BUILDING ADAPTIVE CAPACITY THROUGH LOW-STAKES CREATIVE MINI-TASKS

MARCONI INSTITUTE FOR CREATIVITY
2026 ANNUAL CONFERENCE

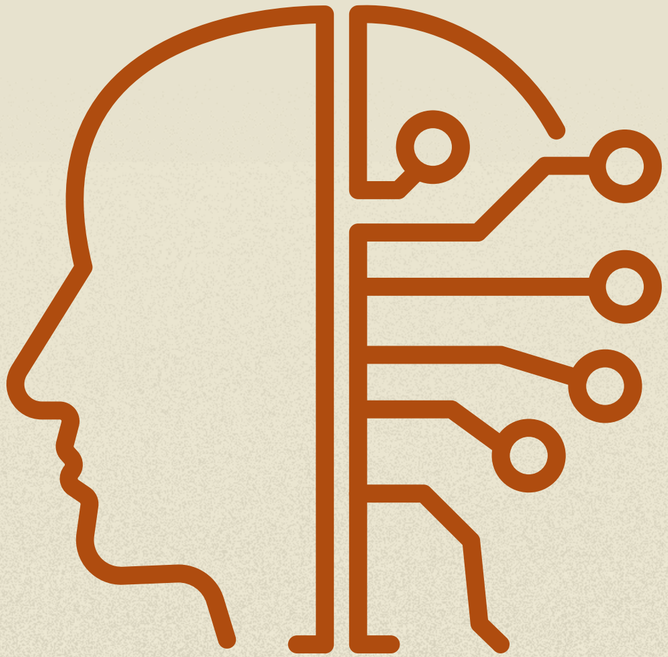
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Current Research:
Creative ecosystems in classrooms

- Student perceptions
- Teacher moves



For learners, dogmas are seductive. They promise simple answers to complex questions, mental security in the face of the unknown. But this security comes at a price: that of suffocation. We are giving up our power to question, to discover the unknown, to be autonomous, our capacity for wonder and our creativity.

--Evelyn Para



- Creativity revolves around our human ability to navigate uncertainty. Adaptive capacity is what develops when people repeatedly practice doing so.
- Cultivating adaptive capacity through creativity may become one of education's most important goals.

RESEARCH QUESTIONS

How does participation in small creative challenges influence students' perceptions of their adaptive capacity as reflected in. . .

1. creative self-efficacy?
2. creative personality traits?
3. creative habits of mind?

PURPOSE: Can repeated low-stakes creative challenges strengthen students' adaptive capacity?

Sample:

- Middle school campus (grade 8, ages 13-14)
- 34 students
- Two nine-week courses
- Two classes in each course

Mixed-Methods:

- Pre/post surveys
- Divergent Assoc. Task
- Non-participatory observations
- Discourse analysis
- SCALE comparison

FRAMEWORK

THESE DIMENSIONS OF CREATIVITY

Creative Self-Efficacy

Creative Habits of Mind

Creative Personality

Divergent Thinking

COLLECTIVELY BUILD

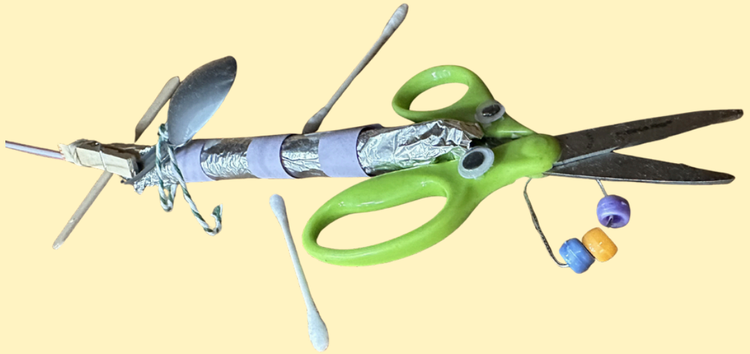
Adaptive Capacity

WHICH ENABLES INDIVIDUALS TO

Solve Ill-Structured Problems

INTERVENTIONS

1. Task One, Inventing: Build a Better Bug
2. Task Two, Engineering: Sticky Spaghetti Towers
3. Task Three, Technology: Digital Storytelling







QUANTITATIVE FINDINGS

Pre- and Post-Survey Evidence:
Self-Perceptions of Creativity, Self-Efficacy, Creative Personality, Creative Habits of Mind, and Divergent Thinking

Survey Questions 1-8 Students' Perceptions of Their Creative Self-Efficacy

(Questions Based on the Short Scale of Creative Self with selections from Karwowski et al., 2018)

Survey Item	Pre-Intervention Agree (%)	Post-Intervention Agree (%)	Change
1. I think I am a creative person.	**100**	**100**	0
2. Being creative is an important part of myself.	82.4	82.3	-0.1
3. I know I can solve complicated problems.	70.6	76.4	**5.8**
4. I trust my creative abilities.	76.5	79.4	2.9
5. My imagination and originality distinguish me from my friends.	56.9	58.8	1.9
6. Many times I have proven that I can handle difficult situations.	79.4	85.3	**5.9**
7. I am sure I can deal with problems requiring creative thinking.	82.3	85.3	3
8. I am good at proposing original solutions to problems.	58.8	73.6	**14.8**

Note: Agree = "Definitely Yes" + "Somewhat Yes." Percentages may not = 100% due to rounding.

