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Improving Students' Retention of Mathematics and Science Concepts: The Case of Two Teaching Experiments

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Improving Students' Retention of Mathematics and Science Concepts: The Case of Two Teaching Experiments

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QUESTIONS

- What activities help students retain information about concepts and skills in mathematics and science?
- How can we improve retention of learned concepts?

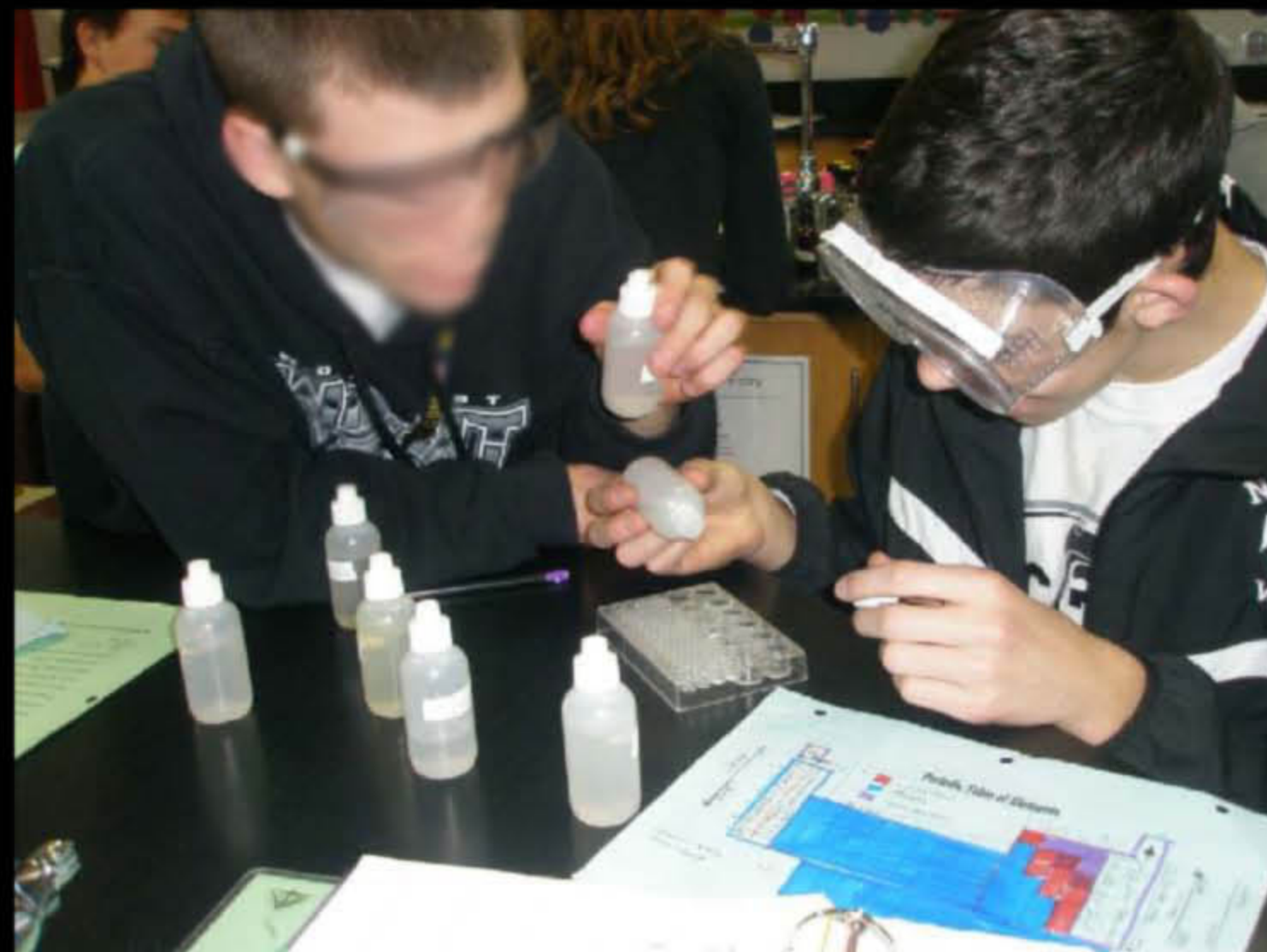
PARTICIPANTS

Science:

- 46 students ages 14 to 16 years old from a high school in Central Illinois
- 23 students were enrolled in Honors Biology and 23 were enrolled in Biology
- School population is 1,675, with an average class size of twenty-five students

Mathematics:

- 45 students, 5 sophomores and 40 juniors enrolled in a South side Chicago Public School
- School serves 324 students ages 12 to 19 with an average class size of thirty-one students



Picture 1. Students work on a lab during a Biology lesson conducted by Bennett.

