate learning goals, identify resources for learning, select and implement learning strategies, and evaluate learning outcomes.

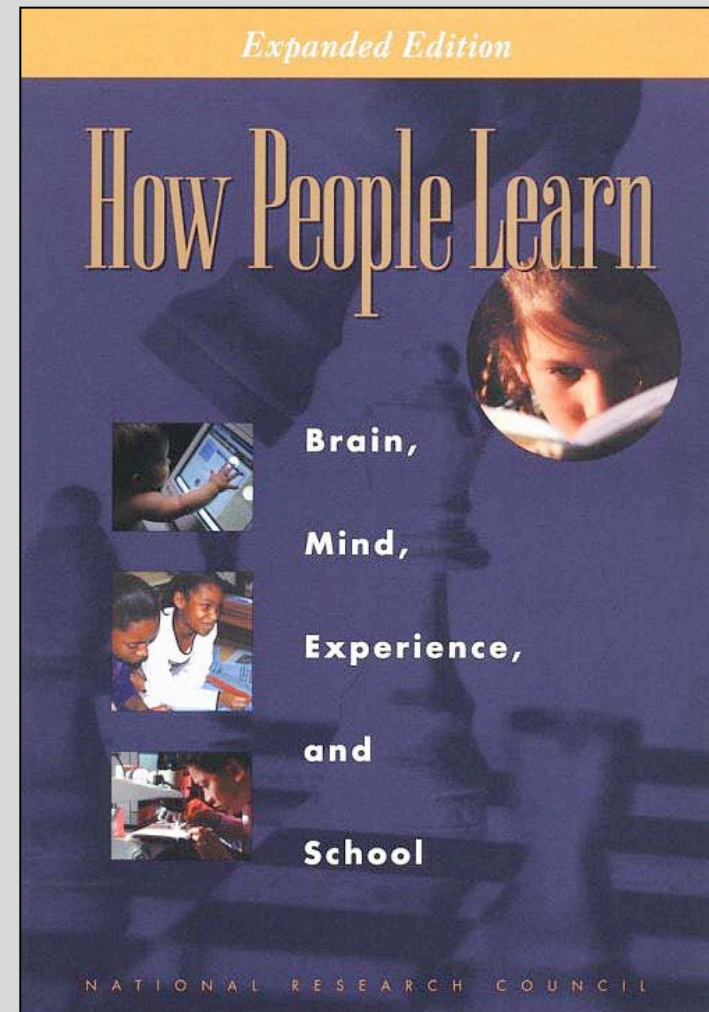


How can we make this happen?

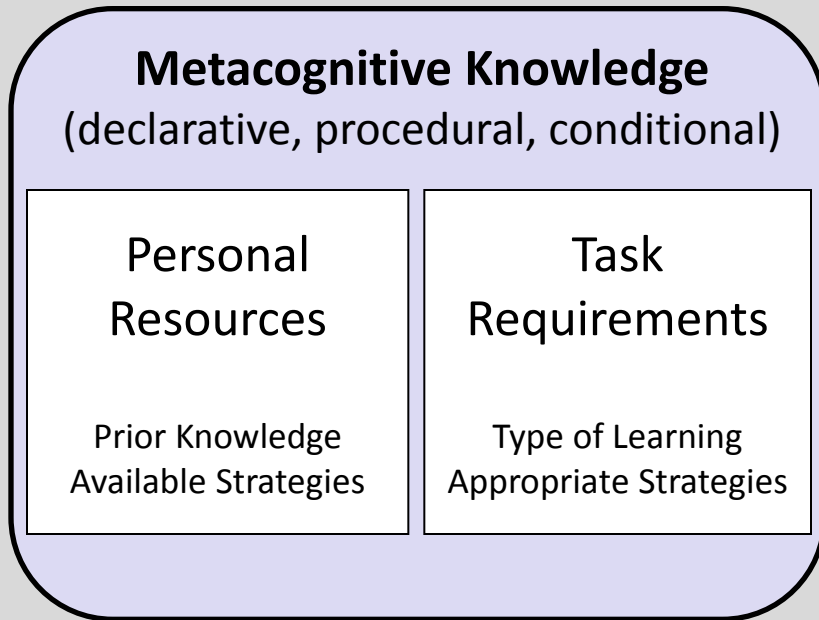
Three Principles of Learning

1. Recognize/Address Preconceptions
2. Expert Knowledge
 - Deep foundation
 - Contextual framework
 - Organizational structure
3. Metacognition and Transfer

Bransford et al. (2000)



Expert Learners - Knowledge



Modified from Ertmer and Newby (1996), Butler (1997), Winne and Hadwin (1998), Pintrich (2000), Lovett (2008)

Geologic Time

Personal Resources

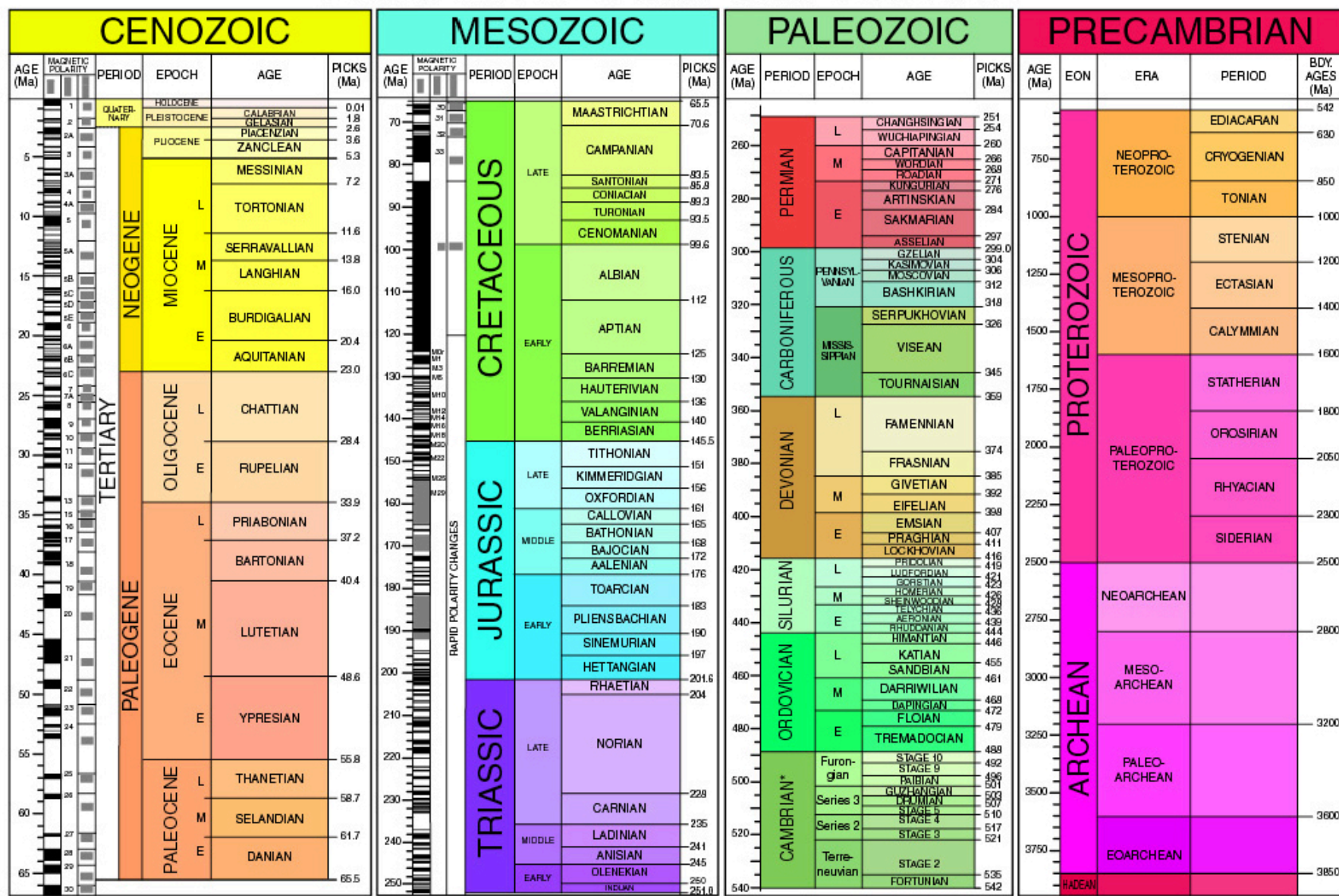
- Prior Knowledge
- Available Strategies

