



Correlational Study of
COMPASS Mathematics Test Scores
And
Scores Students Received
In First Mathematics Class in Freshman Year

A Special Project
Presented to
Dr. Catherine Hardison
Heritage University

In Partial Fulfillment
of the Requirement for the Degree of
Masters of Education

Irma Jiménez de Prieto

2012

MASTER'S PROJECT

Notice: This material may be protected by copyright
law (Title 17 U.S. Code).

FACULTY APPROVAL

Correlational Study of

COMPASS Mathematics Test Scores

And

Scores Students Received

In First Mathematics Class in Freshman Year

Approved for the Faculty

Catherine A. Hardison, Ed.D., Ph.D. Faculty Advisor

ABSTRACT

This project studied the appropriateness of the mathematics placement test for incoming freshman and/or transfer students at Heritage University (HU). A group of 16 students from a pool of 65 students who completed the HU COMPASS placement test and received a mathematics placement recommendation of Mathematics 095 classes participated in the study. Pearson r and Spearman Rho measures of correlation were utilized in the study. The results of the study, in part, supported the hypothesis of both relationships which were not what the researcher had anticipated. In that the first relationship between the COMPASS algebra score and the final exam score revealed that the null hypothesis was rejected at the .05 and .01 threshold, and accepted at the .001 threshold; therefore, there was some relationship. The second relationship had less significance between the COMPASS algebra score and the grade score received in class. It revealed that the null hypothesis was rejected at the .05

threshold, and accepted at the .01 and .001 threshold;
therefore there was minimal relationship.

PERMISSION TO STORE

I, Irma Jiménez dePrieto, do hereby irrevocably consent and authorize Heritage University Library to file the attached Special Project entitled, *Correlational Study of COMPASS Mathematics Test Scores and Scores Students Received in First Mathematics Class in Freshman Year*, and make such Project and Compact Disk (CD) available for the use, circulation and/or reproduction by the Library. The Project and CD may be used at Heritage University Library and all site locations.

I state at this time the contents of this paper are my work and completely original unless property attributed and/or used with permission.

I understand that after three years the printed Project will be retired from the Heritage University Library. My responsibility is to retrieve the printed Project and if not retrieved, Heritage University may dispose of the document. The Compact Disc and electronic file will be kept indefinitely.

Irma Jiménez dePrieto, Author
May, 2012, Date

TABLE OF CONTENTS

	Page
FACULTY APPROVAL.....	ii
ABSTRACT.....	iii
PERMISSION TO STORE.....	v
TABLE OF CONTENTS.....	vi
LIST OF TABLES.....	ix
CHAPTER 1.....	1
Introduction	1
Background for the Project.....	1
Statement of the Problem.....	3
Purpose of the Project.....	3
Delimitations.....	4
Assumptions.....	5
Hypothesis Research Question.....	6
Null Hypothesis.....	6
Significance of the Project.....	6
Procedure.....	7
Definition of Terms.....	8
Acronyms.....	9

CHAPTER 2

Review of Selected Literature.....11

 Introduction.....11

 History of Entrance Examinations.....12

 High School Assessments for Admissions.....16

 The Challenges of Postsecondary Education...18

 Summary.....20

CHAPTER 3

Methodology and Treatment of Data.....22

 Introduction.....22

 Methodology.....22

 Participants.....24

 Instruments.....25

 Design.....27

 Treatment of Data.....27

 Summary.....28

CHAPTER 4

Analysis of the Data.....29

 Introduction.....29

 Description of the Environment.....30

 Hypothesis Research Question.....30

Null Hypothesis.....	31
Results of the Study.....	31
Findings.....	39
Discussion.....	39
Summary.....	40
CHAPTER 5	
Summary, Conclusions and Recommendations.....	41
Introduction.....	41
Summary.....	42
Conclusions.....	44
Recommendations.....	45
REFERENCES.....	47
Appendix A.....	50

LIST OF TABLES

Table 1: Final Exam Data.....33
Table 2: Pearson's Product Moment Correlation.....35
Table 3: Grade Score Data.....36
Table 3: Data Table by Rank Order.....36

CHAPTER 1

Introduction

Background for the Project

Publication of *A Nation at Risk: The Imperative for Educational Reform* in 1983 and a follow-up report issued in 2008, *A Nation Accountable: Twenty Five Years after a Nation at Risk*, educators as well as the American people were warned about the imminent threat the education system was facing in producing a significant number of illiterate students (p. 9) The later report was followed by other reports critical of American K-12 education and higher education systems. One such report was from the College Board and titled *Coming to Our Senses: Education and the American Future*. The concern voiced in the College Board report was that although the United States ranked "second among developed nations in the proportion of workers over the age of 55 with a postsecondary credential, we dropped to number 11 among younger workers (age 25 to 34)" (p. 5).

