MONTGOMERY COLLEGE

Teaching Strategies and Student Feedback

Scholarship of Excellence in Teaching

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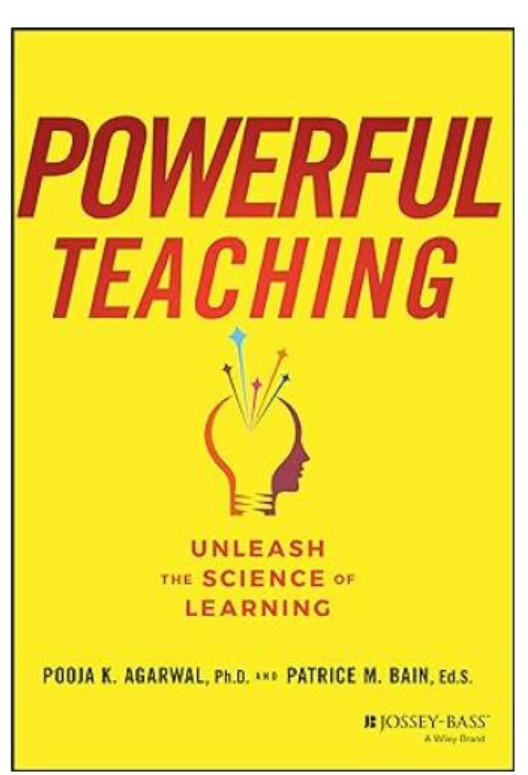
Problems

- Forgetting prior topics throughout the semester, especially when those concepts were necessary to understand new concepts.
- Students experiencing difficulties studying for tests, facing challenges in organizing topics, and uncertainty about what to focus on or what they've already mastered.
- Need for students to comprehend the relationship between classroom learning and real-world applications.
- Engaging quieter students during group work to enhance their participation and improve the overall quality of group collaborations.

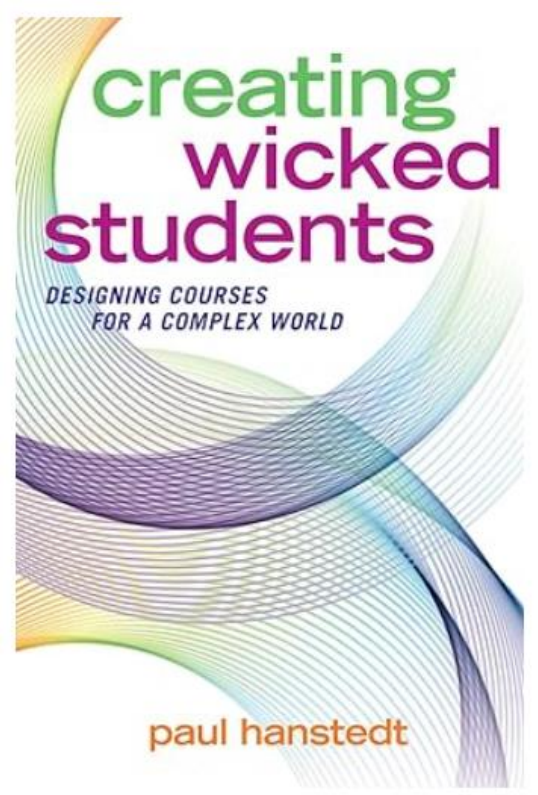
Strategies

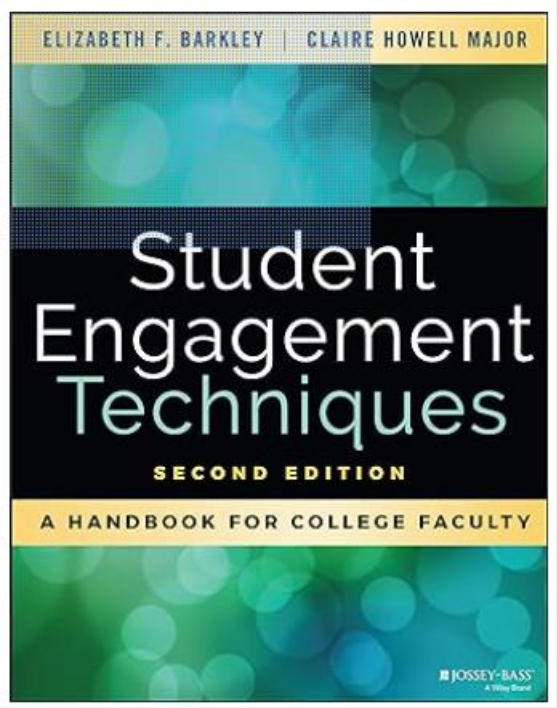
- Utilizing Retrieval Practices in Math 150 (Applied Calculus) class to reinforce learning.
- Implementing PreTests as metacognitive exercises before tests in Math 165 (PreCalculus), Math 150, and Math 284 (Linear Algebra).
- Incorporating four real-world group projects in Math 284 to enhance practical application.
- Enhancing group work in Math 284 by introducing an evaluation component to improve quality and assessment.