Task Requirements

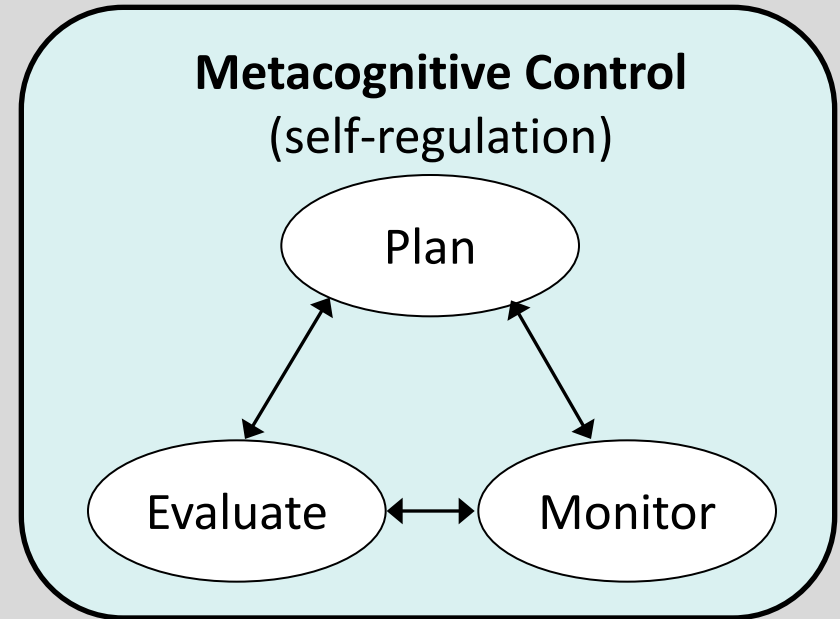
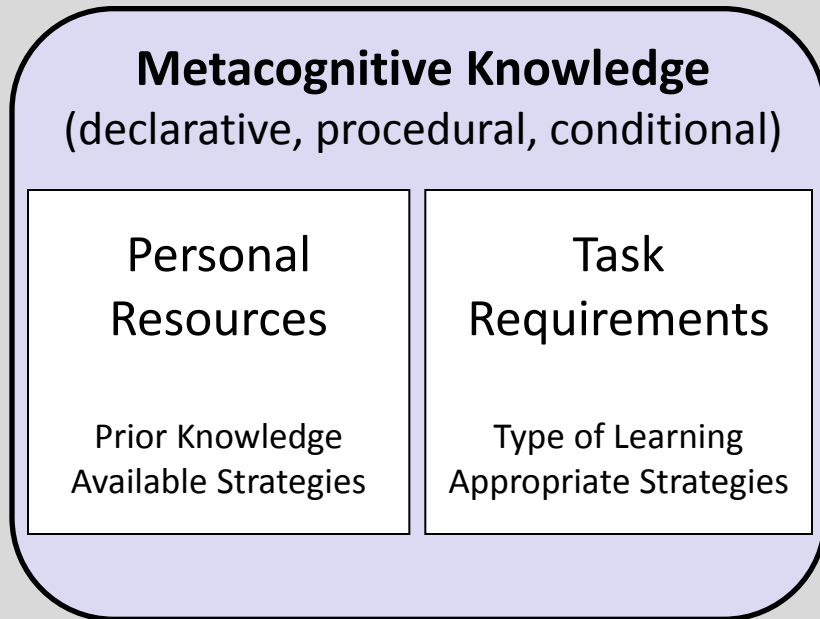
- Type of Learning Task
- Appropriate Strategies

Era	Period / Epoch	
CAENOZOIC	Pleistocene	
	Pliocene	
	Miocene	
	Oligocene	
	Eocene	
	Palaeocene	
MESOZOIC	Cretaceous	
	Jurassic	
	Triassic	
PALAEOZOIC	Permian	
	Carboniferous	Pennsylvanian
		Mississippian
	Devonian	
	Silurian	
	Ordovician	
	Cambrian	
	Precambrian	

Geologic Time



Expert Learners – Self-Regulation



Modified from Ertmer and Newby (1996), Butler (1997), Winne and Hadwin (1998), Pintrich (2000), Lovett (2008)

Solving a Problem

Elapsed Time (mins)	0	2	4	6	8	10	12	14	16	18
Read										
Analyze										
Explore										
Plan										
Implement										
Verify										

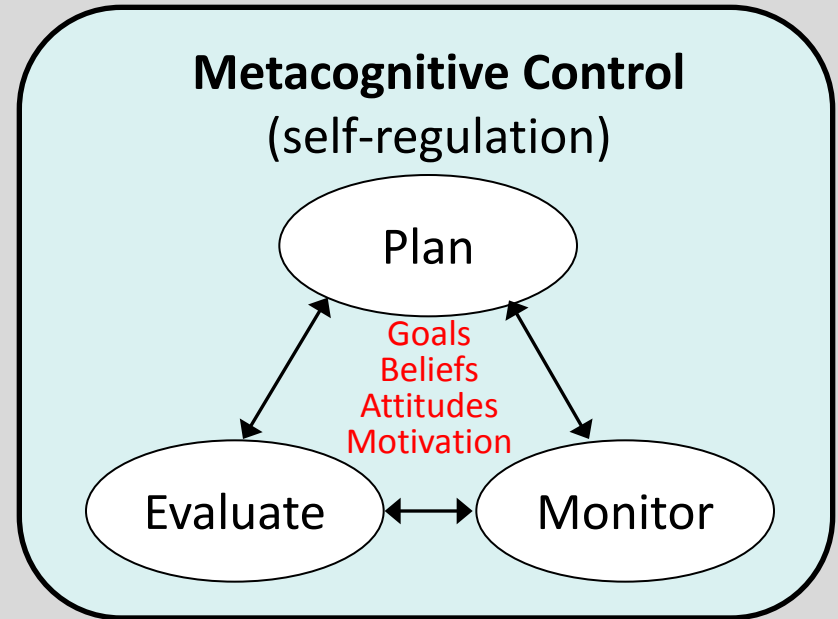
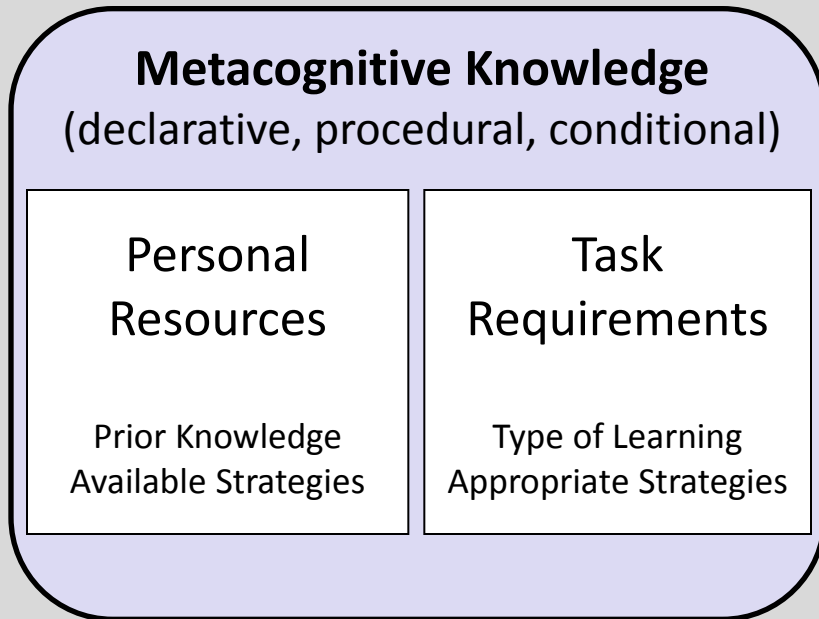
Novices

