

BUILDING AN EARLY WARNING SYSTEM TO IDENTIFY
POTENTIAL HIGH SCHOOL DROPOUTS

by

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ABSTRACT

Over one million high school students drop out of school each year in this country. Dropping out of school is a serious problem for the student, community, and the nation. Often dropouts are unable to compete in an increasingly technological society and face numerous consequences from their decision to leave school early including higher levels of poverty, unemployment, public assistance, incarceration, and poor health. Dropping out is a gradual process of school disengagement and related to individual, family, and school factors. In the past, it has been difficult to track individual student's progress through school and to determine accurate dropout and graduation rates. In 2005, the National Governors Association made a commitment to implement a uniform method to calculate and report graduates and dropouts as well as better data collections systems.

This study intended to replicate aspects of other major studies around the county to determine the best early predictors of dropping out of school in this large school district in southern Arizona and use this information to build an early warning system. Student data were obtained from the district's Research and Accountability office for a cohort of students (n=6751) who began the ninth grade in fall 2006 and graduated or should have graduated in 2010. Data collected included general demographic information, academic data, number of schools attended, and school withdrawal codes.

The intent of this research was to determine if there were statistically significant differences between dropouts and graduates in the variables collected and which variables yielded the highest effect sizes and should be included in the district's early warning system.

Two analyses were used to determine significance differences between dropouts and graduates. Then four analyses were performed to determine the highest-yield variables for this district. Consistent with recent research in the field, the variables of ninth grade attendance, ninth grade English and Math grades, and GPA were the strongest predictors of student dropouts.

Local educators can use this early warning information to help identify potential high school dropouts as early as possible and intervene more efficiently and effectively with these students.

CHAPTER 1

INTRODUCTION

Statement of the Problem

Nationwide, approximately 1.3 million high school students drop out of school every year (America's Promise Alliance, 2010a; Bridgeland, DiTulia, & Morison, 2006). Often referred to as the silent epidemic, dropping out of high school before graduation is a serious problem for the student, community, and the nation. Currently, the United States ranks eighteenth in high school graduation rates among developed countries. Dropouts represent a loss of human potential and productivity and reduce our country's ability to compete in an increasingly global economy (Alliance for Excellent Education, 2010c). In our growing technological society, the demand for educated, skilled workers is rising while there is a decreased need for unskilled labor (Lan & Lanthier, 2003). The computer automates numerous repetitive tasks, taking jobs away from many unskilled workers. According to a 2010 study, between 1973 and 2008, the share of U.S. jobs that required postsecondary education increased from 28% to 59%; over the next decade, this percentage is expected to rise to 63% (Carnevale, Smith, & Strohl, 2010; Kingsbury, 2008). The Alliance for Excellent Education (2009, July) reports that 90% of the nation's fastest-growing and highest-paying jobs require some postsecondary education. The fastest growing professions have high literacy demands, while declining professions have lower literacy demands (Alliance for Excellent Education, 2010b). Governor Joe Manchin III of West Virginia (chairman of the National Governors Association) concluded, "I truly believe that for our next generation to go to the next level, and for the

country to be a superpower well into next century and beyond, we need to achieve better graduation” of our students (“Governors Push,” 2010, p.1).

Dropouts are unlikely to have the skills needed to compete in today’s job market, and the jobs that are available to them are likely to be low-paying with few advancement possibilities. In the 50 largest cities, the median income for high school dropouts is \$14,000, \$24,000 for high school graduates, and \$48,000 for college graduates (Swanson, 2009). In 2004, dropouts were three time more likely to be unemployed than graduates (Bridgeland et al., 2006; Stanard, 2003). Figures from the Bureau of Labor statistics (2009) show the unemployment rate at 15.4% for high school dropouts and 4.7% for individuals with a college degree.

High school dropouts are more likely to live in poverty, be unemployed, receive public assistance, and be incarcerated than high school graduates (Bridgeland et al., 2006). In 2001, four out of ten adults (16-24) without a high school diploma received some sort of government assistance (Bridgeland et al.). In 2006, 52% of welfare recipients and 75% of the prison population were high school dropouts (Bridgeland et al.; Fry, 2003; Office of Juvenile Justice and Delinquency Prevention, 1995; Stanard, 2003). High school dropouts are over three and a half times more likely to be arrested and eight times more likely to be in jail or prison than graduates (Bridgeland et al.; National Dropout Prevention Center/Network (NDPC/N), 2010a). Dropouts are more likely to have poor physical and mental health, more likely to be single parents and/or divorced, have a shorter life span, and are less likely to vote or volunteer than graduates (Alliance

for Excellent Education, 2009, August; Bridgeland et al.). They often have children who become unhealthy, uneducated dropouts as well in an endless cycle.

Keeping students in school through graduation would save taxpayers millions of dollars, reduce crime, expand tax revenues, and improve citizenship (Jerald, 2006). If dropouts from the class of 2009 had graduated, the country would benefit from \$335 billion in income over their lives (Alliance for Excellent Education, 2009, August). If the male graduation rate increased by just 5%, the nation's economy would benefit \$8 billion dollars a year from additional revenue and increased savings related to crime (Alliance for Excellent Education, 2006). If the 2008-2009 dropouts in the state of California were converted to graduates, the state's economy would benefit by \$45.5 billion over the lifetime of these students (Alliance of Excellent Education, 2009, August). Because of the abundance of negative outcomes associated with dropping out of high school as well as the growing awareness of the high economic costs associated with dropping out, this issue has become one of national importance for our society. Policy makers, educational researchers, and politicians are devoting much time and effort to understand the reasons and risk factors associated with dropping out, to implement a uniform measurement of graduation rates, and to identify best prevention/intervention strategies for all students. Even President Obama has become involved in the effort: "Dropping out is quitting on yourself, quitting on your country, and it's not an option – not anymore" (Obama, 2009, p.1).

History of the Methodology

The purpose of this study is to identify the dropout risk factors most likely to predict students dropping out of school in a large school district in southern Arizona. Within the last ten years, the practice of systematically gathering student-level longitudinal data (data collected over time) covering a variety of indicators (referred to as risk factors, early-warning data, or on-track measures) in order to generate accurate graduate/dropout data and to determine early warning risk factors has become quite popular (Bridgeland et al., 2006; Curran & Reyna, 2009; Heppen & Therriault, 2008; HGSE, 2001; Jerald, 2006; Lan & Lanthier, 2003; Legters, 2008; National High School Center, 2007). Longitudinal data can help educators see the process a student goes through before dropping out and more accurately assess various risk factors. According to the National High School Center, longitudinal data systems are “widely recognized by states as the best tool for tracking not only dropout and graduation information, but to gauge individual student academic progress as well” (2007, p. 5). Schools and districts can follow a cohort of students for years to gather relevant data or rely on “retrospective, longitudinal analysis of their own students’ dropout and graduation patterns” to determine factors associated with past student graduates and dropouts (Heppen & Therriault, p. 8).

Longitudinal student databases are made up of accessible data routinely collected by schools. Effective databases may include the following information (or appropriate variations) for each student (Heppen & Therriault, 2008; Jerald, 2006):

- Unique student identifier to track individual students

- Demographic information such as race, gender, socioeconomic status (SES) (determined by free/reduced lunch status), special education status, and English Language Learners (ELL) status
- Enrollment information such as number of time held back, number of schools attended, and dropout/graduate status
- School attendance percentages
- Years over typical age for grade
- Transcript information such as grades in Reading/English and Math (in several different grades), number of courses failed, Grade Point Average (GPA), credits at the end of the ninth grade, and on-time promotion from the ninth to tenth grade
- Standardized test scores in Reading/English and Math (at different grade levels)
- Discipline information such as behavior grades, suspensions/expulsions, and/or office referrals

Once the database has been built and student information added, analyses can be done to determine the significance of different potential indicators or risk factors common to that local school context. The percentage of dropouts with each risk factor is determined. From a long list of potential indicators, a smaller list of high-yield risk factors or indicators can be identified for that particular school context. In the research by Balfanz and Herzog (2006), they identified high risk indicators as 75% or greater; in other words, 75% of students with that risk factor did not graduate.

Once these high-yield indicators are identified, that information can help educators build an early warning system to help identify and predict with high probability

which students are more likely to drop out of school (Bridgeland et al., 2006). An early warning system can trigger the necessary early attention and support some potential dropouts might need to avoid dropping out and target appropriate, comprehensive dropout resources to these students (Heppen & Therriault, 2008; Legters, 2008; Suh & Suh, 2007). The cost of an early warning system is small in comparison to the cost for district-wide interventions to all students and can save a school system thousands or even millions of dollars. The Alliance for Excellent Education asserts that an early warning system can help provide “more effective and efficient use of scarce resources to improve student outcomes” (2008, p. 3).

Recent research done on early warning systems shows that the strongest general indicators of dropping out of school are poor attendance, course failures, and behavior problems (Mac Iver & Mac Iver, 2009). Balfanz and Herzog (2006) found in high-poverty school districts that grades, credits and attendance were highly predictive of future dropping out of school. Heppen and Therriault (2008) found that failing the ninth grade is a strong predictor of eventually dropping out. Several researchers found that sixth grade indicators (poor attendance, failing Math or English, and discipline infractions) were highly predictive of potential dropouts (Balfanz, Herzog, & Mac Iver, 2007; Mac Iver & Mac Iver). Legters (2008) found in her research of high-poverty school districts, that 75% of eventual dropouts could be identified between the sixth and ninth grades by using an early warning system.

In Chicago, Illinois, the *Consortium on Chicago School Research* has been tracking every public school student in the Chicago Public School System for over ten

years and has built an early warning system to determine in the ninth grade if a student is on-track or off-track towards graduation. Their warning system uses the variables of course failures, attendance, GPA, and on-time promotion to the tenth grade (Allensworth and Easton, 2007). Using the on-track indicators, Chicago researchers contend that they can predict 85% of eventual dropouts by the end of the ninth grade (Jerald, 2006).

In Arizona, school districts have been tracking individual students and collecting statewide longitudinal student data since the freshman 2000 class (National High School Center, 2007). Districts collect demographic data, special programs data (ELL, special education, and free/reduced lunch), yearly attendance percentages, course grades each year, standardized test scores for each grade, and high school GPA. Arizona school districts also track when a student began and exited from that district and the assigned withdrawal code for each student. More information can continually be added to each cohort's database.

Research Questions

Research suggests that early warning systems must be built on local school system data. Analyzing retrospective, longitudinal student data for a particular school district will allow educators to better predict and identify potential dropouts and intervene appropriately.

Research Questions and Hypotheses

Question 1. Do statistically significant differences exist between high school graduates and dropouts in the following areas: gender, race, ELL status, special education status, free/reduced lunch status, attendance percentages in the third, sixth and ninth

grades, English and Math course grades in the sixth and ninth grades, standardized test scores in the third and ninth grades, number of schools attended for each student, and high school GPA?

Hypothesis 1. Based on recent research, there will be statistically significant differences between high school graduates and dropouts on the above mentioned variables.

Question 2. If statistically significant differences do exist between high school graduates and dropouts in the areas analyzed, which variables are the most significant predictors for use in an early warning system?

Hypothesis 2. Based on recent research, the most statistically significant differences between high school graduates and dropouts will be in the areas of ninth grade attendance, ninth grade Math course grade, and ninth grade English grade.

Findings from these research questions will enable local educators to build an effective early warning system to identify potential high school dropouts and intervene more effectively and efficiently in this school district. The methodology by which these questions were explored is discussed in the following section.