Certainly, the challenge of retaining students in college was appropriate to Heritage University (HU), as the university's mission has focused on "providing quality accessible higher education for students that have been educationally isolated" (HU Catalog, p. 2). In summer 2008, the Board of Directors and the administration of HU implemented an aggressive initiative for recruitment and retention of students.

After HU opened its doors on July 1, 1982, a placement test was developed specifically for the student population of the community of that time. Over the years, the HU entrance exam evolved, but the essence of the test remained geared to the student populations that HU served. The purpose of the exam was to assess the student's skills when applying for admission.

In order to support the goal established for student recruitment and retention, a need surfaced to determine into the appropriateness of the mathematics placement test for incoming freshman and/or transfer students. As a result, staff in the HU Testing Center

located in the Academic Skills Center (ASC) adopted the new initiative to review and re-design the mathematics test if needed.

Statement of the Problem

Placement results were the only factor used to determine the math class students needed to take during their first semester at HU. However, if the placement in mathematics classes proved to be inappropriate for HU students, the test needed to be re-aligned to meet the appropriate skill level of the students.

Accordingly, the problem which represented the focus of the present study was stated as follows: To what extent was the Heritage University mathematics placement test appropriate for the skill level of HU freshman year students?

Purpose of the Project

The purpose of this quantitative research study was to determine whether students were being placed in a mathematics class appropriate for their skill level in their freshman year at HU. To accomplish this

purpose, a review of selected literature was conducted. Additionally, essential baseline data were obtained and analyzed from which related generalizations, conclusions, and recommendations were formulated.

Delimitations

The study was conducted at HU in Toppenish, Washington. Test data from the Testing Center was used to conduct the study. Mathematics Placement scores from 16 students that took the placement test from January to August, 2010 were used. The researcher obtained grade information for the 16 students from three different HU Mathematics 095 pre-college classes. The classes were taught by three different instructors and the classes were held at three different times during the day/evening. The researcher found that every semester the Chair of the Mathematics Department changed the placement of at least five or six students based on the students' or instructor's feedback, or upon review of high school transcripts. This was important because if the mathematics tests

were not set at the appropriate skill level, a student might be advised to register in the wrong mathematics class.

Assumptions

The assumption was made that Heritage University Testing Center was operated in an efficient manner and that the students who took the placement test were given adequate instructions for taking the test (Appendix A). A further assumption was made that the environment of the testing room was also adequate and conducive for testing. Since dedicated computers were used to take the test, the researcher concluded that there were no technical problems with the equipment and when problems arose, the test proctor sought technical assistance from Internet Technology Department and, if needed, the testers were rescheduled to take the test at another time. Consistency in proctoring the test was followed even if the test was administered by other staff members than the author. In fact, one of those members actually trained the author in proctoring techniques.

Hypothesis Research Question

There will be a positive relationship between Heritage University COMPASS Algebra scores and grade scores received by students in their freshman mathematics class. A second relationship using Heritage University COMPASS algebra placement score, class grade score, and the final class exam score will be used to determine validity of the placement test.

Null Hypothesis

No significant relationship will be found between Heritage University mathematics placement test scores and grades received in the freshman mathematics class taken by the student. No significant relationship will be found at the following thresholds: .05, .01, and .001.

Significance of the Project

Students who applied to HU were required to take a placement test as part of the admissions process. Only those students who had already taken a college level English or mathematics class were exempt from taking the placement test. Unlike the English

(writing) and reading placement tests that had cut-off scores for admittance into the university, placement in Mathematics did not have a specific score that needed to be met for a placement recommendation. Any student, no matter the score received, placed into a mathematics class. With this unrestricted policy, the accuracy of the mathematics placement, particularly, needed to be suited to the student's ability level. Results of this research study could prove helpful to the Academic Skills Center staff in assuring the best possible placement of students in mathematics classes in the future.

Procedure

A group of 16 students who completed the HU placement test and received math placement recommendation of Math 095 class was chosen from a pool of 65 students that tested from January to August 2010 and received the same placement recommendation of Mathematics 095 class. The method used for selecting the participants was convenience sampling. If the student had enrolled in a mathematics 095 class in

fall 2010, the student was automatically part of the selected sample. The researcher then obtained grade scores received in the final exam and the COMPASS mathematics placement scores for the same 16 students and then used Spearman Rho, a measure of correlation, to determine if there was a relationship between COMPASS mathematics placement test algebra scores and grade scores received by participants in their final exam of the mathematics 095 classes.