Experts

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Schoenfeld (1987)

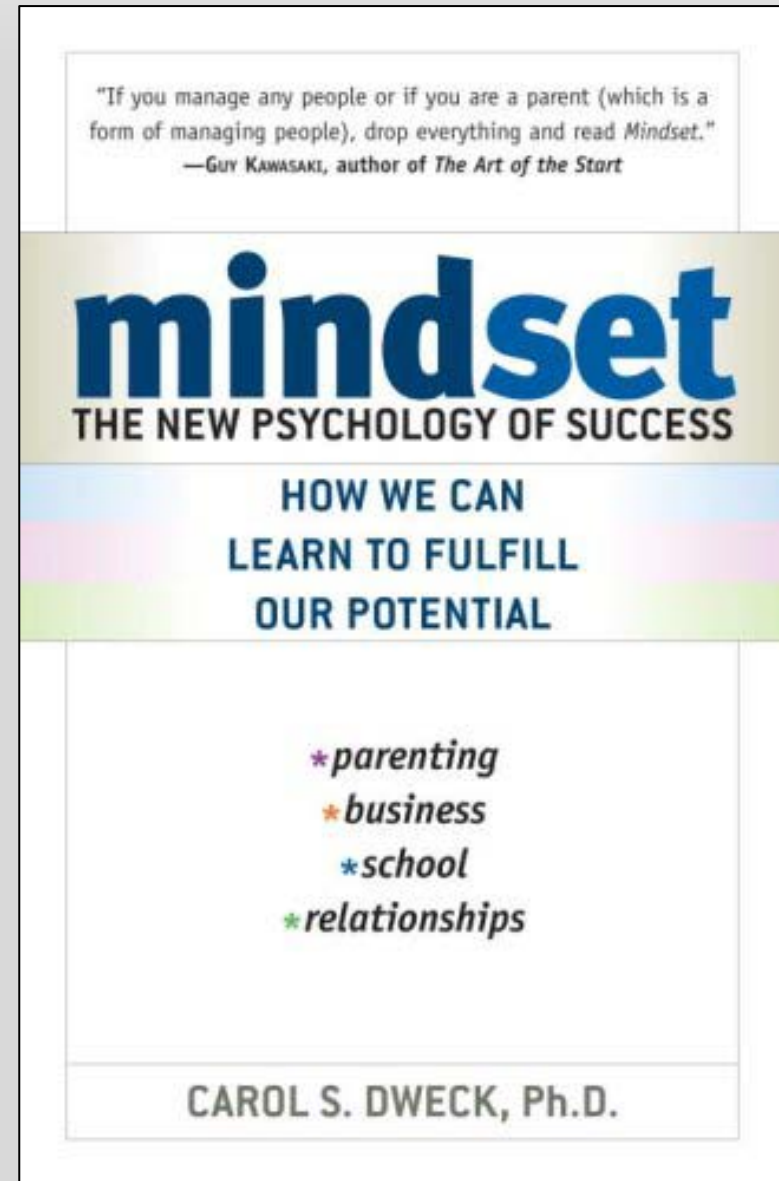
Expert Learners - Affect



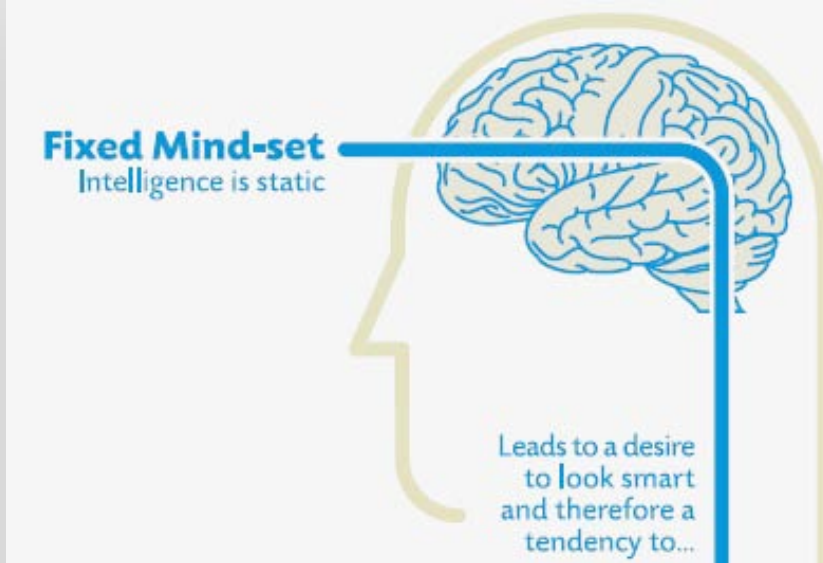
Modified from Ertmer and Newby (1996), Butler (1997), Winne and Hadwin (1998), Pintrich (2000), Lovett (2008)

Affect – Beliefs About Intelligence

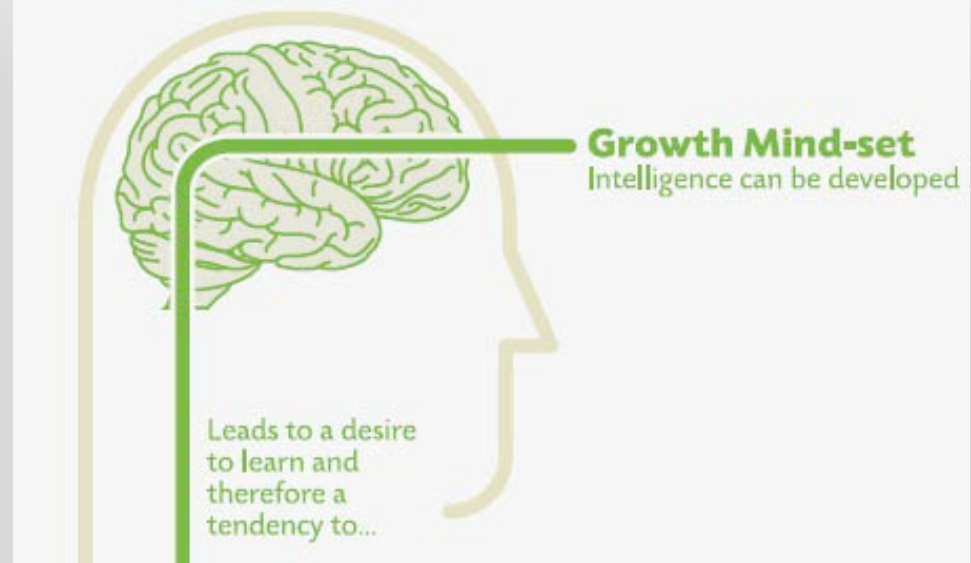
- “fixed” versus “growth” theories of intelligence
- Affects motivation to learn and persistence
- Students taught study skills and brain plasticity outperform control groups