Survey Item	Pre-Intervention Agree (%)	Post-Intervention Agree (%)	Change
9. I view challenging situations as an opportunity to grow and learn.	50	47.1	-2.9
10. I look for experiences that challenge how I think.	47	50	3
11. I seek situations requiring deep thinking.	35.3	47.1	**11.8**
12. I enjoy learning about unfamiliar subjects.	35.3	44.1	8.8
13. I find it fascinating to learn new information.	55.8	64.7	8.9
14. Thinking about difficult problems keeps me awake at night.	47.1	47.1	0
15. I can spend hours on a problem because I want to know the answer.	47	64.7	**17.7**
16. I work harder when I cannot immediately solve a problem.	47	41.2	-5.8
17. I keep working on important problems even when they are hard.	41.2	55.9	**14.7**
18. I see myself as someone who has many artistic interests.	44.3	47.1	2.8
19. I see myself as outgoing and sociable.	44.1	47.1	3
20. I see myself as relaxed and able to handle stress well.	38.2	44.1	5.9
21. I see myself as someone who is active and imaginative.	64.7	61.8	-2.9
22. I see myself as someone who does not get nervous easily.	29.4	50	**20.6**
23. Creativity is an important part of myself.	44.1	58.8	**14.7**

Survey Questions 9-23 Perceptions of Their Creative Personality

(Based on the Big Five Inventory-10 short Form with selections from Rammstedt & John, 2007, and the Five Dimension Curiosity Scale with selections from Kashdan et al., 2018)

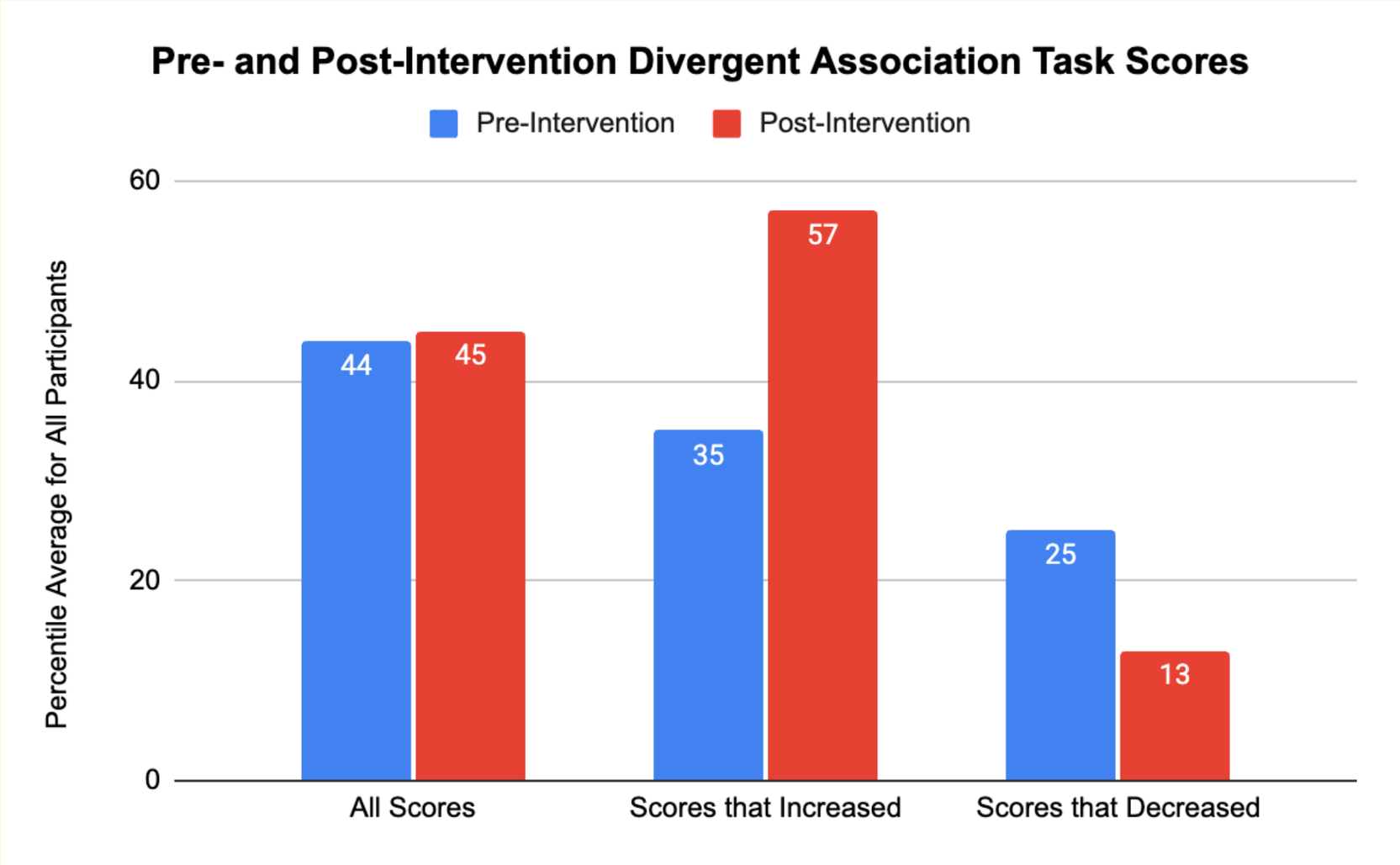
Note: Agree = "Completely Describes Me" + "Mostly Describes Me." Percentages may not total exactly 100% because of rounding.

Survey Item	Pre-Intervention Agree (%)	Post-Intervention Agree (%)	Change
24. I understand what I need to do to accomplish a task.	76.5	70.6	-5.9
25. I think of multiple ways to complete a task before settling on one idea.	70.6	79.4	**8.8**
26. I think of more than one way to rearrange resources to complete a task.	73.5	88.2	**14.7**
27. I share ideas and work with teammates to find the best solution.	76.5	70.6	-5.9
28. I sketch a picture or use materials to make a plan before completing a task.	58.8	58.9	0.1
29. I experiment with materials and discover ways to complete a task without making a plan.	58.8	82.3	**23.5**
30. If a plan is unsuccessful, I think about what went wrong before trying something new.	64.7	61.8	-2.9
31. I often come up with new ideas while working on a project.	73.5	85.3	**11.8**
32. I combine several ideas together to complete a task.	70.6	70.6	0
33. I enjoy sharing my ideas with others to get feedback.	73.5	79.4	5.9
34. Working with other people helps me come up with creative solutions.	70.6	70.6	0

Survey Questions 24-34 Students' Perceptions of Their Creative Habits of Mind

(Original questions based on the seven trans-disciplinary habits of mind from Mishra et al., 2011)

Note. Agree = Strongly Agree + Agree a Little. Percentages may not = 100% due to rounding.