Definition of Terms

Significant terms used in the context of the present study have been defined as follows:

First Generation. at Heritage University the term "First Generation" meant that neither parent has received a bachelor's degree.

Instrument. assessment tool used to test students.

Placement score. score that students received from COMPASS test.

Pearson r. in mathematics, and in particular in statistics, is a measure of how well a linear equation describes the relation between two variables.

Spearman Rho. a measure of correlation appropriate when the data for at least one of the variables are expressed as ranks; it produces a coefficient between .00 and ± 1.00 .

STATPAK. Software program that computes statistics.

Acronyms

ACT. Formerly, American College Testing.

ALEKS. Assessment and Learning in Knowledge Spaces.

AP. Advance Placement.

ASC. A place at HU where students may obtain remedial help and where students take tests to determine placement in freshman English and Mathematics classes.

CEEB. College Entrance Examination Board.

COMPASS. Computer Adaptive Placement Assessment and Support System.

ESL. English as a Second Language.

HU. Heritage University.

IQ. Intelligence Quotient.

SAT. Formerly, Scholastic Aptitude Test.

WASL. Washington Assessment of Student Learning.

CHAPTER 2

Review of Selected Literature

Introduction

In the late 1800's there was no standardized system for college entrance exams. However, over time, two assessments tests were developed and adopted by most colleges and universities throughout the United States, the SAT (formerly known as the Scholastic Aptitude Test and the Scholastic Assessment Test), and the ACT (formerly known as the American College Test). Recently, other student assessments like high school transcripts and state-developed assessments have been considered by institutions of higher education to assess students when they apply for admissions. During the past decade, a decline in the number of students pursuing post-secondary education has been noted. This phenomenon was important to study as Heritage University used an approach to make sure that students were being placed in the right math classes as they entered their freshman year.

The review of selected literature has provided the researcher with an opportunity to explore, in-depth, the history and evolution of college entrance examinations, the use of high school assessments for college admission, and challenges associated with pursuing post-secondary education. Each of these topics has been addressed in the following pages. Additionally, the researcher reviewed information on test measurement principles to obtain a better sense on whether standards provide accurate and fair information for making high-stakes decision for students, particularly in placement testing. And lastly, the researcher reviewed literature on postsecondary remediation work along with best predictors of success in developmental mathematics classes.

History of Entrance Examinations

In the late 1800's the College Board, formerly known as the Entrance Examination College Board, attempted to standardize the process for admissions and the assessments used in testing centers because

prior to that time, there was not uniformity in the type of tests that students had to take at the start of their undergraduate education. What existed was a mixture of idiosyncratic entrance requirements, and the Board was seeking to replace those practices with some type of standardized test that could predict college performance rather than subject mastery (College Board, 2009).

To this date, several exams continue to be used in colleges and universities as high school graduates apply for admissions. Some institutions have developed their own entrance exams, others have used high school or state assessments, while others have continued to use other entrance exams recognized and accepted by institutions of higher education. However, two particular exams have been traditionally used in colleges and universities all over the nation: the Scholastic Aptitude Test or Scholastic Assessment Test, as it was formerly known, and the American College Testing (College Board, 2009).

In the late 1800's, colleges and universities had their own entrance examinations that assessed the preparation of students with no 'official' body checking on uniformity of exams. Thus, concern grew over the many non-standardized exams used by institutions and in 1900, a group representative of twelve colleges and universities in the Northeast came together to form the College Entrance Examination Board (CEEB). It took twenty six years to develop the test and for CEEB to use it at multiple institutions. Other tests were developed after the SAT; however, the SAT has continued to be the primary test used by elite universities in the East Coast (Syverson, S., 2007).

In 1959, a group of individuals that were involved with an Iowa Testing Program (a test widely used by high school students throughout the state) felt they needed to develop a different test unlike the SAT, one that could be used for the non-preparatory student. As a result, the ACT was created (ACT Organization, 2009). Unlike the ACT, creators of the SAT had a very specific interest, they wanted to

identify students who were talented and who had not attended preparatory school. The SAT also included many questions similar to the ones contained in the Army Alpha tests developed during World War I with a strong link to Intelligence Quotient (IQ) tests (Syverson, S., 2007).