“Fixed” versus “Growth” Mindsets

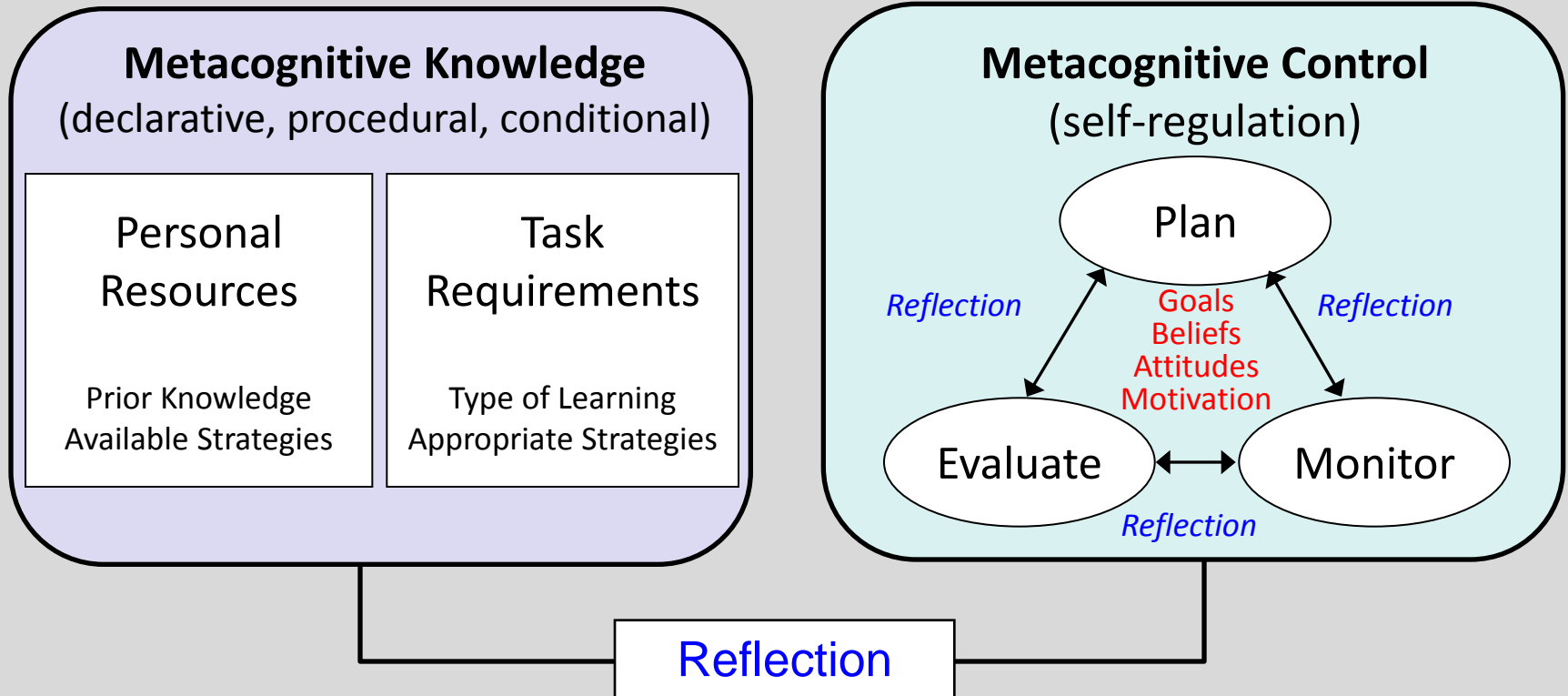


- avoid challenges
- give up easily
- see effort as fruitless
- ignore feedback
- be threatened by success of others



- embrace challenges
- persist in face of setbacks
- see effort as path to mastery
- learn from criticism
- find lessons and inspiration in success of others

Expert Learners - Reflection



Modified from Ertmer and Newby (1996), Butler (1997), Winne and Hadwin (1998), Pintrich (2000), Lovett (2008)

Reflection & Learning

Dimension	Description
Habitual Action	Minimal thought and engagement; memorization is emphasized; correlated with surface learning; tasks treated as unrelated activities; an attitudinal state of unreflectiveness
Understanding	Focuses on comprehension without relation to one's personal experience or other learning situations; book learning that is understanding-oriented; learning stays within boundaries of preexisting perspectives
Reflection	Learning is related to personal experience and other knowledge; involves challenging assumptions, seeking alternatives, identifying areas of improvement; active engagement; characteristic of deep approaches to learning
Critical or Intensive Reflection	Highest level of reflective learning; learners are aware of why they think, perceive, or act as they do; as a result, learner likely alters or changes firmly held personal beliefs and ways of thinking

Modified from Mezirow (1991) by Kember et al. (2000)

Pedagogical Challenge

- Metacognition is a “self-imposed internal conversation”
- Shown to improve transfer (Bransford et al. 2000)
- Easily assumed that students are doing it, or can develop on own; both assumptions are wrong
- Challenge is to keep students in constant contact with their metacognition
- Instruction must be explicit (Pintrich, 2002)

Reflective Prompt

- Given your interests in learning, your discipline, and a particular course that you teach, which aspect of metacognition or self-regulated learning might benefit most from explicit instruction?

Metacognitive Reflections

Activity	Metacognitive Knowledge or Skill
How I Earned an “A”	Goal-setting
Reading Reflections	Monitoring & Evaluation
Critical Thinking	Strategies for Thinking
Learning Reflections	Evaluation & Planning
Exam Wrappers	Evaluation & Planning

Goal-Setting:

Reflection-for-Action

Planning and Goal-Setting

Journal Activity:

Write a letter describing what you accomplished in this course. The letter should be dated for the end of the semester and written in the past tense. Tell me what you did, how you did it, and how your thinking and understanding changed.

Begin your letter with:

I earned an “A” in this course because...

Reading Reflections:

*Supporting Content Learning with
Reflection-in-Action*

Strategic Reading

Expert Readers:

- read with a purpose and in “extensive mode”
- accomplished in use of prior knowledge
- utilize a wide variety of strategies for monitoring and comprehension (e.g., prediction, integration, self-questioning, reflecting)

Novice Readers:

- focus on decoding single words or phrases
- fail to adjust for different texts or purposes
- seldom use text-processing strategies