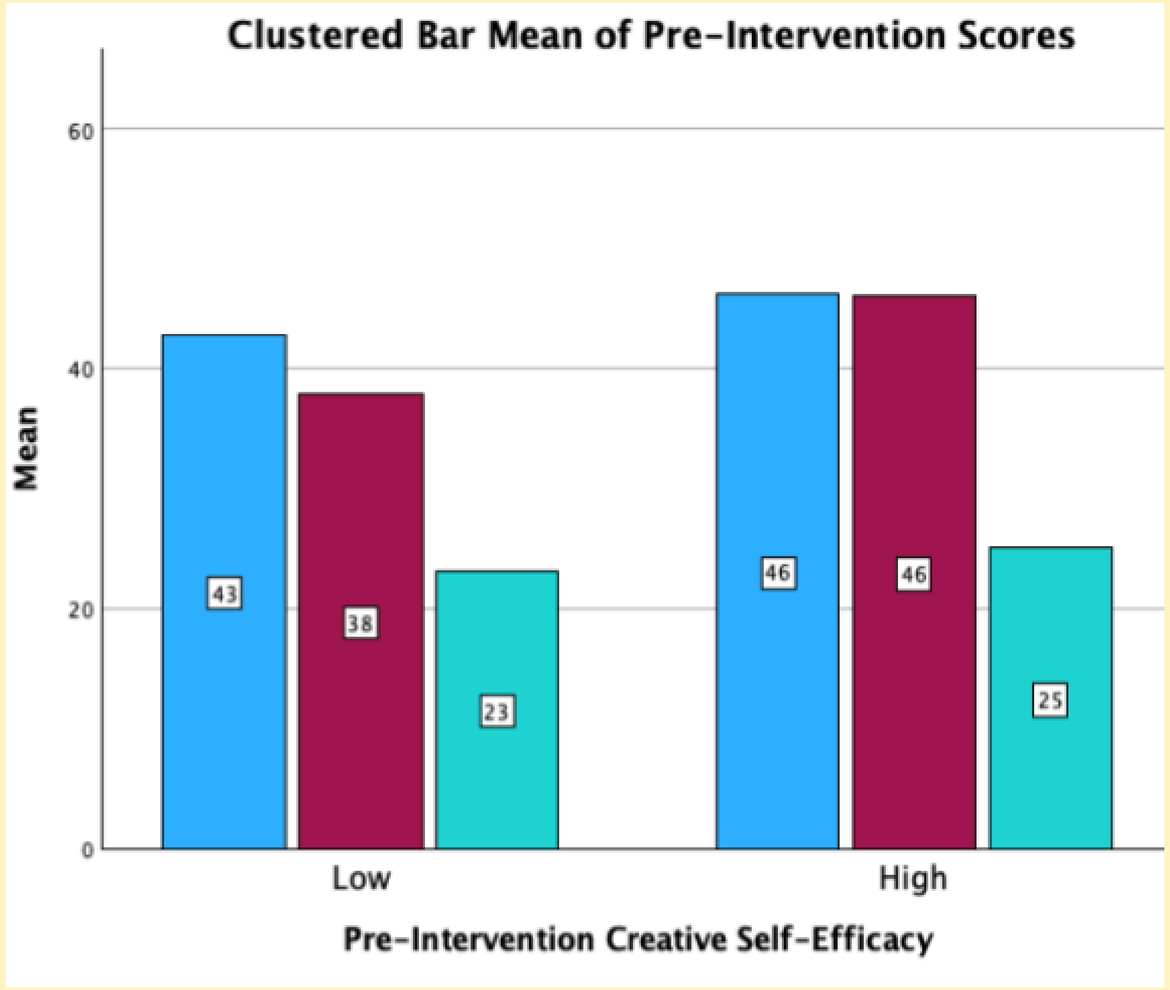


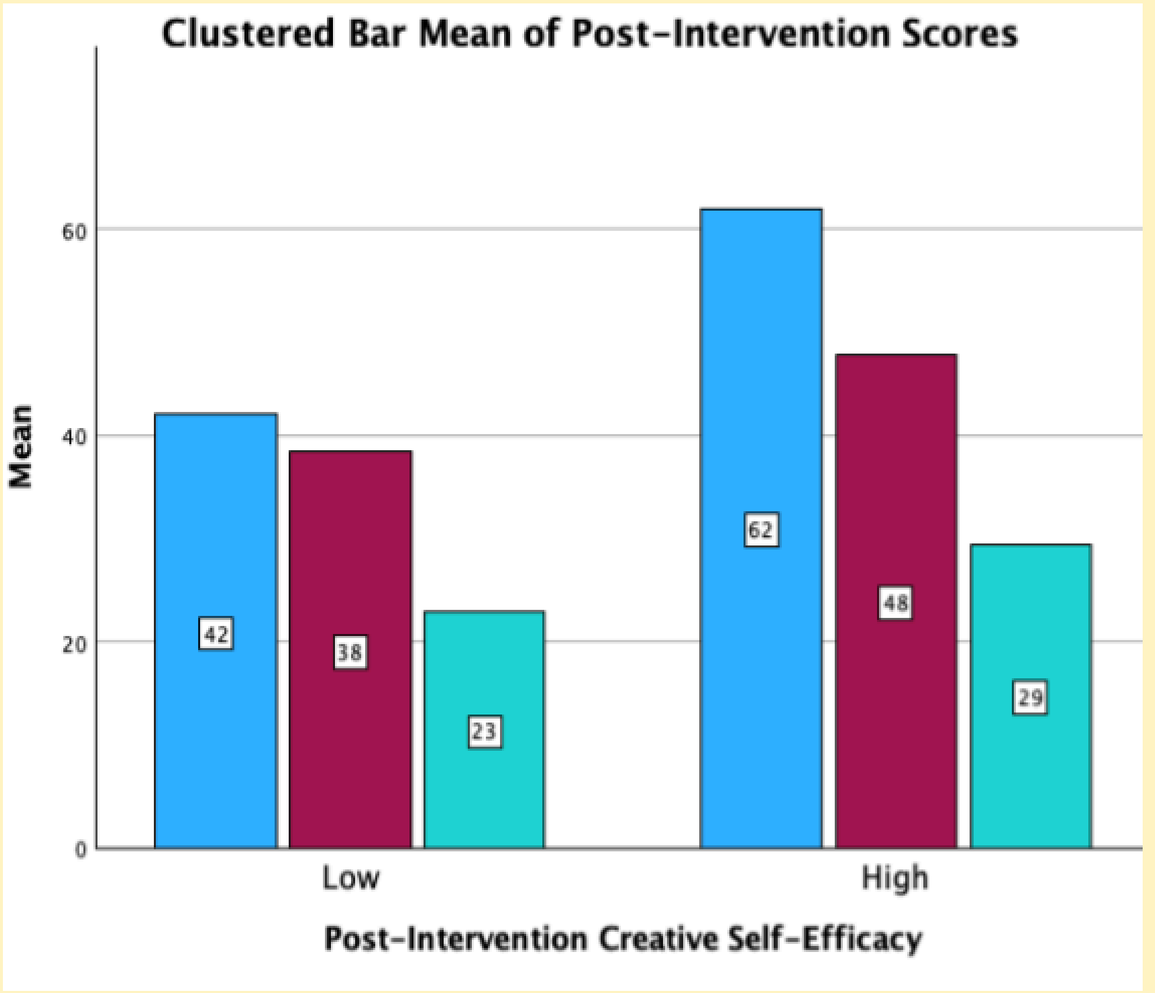
Divergent Association Task

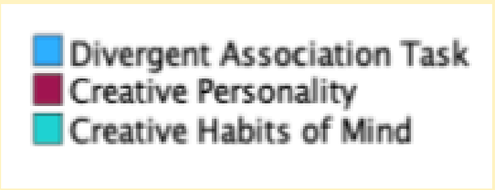
The Divergent Association Task measures verbal creativity in under 4 minutes. It involves thinking of 10 unrelated words. People who are more creative tend to think of words with greater "distances" between them, showing more divergent thinking.

Paired-Samples t-Test Summary

Measure	Pre-Intervention Mean	Post-Intervention Mean	t	p
Creative Self-Efficacy Scores	16.59	15.88	0.845	>.05
Creative Personality Scores	40.29	39.74	0.448	>.05
Creative Habits of Mind Scores	23.68	23.79	0.442	>.05
Divergent Association Task Scores	43.82	44.91	0.425	>.05