Overview of the Methodology

Quantitative analyses were used to determine the significant differences between the high school graduates and dropouts in a cohort of students over a variety of variables at different grade levels. A significance level of $p < .05$ was chosen for all analyses. Using the results of these analyses, the highest-yield indicators or risk factors for this specific school district were determined and an early warning system built to better

identify and intervene with potential high school dropouts. A more in-depth explanation of the methods is included in Chapter 3 (Methods), results in Chapter 4 (Results), and discussion of the results in Chapter 5 (Discussion) of this study.

Prior to acquiring the data, the researcher acquired approval from the Human Subjects Protection Program at the University of Arizona as well as the participating school district. Official school data for this study were obtained through the school district's Accountability and Research Department. All student identification information (name, student identification number, and high school name) were deleted and not provided to the researcher. A random identification number was assigned to each student to link various sources of data.

Participants in this study were 6751 high school students (a cohort) from a large school district in southern Arizona. Students in this cohort started the ninth grade (in this or another district) in the fall of 2006 and were enrolled in this school district at some point during their high school careers. Student in this cohort either graduated from high school in the district on-time during the 2009-2010 school year, transferred to another school, died, or should have graduated during the 2009-2010 school year but did not graduate for a variety of reasons.

The following student data were given to the researcher by the district's Accountability and Research Department: a random identification number for each student, gender, race, ELL status, special education status, free/reduced lunch status, birth date, date student enrolled in district, date student exited district, student status (graduate, dropout, transfer, dead), attendance percentages in the third, sixth and ninth grades,

English and Math course grades in the sixth and ninth grades, standardized test scores in the third and ninth grades, number of schools attended for each student, and high school GPA.

To assess the first research question regarding statistically significant differences between high school graduates and dropouts, two analyses were performed. First, Chi-square tests for independence were used to determine whether categorical variables (gender, ethnicity, ELL status, special education status, and free/reduced lunch status) were related to student status (graduates and dropouts). Effect sizes, using phi coefficient and Cramer's V , were determined for all analyses to determine the strength of association between groups.

Next, independent-samples t -tests were used to compare the mean scores of two different groups of people. The independent variable was categorical (graduates and dropouts). The academic dependent variables were continuous and included attendance percentages for third, sixth, and ninth grades; English and Math course grades in the sixth and ninth grades; Arizona's Instrument to Measure Standards (AIMS) scores (in Math, Reading, and Writing); *TerraNova* scores (in Math, Reading, and Language); high school GPA; and number of schools attended. Effect sizes, using η^2 and Cohen's D , were determined to measure the magnitude of the group differences.

To answer the second research question, four analyses were performed to determine the highest-yield risk factors or indicators to possibly use in an early warning system. First, to enhance understanding of the relationships between variables, correlation analyses were done using Pearson product-moment coefficient to describe the

direction and strength of the linear relationships. Variables included in these analyses included attendance percentages in the third, sixth, and ninth grades; Math and English course grades in the sixth and ninth grades; standardized test scores in the third and ninth grades; GPA in high school; ELL status; special education status; free/reduced lunch program status; and student status. The emphasis of this analysis was on the predictor variables with the highest correlations to student status (graduates and dropouts).

Next, the percentages of dropouts and graduates at different variable levels were determined; in other words, at what point, score, or percentage level did 75% of students not graduate? To determine these group percentages, data from the following variables were re-coded into new variables representing different scores and percentage levels: GPA, attendance (in third, sixth, and ninth grades), English and Math course grades (in sixth and ninth grades), AIMS scores (in Math, Reading, and English), and *TerraNova* scores (in Math, Reading, and Language). Crosstabs frequency analyses were performed to discover whether there were different percentages in the two groups: graduates and dropouts.

Next, factors associated with just the *dropout* group were examined. The predictive power of a variety of variables and combinations of variables were evaluated to determine percentages of various factors that past dropouts had. Ninth grade predictor variables included in these analyses included: $\text{GPA} \leq 2.0$; ninth grade attendance $\leq 80\%$ and $\leq 85\%$; failing ninth grade Math; failing ninth grade English; a D (1.0) or lower in ninth grade Math; a D (1.0) or lower in ninth grade English; and *TerraNova* scores of 1 and 2 in Math, Reading, and Language.

Lastly, logistic regression analysis was performed to assess the impact of four high-yield predictor variables (GPA, ninth grade Math grade, ninth grade English grade, and ninth grade attendance percentage) on the likelihood that students would graduate on time.

Limitations

Using longitudinal student data has been shown to be one of the best methods to predict potential dropouts in a local school context (Allensworth & Eason, 2007; Balfanz & Herzog, 2006; Bridgeland et al., 2006; Jerald, 2006). Further research must be conducted to enhance generalizability to local student cohorts (groups of students) as well as other school contexts. This study's finding will be helpful to shape future research in this area. The limitations of this study are as follows:

1. Only one cohort of students was used in this research. Studying several cohorts from the same locale would enhance and further confirm the findings of this research.
2. Several requested variables were unavailable to the researcher by the district's Accountability and Research Department. The variable of "number of discipline infractions/suspensions/expulsions" would have enhanced the research findings. Also, the related variables of "number of times a student has been held back in grade" and "on-time promotion from the ninth to tenth grade" were not available.
3. In many variables, there were missing data. Decisions were made as to how to use these variables in the analyses. See Chapter 5 (Discussion) for a complete review of how missing data were handled.

Definition of Key Terms and Acronyms

1. Adequate Yearly Progress (AYP): Statewide accountability system mandated by NCLB; requires each state to measure schools and districts to determine improvements based on annual yearly progress goals
2. Advisories: Small groups of high school students that meet with a faculty member on a regular basis, like an in-school social support group
3. Alternative School or Schooling: A school or educational opportunity that provides potential dropouts a variety of options that can lead to graduation (NDPC/N, 2010b)
4. American Recovery and Reinvestment Act (ARRA)
5. American School Counselors Association (ASCA)
6. Attribution Theory of Motivation: Based on an individual's attempt to explain an outcome; causal attributions can be ability, effort, task difficulty, and/or luck; attributions are classified on three dimensions: locus, stability, and controllability; attributions affect self-esteem and motivation (Weiner, 1986)
7. Averaged Freshman Graduation Rate (AFGR): Proportion of public high school students who start high school in ninth grade and graduate four year later on time with a regular diploma; uses aggregate student enrollment data; yields the highest dropout rate
8. Arizona's Instrument to Measure Standards (AIMS): Standardized, state-mandated, criterion-referenced test, designed to measure the academic achievement (in the areas of math, Reading, and English) of all students in

Arizona; scores range from 1(Falls Far Below the Standard) to 4 (Exceeds the Standard); administered in the third, fifth, and eighth grades and in high school

9. Career and Technology Education (CTE)
10. Certificate of Attendance or Completion: Certificate given to a student in lieu of a diploma when the student has not passed all graduation requirements (usually state-mandated graduation tests); it is not a diploma
11. Chicago Public Schools (CPS)
12. Coefficient of Determination: r^2 ; measures the proportion of variability in one variable that can be determined from the relationship with the other variable
13. Cohort: A group of persons sharing a particular statistical or demographic characteristic (Dictionary, 2011)
14. Common Core of Data (CCD): Data compiled by the National Center for Educational Statistics and provide enrollment information for all grades in every public high school in the country
15. Compulsory School Attendance (CSA): The age range in which a student must be enrolled in school; varies state to state
16. Current Population Survey (CPS): Survey done by the Census Bureau of a sample of 60,000 household interviews (does not include individuals in the military, jail or prison, or long-term medical facilities)
17. Data Quality Campaign (DQC)

18. Demographic Information: Characteristics of an individual; for this study the following demographic variables were collected and analyzed: race, gender, ELL status, special education status, and free/reduced lunch status
19. Dropout: A person who withdraws from and does not complete all requirements for a high school diploma
20. Dropout Factory: Term used for the nation's lowest performing high schools; a school where on average over three years, the number of seniors is 60% or less than the number of freshmen at that school three years earlier (Balfanz & Legters, 2004; Zehr, 2010, March, p.3)
21. Early Warning System: A system, based on student data, to look for patterns and help identify and predict with high probability which students are more likely to drop out of high school (Bridgeland et al., 2006)
22. English Language Learners (ELL): a person who is in the process of learning English and has a first language other than English
23. Ethnic Identity: A sense of belonging, commitment, and pride associated with one's ethnic group; self-labeling with that ethnic group, such as African-American or Mexican-American (Graham & Hudley, 2005; Wigfield & Wagner, 2005)
24. Event Dropout Rate: Percentage of high school students (15-24) who drop out of grades 9-12 between October first of one year and the next October first (12 months later); yields the lowest dropout rate

25. Free and Reduced Lunch Program: A government school lunch program; often used as a measure of poverty
26. Freshman Academy: A small learning community of ninth grades students within the school; interdisciplinary team of supportive teachers; created to encourage a smooth transition from middle to high school
27. General Education Development (GED): a group of five subject tests that, when passed, certify that the student has high school level academic skills
28. Grade Point Average (GPA): For this study, grade point average was on a four-point scale: 4 = A, 3 = B, 2 = C, D = 1, F = 0
29. Graduate: A person who has successfully completed all requirements and received a high school diploma
30. High Stakes Tests (HST): Standardized tests whose passage is required for promotion to the next grade or high school graduation; results of these tests are often stated in AYP reports
31. Hispanic Youth: Youth living in the United States who can trace their ancestry to Spain, Latin America, Mexico/Southwestern USA, or the Spanish-speaking Caribbean (Nesman, 2007, p. 415).
32. Immigrant: A person who migrates from another country, usually for permanent residence (Dictionary; 2011)
33. Indicators/Risk Factors/On-Track Measures: student factors (such as demographic attributes, academic variables, and status in various groups, such as

ELL or special education) that can contribute to student success or failure; can be measured and analyzed

34. Individualized Education Program (IEP): Mandated by the Individuals With Disabilities Education Act; includes a statement of a student's competencies, a statement of annual instructional objectives, and a statement of specific educational services to be provide to the student in the least restrictive environment designated; designed to meet the unique educational needs of a student (Kubiszyn & Borich, 2007)
35. Leaver or Exit Codes: Codes that schools use to document why a student left their school; number of codes (3-65) can vary from state to state;
36. Locus of Control: An individual's perception as to the extent to which that individual can control the events and outcomes that affect him/her; individuals who believes they have control over events have an internal locus of control; individuals who believes external forces (luck, fate, God, external circumstances) control their life events have an external locus of control
37. Longitudinal Student Data: Student data collected over time; made up of accessible data routinely collected by schools; can be used to track dropout and graduation information as well as individual student academic progress
38. Mentoring: A caring, supportive relationship between a mentor and protégé that is based on trust (NDPC/N, 2008b, p. 1)
39. Multicollinearity: When predictor independent variables are strongly related to each other (correlations of .8 or .9) and provide redundant information