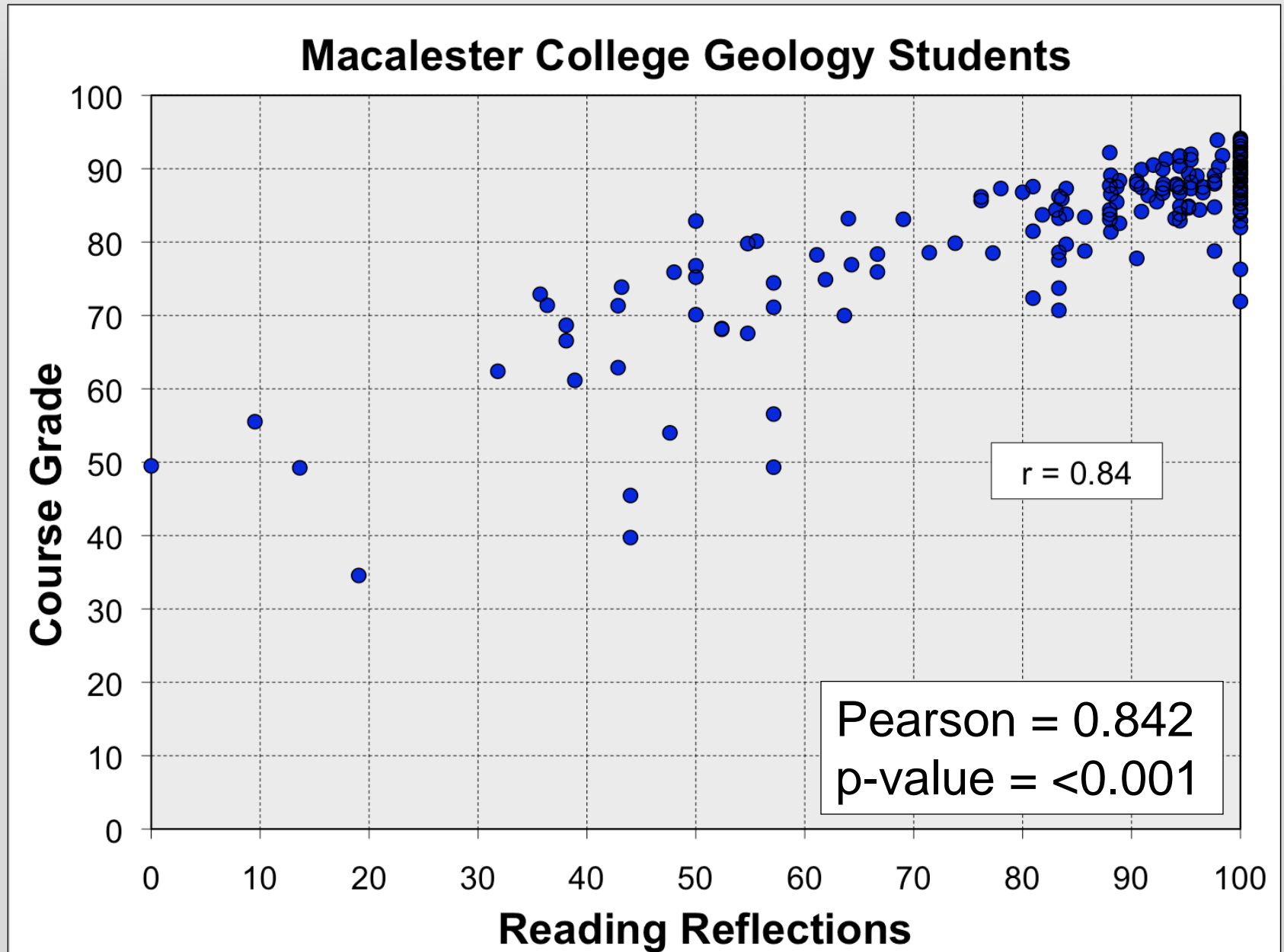
Reading Reflections

- Completed after each reading assignment
- Short responses to three questions

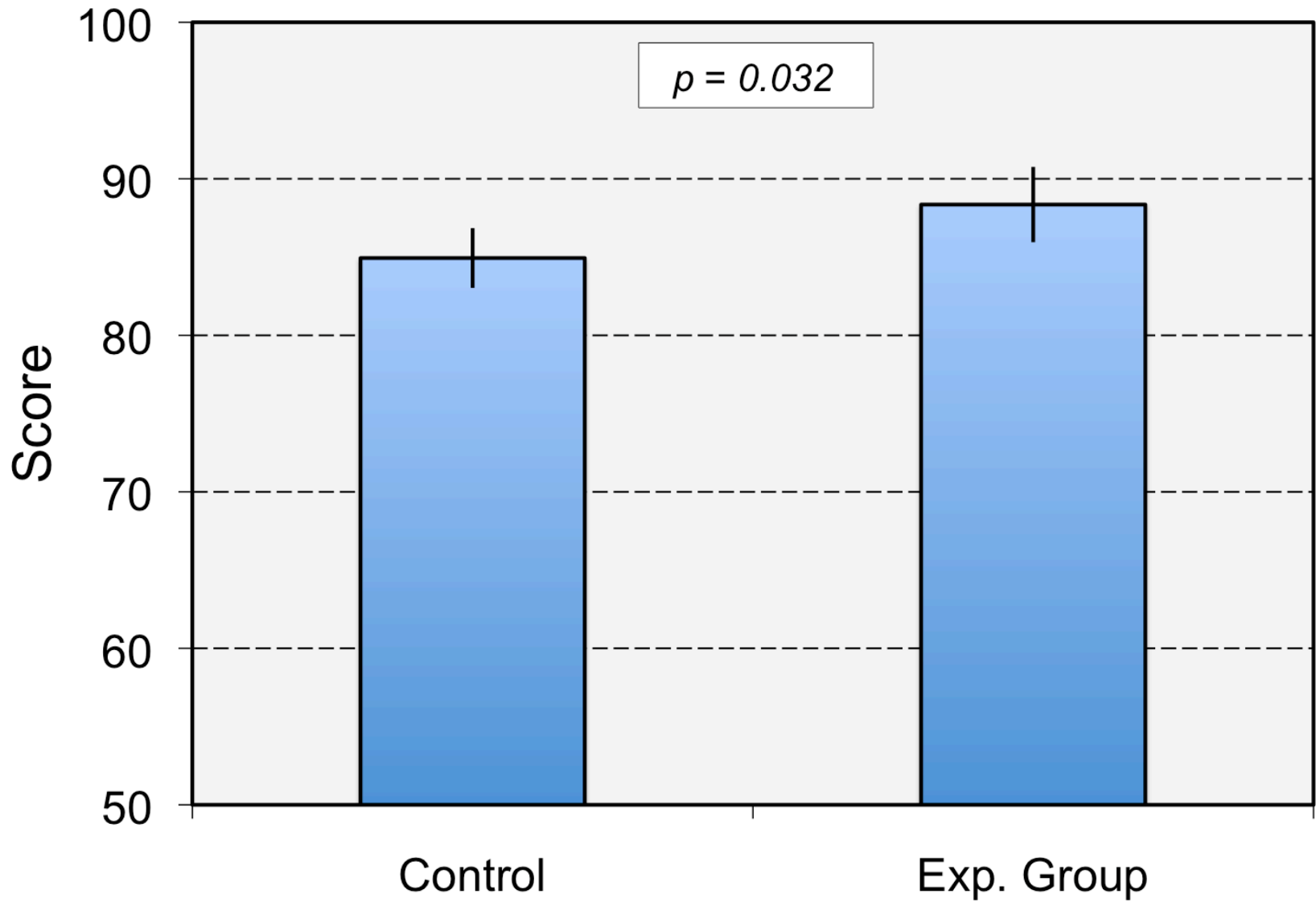
- What is the main point of this reading?
- What did you find surprising? Why?
- What did you find confusing? Why?

