Executive Summary

Using the FCAT Explorer to Improve 5th Graders' Math FCAT Performance

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Introduction

This study analyzes the effect of using an instructional software program, the FCAT Explorer, on fifth grade students' performance on the math FCAT. The study demonstrates that incremental learning steps in the FCAT Explorer that offer practice solving math problems and provide learning feedback help students' performance on the FCAT. The analysis reported here was undertaken with research staff in the Leon County Schools district office, using a sample of fifth grade students in Leon County. The research was conducted at no charge to the school district by Image Research.

The FCAT Explorer: 5th Grade Math (5GM) program (www.fcatexplorer.com) consists of a series of 148 math word problems in the form written to the benchmarks as specified in the Sunshine State Standards. The FCAT Explorer 5GM uses real-life applications of math concepts relevant to 5th grade students. The items in the FCAT Explorer are formatted as multiple-choice, gridded response, or charting problems. Each item includes an illustration visually depicting the word problem. The combination of practice and feedback in this heuristic process is expected to help students learn math concepts related to specific benchmarks and enhance mathematical skills and strategies; thus, they will enhance their performance on the math FCAT.

Data Sources for Analyzing FCAT Explorer Effects

The sample of students in this study is made up of 916 Leon County students who used the FCAT Explorer 5GM program for the period between September 1, 2001 and March 15, 2002. The sample was spread across 20 elementary schools in the county, and included schools with 2001 school grades of A, B, C and N (No Grade). Each student record provides information on how many items a student attempted, how many were answered correctly or incorrectly on first or second attempt, and the math FCAT scores for 2001 and 2002. The research model proposes a direct, positive effect from practicing items in the FCAT Explorer 5GM and from reading the feedback pages.

Results of the FCAT Explorer 5GM Effects Model Analysis

The analysis of Leon County students measures the effects of the practice and feedback components contained in the FCAT Explorer 5GM program on the performance of students on the math FCAT. The model was tested for all students and then is separated out by school grade and by achievement level to control for different skill levels among students. A summary of the finding is as follows:

- Program usage is highest for students in level A schools, drops by almost half for B schools then increases sharply for C schools. This pattern is consistent for FCAT Explorer 5GM usage across the state in 2001-2002.

- Regardless of school grade, high achievers are more likely to answer the FCAT Explorer word problems correctly on the first attempt.
- Students with a higher achievement levels on the FCAT, who missed the FCAT Explorer problem on the first attempt, are more likely to benefit from the hint feedback, and answer the word problems correctly on the second attempt.
- Students in the lower achievement levels on the FCAT do not benefit from the hint feedback, and they are apt to answer incorrectly on the second attempt.
- Most of the practice and feedback indicators have significant relationships with the 2002 math FCAT scores.
- The proportion of FCAT Explorer 5GM problems answered correctly on the 1st attempt has the most significant correlation (r = 0.510) with the 2002 math FCAT scores.
- Another significant correlation (r= 0.274) is between the proportion of problems answered correctly on the 2nd attempt and the 2002 math FCAT scores.
- The proportion of incorrect answers is negatively correlated (r = -0.353) with the 2002 math FCAT scores, indicating a lack of learning from the hint feedback pages.
- Attempting more problems is not significantly related to the 2002 math FCAT scores; rather performance and mastery of the math skills is crucial.
- The FCAT Explorer effect model explains 31% of the variance in the 2002 math FCAT scores (R^2 = 0.311) and it is significant at $p < 0.000$.
- The indicator for knowledge, percent correct on 1st attempt, is the strongest predictor of math FCAT performance, with a beta weight of 0.403 and is significant at $p < 0.000$.
- The indicator for learning, percent correct on 2nd attempt only, is the second predictor of math FCAT performance with a beta weight of 0.202 and is significant at $p < 0.000$.

Conclusions

From the data analysis it is clear that both the practice and feedback components in the FCAT Explorer have an impact on students' performance on the math FCAT. The analysis demonstrates that student performance on the FCAT Explorer varied with the achievement level of the student, regardless of school grade. However, even students who are struggling with their math studies can benefit from a program like the FCAT Explorer. Because the ability to answer correctly on the first attempt at an item is closely related to achievement on the FCAT, the FCAT Explorer 5GM can be used as a diagnostic for assessing students' math abilities. The analysis shows that using the FCAT Explorer 5GM enhances students' learning and mastery of math skills. Therefore, the FCAT Explorer 5GM can play a significant role in helping 5th graders prepare for the math FCAT.