Clustered Bar Mean of Pre-Intervention Scores
Mean
60
40
20
0
43
38
23
46
46
25
Low
High
Pre-Intervention Creative Self-Efficacy


Clustered Bar Mean of Post-Intervention Scores
Mean
60
40
20
0
42
38
23
62
48
29
Low
High
Post-Intervention Creative Self-Efficacy


Divergent Association Task
Creative Personality
Creative Habits of Mind

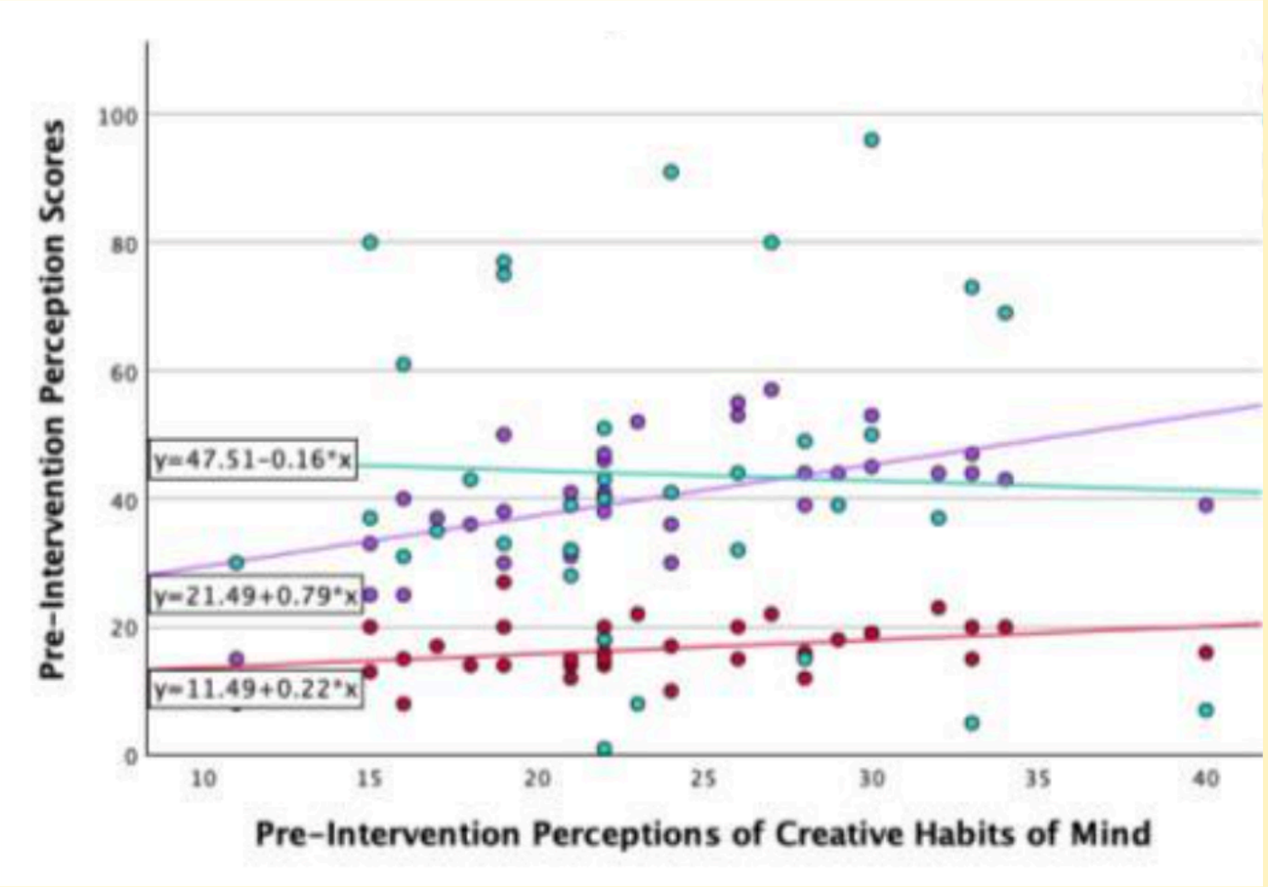
Variables	Time	Pearson χ^2	p	Significant?
CHOM × CSE	Pre-Intervention	0.95	0.329	No
CHOM × CSE	Post-Intervention	6.6	0.01	Yes
CHOM × Personality	Pre-Intervention	4.48	0.034	Yes
CHOM × Personality	Post-Intervention	5.9	0.015	Yes
CHOM × DAT	Pre-Intervention	0.47	0.492	No
CHOM × DAT	Post-Intervention	1.11	0.292	No

