

Impact of Graphing Calculator Ownership in Two Rural High Schools

Case Study 1

Teacher/Researchers – Kathy Gillespie, Motley County ISD, TX
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Location	Title I schools in two small rural districts with about 80% economically disadvantaged students
Course	Precalculus
Grade	11 and 12
Student Profile	1 of each teacher's "mainstream" classes
Technology	TI-83 Plus graphing calculators

Unlimited access to a TI-83 Plus graphing calculator was substantially beneficial to students' conceptual attainment. This was true for both rural high schools, regardless of student SES.

Setting: Lyford CISD is in the Lower Rio Grande Valley of Texas, while Motley County ISD is in the lower eastern part of the Panhandle of Texas – 613 miles apart. Both of the school systems are *small, rural* schools in counties without affluence. The socioeconomic Status of the students in the two schools further serves to verify similarity: the SES numbers are Lyford CISD – 81.3% and Motley County ISD – 73.2%.

In Motley County, before the study, 17% of students reported access to a graphing calculator for homework, and 8% owned one (TI-81 or TI-82). In Lyford, none of the students reported access to a graphing calculator outside of class.

Curriculum & Teaching: Both classes are aligned to the Texas standards. Teachers coordinated the manner of teaching, methodology, and timeline.

Assessment Method: Teachers wrote parallel pre- and post-tests of 4 questions each, and administered them at the beginning and end of each unit. In *Study 1*, the unit tested was on Functions. In *Study 2*, the unit tested was Kinematics.

Results

In Study 1, only Motley County students were issued calculators to take home:

Study 1 (Functions unit)

	<i>Motley County</i>	<i>Lyford</i>
<i>Pre-test (pass rate)</i>	33.3%	16.7%
<i>Post-test (pass rate)</i>	75%	58.3%

Study 2 (Kinematics unit)

In Study 2, both groups were issued calculators to take home:

	<i>Motley County</i>	<i>Lyford</i>
<i>Post-test (pass rate)</i>	83%	75%

By the time of Study 2, the students at Motley County ISD appeared to be more attuned to being back in the classroom and to their teacher. Unlimited access to calculators aided them in maintaining a high rate of passing. The students at Lyford CISD also appeared to be more attuned to the classroom and to the teacher. The results served to validate the belief that unlimited access to technology assists students in learning and retaining concepts as their passing percentage made a more definitive increase.

The state mandated exam, the TAKS test, was administered in April, 2006. The students at Motley County High School continued to show improvement in the math scores, although one class remained consistent. The improvement was only two percentage points.

However, the students at Lyford High School showed a marked improvement in their test scores. These students improved by 19.8 %. These results serve to verify that unlimited access to calculators, which allows students to not only learn the proper usage of the calculator but also allows them to truly grasp the concepts, can dramatically alter exam results in a positive manner.

Both groups of students retain concepts and demonstrate success on higher order thinking skills questions with the use of the calculators. The results of this research also confirm that success is not dependent on socio-economic status, area of residence, or ethnicity. Students today are attuned to technology and understand its usage. When they are afforded the opportunity to have unlimited access to the technology that will assist them in coursework, they do much better.

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