The ACT, however, had two definite purposes for its use. The first was to help students make better decisions on programs of study and which colleges to attend, while the second purpose was to give information to institutions about admission of students and their probable success after enrollment (ACT Organization). At the beginning the ACT was mostly used by the Midwestern colleges, but the use of the ACT rapidly expanded to other states. It was accepted by many colleges because the test did not assess higher order reasoning skills as did the SAT, but rather "mastery of subject taught" in high school (Syverson, S., 2007).

The subject of standardized testing has not changed much over the years. Most recently, an

increasing number of states have looked for ways to use high school assessments such as the Washington Assessment of Student Learning (WASL) and high school transcripts for college admissions, placement, and financial aid (Brown & Conley, 2007).

Use of High School Assessments for Admissions

According to Richard S. Brown and David T. Conley, the use of high school assessments has taken on a new role for postsecondary purposes, although the content and criterion validity of the exams relative to student's pursuits after high school is not well documented (Brown & Conley, 2007). However, with high school achievement assessments in place in many states, it was important for the researcher to find out whether scores from high school exams were being used in any particular fashion.

In California, the Stanford University Bridge Project researched the relationship between high school state standardized tests, math in particular, and a college placement test and found that:

The California Community College placement test content compared to the high school level California Standards Tests in General Mathematics, Algebra I and Geometry. Only the General Mathematics was aligned across a substantial number of standards. Taking into consideration past studies, it appears that the major source of misalignment between the two testing systems occurs within the content areas of Integers and Rationals, Trigonometry and Graphing. (Shelton and Brown, 2008).

In Washington State, the Transition Math Project dealt with high school assessments. The Project initiative, or in other words "a blueprint used to define the core knowledge and skills expected of students entering college-level mathematics" involved educators, students, parents, and local leaders in a collaborative effort to define the higher-level math courses that students needed to take while in high school. In the College Readiness Standards under the mathematics section, they had an extra expectation

piece about the need "to take higher-level math courses when they enter college, especially pre-calculus and calculus courses" (The College Readiness Mathematics Standards, prologue).

Again in California, the Community College System, consisting of three distinct higher education systems in addition to the K-12 system of education, took steps to promote college readiness of students in basic skills programs and placement as well as assessment policies. Additionally, the Community College System was interested in improving some sort of an articulation agreement between K-12 and their California college system (Shelton and Brown, 2008).

The Challenges of a Postsecondary Education

A Nation at Risk: The Imperative for Educational Reform report was first issued the spring 1983, in which a committee of 18 members warned the nation that "the educational foundation of our society is presently being eroded by a rising tide of mediocrity that threatens our very future as a Nation and a people" (p. 1). Educational experts stated that

serious attention needed to be given to the educational systems of the nation. "Individuals in our society who do not possess the levels of skill, literacy, and training" were not going to be competitive but rather effectively disenfranchised (p. 2). Furthermore, the experts noted that between 1975 and 1980, courses in remedial mathematics had increased by 72 percent in public 4-year colleges and constituted one-quarter of all mathematics courses taught in those institutions (p 3).

Furthermore, a decrease in the number of students who were not pursuing a postsecondary education was so grave that the nation no longer could take a wait-and-see attitude. Educational experts attributed the trend to the large number of students who were dropping out of high school; likewise, college students were doing exactly the same, dropping out of college. The highest dropout rate reported for high school students was between grades nine and twelve. Nationally, the high school graduation rate had fallen from 77 percent to 67 percent from school year 1971-72 and the "rate at

which students disappear from schools between grades 9 and 10" had tripled in the last 30 years since 2008. The country had lost ground in high school and college completion compared to other industrialized countries in the world (The College Board, 2008).

Summary

The review of selected literature and related investigation reported in Chapter Two supported the following research themes:

1. Two admissions tests developed and adopted by most colleges and universities throughout the United States. In recent years, these tests were the Scholastic Aptitude Test (SAT) and the American College Testing (ACT).
2. Recently developed high school assessments, including Advanced Placement classes (AP) and the College Readiness Mathematics Standards assess core knowledge skills expected of students entering college.
3. A major challenge confronting American educators has focused on the need to bring the

nation's workforce up in skill, literacy, and training in order to stay competitive with other industrialized countries in the world.

CHAPTER 3

Methodology and Treatment of Data

Introduction

With an increased responsibility of using the appropriate measures for math placement, staff at the Academic Skills Center (ASC), in cooperation with staff from the Heritage University (HU) Mathematics Department, made a decision to review the mathematics scores students were receiving in the pre-algebra and algebra sections of the HU placement test.