Note: CHOM = Creative Habits of Mind; CSE = Creative Self-Efficacy; PER = Creative Personality; DAT = Divergent Association Task.

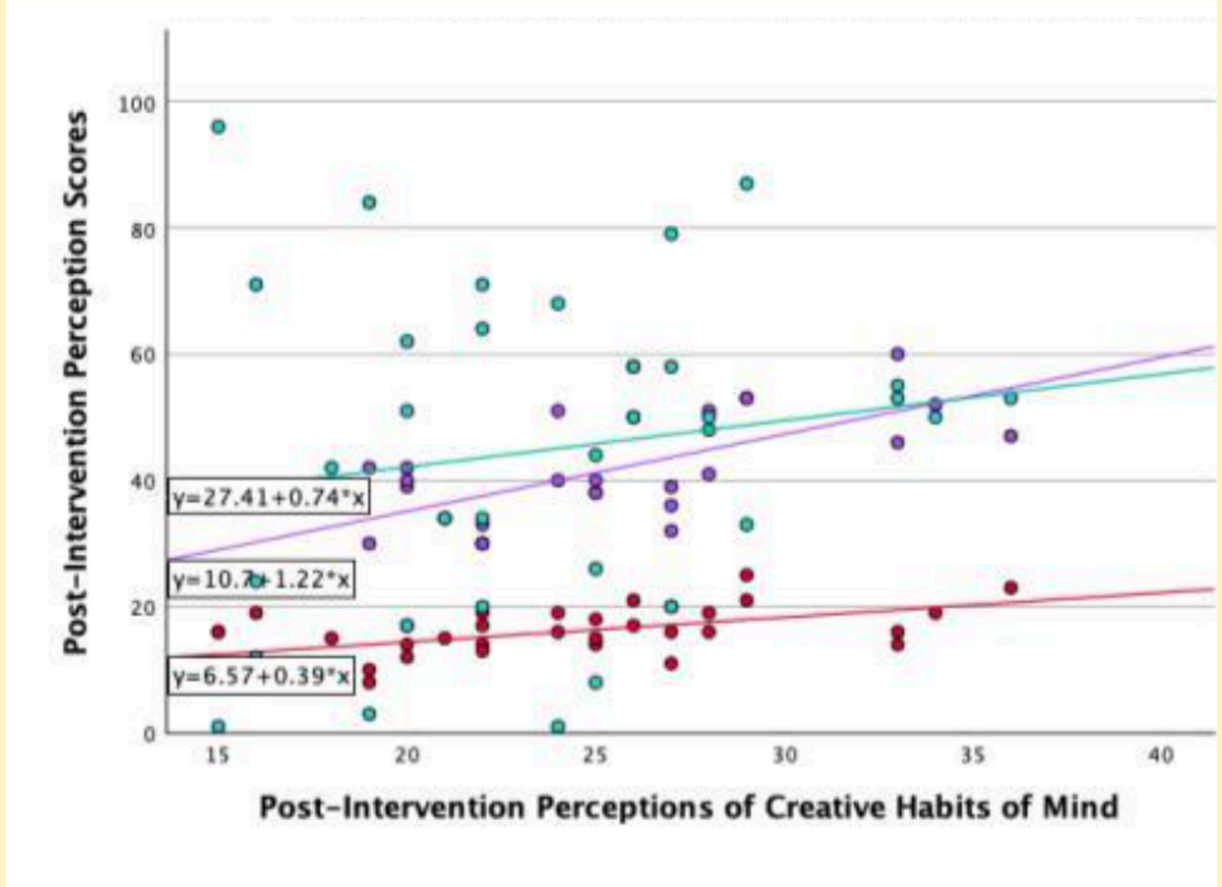
Summary of Chi-Square Analyses

Scores were dichotomized into Low and High categories using the median split for chi-square analyses. Pearson chi-square tests were used to examine associations between variables. Fisher's Exact Test and Yates continuity correction were consulted when appropriate because of the small sample size (N = 34).