40. National Dropout Prevention Center/Network (NDPC/N): A well-established national resource and clearinghouse on issues related to dropout prevention; involved in active research projects, publications, professional development, and third party Program Assessment and Reviews; located at Clemson University in South Carolina
41. National Governors Association (NGA)
42. National Governors Association Graduation Counts Compact (NGA Compact)
43. National Parent and Teachers Association (PTA)
44. No Child Left Behind Act of 2001 (NCLB): Signed into law during the George W. Bush administration; set high standards and measurable goals to improve student outcomes for all student subgroups; includes annual testing, standards for academic progress, annual school report cards, and increased teacher qualifications
45. OA-UC: Over aged and under credited
46. Oppositional Identity: Minority ethnic groups may lack identification with traditional norms, adopt values and behaviors that are contradictory with the majority ethnic group, and refuse to engage in things of value or characteristic of the dominant group (Aronson & Steele, 2005; Sterns & Glennie, 2006)
47. Positive School Climate: An atmosphere where all students feel comfortable, wanted, valued, accepted, and secure in an environment where they can interact with caring people they trust; includes fair and consistent discipline policies,

safety from violence, engaged parents, and a supportive classroom environment (Bridgeland et al., 2006; Christle et al., 2007; Johnson, 2001, p. 3.1)

48. Program Assessment and Review (PAR)
49. Race: For this study, race was divided into five categories: White, African American, Hispanic, Native American, and Asian/Pacific Islander
50. Racial Stereotypes: Overgeneralizations, usually negative, about characteristics and behaviors of a particular racial group (Aronson & Steele, 2005)
51. Response to Interventions (RTI)
52. Retrospective Student Data: Student data from past school years
53. Scholastic Aptitude Test (SAT): Widely used college admission exam
54. Self-efficacy: The belief (whether true or not) in one's capabilities within a specific situation; influences the choices people make
55. Self-esteem: A person's general sense of self-worth; positive and negative self-evaluations
56. Service Learning: Connects meaningful community service experiences with academic learning and promotes personal/social growth and civic responsibility (NDPC/N, 2010b)
57. Social Support: The perception on the part of a given individual that others, with whom he or she has an emotion-based attachment, value education and want the individual to stay in school and graduate from high school (Rosenthal, 1996, p. 300)

58. Socioeconomic Status (SES): a measure of a person's work experience and economic and social position relative to others; based on income, education, and occupation
59. Special Education Diploma: Alternate diploma available to special education students; a student's IEP states whether the student is pursuing a high school diploma or a special education diploma; earning this diploma is based on achieving individual education goals set out in a student's IEP; most colleges and the military do not accept a special education diploma for admission
60. Statistically Significant: For this study a significance level of $p < .05$ was chosen for all analyses (meaning the results could have occurred by chance five or fewer times in 100 trials); results with a significance level of $< .05$ are reported as statistically significant
61. Status Dropout Rate: Percentage of 16-24 year old, non-institutionalized adults who are not enrolled in school and have not graduated high school or earned an equivalency credential, such as a GED
62. Stereotype Threat: Awareness that individuals have about negative stereotypes associated with their group (Graham & Hudley, 2005, p. 397)
63. Student Status: For this study, students were coded as graduates, transfers, dead, or dropouts
64. *TerraNova*: National norm-referenced test that measures how well Arizona students score in comparison to their peers nationwide in the areas of Reading, Language, and Math

65. Teacher Incentive Fund (TIF): A federal government program that provides grants to poor schools to improve teacher quality
66. Transfers: A student who legitimately withdraws from one school and enrolls in another school; usually verified by a transcript request from receiving school
67. Unique Student Identifier: A unique state-wide or nation-wide student identification number so students can be followed from school to school through their educational careers
68. Weak Promoting Power: a measure of how efficiently and effectively a high school promotes their students from grade to grade; a school is weak when it promotes 50% or fewer freshman to senior status on time
69. What Works Clearinghouse (WWC): Established in 2002 by the Institute of Education Sciences as a reliable source of scientific, research-based evidence of what works in education (U.S. Department of Education, 2007)
70. Zero-Tolerance Policies: Policy of strict adherence to stated rules and punishment of any infraction of the rules, regardless of intent, ignorance, or extenuating circumstances

CHAPTER 2

LITERATURE REVIEW

Measuring the Dropout Rate

In 2002, the No Child Left Behind Act (NCLB) was signed into law (No Child Left Behind Act of 2001). One of the goals of NCLB is that all students will graduate within four years of starting high school. NCLB policy also requires that all schools, districts, and states publicly report student academic progress (including dropout rates) and be making adequate yearly progress (AYP) in terms of academic performance and graduation rate. While NCLB includes specific ambitious academic goals and related incentives, in the past there have been no established graduation goals or incentives; states were allowed to use different graduation measures and count even the smallest improvement as adequate progress. Calculating graduation rates depended on high schools self-reporting how many of their students dropped out, and this rate varied greatly (Swanson, 2004). In many cases, states used one method of calculation for federal reporting and another method for state reporting requirements. Reporting the graduation rates for student subgroups (minorities, disadvantaged, special education) was also not required (Bridgeland et al; 2006; Curran & Reyna, 2009; NCLB). Balfanz and Legters (2004) contend that “NCLB has no real teeth at the high school level” (p. 20).

Since that time, there has been much research and attention given to high school dropouts and how the dropout rate is measured. In the past, there has been no national standardized way to define or measure dropouts, and calculation methods varied greatly. School districts could easily hide their real dropout rates and portray a manipulated lower

rate than what actually existed. Low graduation rates were hidden by inaccurate data and misleading calculations. In many states there was a wide disparity between state-reported, federally-reported, and independently-reported graduation rates.

Problems with Measuring the Dropout Rate

There is often no follow-up to see if students leaving one school are actually enrolling in another school. In many schools, a student who does not return to high school in the fall is considered to be a *summer withdrawal* instead of a dropout. Often incarcerated students or students who have left school but are over the mandatory attendance age (16) are not counted. A school system in New Mexico defined its graduation rate as the percentage of enrolled twelfth graders who received a diploma, totally ignoring all students who left school before the twelfth grade, which may be the majority of dropouts (Dillon, 2008). New Mexico reported their graduation rate (2002-2003) at 89% compared to Education Weekly calculation of 57% for that same year (Vu, 2006). Often schools do not include students below tenth grade or less than 16 years old in their dropout rate (Christle, Jolivet, & Nelson, 2007). One state counts students who go to jail as transfers. Some states do not count students who get a General Educational Development degree (GED) as dropouts; some states do not count students who *plan* to get a GED as dropouts. In many states there are a variety of leaver or exit codes (from 3 to 65 codes) that can be used to *avoid identifying students as dropouts*: withdrew for home schooling, withdrew to enroll in private school, returned to home country, incarceration, hospital-bound, marriage, deceased. Some states count students who take longer than four years to graduate as dropouts; other states do not. If a student's status is

unknown, it is very easy for school officials to code the student as a transfer.

Underreporting of dropouts is very common. Often states *lose* thousands of students. In 2008, the state Department of Education in one southern state could not account for over 20,000 students. These students had been marked as transfers, but it was unclear where they had gone; there was no evidence that they had enrolled in another school (Perdue, 2010). Before serious dropout prevention/intervention reforms can be enacted, there must be an accurate, consistent method of measuring the dropouts in our country. As Margaret Kondracke, president of *America's Promise Alliance* (a non-profit group working to reduce the dropout rate) stated "We can't move forward until we can measure where we are now" (Kingsbury, 2008, p. 2).

Past Measurement Systems

In the past, the three most common ways to measure and report national dropout rates were the event dropout rate, the status dropout rate, and the averaged freshman graduation rate (AFGR). The event dropout rate yields the lowest dropout rate and is defined as the percentage of high school students (15-24) who drop out of grades 9-12 between October first of one year and the next October first (12 months later). The ratio is the percentage of dropouts compared to the total enrollment. Using this method of calculation, in 2007 3.5% of all students in public and private schools left school without a diploma (U.S. Census Bureau, 2008).

The status dropout rate is the percentage of 16-24 year old non-institutionalized adults who are not enrolled in school and have not graduated high school or earned an equivalency credential, such as a GED certificate. This rate focuses on the overall age

group, rather than on individual students in school and is not necessarily a reflection of the performance of schools because it includes students who never attended schools in the United States. According to the National Center for Education Statistics (2009), the national status dropout rate is 9% (or 6.2 million students). This figure can be further broken down to 5% of White adults, 8% of African American adults, 3% of Asian adults, and 21% of Hispanic adults. More status dropouts are reported to be males than females and foreign-born than those born in the United States (National Center for Education Statistics, 2005).

The third method used to calculate the dropout rate is the averaged freshman graduation rate which is sometime referred to as the cohort rate and yields the highest dropout rate figures. This is the rate that is currently reported in state performance report cards required by NCLB. The AFGR is the proportion of public high school students who start high school in ninth grade and graduate four years later on time with a regular diploma. (For example, if 400 students start ninth grade together at a particular high school, and 200 students graduate four years later from the same high school, the AFGR is 50%.) The AFGR uses aggregate student enrollment data of the freshman class and aggregate data of diplomas awarded four years later, without taking into account transfers in and out of high school. Based on the AFGR, the National Center for Education Statistics (2004) reports that only 68% of students will graduate in four years. This percentage varies widely depending on school location, with just 53% of urban students and 71% of suburban students finishing high school in four years. Cleveland, Ohio currently has the largest graduation gap between urban and suburban students: 38% of

urban students compared to 80% of suburban students graduate in four years (Dillon, 2009, April 22). The high school dropout rate for Hispanic, Black, and Native American students exceeds 50% (Bridgeland et al., 2006; Swanson, 2004). The AFGR rates are gathered from the Census Bureau's Current Population Survey (CPS), the Common Core of Data (CCD), and the GED Testing Services statistical reports. CPS data is gathered through a sample of 60,000 household interviews but does not include individuals in the military, in jail or prison, or in long-term medical facilities. CCD is compiled by the National Center for Educational Statistics and provides enrollment information for all grades in every public high school. This data allows for the comparison between freshman class and senior class enrollment. Some claim that minority students are underrepresented in CPS and CCD data sampling (Bridgeland et al.; HGSE, 2001).

New Measurement System

In 2005, the *National Governors Association (NGA) Center for Best Practices*, under the leadership of Virginia Governor Mark R. Warner, formed the *Task Force on State High School Graduation Data* to “make recommendations for improved standard measures of state high school graduation rates and other complementary indicators of the performance of the nation’s high schools offer some guidelines and principles for states to follow to collect and produce the best data possible on high school graduates and dropouts” (National Governors Association, 2005, p. 11). All 50 state governors and 12 national organizations made a commitment to voluntarily implement a uniform method to calculate and report graduates (and dropouts) as well as better data systems by signing the

National Governors Association Graduation Counts Compact (Bridgeland et al., 2006; Curran & Reyna, 2009; Kingsbury, 2008). The graduation rate was based on this formula:

$$\frac{\text{On-time graduates by year X}}{[(\text{first-time 9th graders in year X-4}) + (\text{transfers in}) - (\text{transfers out})]}$$

To use this formula, schools and states must be able to accurately identify first-time ninth graders and track and gather individual longitudinal student data for four or five years; aggregate or summary counts will not work with this formula. The NGA Compact (or cohort rate) contains four key commitments of the states (Curran & Reyna; National Governors Association; 2005):

- Use a compact, four-year adjusted cohort graduation rate formula
- Build state data collection and reporting capacity; link data systems though education from preschool through post-secondary education
- Develop additional student outcome indicators
- Report annually on their progress toward meeting these commitments

Using longitudinal data systems and better reporting practices, the new NGA Compact will improve consistency and accuracy among state reporting systems. A state should be able to look at a particular ninth-grade cohort and track individual students outcomes to include: on-time graduation, transfer, deceased, incarcerated, dropout, or still in school.