Additionally, in 2009, HU shifted efforts in improving retention and persistence of freshman students.

Methodology

In fall 2010, HU offered a developmental program for students who were not academically prepared in mathematics, reading and writing. A total of 319 students took the COMPASS placement test from January 3rd to August 24th for fall semester 2010. HU offered three mathematics classes at the 095 level that had an enrollment of 55 students in all three classes. Of those 55 students only sixteen, ten males and six

females, students fell in the category for participation in the study because they had enrolled in one of the mathematics 095 classes. The classes were offered at three different times and taught by three different instructors. Even though the classes were taught by three different instructors, the curriculum and the final exam for the three classes were the same. The sample size was small and the validity issues considered were the COMPASS algebra score that students received when they took the placement test, the final exam score, and the grade score received in the class.

Participants in the study received an algebra COMPASS test score that range from 15 to 57 points, while the final exam scores ranged from 35 to 98 points, and class grade scores ranged from a low of 32.4 to a high of 100.7. This was across the three different classes.

The project was a co-relational study and the purpose of this quantitative research study was to determine whether students were being placed in a

mathematics class appropriate for their skill level in their freshman year at HU. The procedure began in January and continued through the end of the testing period of August, 2010. The method used for selecting the participants was convenience sampling. If the student had enrolled in a mathematics 095 class in fall 2010, the student was automatically part of the selected sample. The researcher then obtained grade scores received in the final exam and the mathematics placement scores for the same 16 students and used Spearman Rho, a measure of correlation, to determine if there was a relationship between mathematics placement COMPASS test scores in algebra and grade score received by participants in their final exam of the mathematics 095 class. The limitations of the study were that all participants needed to be in their freshman year and had a recommendation to enroll into a Mathematics 095 class in fall 2010.

Participants

A total of 319 students took the math placement test, 65 students received a placement recommendation

at the math 095 level; of the 65 students only 17 students enrolled in one of the three classes offered in fall semester 2010; however, one of those students dropped the class; hence, this student was dropped from the project. The number of participants the researcher ended up with was only 16 students. These 16 students took the placement test from January 3rd to August 24th. Gender representation in the pool was 62.5% male and 37.5% female. The students' age range was from 18 to 23 years of age. Two students had previous college experience, while the remaining fourteen had not attended school beyond high school. Additionally, fourteen students out of the sixteen were considered first generation students (neither parent had completed a bachelor's degree) while two students had at least one parent who had received a degree.

Instruments

The instruments utilized for this project were the COMPASS test and the instructors' grade books. The instructors' grade books considered identical factors

to produce the grade score. Those factors were: attendance, coursework, ALEKS pie (Assessment and Learning in Knowledge Spaces), midterm exam score, and final exam score. ALEKS was a Web-based, assessment and learning system that used adaptive questioning to quickly and accurately determine exactly what a student knew and did not know in the class. The second instrument, COMPASS, was a diagnostic test that, when administered was non-timed, and tested students in numerical skills, pre-algebra, and algebra skills. Further, COMPASS provided the institution with information in course placement that matched the students' skills and their educational goals and plans.

The validity of the placement test was found to be reliable according to a group of math faculty who examined the validity of the COMPASS test instrument against two other commercial systems. The study was conducted by two testing centers, one located at Indiana University and the other at Purdue University at Indianapolis. The statement made by the researchers

stated that "they concluded that the COMPASS system provided the best overall package in terms of its predictive validity" (Mzumara and Shermis, 2000).

Design

The quantitative project design had only one group of students and used convenience sampling; thus, making the study co-relational in nature.

Treatment of Data

The scores students received in COMPASS, the class final exam, and grade received in class were compared using Spearman Rho, which measures correlation appropriate when the data for at least one of the variables was expressed as ranks. Also, Pearson r was used in the treatment of the data; Pearson r measures correlation appropriate when the data represent either interval or ratio scales. Both measures were part of the STAT Pak program, a statistical tool that helped calculate frequently used statistical tests quickly and efficiently.

Summary

One set of students with three scores were compared using Spearman Rho and Pearson r to show if there was significant correlation among the three sets of scores: COMPASS mathematics score, final exam score, and grade received in Mathematics 095 class.