Scatter Plot of Pre-Intervention Perception Scores by Pre Intervention Perceptions of Creative Habits of Mind



Scatter Plot of Post-Intervention Perception Scores by Post-Intervention Perceptions of Creative Habits of Mind



Creative Personality
Creative Self-Efficacy
Divergent Association Task

Summary of Pearson Correlations

Relationship	Pre-Intervention r	Post-Intervention r	Interpretation
CSE × Personality	0.604	0.488	Significant both
CHOM × Personality	0.555	0.687	Stronger post
CHOM × CSE	0.333	0.552	Emerged after intervention

Regression Summary Table

Time	F	p	R^2	Interpretation
Pre-Intervention	3.99	0.054	0.111	Not significant
Post-Intervention	14.04	<.001	0.305	Significant predictor

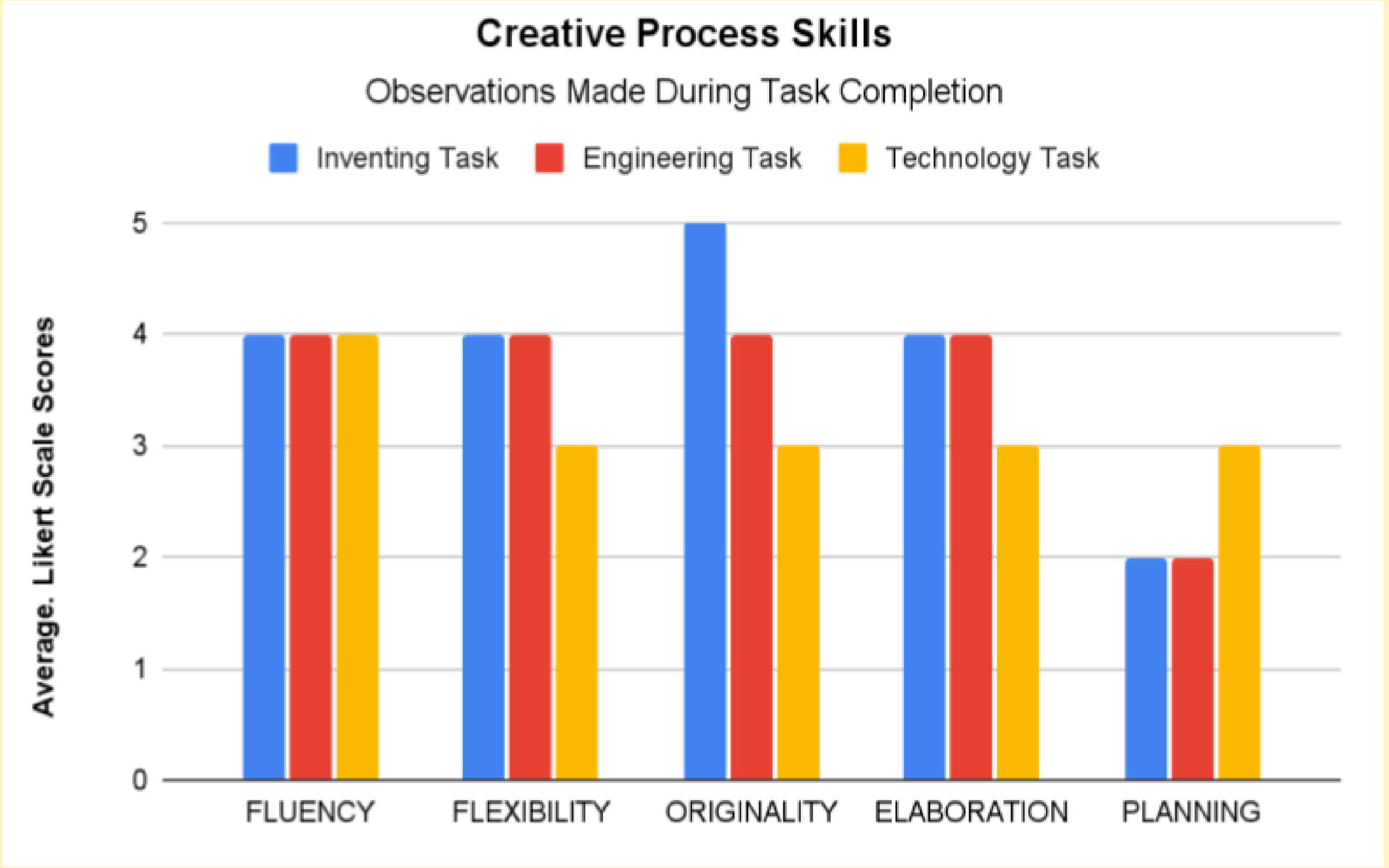
As a body of information, inferential analysis reveals that the intervention strengthened the relationships among the dimensions of adaptive capacity.

