



*Research Summary Topic*  
*Metacognition*

“ Nurturing gifted student’s metacognitive awareness: effects of training in Homogeneous and Heterogeneous classes”





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# *Introduction*

- Grouping students by ability is a common practice
  - costs and benefits of this practice yet to be known
- Past studies have maintained higher ability students benefit more from use of metacognitive strategies

# *Introduction*

- Advocates say gifted students must interact with other students to benefit from their education
- Vygotsky's theory indicates students must interact with their "more able" peers when developing metacognition

# *Purpose*

See if gifted children and special students would differ in their responses to metacognitive awareness training

Strategies relied heavily on peer interaction

# *Clarifying Terminology*

- Homogeneous refers to the similarities in thinking abilities of the students
- Heterogeneous refers to the fact the students varied in their ability but were similar in others areas such as interests, SES, personality, etc.

# *Clarifying Terminology*

- Metacognition (Brown)-”Awareness and regulation of thinking processes students exercise in deliberate learning & problem solving situations”

## *4 Types of Metacognitive Processes at work during learning:*

- “Knowing what you know and don’t know”
- Predicting the accuracy of cognitive acts in advance of responding
- Planning a sequence of strategic activities
- Checking & monitoring the outcome of an attempt

# *Research Questions*

- Will the training be effective?
- Will the range of ability in each class affect what was learned?
- Will this range of ability affect the gifted students' participation in group discussion?

# *Methods*

- Participants
  - 39 ten to eleven year olds
    - 26 in regular heterogeneous 5th grade classroom
    - 13 homogeneous in private school (admission requirements >95 percentile on intelligence testing)
      - 3 gifted students ( in 94th percentile of Raven's Standard Progressive Matrices)
      - given pseudonyms- Paula, Brian, Wayne

# *Teacher/researcher*

- Provided the metacognitive awareness instruction
- >20 years of teacher experience
  - 3 years as language arts consultant
  - professional preparation (workshops and coursework) as teacher for gifted students

# *Activities*

- Children represented their metacognitive activities by using the analogy “Mind is like a machine...” for their problem solving process.

# Activities

- Asked to draw and describe the machine which represents how their mind works when it solves problems:
  - “When I’m \_\_\_\_\_, my mind \_\_\_\_\_” and
  - “It’s like a \_\_\_\_\_”
  - A drawing of a thought cloud above the child’s head was the frame of illustration of the mind machine

# *Activities*

- A different problems was posed each day including:
  - Doing hard math problems
  - Writing a poem
  - Deciding how to illustrate a story
  - Choosing a topic for a research project in social studies
  - Trying to convince parents to raise their allowance

# *Interview*

9 open ended questions to measure post intervention awareness of their thoughts & feelings

- 1 If you wanted to explain metacognition to a friend, what would you say?
- 2 Do you use the same kinds of thinking in a different situations? Please give an example.
- 3 Did you learn some things about metacognition from your classmates? Please give some examples.
- 4 Have you learned something new about how your mind works? What have you learned?
- 5 Would you approach a learning situation differently now as compared to last week? What is different?

## *Interview Questions (cont'd)*

6. Do you think metacognition could help friends of yours?  
How?
7. If you wanted to help someone think about their own thinking, what would be the most important thing you would say?
8. Did you enjoy the project? What do you think of this “metacognition” stuff?
9. Explain how these pictures are like you mind.

# *Results*

- Each child's mind machine was distinctive
- 3 themes emerged in the data:
  - Changes in awareness
  - Differences in metacognitive awareness
  - Group differences

# *Changes in Students' Awareness*

- Day 1- none had heard to term “metacognition”, or to have thought about their thinking
- Day 5 - students reported an awareness of the complexity of their thinking
  - “Before I just thought, but now that I’ve though about it, I know how my mind works and I’m not just passing thorough things”
  - “I just thought I thought identical all the time. I either knew something or I didn’t”

# *Changes in the functions of the metaphorical machine*

- Students demonstrated various actions the mind machine performed depending on the task
  - Realizing
  - Predicting
- None mentioned planning, or monitoring

# *Intra-individual differences*

- Students recognized they used different thinking on different tasks. Within students they also used different phrases to describe the type of thinking they do.
  - “It depends on the situation”

# *Inter-individual differences*

- Students recognized:
  - “Everybody thinks about things in different ways”
  - “...a lot of people think in different ways and describe their thinking differently”

# *Differences b/t homogeneous & heterogeneous settings*

- All students increased their awareness of executive functions
  - Students in the homogeneous setting increased their awareness more
- When describing how their thinking had changes
  - Students in the homogeneous group had more sophisticated and elaborate explanations

# *Differences b/t homogeneous & heterogeneous settings*

- Willingness to contribute to discussion
  - Homogeneous group were more self directed, engaged more spontaneously with peers into discussions
  - Heterogeneous group less spontaneous, fear of copying or being copied

# *Discussion*

- All intellectually gifted students benefited from the training activities
- Teacher/researcher acted as more capable peer by leading the changes in instruction
- They came to appreciate task and person variables that influence problem solving
- They became able to talk about their thinking

# *Discussion*

- The leap frogging of ideas in the gifted group may be spontaneous scaffolding not present in the heterogeneous group
- Ability level of students may have effected their participation
- Social interactions may have been influenced by prior relationships and teaching environments



*The End*