Method

Participants

The participants in this study were 120 fifth-grade students (60 boys and 60 girls) from three different elementary schools in a suburban school district. The students were randomly assigned to either the experimental group or the control group. The experimental group consisted of 60 students (30 boys and 30 girls), while the control group also consisted of 60 students (30 boys and 30 girls).

Research Design

A randomized controlled trial (RCT) design was employed to investigate the effects of the new teaching method on student learning outcomes. Random assignment of students to the experimental and control groups was conducted to minimize selection bias.

Intervention

The experimental group received instruction using the newly developed teaching method, which emphasized interactive and collaborative learning strategies, real-world problem-solving, and the integration of technology into the curriculum. The control group received traditional instruction based on the existing curriculum used in the school district.

Procedure

Pre-testing

Prior to the intervention, all students participated in a pre-test to assess their baseline knowledge of the mathematical concepts that would be covered during the study. The pre-test was designed by experienced educators and administered in a standardized manner to ensure consistency.

Intervention Phase

The intervention was implemented over a 6-week period. Both the experimental and control groups received their respective instructional methods during regular mathematics classes. The experimental group's teachers underwent training on the new teaching method to ensure fidelity of implementation.

Post-testing

Following the intervention, all students completed a post-test identical to the pre-test to measure changes in their understanding of the mathematical concepts. The post-test was administered in the same standardized manner as the pre-test.

Data Analysis

Quantitative data collected from the pre-test and post-test were analyzed using independent samples t-tests to compare the mean scores between the experimental and control groups. Additionally, a multivariate analysis of covariance (MANCOVA) was conducted to control for any potential covariates.

Ethical Considerations

This study received approval from the Institutional Review Board (IRB) of [Institution]. Informed consent was obtained from both students and their parents, and the research adhered to ethical guidelines regarding the treatment of human subjects.