Given the importance of a more reliable method of calculating the graduation rate and observing the progress states were making, in 2008, the U.S. Department of Education approved new regulations that would require all states to implement and report their graduation rate on federally mandated state, district, and school report cards using

this new four-year NGA Compact to fulfill NCLB requirements. In addition, after the 2011-2012 school year (with few exceptions), to determine and report AYP, high schools must use this same NGA Compact rate and set an annual graduation goal that reflects “continuous and substantial improvement” from the previous year. States must also begin reporting disaggregated graduation rates for all AYP-required student subgroups (Curran & Reyna, 2009).

By 2009, 20 states were using the NGA Compact formula to calculate and report their graduation rate. Thirteen more states planned to implement the NGA formula by 2010, and 12 more states by 2011. Other states have not yet made a date commitment but should comply by the new federal reporting deadline of 2011 (Curran & Reyna, 2009; National High School Center, 2007). As of 2009, 12 of the 20 states reporting the Compact rate were also using this rate for their NCLB requirements, 18 of the 20 states reported additional student indicators (such as five- and six-year cohort rates, high school dropout rate, GED completion rate, rate of students who completed all required courses but have not passed all graduation tests, and college readiness rate), and 19 of the 20 states disaggregated data for different student subgroups (minorities, disadvantaged, special education) (Curran & Reyna). Disaggregating the graduation rates for different student subgroups will raise awareness of problems within student subgroups and allow educators to more effectively work with different subgroups. Ultimately, states will be able to track students through the education pipeline from kindergarten through postsecondary education.

In the past, most states did not follow individual students over time; they reported annual or summary grade enrollments (Bridgeland et al., 2006). To use the NGA Compact approach, each state would need to implement a longitudinal data system to track individual students over time using a unique student identifier to connect student data over years; this approach would also include information on students transferring in and out of schools. Several organizations have agreed to help states build their data systems. The *NGA Center for Best Practices* is working with governors and state officials to provide guidance, technical assistance, and access to national experts. The *American Recovery and Reinvestment Act (ARRA)* has allocated \$245 million specifically for state data systems (Curran & Reyna, 2009). The *Data Quality Campaign (DQC)*, a national organization, will provide tools and resource to support states' efforts to design and implement longitudinal data systems. The DQC has defined four integral elements of an effective longitudinal data system: a unique statewide student identifier, student-level demographic information (race, gender, ethnicity, poverty, disability, limited English proficiency, and migrant status), enrollment information, student-level graduation and dropout data, and a state data audit system (Curran & Reyna). States might even begin using student identifiers that would allow students to be tracked across state lines.

To accurately track students through high school, a minimum of five years of student-level data is needed, from the eighth grade (to determine true first-year ninth graders) through proposed graduation four years later. As of 2009, 42 states had implemented the data systems and included the four DQC integral elements needed to

track individual students. Many states did not yet have the required five years of cohort data to accurately report the new NGA Compact rate.

Under the new NGA approach, *graduates* are those students receiving a diploma. Receiving a GED, a Certificate of Attendance, or a Certificate of Completion will not count as graduation, nor does taking more than four years to graduate. (Completing graduation requirements during the summer after the fourth year does count as graduation.) The NGA does encourage that states document five- and six-year graduates in their data collection. The default for a student who disappears or whose status is unknown is dropout. The system does take into account and track differently those special education students and recent English Language Learners (ELL) students who are allowed more than four years to graduate; they may be assigned to different cohorts based on that expectation. Students with modified diplomas (such as a Special Education Diploma) do count as graduates if the modified diploma is determined in the student's Individualized Education Program (IEP) The denominator can also subtract deceased students in addition to transfers.

Verifying student transfers from one school to another will also become easier and more efficient with the student-level longitudinal data system. The data system will not allow a student to be enrolled in two schools at once. A student will remain on the rolls (data system) of one school until he/she enrolls in another school (verified by a transcript request from a receiving school). If a student leaves one school but never enrolls in another school, the data system will code this student as a dropout. This procedure will force schools to correctly identify where a student is enrolled in school.

It is important to note that when considering graduation statistics, the graduation rate is not the opposite of the dropout rate; a state's graduation rate will not necessarily be 100% minus the dropout rate. These are two distinctly measured events, must be calculated separately, and are not the only educational outcomes possible. Using the NGA Compact, students who take longer than four years to graduate, transfer to home school or private school, or die are not graduates but many not be dropouts either. The NGA Compact does not imply that all students are either dropouts or graduates.

In 2008, in one of her last official acts as the U.S. Department of Education Secretary, Margaret Spellings ordered states to have new systems in place based on the NGA Compact recommendations by 2011 and report the dropout rate in a uniform, reliable way. As Ms. Spellings stated in her announcement "For too long we've allowed this crisis to be hidden and obscured ... Where graduation rates are low, we must take aggressive action" (Kingsbury, 2008, p. 1). These new rules will allow schools and school districts to be compared to one another in terms of graduation rates with consistent, public data. The results will also be disaggregated by race, gender, and SES. Dropout rates are frequently used to benchmark school system performance. School and federal officials hope that this new public data will present a more accurate picture of the dropout problem.

The implementation of the new *NGA Graduation Counts Compact* may initially yield surprising low graduation rates, much lower than previously reported. Because the public has often been unaware of the severity of the dropout problem due to inaccurate and confusing data, these new rates will force education leaders, policy makers, and

community members to confront the dropout problem in a uniform and meaningful way. Owning up to and realizing the dropout problem is the first step in addressing it. Hopefully significant attempts at high school reforms will follow.

Risk Factors

It is very difficult to accurately predict who will eventually drop out of high school and who will not. Most studies report that the dropout decision is a gradual process of disengagement from school (that may begin before a child even enters school) and is related to numerous factors, not just one risk factor (Bridgeland et al., 2006; Hickman, Bartholomew, Mathwig, & Heinrich, 2008; NDPC/N, 2010b). According to Christle et al. (2007, p. 334), “Dropping out of school is not an impulsive action, but rather a cumulative process.” Many students are exposed to multiple risk factors which compound and may accelerate the risk of dropping out of high school (Suh & Suh, 2007). Lan and Lanthier (2003, p. 310), concluded that “The high school dropout rate is a complicated problem that is related to environmental factors, such as characteristics of school, family, and community, as well as personal attributes of students who drop out.”

The factors related to dropping out of school are many and varied; dropouts are not a homogenous group. Usually students who drop out of school cite a variety of factors with complex interactions across multiple domains. No single risk factor or even combination of factors can accurately predict who will eventually drop out, although dropout predictions are stronger with multiple risk factors. Risk factors can be divided into three different categories or domains: individual, family, and school. Individual risk factors include poor academic performance/engagement, problem behavior, social

rejection, early adult responsibilities, and personal student attributes. Family risk factors include low SES, lack of parental support/involvement, lack of positive role models, race, and other family factors. School risk factors relate to the type of high school a student attends and includes inferior physical school structure and school location, lack of teacher and administration support, and lack of a relevant and challenging curriculum.

Individual Risk Factors

Individual Risk Factor: Poor Academic Performance/Engagement.

Poor academic performance is one of the major predictors of dropping out of high school and is “the earliest potential indicator of dropout status” (Bridgeland et al., 2006; Hickman et al., 2008; Hondo, Gardiner, & Sapien, 2008; Jerald, 2006; Lan & Lanthier, 2003, p. 327; Mac Iver & Mac Iver, 2009; National Center on Secondary Education and Transition (NCSET), 2004; National Education Association (NEA), 2008; Srebnik & Elias, 1993; Suh & Suh, 2007). Academic deficiencies related to dropping out can be seen as early as kindergarten. According to Hickman et al. (p. 11) “There appears to be a critical period of academic success prior to matriculation to kindergarten.” In a recent cohort study, the researchers found that dropouts had on average, significantly lower scores in all course grades and standardized test scores from kindergarten through high school than graduates had (Hickman et al.). One study found that a student’s reading level in the third grade heavily influenced later achievement and was the strongest predictor of an eventual dropout (Christenson & Throw, 2004). By the third grade, a pattern of learning is established that contributes to the course of a student’s entire school career. Paulson (2010, p. 1) stated “After [third grade], classroom materials tend to be

more complex, and students who do not have effective reading skills are more likely to fall behind.” McCaslin, Burross, and Good (2005) found in their research that “the fourth grade window” (the transition between grades 3 and 5) is a particularly susceptible time for students to fall behind academically, especially students of poverty.

These academic deficiencies often lead to the decision by teachers, administrators, and/or parents to hold a student back and have him/her repeat the grade. Educators often believe that holding back a struggling student will help him/her mature and catch up. However, this is not the case. Being retained or held back in a grade (and then being overage for grade) is a strong predictor of dropping out of school early in all student subgroups (Alexander, Entwistle, & Kabbani, 2001; Bridgeland et al., 2006; Carpenter & Ramirez, 2007; Christle et al., 2007; Hickman et al., 2008; Jerald, 2006; Lever et al., 2004; NCSET, 2004; Stearns & Glennie, 2006). Viadero contends that repeating a grade in elementary or middle school is the most predictive factor in the decision to drop out (2006). One study reported that 64% of students in elementary school and 63% of students in middle school who repeated a grade did not graduate on time (Alexander, Entwistle, & Horsey, 1997). According to Freeman (2004), boys are more likely to be held back in grade than girls, and minority students are more likely to be held back than White students.

Poor academic performance/engagement is often related to high rates of absenteeism from school (Bridgeland et al., 2006; Hickman et al., 2008; Jerald, 2006; Mac Iver & Mac Iver, 2009; NCSET, 2004; Stearns & Glennie, 2006; Suh & Suh, 2007). As the saying goes, “Showing up is half the battle.” Hickman et al. found that attendance

differences between high school graduates and dropouts could be seen as early as kindergarten. Christle et al (2007) also found a negative correlation between school attendance and dropout rate. In the research by Bridgeland et al., the absenteeism rate is the most common indicator of school engagement. One of the major reasons given for dropping out of school in Swanson's study (2004) is that the student has missed too many days and could not catch up. Attendance is often cited by schools as the reason for dropping out when the real (or more specific) reason is not known (Stearns & Glennie).

English language proficiency is a significant predictor of academic success in immigrant students, first generation students, and second generation students (Lopez, 2009; NCSET, 2010; Suarez-Orozco et al., 2010). While oral language proficiency can be developed within a year or two, some language experts contend that language skills similar to native-born students take five to seven years to develop in the best of conditions (Cummins, 1991). Depending on when a foreign-born student begins in the U.S. public school system, the reasons for academic failure are varied. For foreign-born teens that arrive in late adolescence, the dropout rate is over 70% (Fry, 2005). These older students may have had limited prior schooling or feel out of place with the different educational structures and processes in the United States compared to their home country. They may be required to adjust to different motivation styles, communication styles, and teaching styles. Having to learn and test in an English-only environment may be setting a new immigrant student up for failure. If foreign-born students arrive in the United States in childhood, they have a better chance of matriculating through the educational process (Saenz & Ponjuan, 2009). In addition, many students from other countries may be placed

in ELL classes which isolate them from most of the student body. According to Suarez-Orozco et al. “In many cases, newcomer immigrant children have almost no meaningful contact with English-speaking peers” (2010, p. 614).