Retrieval & Metacognitive Practices



Real-World Project & Enhancing Group Work





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Retrieval Practice

Wheel of topics

- Two-thirds of the semester conducted once a week; remaining one-third covered twice a week.
- Group collaboration on chosen topics; students write recalled information on the board (4 groups, four whiteboards).
- Assigned problems related to the selected topic for students to solve.
- Presentation of answers by students, followed by peer review where they identify mistakes in other groups' solutions.

Metacognitive Exercises

- 1) Put a * if you know the answer or a ? if you don't
- 2) Answer all the * without your books or notes
- 3) Look up all the ? using your books and notes
- 4) Verify all the * are correct

Real-World Projects

- System of equations and electrical circuits
- Vectors and Knight move in a chess game
- Eigenvalues/eigenvectors and managing a sheep herd in New Zealand
- Least square problems and GPS

Refference:Linear Algebra and Applications: An Inquiry-Based Approach
Feryal Alayont
Steven Schlicker
Grand Valley State University

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Improving Group work

	1st round	2nd round	3rd round	4th round(Evaluation)
Group 1	Problem #1	Problem #2	Problem #3	Problem #4
Group 2	Problem #2	Problem #1	Problem #4	Problem #3
Group 3	Problem #3	Problem #4	Problem #1	Problem #2
Group 4	Problem #4	Problem #3	Problem #2	Problem #1

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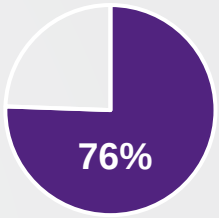
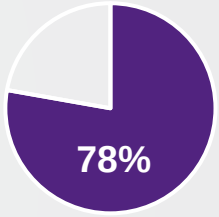
Retrieval Practice Survey – MATH 150

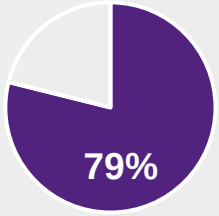
- **Q1:** How helpful were the regular retrieval practice exercises in reinforcing the understanding of the course material



- **Q2:** If integration of retrieval practice improved long-term memory and ability to apply knowledge in solving problems



- **Q3:** How much students prefer having retrieval practices in their course



Comments

- Maybe to do it more often like at the end of every class
- I would recommend that after we go over 1 topic, its removed off the spinning wheel just to avoid receptiveness
- Skip topics that have been reviewed more than 3 times
- It help me keep earlier topics fresh in my brain while learning the new topics

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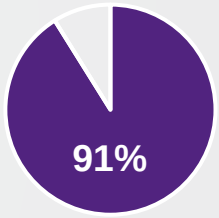
Pretest Survey – MATH 150

- **Q1:** How much pretest helped students assess their understanding of course material

- **Q2:** Effectiveness of guidance on how to utilize pretests as study material



Comments

- The pretest helped me understand the course material before each test because it broke it down into smaller subunits, which pointed out my weak points
- Reviewing things with others helped me more because by myself I tend to get lost or procrastinate and not study

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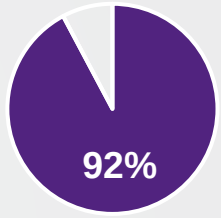
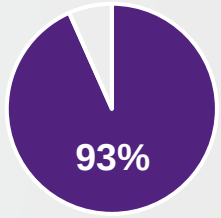
Pretest Survey – MATH 165

- **Q1:** How much pretest helped students assess their understanding of course material



- **Q2:** Effectiveness of guidance on how to utilize pretests as study material



Comments

- I was very ready for all exams as pretest showed all the flaws I has and how I improve more
- The pretest showed me exactly what I was expected to know for the test
- The pretest allowed me to identify the areas I needed to improve on to make a better grade on the exam
- They help me not freak out during the test

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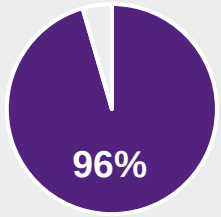
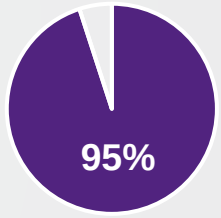
Pretest Survey – Linear Algebra

- **Q1:** How much pretest helped students assess their understanding of course material



- **Q2:** Effectiveness of guidance on how to utilize pretests as study material



Comments

- I knew what topics to study for
- It was a great review, and recalling of all the units and relearning them if necessary
- The structure of the pretest was very good, completing the questions I knew how to do first, and going back to relearns what I didn't know was really helpful for me
- It was very helpful in letting me figure out my areas of difficulty
- Gave me a good scope of what would be tested