- Submitted online before class
- Credit awarded for “reflective” submissions

Initial Observations

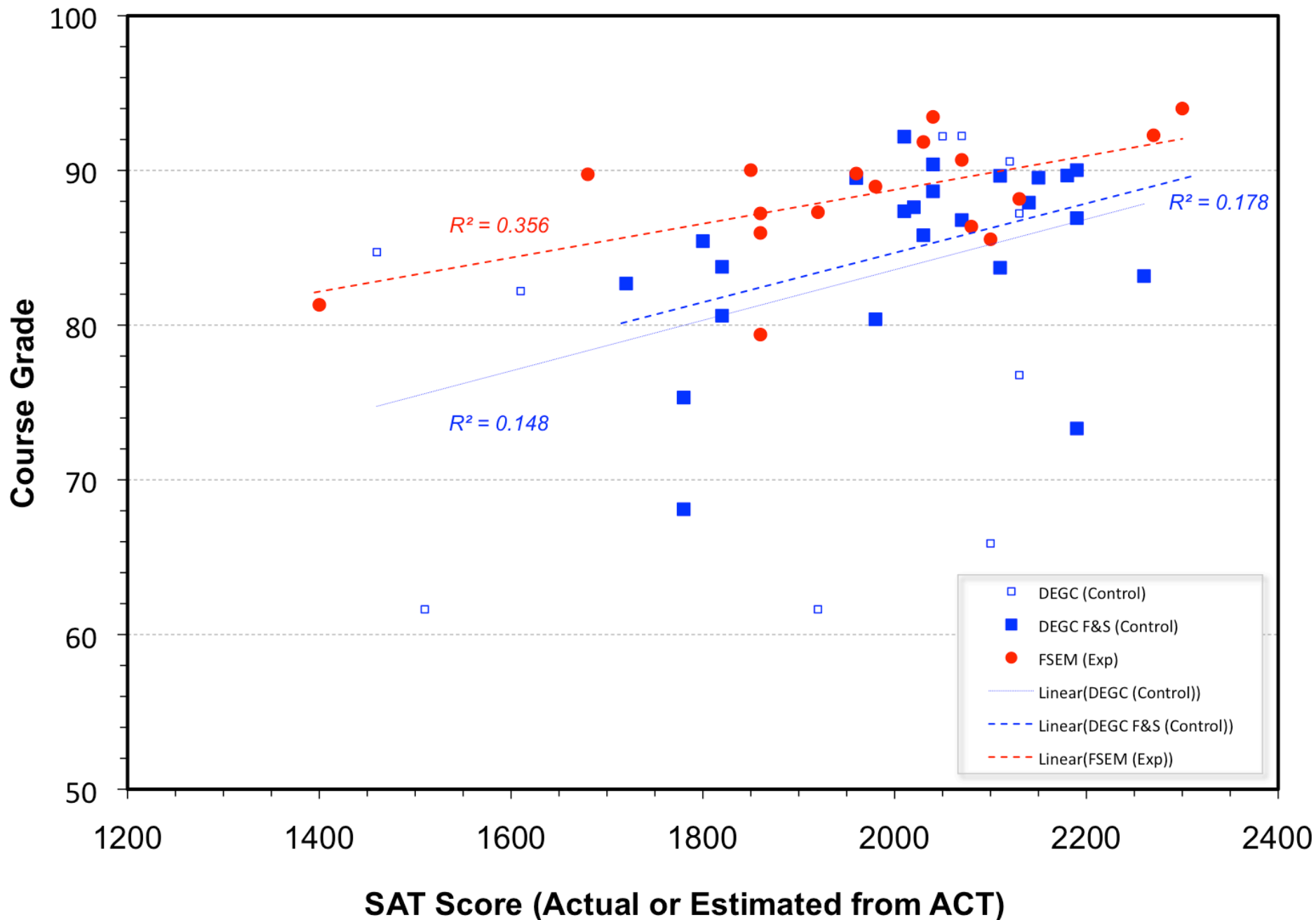


Dynamic Earth Course - Course Grade

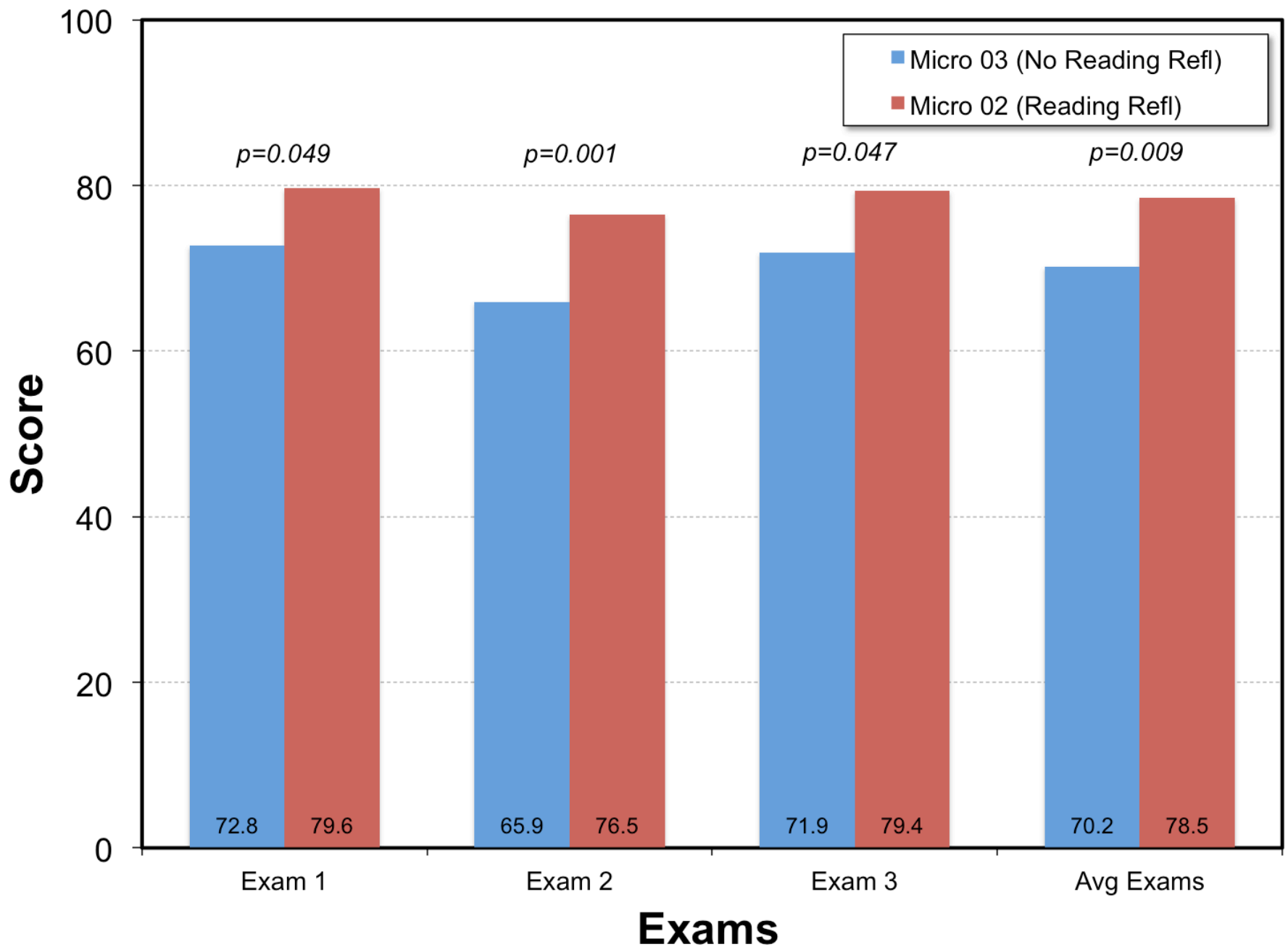


Effect Size = 0.71 (Large)

Effect of Reading Reflections on Course Grade



Fall 2010 Micro Economics Course



Critical Thinking:

