

Critical Thinking in the Classroom

Brian Bird

GCC Math Faculty

Spring 2018



"You must be the new hire. Welcome aboard. Here's our prepackaged curriculum. If time permits, encourage critical thinking."

Critical Thinking Defined

- According to John Dewey, critical thinking is reflective thought in which you suspend judgement, maintain a healthy skepticism, and exercise an open mind. It requires an active, persistent and careful consideration of any belief in light of the ground that supports it. It has both intellectual and emotional components.

Critical Thinking Defined

- “Critical thinking is the art of analyzing and evaluating thinking with a view to improving it” via Paul and Elder
- “Purposeful, reflective judgment which manifests itself in reasoned consideration of evidence, context, methods, standards, and conceptualization in deciding what to believe or what to do” via the Delphi Report

Delphi Report

- International group of experts (46 men and women from USA and Canada) from different scholarly disciplines tried to form a consensus about the meaning of critical thinking
- Lasted 2 years (Feb 1988 to Nov 1989)
- On behalf of American Philosophical Association



The Delphi Method



- Developed to enable experts to think effectively about something over large spans of distance and time
- Central investigator organizes the group and feeds them an initial question
- Central investigator receives responses, summarizes them, and transmits them back for reactions, replies and additional questions

Cognitive Skills and Sub-Skills

1. Interpretation
 - Categorization
 - Decoding Significance
 - Clarifying Meaning
2. Analysis
 - Examining Ideas
 - Identifying Arguments
 - Analyzing Arguments
3. Evaluation
 - Assessing Claims
 - Assessing Arguments

Cognitive Skills and Sub-Skills (cont)

4. Inference

- Querying Evidence
- Conjecturing Alternatives
- Drawing Conclusions

5. Explanation

- Stating Results
- Justifying Procedures
- Presenting Arguments

6. Self-Regulation

- Self-examination
- Self-correction

IDEAS

Acronym for 5 Step Problem Solving Process

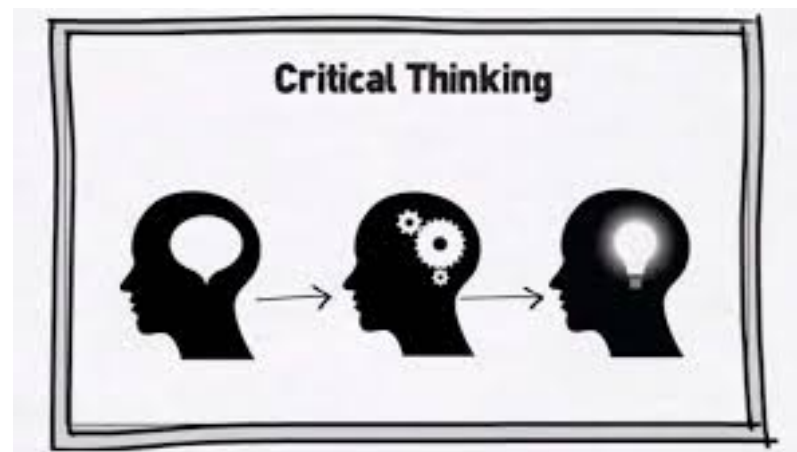
I=Identify the problem and set priorities

D=Determine relevant information and deepen understanding

E=Enumerate options and anticipate consequences

A=Assess the situation and make a preliminary decision

S=Scrutinize the process and self-correct as needed



Classroom Strategies

- Mini-lecture activity sandwich
 - Short introductory lecture
 - Group activity
 - Short summative lecture
- Student participation and peer interaction are correlated positively with improved critical thinking
- Cut 20% out of lecture and allow for group activities
- Students can be held accountable for topics not covered in class



Effective Group Traits

- Positive interdependence
- Personal responsibility and individual accountability
- Reflection on group process
- Conflict management
- Group operating procedures



Group Size and Structure

- 4 or 5 seems to work best – everyone can contribute and if one person is absent it is not a big deal
- Permanent or Temporary (depends on size and layout of class)
- Heterogeneous (i.e. diverse) groups via random or non-random methods



Suggested Group Activities

- Write an exam question and a rubric to grade it
- Switch notes, review, and critique
- Individually develop a question on the mini-lecture then answer each others questions
- Teach each other a concept slightly beyond the mini-lecture
- Group presents solution to problem presented by teacher to entire class

Benefits of Cooperative Groups

Research shows that cooperative learning groups yield:

- Higher student achievement
- Increased critical thinking
- Greater student satisfaction
- Lower attrition
- Higher self esteem



References

- <https://www.insightassessment.com/Resources/Importance-of-Critical-Thinking/Critical-Thinking-What-It-Is-and-Why-It-Counts/Critical-Thinking-What-It-Is-and-Why-It-Counts-PDF>
- <https://stearnscenter.gmu.edu/wp-content/uploads/2012/08/12-The-Delphi-Report-on-Critical-Thinking.pdf>
- <https://eric.ed.gov/?id=ED315423>
- <http://www2.gsu.edu/~dschjb/wwwcrit.html>