Elementary Algebra Score Comparison to Subsequent term Math 233 success

Introduction

In order to understand the relationship between students' scores on the Elementary Algebra assessment and their subsequent performance in Math 233, a series of questions were examined. In particular, students sub-scores and cumulative assessment scores were compared against their performance in Math 233. The current data was culled from students who assessed prior to the Fall 09 and Spring 10. The total Math 233 sample with matched scores from the prior testing period was 53.   Below are the examinations.

Algebra Readiness Assessment

Sub-score Category	Number of Items	Pre-set mastery levels
Arithmetic Operations	6	4
Polynomials	7	5
Linear Equation and Inequalities	6	4
Quadratic Equations	4	3
Graphing	4	3
Rationale Expressions	6	4
Exponents & Square roots	6	4
Geometric Measurement	5	4
Word Problems	6	4
Total	**50**	**17+**

Table 1: Success Rate in Math 233 by sub-score mastery.

		205 Success	
		Count	%
Arithmetic Operations	Non-mastery	16	53.3%
	Mastery	17	73.9%
Polynomials	Non-mastery	18	53.6%
	Mastery	15	71.4%
Linear Equation and Inequalities	Non-mastery	27	58.7%
	Mastery	6	85.7%
Quadratic Equations	Non-mastery	29	60.4%
	Mastery	4	80.4%
Graphing	Non-mastery	19	55.9%
	Mastery	14	73.7%
Rationale Expressions	Non-mastery	28	60.9%
	Mastery	5	71.4%
Exponents & Square roots	Non-mastery	21	55.3%
	Mastery	12	80.0%
Geometric Measurement	Non-mastery	30	63.8%
	Mastery	3	50.0%
Word Problems	Non-mastery	22	66.7%
	Mastery	11	55.0%

Table 2: Success Rate in Math 233 by aggregate

	Success	
	Count	%
8	1	100.0%
12	1	100.0%
14		
15	1	100.0%
16		
17	2	40.0%
18	2	100.0%
19	2	40.0%
20	2	66.7%
21	3	100.0%
22	1	20.0%
23	2	66.7%
24	2	50.0%
25	1	100.0%
26	1	50.0%
27	3	50.0%
29	4	100.0%
30	2	100.0%
33	1	100.0%
35	1	100.0%
38	1	100.0%

Table 3: Success Rate in Math 233 by scores

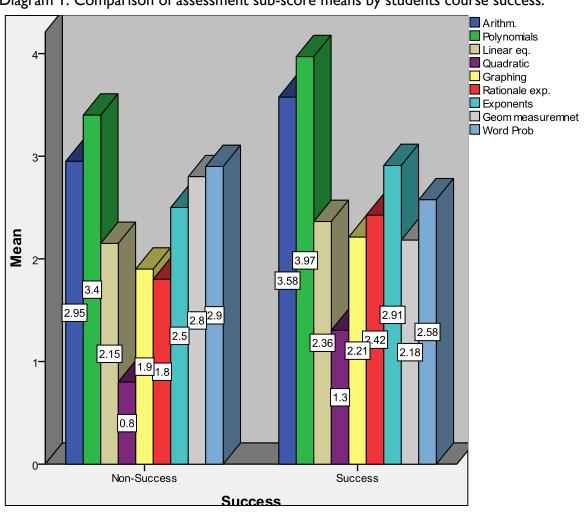|		Total Score	Arithm.	Polyn.	Linear Eq.	Quadratic Equations	Graph-	Rationale Expr.	Exp. & Sqrts	Geom. Meas.	Word Problems
		Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
Final Grade	A	24	4	5	2	1	3	2	3	2	3
	A-	23	4	3	3	1	2	2	2	2	4
	B	26	4	5	3	1	3	2	4	2	2
	B-	23	4	4	3	2	2	2	4	2	2
	B+	32	6	6	3	2	3	4	4	3	4
	C	23	3	4	2	1	2	2	3	3	2
	C+	14	3	2	1	1	2	2	2	1	2
	D	21	3	3	3	1	2	1	3	3	3
	F	22	3	4	2	1	2	2	3	3	3
	I	17	5	4	1	0	2	1	1	3	2

Diagram 1: Comparison of assessment sub-score means by students course success.

Table 4: Correlation between scores and performance.

		Success	Total correct	Arithm.	Polynomials	Linear eq.	Quadratic	Graphing	Rationale exp.	Exponents	Geom measure mnet	Word Prob
GPA	Pearson Correlation	.872**	.227	.308*	.196	.118	.158	.181	.180	.104	-.252	-.019
	Sig. (2-tailed)	.000	.101	.025	.159	.398	.259	.195	.198	.461	.069	.892
	N	53	53	53	53	53	53	53	53	53	53	53
Success	Pearson Correlation		.197	.230	.156	.092	.243	.158	.249	.133	-.289*	-.092
	Sig. (2-tailed)		.157	.097	.264	.511	.079	.258	.072	.342	.036	.510
	N		53	53	53	53	53	53	53	53	53	53

Table 5: Logistic Regression predicting success by assessment sub-score.

	B	S.E.	Wald	df	Sig.	Exp(B)
z Arithm	.964	.467	4.257	1	.039	2.622
z Polyn.	-.264	.448	.347	1	.556	.768
z Linear Eq.	.230	.402	.328	1	.567	1.259
z Quadratic Equations	.639	.464	1.896	1	.169	1.895
ZGraphing	.217	.383	.321	1	.571	1.242
z Rationale Expr.	.442	.444	.994	1	.319	1.556
z Exp. & Sqrts	-.122	.453	.072	1	.788	.885
z Geom. Meas.	-.623	.405	2.361	1	.124	.536
z Word Problems	-.892	.465	3.680	1	.055	.410
Constant	.679	.351	3.736	1	.053	1.971

a. $R^2 = 0.264$