Special education students drop out of school more often than regular education students (NCSET, 2010). According to the U.S. Department of Education (2001), during the 1999-2000 school year, only 57% of students with disabilities graduated with a regular diploma. In Ingram’s research (2006), there was a positive correlation between learning disabilities and dropping out of high school. Black and Latino students are more likely than White students to be diagnosed with learning disabilities and be placed in restrictive educational settings (Stearns & Glennie, 2006).

As students enter high school, new factors emerge. High school places new demands on students, academically, socially, and emotionally. According to Lan & Lanthier (2003, p. 9) “The transition to high school is a critical, yet neglected time when interventions should be provided.” Those students who succeed in ninth grade and are promoted to the tenth grade on time are more likely to continue doing well and graduate. Ninth grade students (across all ethnic groups) have the highest dropout rate of all grades (Allensworth & Easton, 2005, 2007; Alliance for Excellent Education, 2010, September; Bridgeland et al., 2006; Mac Iver & Mac Iver, 2009; Stearns & Glennie, 2006). Ninth grade is a pivotal year. Lan and Lanthier contend that “A successful transition from junior high to high school is the key for retaining student in high school through graduation” (p. 327). According to the Alliance for Excellent Education (2008, 2010a), only 30% of students entering high school can read on a proficient level. Struggling

students may be placed on a special academic (vocational or technical) regardless of their academic background (Nesman, 2007; Saenz & Ponjuan, 2009; Srebnik & Elias, 1993; Suarez-Orozco et al., 2010). This tracking can push high concentrations of at-risk, high-needs student into low level classes with unchallenging assignments, making them feel ignored and unimportant (Bridgeland et al.; Mac Iver & Mac Iver; Srebnik & Elias). This academic track can also keep students from graduating with a general or college prep diploma.

High-stakes tests (HST) also contribute to dropout rates (Bridgeland et al., 2006; Carpenter & Ramirez, 2007; Ryan & Brown, 2005; Viadero, 2005). Three of the stated goals of NCLB (2002) are to raise overall achievement, close the achievement gap between middle class and poor minority students, and ensure that all students be proficient in math and reading by 2014 . In its current state, NCLB holds schools accountable for standardized test scores but not accountable for graduation rates. The mandates of NCLB place immense pressure on schools to receive a passing score in each subgroup of students tested in order to meet AYP. One unintended consequence of NCLB is schools' *pushing-out* of low-performing students (possibly through suspension or expulsion) or just quietly ignoring these students dropping out, thereby increasing their school's test scores (Mac Iver & Mac Iver, 2009). According to Ryan & Brown (p. 356) "Reforms based on HST have been associated with increased school dropouts...especially salient among those already at risk, including...those for whom English is a second language – the very children whom many HST advocates have said they do not want to leave behind." Since NCLB, educators often feel pressure to teach

material the students will be tested on HST (Hondo et al.). Some of the negative consequences of this perceived pressure include teachers teaching to the test, eliminating enriching activities on which students will not be tested, and pushing-out of low performing test takers (Bridgeland et al.; Ryan & Brown, 2005). According to Medina (2009, p. 1) “The Education Department has been sued several times for pushing out students who are struggling and are unlikely to graduate, a practice that can help raise the school’s test-score averages and graduation rates.” Despite their criticism, HST seems to be here to stay. More than half of all states require passing a standardized test for high school graduation (Ryan & Brown, 2005). In some cases, being denied promotion to the next grade or even graduation can be the result of failure on a single indicator. While there have been increases in achievement in all subgroups since 2002, the achievement gap remains the same. This improvement may be the result of increased test preparation and test-taking strategies, especially in poorer districts (Ryan & Brown). HST put immense pressure on students to pass the test. Ryan & Brown contend that “If the bar appears to be too high, many students will experience futility and withdraw their effort. People are simply not motivated by the prospect of failure” (p. 363). It is often easier to drop out of school than face a HST failure yet once again.

Overall, low academic performance, repeating a grade, poor school attendance, language difficulties, tracking, and difficulties on high stakes tests can lead to low academic self-efficacy and low self-esteem. This low academic success can make a student feel a disconnection from school and that he/she does not belong at school. School disengagement often starts at an early age: students struggle academically, feel

powerless at school, develop low educational expectations, and eventually begin to disengage from school; they may also withdraw from extracurricular activities or feel resentful or indifferent as a result. In Lan and Lanthier's study (2003), disengagement and alienation from school steadily increased from eighth to tenth to twelfth grades among eventual dropouts. This cycle can become a downward spiral towards eventually dropping out of school (Anderman, 2003; Bridgeland et al., 2006). As Gary Ofield, co-director of the Civil Rights Project at Harvard University said, "Dropping out of school is a slow-motion dive for most kids and we can see them approaching the edge long before they fall off" (Harvard Graduate School of Education (HGSE), 2001, p. 1).

Individual Risk Factor: Problem Behaviors.

Dropouts often exhibit an early history with problem behaviors: aggression, problems with teachers, suspensions, expulsion, and/or juvenile matters (Bridgeland et al., 2006; Carpenter & Ramirez., 2007; Christle et al., 2007; Hickman et al., 2008; Jerald, 2006; Lever et al., 2004; Mac Iver & Mac Iver, 2009; NCSET, 2010; Srebnik & Elias, 1993; Stearns & Glennie, 2006; Suh & Suh, 2007; Terry, 2008). Beginning in middle school, suspension can make a student feel he/she is not accepted and does not belong at school (Srebnik & Elias). Dropouts also have increased involvement with gangs, theft, and illegal drug use (Nesman, 2007) and are more likely to be on probation than graduates (Hickman et al.). Getting in trouble often takes the form of rebellion, attempting to maintain a certain reputation or a cool reputation, or reacting to perceived unfair or discriminatory treatment (Nesman). Because school administrators may want to suspend/expel problem students as early as possible, dropping out of school for discipline

reasons is most often seen in ninth grade (across all ethnic subgroups) and declines as students progress through school. Males and Black students are more likely to leave school for discipline reasons; Sterns and Glennie contend that “Perhaps these results indicate that public schools rid themselves of the misbehaving youngsters as soon as it is legally possible to concentrate on educating more compliant students” (2006, p. 54). To compound the problem, schools with many poor or minority students are more likely to have zero-tolerance policies in place (Hondo et al, 2008; National Center for Education Statistics, 1998). An example of this would be school policies that dictate suspension or expulsion for students who are absent or tardy a certain number of days, no matter what the reason (Sterns & Glennie). Often students with discipline problems are sent to alternative schools, yet these schools have an even higher dropout rate than public schools (Nesman, 2007).

Another contributing factor to discipline problems can be related to the quest for ethnic identity. During adolescence, students are dealing with issues of identity (Erikson, 1980). Minority students are often trying to function in the dominant culture while striving to keep their ethnic identity. Ethnic identity can be defined as a sense of belonging and commitment to one’s ethnic group; a feeling of pride associated with one’s ethnic group; knowledge of history and culture of that group; and self-labeling with that ethnic group, such as African-American or Mexican-American (Graham & Hudley, 2005; Wigfield & Wagner, 2005). Research shows that a strong ethnic identity is positively correlated with self-esteem and is a protective factor against the effects of discrimination (Graham & Hudley). A strong ethnic identity is also associated with intrinsic motivation,

academic engagement, and a high value of school (Okagaki et al., 1996). How ethnic minority students negotiate their ethnic identity has an impact on motivation and competence (Graham & Hudley).

When expression of students' ethnic identity is discouraged, some minority students may reject school authority and mainstream school values in an attempt to not "act White" (Graham & Hudley, 2005; Nesman, 2007; Stearns & Glennie, 2006). The stigma of acting White may reflect these students' lack of identification with traditional U.S. norms of academic success. Also called oppositional identity, minority ethnic groups may adopt values and behaviors that are contradictory with the majority ethnic group and refuse to engage in things of value or characteristic of the dominant group, such as formal education, school success, and academic motivation (Aronson & Steele, 2005; Graham & Hudley; Stearns & Glennie). They may even aspire to opposite characteristics such as school disengagement and disruptive behaviors to preserve their ethnic identity.

Individual Risk Factor: Social Rejection.

Research shows that at-risk, minority students are at an increased risk for social rejection by their peers (Baumeister et al., 2002; Ellenbogen & Chamberland, 1997; Jerald, 2006; Terry, 2008). In early adolescence, rejected children often befriend each other, forming delinquent peer groups (Hickman et al., 2008). Older rejected students have fewer school friends and tend to associate with out-of-school friends who work full-time (Ellenbogen & Chamberland; Terry). This rejection can affect academic performance and school engagement and possibly lead to dropping out. Rejection based

on discrimination can negatively affect motivation and can lead to lower confidence and self-efficacy for the student (Graham & Hudley, 2005). Even unsubstantiated discrimination can lead to mistrust of teachers, lack of engagement, and disruptive behaviors (Graham & Hudley).

Related to racial discrimination is the concept of racial stereotypes. Graham and Hudley (2005, p. 396) define stereotypes as, “culturally shared beliefs, both positive and negative, about the characteristics and behaviors of particular groups.” Racial stereotypes are overgeneralizations (usually negative) about a particular racial group, and they can be quite powerful. According to Aronson and Steele (2005, p. 440), “Just the mere knowledge of a stereotype can influence the thinking and behavior of a teacher, parent, or peer...impact the student more directly.” Based on a negative stereotype, a teacher may have low expectations of his/her minority students which can affect their performance. Over time, these stereotyped expectations can lead to a self-fulfilling prophecy (Aronson & Steele). Stereotype threat can be defined as the “awareness that individuals have about negative stereotypes associated with their group” (Graham & Hudley, p. 397). Stereotype threat impairs performance by causing anxiety over trying to disprove the negative stereotype and also places an extra cognitive burden on those trying to suppress the negative stereotype (Aronson & Steele).

Individual Risk Factor: Early Adult Responsibilities.

Early adult responsibilities such as pregnancy, becoming a parent, family obligations, and job opportunities can also influence a student to drop out of school (Bridgeland et al, 2006; Jerald, 2006; Pew Hispanic Center, 2009; Stearns & Glennie,

2006). These factors can be especially prevalent among minority youth. In a survey of dropouts by Bridgeland et al., when asked why they did not finish high school, 26% of all students said it was because they became a parent, and 33% of female students gave this reason for dropping out. Minority youth begin having children at a much younger age than White youth. By the time they are 19 years old, 26% of Hispanic females, 22% of Black females, 11% of White females, and 6% of Asian females are mothers (Pew Hispanic Center). According to the Alliance for Excellent Education (2003), students with low academic achievement are twice as likely to become parents in high school than high-achieving students. Latino youth also marry at younger ages than other ethnic youth. Fifteen percent of Hispanic youth (16-25) are married compared to 9% of the general population at this age; immigrant Hispanic youth have an even higher rate with 22% of youth married (Pew Hispanic Center). Minority females tend to have more children than White females over their lifetime. On average, Hispanic females give birth to just over three children; Black females have 2.15 children; and White females have 1.86 children (U.S. Census Bureau, 2006). This high rate of teen pregnancy, early child-bearing, and early marriage among minority females can make finishing high school very difficult and give young females a reason to leave school.

According to research at the Pew Hispanic Center (Lopez, 2009), 74% of 16-25 year old Hispanic dropouts surveyed said they left school to work and support their families. Hispanic students are more likely to be employed and contributing to family income than White students, and the older the Hispanic adolescent, the more pressure there is to contribute to the family (Bridgeland et al., 2006; Fry, 2003 Jerald, 2006; Saenz

& Ponjuan, 2009). Two thirds of immigrant Hispanics (18-25 years old) sends money back to their families in the country from which they originated (Lopez). The Pew Hispanic Center concludes that “Young immigrant Hispanics appear to have financial commitments that limit their ability to pursue more education” (2009, p. 53).