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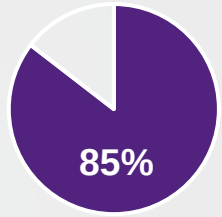
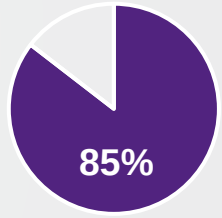
Improved Group Work – Linear Algebra

- **Q1:** How effectively the changes made to group work improve collaboration among group members



- **Q2:** If the modifications positively impacted equal participation and involvement among group members



Comments

- To avoid bias, provide a rubric for selecting the best answer and make it anonymous
- They helped our collaboration when we graded together
- It was fun and drove us to try to win
- It improved communication within the whole class when discussing the best answer

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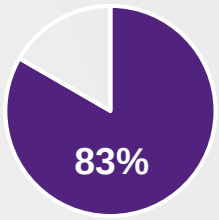
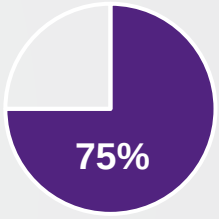
Real-World Project – Linear Algebra

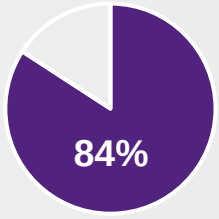
- **Q1:** Real-world projects assisting students in better understanding the practical application of the subject matter



- **Q2:** Clarity and relevance of the project topics and objectives to the course content



- **Q3:** If working on projects in groups enhance the students' problem solving and collaboration skills



Comments

- I can see how it is applied to real life but it is complex
- They really helped me apply methods to real-world problems
- They were challenging and they provided opportunities for critical thinking and creativity

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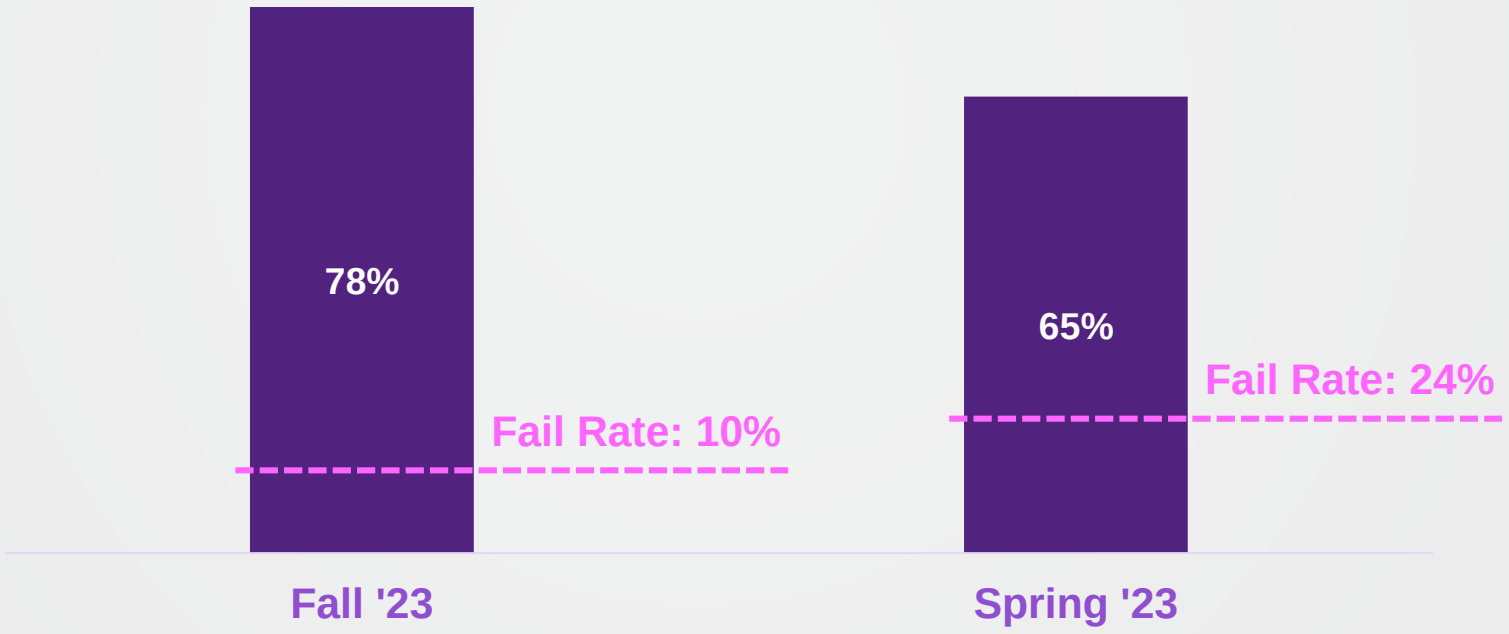
Average Grade Comparison – MATH 165



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