CHAPTER 4

Analysis of the Data

Introduction

Determining the appropriateness of the mathematics placement test for incoming freshman and/or transfer students was one of the steps staff in the Academic Skills Center (ASC) took, with the assistance of faculty in the Mathematics Department, to support the goal established in 2009 by Heritage University (HU) administration for student recruitment and retention. Many students had significant time gaps in the developmental mathematics class series, frequently 1-2 years, between passing one mathematics course and the next. Without this important step of reviewing and re-design of the mathematics placement test, if needed, the students potentially could risk being misplaced according to the COMPASS test recommendation; consequently, taking a longer time to exit the developmental mathematics class series as set by program chair.

Description of the Environment

A group of 16 students who completed the HU COMPASS placement test and received a mathematics placement recommendation of Mathematics 095 classes were placed from a pool of 65 students that were tested from January 3rd to August 24th, 2010. The participants were students in one of the three mathematics 095 classes that were offered in fall of the same year. Consistency for proctoring the COMPASS test was followed even if the test was administered by different staff members in the Academic Skills Center (ASC). The mathematics classes were offered at three different times and taught by three different instructors; however, the curriculum and the final exams for the three classes were essentially the same. Factors considered in determining the final grade were also consistent.

Hypothesis Research Question

There will be a positive relationship between Heritage University COMPASS Algebra scores and grade scores received by students in their freshman

mathematics class. A second relationship using the Heritage University COMPASS algebra placement score, class grade score, and the final exam score will be used to determine validity of the placement test.

Null Hypothesis

No significant relationship will be found between Heritage University mathematics placement test scores and grades received in the freshman mathematics class taken by the student. No significant relationship will be found at the following thresholds: .05, .01, and .001.

Results of the Study

The algebra scores students received in COMPASS were collected from the instructors' grade book and from the placement test. Then, the researcher compiled a list with the participants' COMPASS algebra scores and the final exam scores as illustrated in Table 1.

Table 1

Final Exam Data Table

Subject Assigned Number	COMPASS Algebra Score	Final Exam Score
1	35	80
2	28	95
3	31	90
4	32	97
5	30	84
6	57	97
7	27	74
8	32	67
9	25	67
10	41	50
11	26	98
12	27	48
13	28	35
14	35	37
15	15	81
16	31	87

The second step the researcher used to find correlation was the input of data into a Pearson product-moment correlation coefficient (Pearson r) using an actual set of scores—COMPASS algebra scores and final exam scores as illustrated in Table 1. This led to the sum of squares of X and Y to equal 37301.00. Group X of sixteen students had a mean of scores of 31.25 and group Y had a mean of scores of 74.19. The resulting Pearson's r value was 0.07 with 14 degrees of freedom.

Table 2

Pearson's Product Moment Correlation

Statistic	Values
Number of Items	16
Sum of X	500.00
Sum of Y	1187
Sum of Squared X	16802.00
Sum of Squared Y	94985.00
Mean of 'X' Scores	31.25
Mean of 'Y' Scores	74.19
Sum of XY	37301.00
Pearson's r	0.07
Degrees of freedom	14

Pearson r

$$r = \frac{1}{n-1} \sum_{i=1}^n \left(\frac{X_i - \bar{X}}{s_X} \right) \left(\frac{Y_i - \bar{Y}}{s_Y} \right)$$

A second relationship using the COMPASS algebra score and grade score was used to determine validity of the placement test. Before running scores in Spearman Rho, the researcher obtained grade scores from the instructors' grade book. Both tables 3 and 4 were used for Spearman Rho.

Table 3

Grade Score Data

Subject Number Assigned	COMPASS Algebra Score	Math095 Letter Grade	Grade Score	Mid Term Score	Attendance Score	Course-work Score	ALEKS Score
1	35	P	88.1	85	100	98.1	93
2	28	P	100.7	89	93.3	101.5	91
3	31	P	87.6	70	100	100	78.1
4	32	P	99.8	93	100	99.7	78
5	30	P	78.4	70	92	76.9	0
6	57	P	97.7	96	100	100	100
7	27	P	81.7	69	93.3	80.4	50.5
8	32	P	78.4	77	96	76.4	0
9	25	P	72.9	74	92	70.8	0
10	41	P	73.6	79	96.7	71.1	67
11	26	P	103.6	90	96.7	104.4	100
12	27	NP	52.2	42	92	54.5	0
13	28	NP	35.9	33	96	29.2	0
14	35	NP	32.4	33	90.3	50	0
15	15	P	94.4	91	100	84	100
16	31	P	85.8	82	92	85.1	0

One more step was taken in order to run Spearman Rho. The step was to produce rank order as illustrated in Table 4. Values of the correlation coefficient used as a result of the Pearson r as well as the Spearman Rho were at 14 degrees of freedom at the .05, .01, and .001 thresholds were .4973, .626, and .7420 respectively.