Hispanic females are also more likely to leave school for family reasons than any other female subgroup (Stearns & Glennie, 2006). Young Hispanic females may feel the pressure and responsibility of family in their decision to drop out or stay in school. Often there is a family expectation for the adolescent female to help with childcare of younger siblings, care of the elders, housework, and/or meal preparation while parents go to work (Bridgeland et al., 2006; Nesman, 2007; Suarez-Orozco, 2010). For many young girls, while school might be important, family responsibilities take priority.

Dropping out of school early to help with family responsibilities has its costs. Low education levels translate into low-skilled jobs (such as construction, agriculture, manufacturing, or food service) with low wages, no health insurance, few opportunities for advancement, and often hazardous conditions (Fry, 2005; Saenz & Ponjuan, 2009). The pull of family responsibilities and job opportunities usually occurs in conjunction with other dropout factors. According to Nesman (2007) “The combination of being over age, feeling that you were not progressing, and being able to get a job easily created a strong pull to give up on school and pursue other goals” (p. 426). For many adolescents, making money gives a feeling of independence and is an important goal that conflicts with the goal of education. The importance of work and earning income increases with the age and grade of the student (Stearns & Glennie, 2006).

Individual Risk Factor: Personal Student Attributes.

Personal student attributes such as locus of control and perceived autonomy are related to the decision to drop out of high school (Lan & Lanthier, 2003). Based on the Attribution Theory of Motivation developed by Bernard Weiner (1986), when a success or failure happens, an individual will have an emotional reaction and then ask why or attempt to explain this outcome. The cause or causal attribution could be *ability*, *effort*, *task difficulty*, and/or *luck*. These attributions are classified on three causal dimensions: *locus*, *stability*, and *controllability* (Weiner). The locus dimension can be viewed as internal or external. A student with strong autonomy (internal locus of control – feeling of power) at school will be likely to graduate from high school (Vallerant & Frontier, 1997). A student with an external locus of control may feel controlled by external forces with no personal control. This external locus of control can lead to learned helplessness where a student may abandon any efforts to even try which can then lead to even lower performance and lower motivation (Lan & Lanthier). The stability dimension refers to whether the cause is stable or unstable. The controllability dimension contrasts what one can control with what is outside of one's control. All attributions (or causes) are located within these three causal dimensions. For example, ability is generally considered to be internal, stable, and uncontrollable. Effort is internal, unstable, and controllable. Task difficulty is seen as external, stable, and uncontrollable, and luck is considered to be external, unstable, and uncontrollable.

A student's perceptions or attributions will influence how he/she interprets a success or failure as well as the amount of effort the student will spend on that activity in

the future. For example, if a student fails a required graduation test and attributes the failure to lack of ability, motivation will decline, and the student is unlikely to retake the test because the same result will be expected. If the student attributes the failure to lack of effort because of illness, then motivation is not damaged because retaking the test will likely give different results. In academic settings, students will persist more if they attribute their successes and failures to controllable factors such as effort. Urdan and Turner (2005) found that “Greater perceptions of control are associated with increased motivation” (p. 305).

Many minority students are already dealing with factors out of their control: low SES, high-poverty schools, broken families, limited language skills, frequent moves, and tracking. Lack of academic proficiency and social mastery can lead to low self-efficacy (Schunk & Pajares, 2001). Because of low self-esteem, these students may tend to have an external locus of control and believe that things that happen to them are controlled by external factors (Lan & Lanthier, 2003). They might also feel that academic achievement and competence are also out of their control.

A final individual risk factor is the gender of the student. Among all ethnicities and SES levels, the female graduation rate is higher than their male counterparts: females (72%) to males (65%).

Family Risk Factors

Family Risk Factor: Low Socioeconomic Status.

Low SES is a major risk factor in predicting who will drop out of school (Allensworth & Easton, 2005; Jerald, 2006; Jordan, Lara, & McPartland, 1996; NCSET,

2010; Suh & Suh, 2007). Graduation rates are lower in school districts with a high percentage of students on the government lunch program (free and reduced lunch: a measure of poverty) than districts with a lower percentage (Swanson, 2004). Students from families that experience persistent economic stress are more likely to drop out than students from families with occasional stress (Annie E. Casey Foundation, 2003). According to the Coalition for Juvenile Justice (2001) and the National Center for Educational Statistics (2004), the dropout rate of low SES students is two and a half times greater than middle-income families and six times greater than the dropout rate for high SES students. In studies by Christle et al. (2007), a strong relationship was found between the dropout rate and poverty. Research on elementary school students shows that 83% of low SES fourth graders were not proficient in reading (Paulson, 2010).

Family Risk Factor: Lack of Parental Support/Involvement.

For those students who did drop out of school, usually parental involvement in education was low. In research by Bridgeland et al., 68% of dropouts interviewed said their parents became involved in their education only after they were dropping out (2006). Poor parental attitudes toward education may actually support a student's decision to drop out of school early (Terry, 2008). In a statewide (Arizona) survey conducted by the Educational Policy Studies Laboratory (2004), a sample of parents was asked "What do you think is the single biggest reason high school students drop out of school before finishing their education?" Thirty percent of parents answered poor home background and/or lack of parental involvement.

In some cases there may be a lack of connection between the home and school. Parents may feel unwelcome and misunderstood at their child's school even when they attempt to get involved. They may be confused by the school structure, school politics, and implicit expectations (Hill & Torres, 2010). These parents often do not understand their parental rights. Minority parents may be intimidated because of their lack of education, limited English skills and/or undocumented status (Suarez-Orozco et al., 2010). Parents can be easily intimidated by teachers and school administrators and often walk away from a meeting or conference feeling confused, incompetent, misunderstood, and/or embarrassed (Hill & Torres, Hondo et al., 2008; Suarez-Orozco et al.). Many parents need more information on how to support their child's academics.

Family Risk Factor: Race.

The race of the family is also related to the dropout rate (Allensworth & Easton, 2005). Minority student groups have a higher dropout rate than White students: Only 55% of Hispanic students, 51% of Black students, and 51% of American Indian and Alaska Native students will graduate on time with a regular diploma compared to 77% of White students and 81% of Asian students (Alliance for Excellent Education, 2010a; Bridgeland et al., 2006; Jerald, 2006; National Center for Educational Statistics, 2004; Swanson, 2004). Minority group populations are increasing. In 2009, 49% of U.S. births were to minorities (Alliance for Excellent Education, 2010, July). Bob Wise, the president of the Alliance for Excellent Education, commented "If the nation's education system does not start serving students of color better today, all Americans will feel the difference in their wallets...the best economic stimulus is a high school diploma" (p. 1).

Family Risk Factor: Other Familial Factors.

There are other family factors that can contribute to a student dropping out of school. Frequent family moves have a negative effect on academic performance of younger high school students (Jerald, 2006; NCSET, 2010; Sterns & Glennie, 2006). Students who changed schools between the eighth and tenth grades were significantly more likely to drop out than students who did not move (Swanson & Schneider, 1999). Hispanic students (especially immigrant students) have higher mobility rates in comparison with other ethnic groups and are more likely to drop out of school because of moving than students of other ethnic groups (NCSET; Sterns & Glennie; Suarez-Orozco et al., 2010). Hispanic immigrant families may leave for months at a time for seasonal work, and their children miss school to help out the family.

There is often a lack of positive family role models in the area of education. Some of these students have parents, siblings, and friends who have already dropped out of school (Bridgeland et al., 2006; Hickman et al., 2008; Hondo et al., 2008; Suh & Suh, 2007; Terry, 2008). Students with siblings who dropped out are more likely to drop out themselves (Carpenter & Ramirez, 2007).

The education level of the parents is also related to academic success. There is a positive correlation between the academic background of parents and high school completion of their children (National Center for Education Statistics, 2010; Suarez-Orozco et al., 2010; Terry, 2008; The Heritage Foundation, 1990). In Ingram's (2006) research of graduates and dropouts, higher parental education level was negatively associated with dropping out. The average mother's education level was 12.78 years of

school for graduates and 10.74 years of school for dropouts. Ingram found that for each additional grade that the mother completed, her child was 2.72 times less likely to drop out of high school early. In another study, more than half of the dropouts live in households where a parent had completed less than 12 years of school (Markey, 1988). The percentage of parents of White students with at least some college education is 73% compared to 51% of parents of Black students, 35% of parents of Hispanic students, and 76% of parents of Asian students (Fass & Cauthen, 2006).

The type of family arrangement in which a student lives can also affect academic performance. Single parent families, households with many siblings, and/or families in turmoil with alcohol, drugs, or abuse can have a negative effect on student academic success (Jerald, 2006; NCSET, 2010; Rumberger, 1995; Suh & Suh, 2007; Terry, 2008). Sixty-five percent of Black students live in single parent families (Kids Count Data Center, 2008). For immigrant families, often students are separated from their parents as part of the immigration process, may grow up in nontraditional households with multiple caregivers, or live in single parent families. In a study by Nield and Balfanz (2006) in Philadelphia, PA, 70% of high school students who either have a substantiated case of abuse or neglect, were in foster care, or gave birth during high school did not graduate on time. All of these situations are associated with a decrease in students' school performance (American Psychological Association, 2010; Suarez-Orozco et al., 2010).

School Risk Factors

School Risk Factor: Inferior Physical School Structure and School Location.

Related to poor academic performance is the type of school many minority students attend. Christle et al. (2007) contend that “For many students, the school they attend may be the strongest determining factor in their completing versus dropping out of school” (p. 327). There are vast differences between high schools with the highest dropout rate and high schools with the lowest dropout rate, such as teacher professionalism, experience of staff and administration, physical condition of the schools, and instructional strategies used. In the research by Christle et al. of low dropout and high dropout schools in Kentucky, low dropout schools were cleaner and in better condition than high dropout schools, and administration in low dropout schools had an average of nine years of experience while administration in high dropout schools had an average of four years of experience. Schools with the highest dropout rates tend to be large, urban, high-poverty schools (Alliance for Excellent Education, 2010, April; Balfanz & Herzog, 2006; Mac Iver & Mac Iver, 2009). According to Swanson (2009), the cities with the lowest graduation rates include Indianapolis, IN (31%), Cleveland, OH (34%), Detroit, MI (38%), Milwaukee, WI (41%), Baltimore, MD (41%), Atlanta, GA (44%), Los Angeles, CA (44%), Las Vegas, NV (45%), and Columbus, OH (45%). Eighty four percent of the nation’s schools with the lowest graduation rate are also high-poverty schools (defined as having over 40% of the students eligible for free or reduced lunch) (Alliance for Excellent Education). On average, low-performing, high-poverty schools are made up of 46% Hispanic and 34% Black students (Alliance for Excellent Education;

Khadaroo, 2010). These schools are often impersonal and can make students feel invisible, anonymous, and ignored (Rodriguez, 2008). They tend to be the most chaotic, poorly equipped schools in the most impoverished school districts (Hill & Torres, 2010; Suarez-Orozco et al., 2010). These schools are likely to have less experienced teachers, low teacher expectations, high teacher turnover, low levels of parental involvement, and poor administrative leadership (Khadaroo; Saenz & Ponjuan, 2009; Suarez-Orozco et al.). Jerald concluded “school-level factors play a significant role in determining whether students will earn a diploma . . . attending a high school with certain characteristics can itself be a risk factor for dropping out” (2006, p. 6). The poor quality of schools does little to help students overcome their academic challenges. In other words, the “students who need the most in terms of support are in schools that have the least to offer in this regard” (Suarez-Orozco et al., p. 613).