*Tools and Dispositions for Thinking and
Reflecting*

To Analyze Thinking We Must Identify and Question its Elemental Structures

Use the elements with sensitivity
to Intellectual Standards »

Clarity

Accuracy

Precision

Relevance

Depth

Breadth

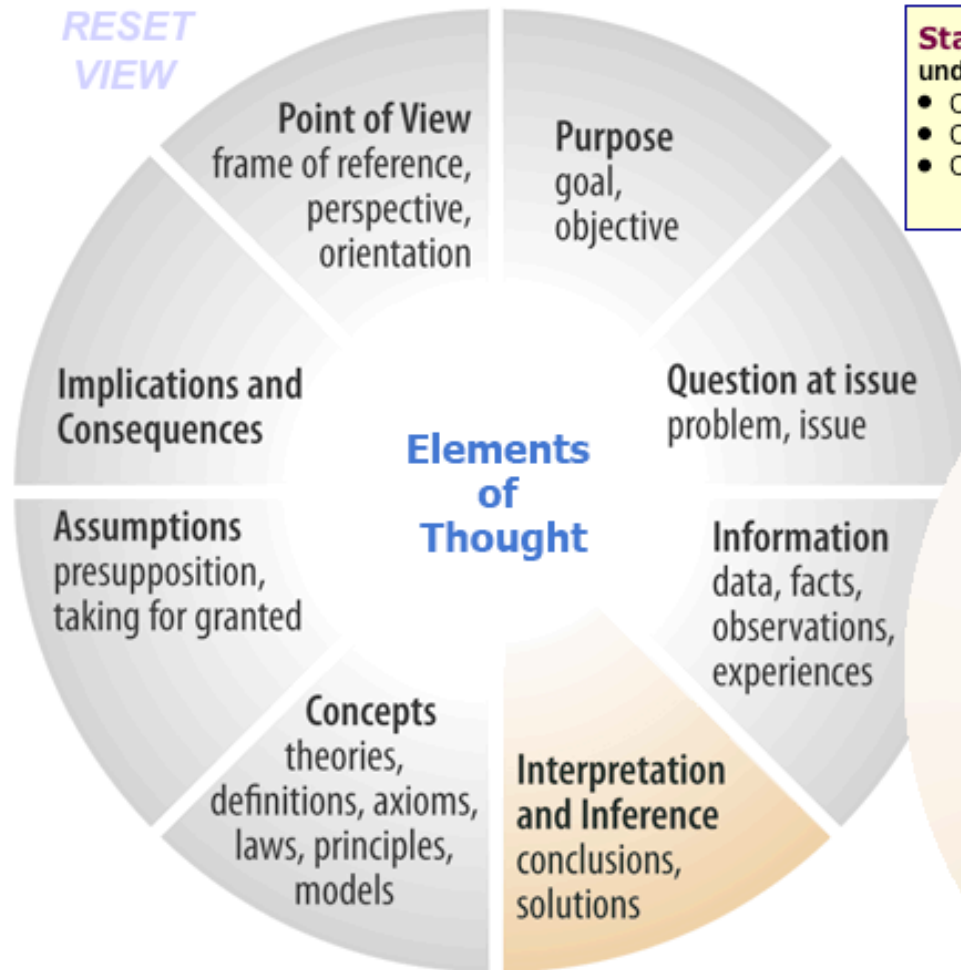
Logic

Significance

Fairness

more...

RESET
VIEW



Standard: Clarity

understandable, the meaning can be grasped

- Could you elaborate further?
- Could you give me an example?
- Could you illustrate what you mean?

Watch Your... Inferences

Inferences are interpretations or conclusions you come to. Inferring is what the mind does in figuring something out.

Inferences should logically follow from the evidence. Infer no more or less than what is implied in the situation.

Questions to check your inferences

- What conclusions am I coming to?
- Is my inference logical?
- Are there other conclusions I should consider?
- Does this interpretation make sense?
- Does our solution necessarily follow from our data?
- How did you reach that conclusion?
- What are you basing your reasoning on?
- Is there an alternative plausible conclusion?
- Given all the facts what is the best possible conclusion?
- How shall we interpret these data?



Foundation for Critical Thinking

Online Model for learning the Elements and Standards of Critical Thinking

©2007 Foundation For Critical Thinking. - *reference material from [The Thinker's Guide to Analytic Thinking](#)

Learning Reflections:

*Supporting Learning with
Reflection-on-Action*

Reflecting on Learning

- What are the three most important things you have learned? Why?
- Describe the learning strategies that you are using.
- How might they be adapted for more effective learning?
- How does learning in this course relate to other courses?




Wrappers:

A Structured Reflection-for-Action

Exam “Wrapper”

- Self Evaluation
- Preparation Strategies
- Performance Analysis
- Planning

Achacoso (2004)
Lovett (2008)



Post-Exam Reflection I - DEGC 2009

This activity is designed to give you a chance to reflect on your exam performance and, more importantly, on the effectiveness of your exam preparation. Please be candid in your responses. Your responses are being collected to improve teaching and learning in this course. They will have no impact on your grade, but you will receive credit for thoughtful reflection.

Name

A1. After studying for this exam, how many points did you expect to earn?
Choose from the list below.

51-55

A2. After completing the exam, but before receiving the score, how many points did you think you had earned?
Choose from the list below.

51-55

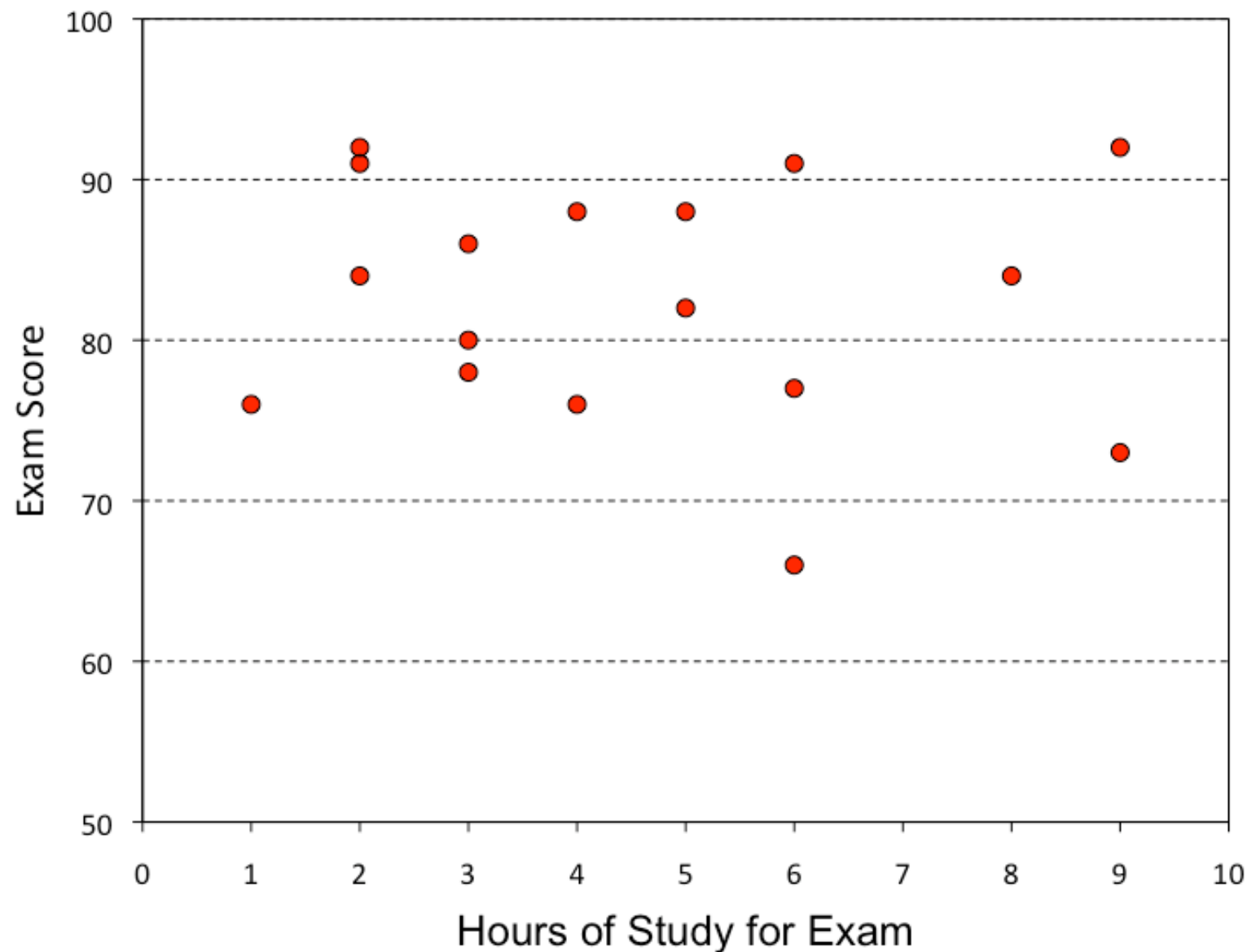
A3. According to your Knowledge Survey responses, how many points did you think you would earn on the exam?
Choose from the list below.