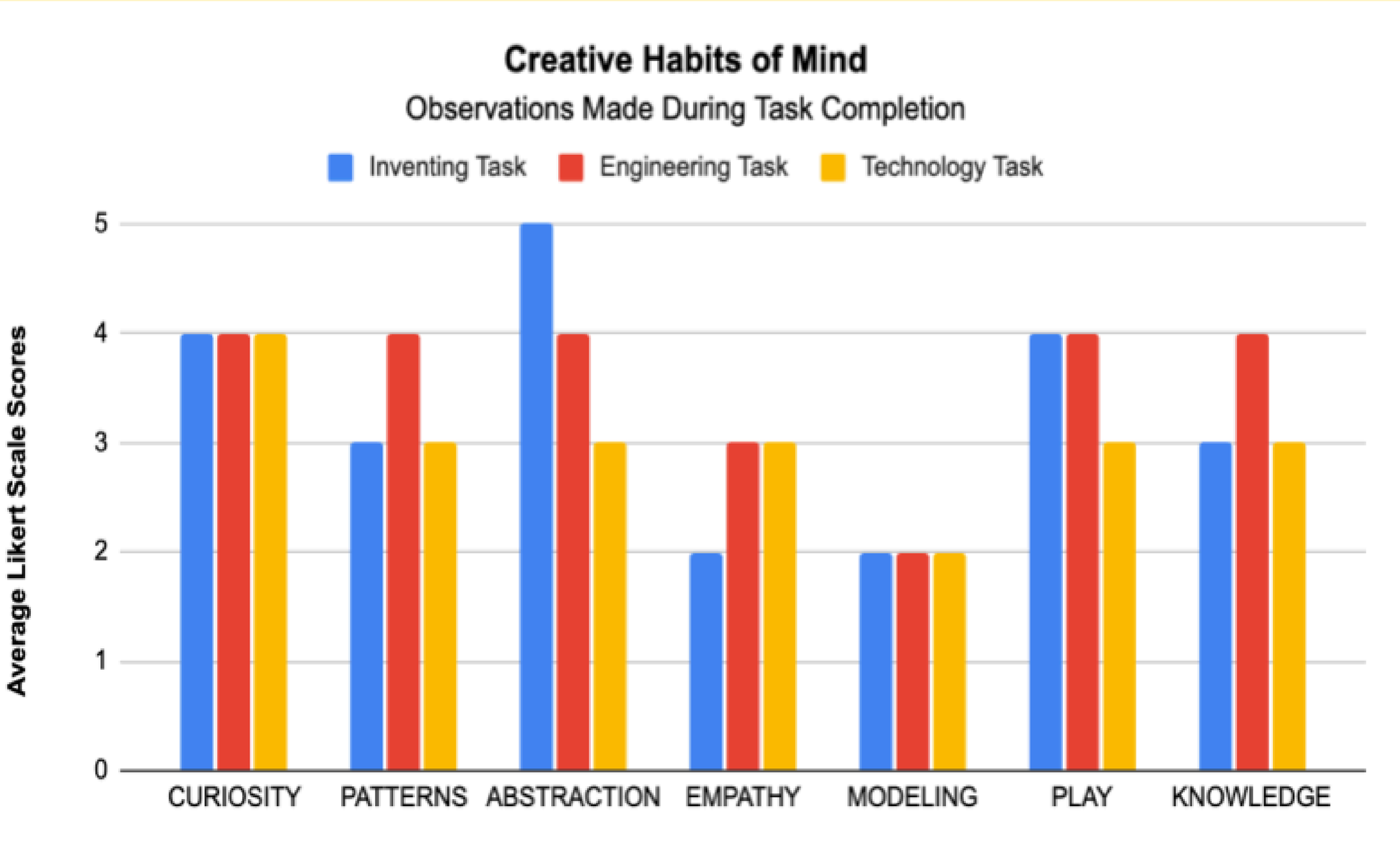
- Creative habits of mind became significantly associated with creative self-efficacy
- Creative habits of mind became significantly predictive of creative self-efficacy
- Stronger correlations emerged among creative self-efficacy, creative personality, and creative habits of mind

This emerging pattern provides strong evidence that repeated engagement in authentic, low-stakes creative experiences can help students develop a more integrated adaptive mindset for responding to novel and complex problems.

QUALITATIVE FINDINGS

Non-participatory Observations,
Discourse Analysis, SCALE Comparison


Creative Process Skills
Observations Made During Task Completion
Inventing Task
Engineering Task
Technology Task
Average. Likert Scale Scores
5
4
3
2
1
0
FLUENCY
FLEXIBILITY
ORIGINALITY
ELABORATION
PLANNING