METHODOLOGY

- Steffe (1983) defined a *teaching experiment* as "a sequence of teaching episodes" (p. 274).
- We define *retention* as the ability to recall information about a topic or a concept over an extended period of time.
- Quizzes and entrance/exit slips were used to demonstrate short-term retention.
- Post-tests and unit tests were used to demonstrate long-term retention.

PROCEDURE

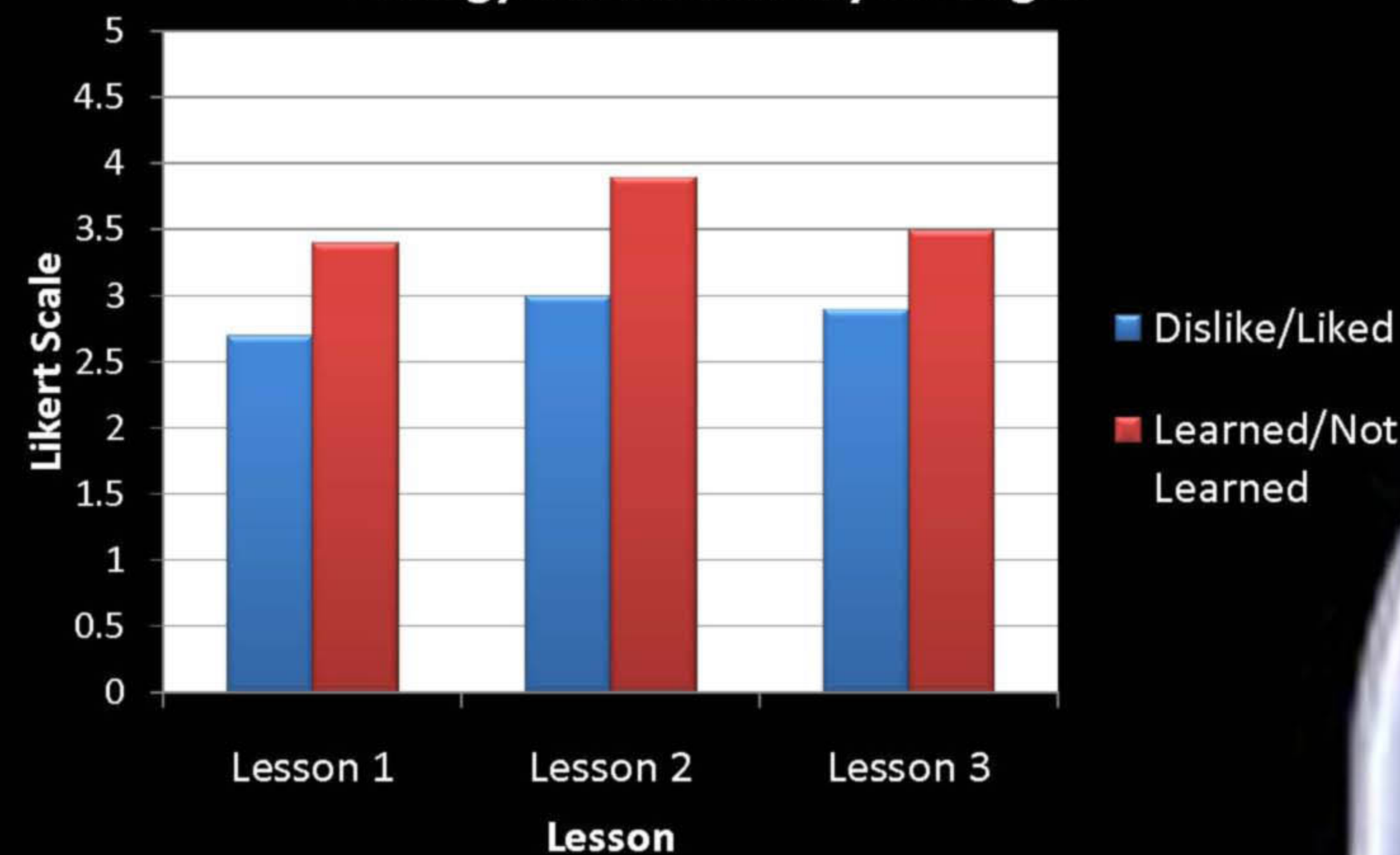
Science:

- Data was gathered over a 2-3 week period covering the topic of cells
- *Assessments*: Pre-test consisting of 13 multiple choice questions, Post-test, Entrance slips, Quiz, Unit test
- *Feedback*: Survey about enjoyment and retention

Mathematics:

- Data was gathered over a 2-3 week period covering a variety of topics of Algebra
- *Assessments*: Pre-test to determine mathematical ability, Exit Slips, Quiz, Unit Test
- *Feedback*: Survey about preference of lessons

Biology Student Survey Averages



Honors Biology Student Survey Averages

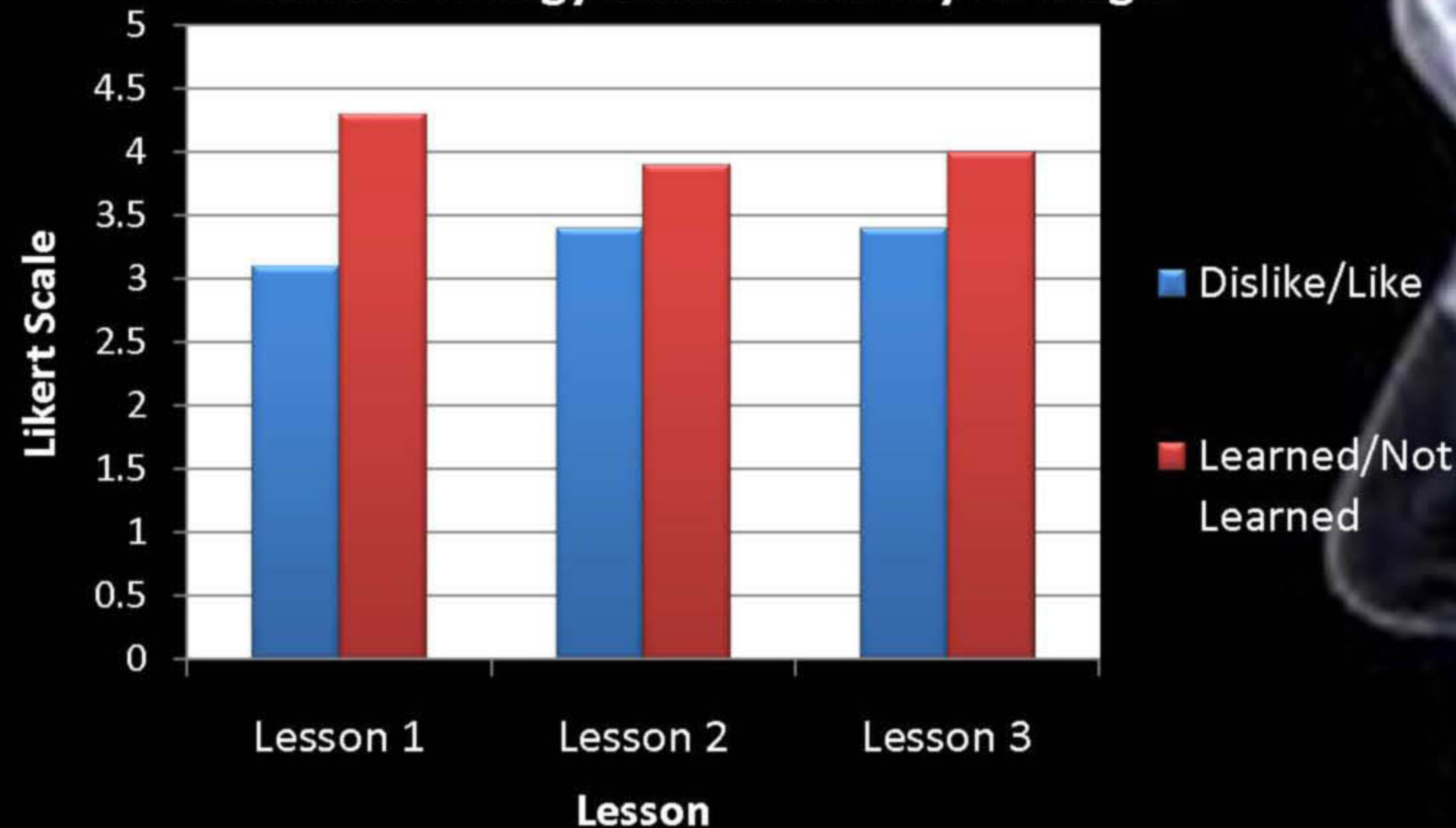


Figure 1. Results from the survey show that there is not a direct relationship between students enjoying a lesson and the amount of material learned. Even though students admitted to not enjoying a lesson as much, they still retained presented information well.