A “dropout factory” is the term used for the nation’s lowest performing schools (Balfanz & Legters, 2004). A school is placed on the dropout factory list when “on average over three years, the number of seniors is 60% or less than the number of freshmen at that school three years earlier and is said to have “weak promoting power” (Balfanz & Legters; Zehr, 2010, March, p. 3). A school in which a majority of the students are from a minority ethnicity is five times more likely to have weak promoting power than a majority White school (Balfanz & Legters). Half of all Black students, 40% of Hispanic students, and 11% of White students attend high schools where more students do *not* graduate than graduate on time (Balfanz & Legters). There are approximately 2000 dropout factories in the United States; this number accounts for one in five regular

or vocational high schools and collectively educates over 2.6 million students (Balfanz & Legters). These 2000 dropout factories (mostly in large, urban areas and poor, rural districts) produce 50% of all dropouts nationwide (Alliance for Excellent Education, 2010, April; Samuels, 2007). The dropout rate varies widely from state to state. Fifteen states account for 80% of the dropouts; these states are Arizona, California, Georgia, Florida, Illinois, Louisiana, Michigan, Mississippi, New Mexico, New York, North Carolina, Ohio, Pennsylvania, South Carolina, and Texas. Five southern states (Georgia, South Carolina, North Carolina, Florida, and Texas) collectively have the highest number and highest concentration of high schools with weak promoting power (Balfanz & Legters). Some researchers contend that in the 15% of the most challenged high schools, it would be better to close the schools and start all over (Balfanz & Legters).

Robert Balfanz is the coordinator of the *Everyone Graduates Center* at John Hopkins University where data are tracked and compiled for the dropout factory list. Schools on the dropout factory list are located in all parts of the country, in every state, in every type of community, and in every size school. According to the Alliance for Excellent Education (2010, April), dropout factories are located in the following areas: 51% urban, 21% rural, 19% suburban, and 9% in a town. Additionally, dropout factories can be found in large and small schools: 33% in schools over 1000 students, 29% in schools with 400-1000 students, 22% in schools with less than 400 students, and 9% in public charter schools. The one characteristic that all of these schools share is that they are disproportionately composed of poor and minority students. Minority students are six times more likely to attend one of the nation's lowest-performing school than their White

peers (Alliance for Excellent Education). In some cities, minority students have no other choice than to attend a high school with weak promoting power. Darling-Hammond concluded that “outcomes for students of color are much more a function of their unequal access to educational resources, including skilled teachers and quality curriculum” (2007, p. 320).

While most dropout factories are in large urban areas (51%), about 21% of the high schools that are on the dropout factory list reside in rural areas; South Carolina has the most rural schools on the dropout factory list of any state, followed by Georgia and North Carolina (Zehr, 2010, March). Rural schools are located in communities of 20,000 or less people (Hondo et al., 2008). Many of these rural high schools have fewer than 500 students. Rural schools as a group do not do well under NCLB requirements for AYP; often their *failures* are in the Black, Hispanic and/or low SES subgroups (Hondo et al.; National Center for Education Statistics, 2007). Some of these rural communities have what is referred to as “generational poverty;” many of these students’ parents and grandparents did not complete high school, and there is often a lack of aspiration and vision (Zehr). In the past, dropouts from a poor, rural school could plan on getting a job in the factory or textile mill, but now in many areas, these factories and mills have been closed. Rural schools often have inadequate educational funds, limited access to dropout intervention programs, inadequate access to health care, lack of access to professional jobs with higher pay, lack of public transportation, lack of computer/Internet access, and less emphasis on graduation (Hondo et al.).

School Risk Factor: Lack of Teacher and Administration Support.

In much of the research literature on minority dropouts, the students expressed a similar view of their teachers and administrators; students felt that their teachers did not care about them (Carpenter & Ramirez, 2007; Hill & Torres, 2010; Hondo et al., 2008; Nesman, 2007). Many students felt that their teachers and administrators openly disliked them or ignored them, held low expectations for them, were unresponsive, and/or were condescending to them (Bridgeland et al., 2006; Hondo et al.; Nesman; Tenenbaum, 2007). In Knesting's study (2008), the students' biggest complaint about school was the uncaring and disrespectful teachers and administration. Many minority students felt they were in a "school system that expected and accepted their failure" (Hondo et al., p. 99). In the case studies by Hondo et al., minority students felt invisible, unimportant, feared, or disliked by educators. One student felt that the principal "just wanted me out of his school" (p. 89). Other students expressed that the teachers showed favoritism toward high-status students. Tenenbaum found that teachers praised Hispanic students less, behaved less favorably to them, penalized them for low English proficiency, and talked down to them. For many dropouts, teachers or administrators had never contacted the parents directly about grades, attendance, or lack of motivation, and students were never counseled about the consequences of dropping out of school (Hondo et al.).

Many minority youth do not have positive role models at school. There is a significant gap between the ethnicity of students and teachers in public schools. Nationwide in 2006, 87% of teachers were White, 6% were Black, 4% were Hispanic, 1% were Asian, 1% were American Indian, and 1% were Other. In 2010, 40% of public

schools had no minority teachers at all (Hondo et al., National Education Association, 2010). Also, only 25% of all teachers are male (Saenz & Ponjuan, 2009). Though quite uncommon in the public schools, minority male teachers could serve as powerful role models for minority male students.

School Risk Factor: Lack of a Relevant and Challenging Curriculum.

In several studies of high school students, the students' major complaints about school were poor academic instruction, too much busywork and handouts, seen as boring or useless, not connected with real-life experiences, and offered no help or assistance for struggling students (Bridgeland et al., 2006; Hondo et al., 2008; Jerald, 2006; Lopez, 2009; Mac Iver & Mac Iver, 2009; Nesman, 2007; Quillen, 2010, March). School did not keep these students motivated and engaged and was not rewarding to them. In the research by Bridgeland et al., they found that 50% of student dropouts said that they left school because classes were not interesting; 70% of dropouts said they were not motivated to work hard; 70% were confident they could have graduated; 80% said they might have stayed in school if classes were more interesting and relevant; and a majority of the student dropouts said that higher expectations from teachers and parents might have helped keep them in school. Dropout rates are lower in schools that make a connection between high school and students' futures (Allensworth & Easton, 2007).

Effective Strategies of Dropout Prevention Programs

In 1983, a government report titled *A Nation at Risk* was released after 18 months of research (National Commission on Excellence in Education). This report documented the steady decline of our nation's students on many different measures: international

comparisons of student achievement, standardized test scores, Scholastic Aptitude Test (SAT) scores, science and technology achievement, “higher order thinking” skills, and preparation for the military, workforce, and college. The report concluded “the educational foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future as a Nation and a people” (p. 1). Following the *Nation at Risk* release, more attention was paid by states and districts to the dropout problem in their communities. Between 1988-1994 the federal government gave \$214 million towards a *School Dropout Demonstration Assistance Program* (Jerald, 2006). Dropout prevention programs proliferated around the country without much research to guide them. Between 1985 and 1989, the New York City School District spent more than \$120 million on a prevention program that made very little to no difference in their district’s dropout rate (Heritage Foundation, 1990). Since a variety of risk factors that correlated with dropping out were known, many programs used checklists to assess who should be targeted for dropout interventions and who should be excluded. Two problems with the checklist method were: (1) The number of risk factors that must be checked in order for the student to be at-risk for dropping out, and that (2) The checklist instruments may need to vary in different locations around the country. A study conducted by Gleason and Dynarsky of Mathematica Policy Research, Inc. assessed the risk factors on the checklists found that no single risk factor yielded a dropout rate of more than 28% (2002). In other words, more than 70% of students with that risk factor would graduate. Even when Gleason and Dynarsky combined risk factors, the dropout rate was still no more than 28% with any combination of risk factors. Simply knowing the risk factors

associate with dropping out may be helpful, but it is not a reliable way to predict if a particular student will drop out of school early. In 1989, the Dropout Prevention Center discouraged the use of checklists and encouraged statistical analysis to develop a statistically generated prediction formula.

There are currently hundreds of dropout prevention programs around the country with the purpose of keeping students in school through graduation. The National Dropout Prevention Center Model Programs (FOCUS) database has more than 400 dropout prevention programs listed on their website (2010c). Despite federal money and the work of educational researchers, concerned policy makers and school officials, the majority of dropout prevention programs have made little significant difference in the dropout rate in the past 30 years (Bridgeland et al., 2006; Christle et al., 2007; Mac Iver & Mac Iver, 2004; Prevatt & Kelly, 2003; Rosenthal, 1996; Samuels, May 2007). Principal dropout prevention investigator, Mark Dynarski, remarked “For 20 years we’ve had a social problem that’s pretty big that has not moved one whit” (Samuels, para. 5). Mac Iver and Mac Iver asserted that “We know a lot about why students drop out of school. The challenge is to do something about it” (p. 4). There are many aspects of effective strategies to consider when planning and implementing dropout prevention programs.

Effective Strategy: Timing of Interventions

Currently there is much research being conducted on the dropout problem and many opinions as to the ideal timing of interventions and best practices. Some researchers believe that early proactive intervention is critical when risk factors are few (Hickman et al., 2008; Paulson, 2010; Srebnik & Elias, 1993; Suh & Suh, 2007). The contention is

that primary prevention efforts should begin early, before school disengagement begins. Waiting to help students after poor academic achievement and high rates of absenteeism are apparent is often too late. These researchers believe that interventions should begin in preschool and continue through the students' school careers. In a large study published in the *Journal of the American Medical Association*, nearly 1000 children low-income children (mostly Black) received supplemental early educational experiences. Participants in the study reached higher educational levels and were less likely to drop out of school than similar children not participating in the program (Reynolds, Temple, Robertson, & Mann, 2001). Kennelly and Monrad, (2007) researchers for the National High School Center, believe that the beginning of middle school is the most effective time to begin interventions. Other researchers emphasize high school as the most important time to intervene in dropout prevention. Declines in motivation, academic performance, family and peer relations, participation in school activities, and self-esteem are seen most between eighth and twelfth grades; currently most dropout prevention programs are aimed at the high school level (Hickman et al.; Lan & Lanthier, 2003). The transition periods from elementary to middle school and middle school to high school are also critical times for dropout interventions, specifically interventions that focus on improving school engagement (Arizona Department of Education, 2008; Bridgeland et al., 2006; Hickman et al.; Lan & Lanthier; Srebnik & Elias).

Effective Strategy: Flexibility

Flexibility is another important aspect to consider when planning dropout prevention programs. Prevention strategies must be tailored to individual and local

community needs (Bridgeland et al., 2006; Carpenter & Ramirez, 2007; Kennelly & Monrad, 2007). A strategy that works in Chicago schools may not be the most effective strategy for rural South Carolina schools. Effective strategies must also be comprehensive in that they address the individual, family, school, and community involved. Ideally, student subgroups are analyzed separately to determine unique causes and effects within individual subgroups. Dropout strategies need to target specific grade levels and risk factors. Dynarsky and Gleason (2002) contend that one reason that dropout prevention programs do not seem to be effective is that they are not tailored to the specific risk factors and needs of the students.