Table 4

Data Table by Rank Order

Assigned Number	Rank Number	COMPASS Algebra Score	Grade Score	Final Exam Score
A	1	57	97.7	97
B	2	41	73.6	50
C	3.5	35	88.1	80
D	3.5	35	32.4	37
E	5.5	32	99.8	97
F	5.5	32	78.4	67
G	7.5	31	87.6	90
H	7.5	31	85.8	87
I	9	30	78.4	84
J	10.5	28	100.7	95
K	10.5	28	35.9	35
L	12.5	27	81.7	74
M	12.5	27	52.2	48
N	14	26	103.6	98
O	15	25	72.9	67
P	16	15	94.4	81

Spearman Rho

$RHO = 1 - \frac{6 \sum D^2}{N(N^2-1)}$	
RHO	0.04
N	16
DF	14

Findings

The results of the study, in part, supported the hypothesis of both relationships which were not what the researcher had anticipated. In that the first relationship between the COMPASS algebra score and the final exam score revealed that the null hypothesis was rejected at the .05 and .01 threshold, and accepted at the .001 threshold; therefore, there was some relationship. The second relationship had less significance between the COMPASS algebra score and the grade score received in class. It revealed that the null hypothesis was rejected at the .05 threshold, and accepted at the .01 and .001 threshold; therefore there was minimal relationship.

Discussion

The purpose of the quantitative study was to determine whether students were being placed in a mathematics class appropriate for their skill level in their freshman year at HU.

Summary

A group of 16 freshman students were chosen from three different mathematics 095 classes to participate in a quantitative study to find out if there was a positive relationship between COMPASS algebra scores and final exam score. Another correlation was conducted to find out if there was a second relationship between COMPASS algebra scores and grade score received from class. The study revealed some degree of relationship as the first correlation found some relationship while the second correlation found minimal relationship to the hypothesis.

CHAPTER 5

Summary, Conclusions and Recommendations

Introduction

In the spring of 1983, the National Commission on Excellence in Education published a report detailing how the quality of American education had "lost sight of the basic purposes of schooling" and warned educators that the nation was at risk. Furthermore, the Commission claimed that the future of education in America was in jeopardy due to the disproportion of workers lacking postsecondary credentials because the country had lost ground in high school and college completion compared to other industrialized countries in the world (College Board Advocacy, 2008).

A similar concern of persistence and retention of students was shared with Heritage University faculty and staff. Hence, the decision to review appropriate measures of math placement was initiated by staff in the Academic Skills Center, in cooperation with the mathematics department, in order to find out if the

placement test was appropriate for the skill level of incoming freshman students.

Summary

The challenge at Heritage University (HU) was not uncommon. Across the nation, institutions of higher education were facing the same challenge of retention and production of college graduates. Educational experts had concerns about education systems in the United States. They wanted to inform the nation that serious attention needed to be given to the "widespread public perception that something is seriously remiss in our educational system" (The Nation at Risk, 1983). Likewise, HU was in a quest to find out if the only factor used to determine math placement of freshman students proved to be appropriate.

HU offered a developmental program for students who were not academically prepared in mathematics, reading and writing. A total of 319 students took the COMPASS placement test from January 3rd to August 24th for fall semester 2010. HU offered three mathematics

classes at the 095 level that had an enrollment of 55 students in all three classes. Of those 55 students, ten males and six females, only sixteen students fell in the category for participation in the study because they enrolled in a mathematics 095 class in fall 2010. The classes were offered at three different times, and taught by three different instructors; the curriculum and the final exam for the classes were the same. The sample size was small and the validity issues considered were the COMPASS algebra score that students received when they took the placement test, the final exam score, and the grade score received in the class.

Participants in the study received an algebra COMPASS test score that range from 15 to 57 points, while the final exam scores ranged from 35 to 98, and class grade scores ranged from a low of 32.4 to a high of 100.7.

The project was a co-relational study and the purpose was to determine whether students were being placed in a mathematics class appropriate for their

skill level in their freshman year at HU. The procedure began in January and continued through the end of the testing period of August, 2010. The method used for selecting the participants was convenience sampling. If the student had enrolled in a mathematics 095 class in fall 2010, the student was automatically part of the selected sample. The researcher obtained grade scores received in the final exam and the mathematics placement scores for the 16 students and then used Spearman Rho, a measure of correlation, to determine if there was a relationship between mathematics placement COMPASS test scores in algebra and grade score received by participants in their final exam of the mathematics 095 class. The limitations of the study were that all participants needed to be in their freshman year and had a recommendation to enroll into a Mathematics 095 class in fall 2010.