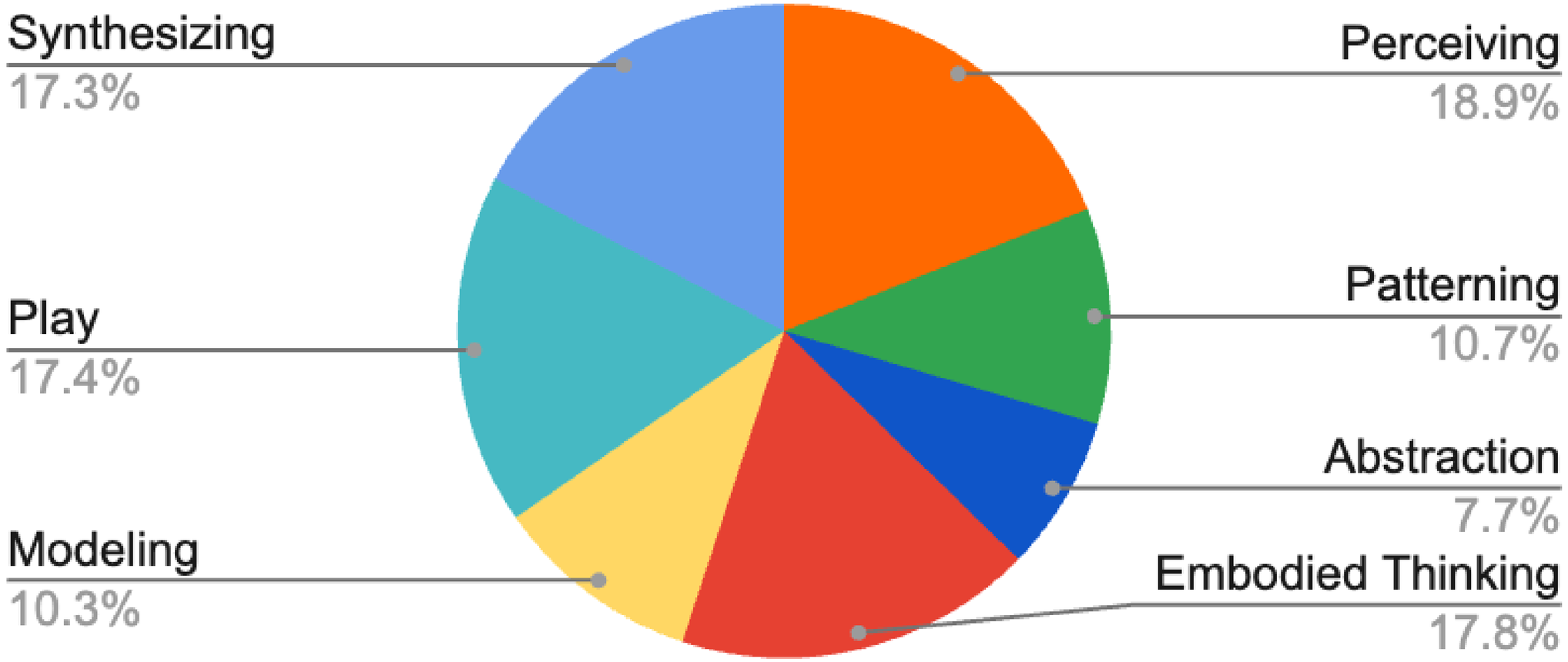


Creative Habits of Mind modified from Mishra et al, 2011.

SAMPLE FROM TABLE:
Quotes Encompassing Words Related to Creative Habits of Mind

Perceiving		
Word Choice	**Quotes**	**Rationale**
looks	“Hey, that kind of looks like the Eiffel Tower, if it was wobbly and made out of spaghetti.”	• Imagery involves envisioning new possibilities • Asking why suggests curiosity and a desire to know
what is	“What is this? It's like the tongue that holds the meat. Yeah, and when it moves, it snaps. Wait, can this be the meat? And then we put cardboard on the other end to make it look like a bear trap.”	
why	“What does he eat? Dumpster food. Because he goes into trash cans. He eats drawings. . .Is that why he's called the Doodlebug? Yes. He eats people's drawings.”	

Percentage of Word Choices According to Creative Habits of Mind Classification



FINDINGS

- **Students consistently demonstrated adaptive capacity across all three creative mini-tasks** by generating multiple ideas, exploring alternative approaches, developing original solutions, and building on one another's thinking.
- **Creative habits of mind were evident throughout the interventions** and include curiosity, abstraction, pattern recognition, play, and the application of prior knowledge to new situations.
- **Observational evidence suggests that adaptive capacity was enacted through both creative thinking and creative action** as students collaboratively navigated open-ended problems and refined their ideas together.

Rather than producing isolated creative products, repeated engagement in low-stakes creative challenges encouraged students to integrate cognitive, behavioral, and interpersonal processes associated with adaptive capacity.

These findings provide qualitative evidence that adaptive capacity can be cultivated through regular opportunities for collaborative creative problem solving.



SCALE

Support of Creativity in A Learning Environment

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SCALE Component	Rating	Evidence/Notes
Physical Environment		
A variety of resources are available and accessible to students.	0 1 2 3	
Examples of student work appear in the space.	0 1 2 3	
A variety of work stations or areas are available to students.	0 1 2 3	
The furniture allows for multiple arrangements and configurations.	0 1 2 3	
Learning Climate		
Students are involved in discussions among themselves, with or without the teacher, that deepen their understanding.	0 1 2 3	
The students are caring, respectful, and value differences.	0 1 2 3	
The teacher is a facilitator, co-learner, explorer, or inquirer with students.	0 1 2 3	
Mistakes, risk-taking, and novel ideas are valued or encouraged.	0 1 2 3	
Learner Engagement		
Students are involved in tasks that are open-ended and/or involve choice.	0 1 2 3	
Students are involved in activities that may include inquiry, project based learning, or interdisciplinary tasks.	0 1 2 3	
Students use multiple perspectives/viewpoints/ways of knowing or various modes of investigation/problem solving.	0 1 2 3	
Students demonstrate interest in or enthusiasm for the activity beyond being "on task."	0 1 2 3	
Students spend time developing ideas for deeper understanding and/or reflecting on their learning.	0 1 2 3	
Students work at their own pace and/or time is used flexibly.	0 1 2 3	

THE CLASSROOM ECOSYSTEM

- **SCALE Score: 36/42**
  - The classroom environment strongly supported creativity and adaptive capacity.
- **Supportive learning ecosystem**
  - Open-ended inquiry, collaboration, and risk-taking were consistently encouraged.
- **Adaptive learning in action**
  - Flexible spaces, accessible resources, and student choice fostered curiosity, experimentation, reflection, and collaborative problem solving.

LIMITATIONS

- **Small sample & short duration**
  - N = 34 participants
  - Single 9-week intervention
- **Survey design**
  - Included a neutral response option
  - May have reduced sensitivity to detect change
- **Variation in intervention tasks**
  - Tasks differed in openness and autonomy
  - While methods were not prescribed, some constraints existed due to resources provided
  -

CONCLUSIONS

- **Low-stakes creative challenges strengthened adaptive capacity** by increasing the integration of creative self-efficacy, creative habits of mind, and creative personality.

- **Adaptive capacity developed through the interaction of processes**--cognitive, behavioral, and affective--not growth in a single construct.

CONCLUSIONS

- **Qualitative evidence demonstrated adaptive capacity in action** through curious, flexible, collaborative, reflective, and iterative problem-solving.

- **A supportive classroom ecosystem was essential for fostering adaptive learning** as the environment promoted student choice, psychological safety, productive failure, and collaboration.

CORE FINDING

Adaptive capacity is teachable and can be intentionally developed through repeated classroom experiences in an appropriately designed creative classroom ecosystem.

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