Algebra Student Survey Averages

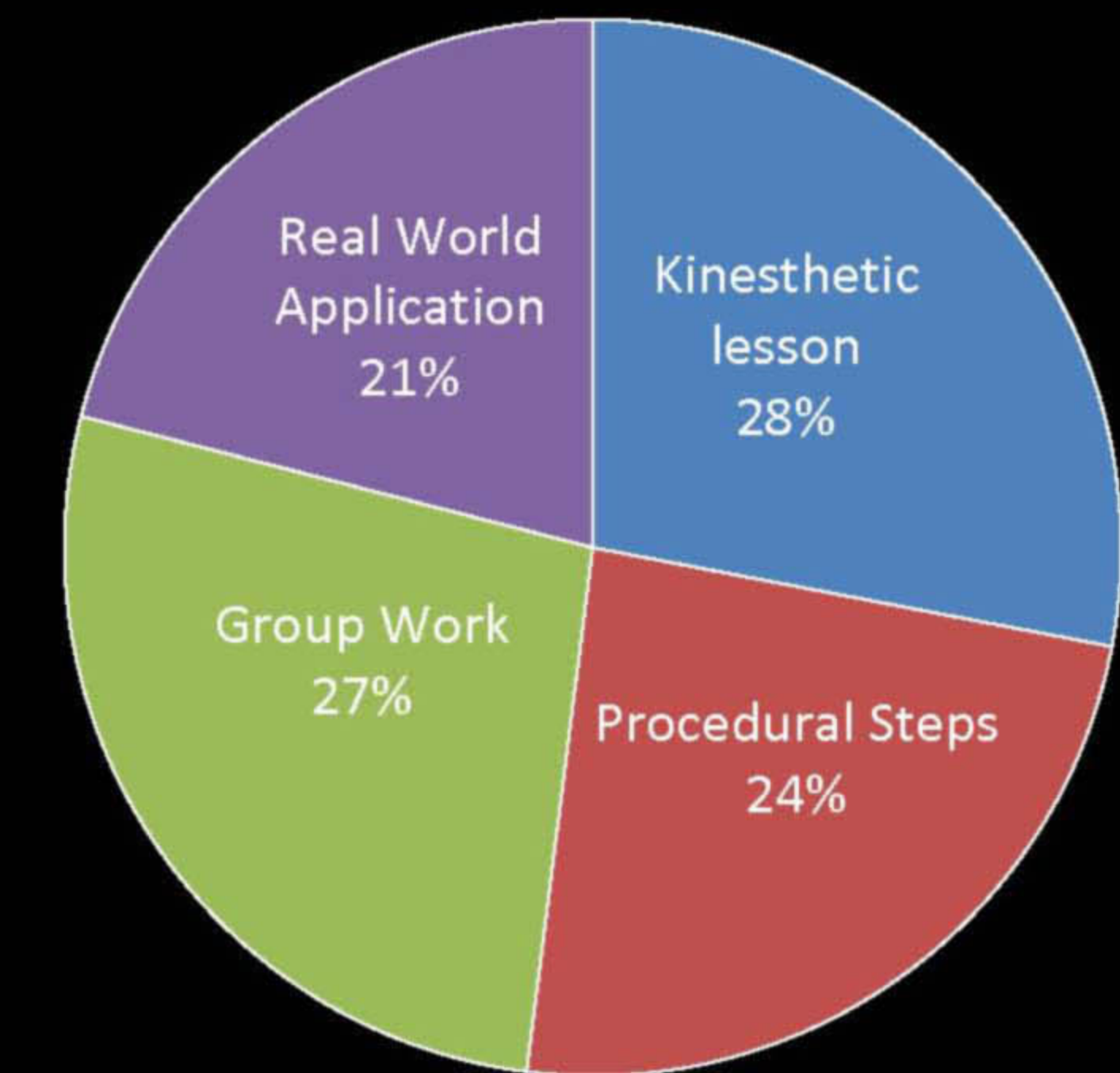


Figure 2. The results showed an almost even split in enjoyment of the lessons. Most students ranked the kinesthetic lesson as either their first preferred or second preferred. The ability to work with peers (group work) ranked second highest overall.

CONCLUSIONS

- The use of technology in the classroom increased the retention of concepts and provided students with an enjoyable learning experience.
- Lessons that allowed students to move about the classroom helped students recall concepts and gave them a unique and entertaining classroom environment.
- The difficulty of the lesson can affect the students' overall enjoyment of the lesson.
- Students retained information from individual work, but the work was not as likeable as other interactive lessons.
- The use of teaching experiment was beneficial because it allowed for a variety of instructional strategies to be examined.

BRIEF LITERATURE REVIEW

- Starbek, Erjavec, and Peklaj (2010) that the use of multimedia as an addition to text during learning contributed to acquiring knowledge and improving comprehension.
- Hill (2010) conducted a study that used students' interests to make mathematics more interesting. She found that incorporating interests helped students retain information.

ACKNOWLEDGEMENTS

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