Conclusions

The study revealed some degree of relationship between the COMPASS algebra score and the final exam

score at the .05 and .01 threshold. The second relationship had less significance as the null hypothesis was accepted at the .01 and .001 threshold.

Recommendations

The researcher learned that standardized tests such as the COMPASS test Heritage University uses for placement are not reliable predictors of how well students would do in a class. The researcher attributes the knowledge gained in the study to the numerous discussions that have been held among faculty of the General Studies Program. In those discussions, the math and English faculty have noted that factors such as students' diligence in class attendance and completion of class assignments in a timely fashion, contributes to the scores students receive in classes.

In order to have results that can relate in a broader sense to placement testing and how well students do academically in class, it is the recommendation of the researcher to do another study with more students and continue it over a longer period of time. The new study should also expand by

analyzing more pieces of data such as student study habits (student's academic preparedness), support networks, and the extent of family/home/work responsibilities. This in-depth and longitudinal study could produce meaningful and more reliable information to Heritage University administration as they develop new initiatives.

REFERENCES

- ACT, (2009). *About Act/History of ACT/ACT-Windows Internet Explorer*. Retrieved from <http://www.act.org>
- Brown, R., & Conley D. (2007). *Comparing State High School Assessments to Standards for Success in Entry-Level University Courses, Educational Assessment, 12(2), 137-160*. Retrieved March 4, 2009, doi:10.1111/j.0038-4941.2004.00278x
- College Board (2009). *About us/College Board History-Windows Internet Explorer*. Retrieved March 6, 2009, from <http://www.collegeboard.org>
- College Board Advocacy (2008). *Coming to Our Senses: Education and the American Future*, December 2008. Retrieved from <http://professionals.collegeboard.com>
- Heritage University (2008). *History of the University*, Heritage University Catalog, Toppenish, WA; Heritage University
- Mzumara, H.R. (2000). *Predictive Validity of Placement Test Scores For Course Placement At IUPUI: Summer*

and Fall 2000, from

<http://tc.iupui.edu/report/VAL2000.pdf>

Shelton, S. & Brown, R. (2008, March). *Measuring the Alignment of High School and Community College Math Assessments*, Symposium Conducted at Annual Meeting of the American Educational Research Association. New York City, NY

Syverson, S. (2007). The role of standardized tests in college admissions: Test-Optional admissions. *New Directions for Student Services*, Retrieved March 4, 2009, doi:10.100222.241

The Transition Math Project, (2010). *College Readiness Math Standards*, 2010 Revised Version, Retrieved from
<http://www.transitionmathproject.org/standards/doc/prologue.doc>

U.S. Department of Education, (2008). *A Nation Accountable: Twenty-Five Years After A Nation at Risk*, Washington, D.C. Retrieved from:
<http://www.ed.gov/rschstat/research/pubs/accountable/>

U.S. Department of Education, (2003) *A Nation at Risk:*

The Imperative for Educational Reform,

Washington, D.C.

APPENDIX A

General Procedures for Placement Testing

COMPASS-ESL is used at Heritage University to find placement of students in mathematics and reading. For writing, testers write a diagnostic essay, in a summary and response format for English courses.

1. Testers report to the Students Services Building where they present picture identification. When identification is established, testers are issued a student identification number then walked over to the Academic Skills Center (ASC) where they take the placement test.
2. Once in the ASC, a staff person greets the testers and determines which test they are to take. The proctor in turn downloads requested test to dedicated computers in the testing room. The testing room accommodates nine testers only. If more computers are needed, the proctor uses the classroom adjacent to testing room for testers to take their tests there.

3. Testers are welcomed and given a brief description of the test(s); testers are also provided with scratch paper, pencil, and basic calculator if they are taking the math test. Testers also have access to calculator COMPASS-ESL provides on-line.
4. The writing section usually follows after the math and reading tests. This is determined by the proctor. For this section, testers are given written instructions in a hand-out that also contains two reading passages. Testers choose one of the passages on which to base the summary and response essay and the proctor is available for questions or clarification for this portion of the test.
5. Retakes of math, reading, and writing are allowed and dictated by student, academic advisor, admission's counselor, or evaluator.
6. Testers are officially informed of test results in writing by the director of testing.