51-55

A4. What was the actual score that your responses earned on the exam?
Choose from the list below.

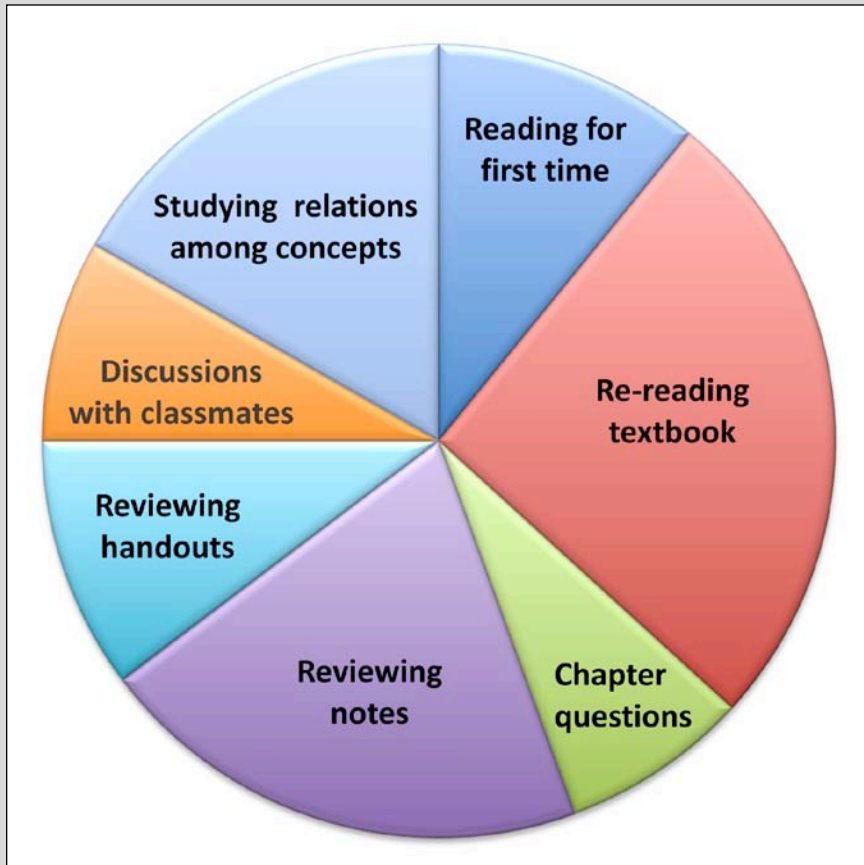
51-55

Exam Preparation

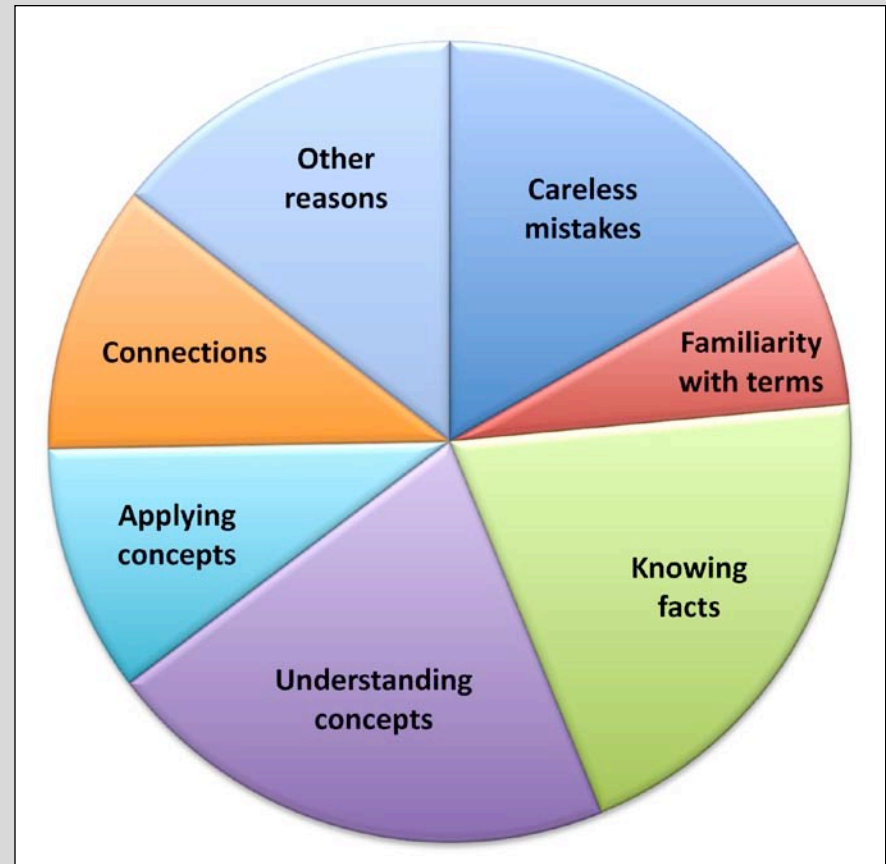


Exam “Wrapper” Results

Study Strategies



Analysis of Errors



Reflective Prompt

- Identify a critical event, activity, or concept in a course
- What do you want students to **know or think about as they learn** from this event, activity, or concept
- Plan/design a reflective activity to improve student understanding of their own learning



What will YOU do to improve student learning?

Pursuing an Academic Career *Webinar Series*

- March 9, 2012 (Friday) **Linking goals, assessment and teaching strategies to promote effective learning**
Leader: David McConnell
- April 10, 2012 (Tuesday) **Setting goals for effective and innovative courses,**
Leader: Barbara Tewksbury
- May 2012 **Developing a thriving research program and balancing it with teaching, service and other passions**
Leaders: Rachel Beane and Michael Williams



Thank you!

We're glad you were able to join us today.

Please help us by completing an evaluation form at:

http://serc.carleton.edu/NAGTWorkshops/careerd/ev/AcademicCareer2012/feb_eval.html