Effective Strategy: School Engagement and Positive School Climate

Some researchers believe that the focus must shift from student characteristics to school environmental factors and focus on school engagement as a protective factor against dropping out (Mac Iver & Mac Iver, 2009; Srebnik & Elias, 1993; Suh & Suh, 2007). When students feel part of the school community and a sense of belonging, their motivation and behavior often changes, and they can become more interested in school (Knesting, 2008). To enhance engagement in school, students must be given opportunities to contribute to school, must have the skills to contribute to school, and need recognition for their contributions (Nesman, 2007; Srebnik & Elias). Positive social connections through sports, clubs, and/or school activities can help students feel like they belong, they are involved, and they have a responsibility to others; all of these feelings promote positive school engagement (Lever et al., 2004; Srebnik & Elias). In their studies with students in the Chicago Public Schools, Allensworth and Easton (2007) found that

freshmen entering the ninth grade with weak academics but reporting a positive ninth grade experience were twice as likely to graduate than freshmen with strong academics but reporting a negative ninth grade experience.

Promoting positive school climate is vital for keeping at-risk students in school; students must feel safe and welcome in their school (Alliance for Excellent Education, 2011a; Bridgeland et al., 2006; Hondo et al., 2008). A positive school climate that fosters academics includes increased supervision, fair and consistent discipline policies, safety from violence, and a supportive classroom environment (Bridgeland et al.; Christle et al., 2007; Lan & Lanthier, 2003; NCSET, 2010). A positive school climate exists when “all students feel comfortable, wanted, valued, accepted, and secure in an environment where they can interact with caring people they trust” (Johnson, 2001, p. 3.1). In the research by Allensworth & Easton (2005; 2007), teacher collaboration, coherence in instructional programming, high academic achievement and relevance, support for struggling students, and engaging parents all contributed to positive school climate for students.

Effective Strategy: Academic Support

One effective strategy repeatedly found in the dropout prevention literature is to expect high academic standards from all students (Bridgeland et al., 2006; Christle et al., 2007; HGSE, 2001; Jerald, 2006). All students should have the opportunity for challenging classes and even college-credit courses (Advanced Placement classes, International Baccalaureate classes), if available. While many people argue that raising academic standards will increase the dropout rate, the opposite has been found to be true (Jerald). For example, in Chicago, graduation rates improved when all students were

required to take a college-preparatory sequence and number of courses (Allensworth & Easton, 2007). In 1998, a school district in San Jose, California implemented a college prep curriculum for all students, and since that time the district's dropout rate has decreased (Forger, 2010). In the research by Bridgeland et al., two-thirds of the dropouts interviewed said that they would have worked harder had more been demanded of them.

More emphasis on the performances of the middle schools must also be considered. Most high schools with weak promoting power are fed by low-performing middle schools. Ninth grade failure (a major factor in dropping out) is often a result of weak reading and writing skills, underdeveloped math skills, and/or overall academic weaknesses.

In conjunction with raising academic standards, there must be additional support for struggling students in elementary, middle, and high school as well as opportunities to recover from academic setbacks (Alliance for Excellent Education, 2011a; Bridgeland et al., 2006; HGSE, 2001; Lan & Lanthier, 2003; NCSET, 2010). Academic support can include tutoring, afternoon homework assistance, Saturday school, summer school, modified curriculum and instruction for students' current knowledge and skill level, academic scaffolding, flexible schedules, individualized graduation plans, and extra support when ELL students transition out of ELL classes. School restructuring into smaller learning communities with smaller classes and/or smaller schools can be helpful as well; examples of these would include alternative schools, ninth grade academies, career academies, and theme-based schools which would allow for more individual attention and have been shown to improve academics (Arizona Department of Education,

2008; Bridgeland et al.; Gewertz, 2009, August; HGSE; Jerald, 2006; Kennelly & Monrad, 2007; NCSET; U.S. Department of Education, 2007; Zehr, 2010, March). Credit recovery programs, second-chance schools, catch-up courses, on-line classes/schools, and career/technical programs can also help students stay in school. At a public charter high school in Houston, Texas which serves many recent immigrants, classes begin in the late afternoon and go through the evening so students can work in the morning through mid-afternoon and still go to school (Forger, 2010). At a high school in Las Vegas, Nevada, classes are held in the evenings and free child care is offered to students (Forger).

Many states and school districts, using grant money, federal economic stimulus money, or state funds, are beginning to implement (or explore options regarding) graduation coaches, adequate yearly progress coaches, dropout prevention specialists, or truancy monitors into their middle and high schools (Arizona Department of Education, 2008; National High School Center, 2008; Zehr, 2010, March; Zehr, 2010, June). These individuals attempt to keep students in school by meeting one-on-one with at-risk students, monitoring academic progress and attendance, visiting students' homes, exploring available alternative options for graduation, and supporting students with their graduation plans.

Efforts are also being made to try and connect the strongest teachers with disadvantaged students in high-poverty schools. Too often the less qualified and less experienced teachers are assigned to the most challenging schools. Fewer teachers in high-poverty schools have Masters degrees than teachers in middle- or upper-class schools. (Khadaroo, 2010). Many schools districts (especially in high poverty districts)

find it difficult to recruit and retain highly qualified teachers. Teacher retention is a difficult proposition for any school district: nationally, 14% of teachers leave the teaching profession after one year, 33% leave after three years, and 50% of teachers leave the profession within five years (Alliance for Excellent Education, 2010a). Since 2006, a federal government program, *Teacher Incentive Fund (TIF)*, has been helping districts improve teacher quality for poor schools by \$437 million in TIF grants.

Raising the compulsory school attendance (CSA) age from 16 to 18 is another proposed strategy that might keep students in school (Bridgeland et al., 2006). Currently, states can decide at what age students can dropout. As of 2010, in 18 states, students can legally drop out of school at age 16 (approximately tenth grade). Other states have already raised the CSA age requirement to 17 or 18 with some exemptions. See Appendix B for a complete list of compulsory school attendance laws and exemptions, by state.

In a study conducted at Cornell University (Burkhauser, 2002), researchers analyzed the costs and benefits of raising the CSA age from 16 to 18 and the effects on the dropout and completion rates. After reviewing results from states that had previously raised their CSA age from 16 to 18, they found no correlation between raising the age of CSA and high school completion rates. In some cases, truancy rates increased as well as the costs for enforcing the new policy. The study did show that supplemental programs aimed at at-risk students were a more effective way to improve completion rates. Opponents of raising the CSA age will also point out the fact that the states with the highest school completion rates (Iowa, Vermont, and North Dakota) mandate school

attendance to age 16 while the state with the lowest completion rate (Nevada) compels attendance to age 18 (“House Bill,” 2011).

A major complaint of students who dropped out was that school was boring and not meaningful or relevant to the world of work. To keep students interested, schools must attempt to make the curriculum and instruction more relevant and engaging, enhance the connection to higher education and the workplace, offer career-oriented courses and internships, focus on transitions to college or the workforce, and collaborate with local businesses (Allensworth & Easton, 2007; Alliance for Excellent Education, 2011a; Arizona Department of Education, 2008; Balfanz & Legters, 2004; Bridgeland et al., 2006; Kennelly & Monrad, 2007; Lever et al., 2004; Mac Iver & Mac Iver, 2009; NCSET, 2010; Srebniak & Elias, 1993; Suarez-Orozco et al., 2010; U.S. Dept. of Education, 2007). Allensworth and Easton contend that “The more students see their schoolwork as relevant for the future, the greater the likelihood that school as a whole will feel worthwhile” (p. 39). Teaching the skills of work force readiness, problem solving, decision making, interpersonal skills, and a sense of personal responsibility can also help support a student’s future career goals. For example, *Big Picture* schools opened their first school in 1996 and now have over 60 schools around the country. These schools “cultivate engagement rather than demand compliance” (Pink, 2009, p. 180). The students (mostly from minority and low-income areas) learn a basic curriculum but then acquire other skills by working in internships with local businesses and non-profit organizations. Students work with on-the-job mentors to help students see the relevancy of curriculum to work life and are assessed on work performance, attitude, effort,

individual presentation, and behavior. Nationwide, more than 95% of *Big Picture* students graduate and go on to college (Big Picture Schools, 2010; Forger, 2010; Pink).

Effective Strategy: Mentors, Advocates, Monitors, and Social Support by Teachers

Another effective strategy seen in many dropout prevention programs is having a strong, positive, respectful, adult-student relationship at school (Arizona Dept. of Education, 2008; Jerald, 2006; NCSET, 2010; Rosenthal, 1995; Srebniak & Elias, 1993; Zehr, 2010, March). Ideally, high schools would be small enough (or divided into smaller units) that teachers could get to know the students as individuals. In the research by Bridgeland et al., only 41% of dropouts interviewed had someone at school they could talk to about personal problems (2006). This positive school relationship can come in the form of a mentor, advocate, or teacher/faculty/coach support.

Mentoring has been shown to be extremely effective with at-risk youth. The National Dropout Prevention Center/Network defines mentoring as a “caring, supportive relationship between a mentor and a protégé that is based on trust” (2008b, p. 1). Newman (2007) found “The actions of caring and supportive adults...encouraged students to continue putting effort into school” (p. 422). A mentoring relationship can be one-to-one, one-to-group, or in conjunction with a sports team or extracurricular activity. Expected benefits of mentoring for the student include improved academic achievement, increased graduation rates, increased school attendance, increased self-esteem, and decreases in discipline referrals and early pregnancy (NCPC/N). Mentoring can help break the negative cycles of some students and their families. The key to effective mentoring is the development of a trusting relationship which requires time and effort.

Other terms used for mentors at school are *advocates* or *monitors*. These adults can regularly assess academic and attendance data, provide feedback to students, help identify community/social services when needed, and provide encouragement to students (U.S. Department of Education, 2007).

Social support for school can also come from a student's academic teacher, homeroom teacher, or other faculty member. For at-risk students, teachers can be a strong source of social support for staying in school (Chapin & Young, 2009). Students attend class more often and have a higher engagement with school when they feel that they have strong relationships with their teachers (Allensworth & Easton, 2007). Social support for staying in school was negatively related to dropping out of school (Rosenthal, 1996). Rosenthal defines social support for staying in school as "the perception on the part of a given individual that others, with whom he or she has an emotion-based attachment, value education and want the individual to stay in school and graduate from high school" (p. 300). Positive social support can overcome many risk factors a student might have; the social support can protect the student from other risk factors. Social support can promote the development of confidence in one's abilities and skills which can contribute to feelings of competence in one's environment (Chapin & Young). A study by Christle et al. (2007) showed the influence of teachers as role models and the influence that their attitudes and behaviors had on students. Social support for remaining in school comes from teachers who are committed and caring, believe that all students can succeed, provide high expectations, respect, and safety in the classroom, care whether a student graduates or not, and create classrooms where students feel respected, supported, valued,

and a sense of belonging (Bridgeland et al., 2006; Knesting, 2008; Lan & Lanthier, 2003). Additionally, social support for staying in school is shown by teachers who listen to students, talk to student in the halls, smile and make eye contact with students, and convince students that they can succeed (Christle et al.; Knesting). Failure rates are lower at schools where students have a high level of trust in their teachers (Allensworth & Easton, 2007). Knesting found that “Teachers who sought to understand students’ behavior, believed in students’ ability to succeed, and accepted them *as is* were especially able to help at-risk student stay in school” (p. 5).

One method of providing social support to students is to ensure that every student has a strong relationship with at least one adult at school. Many successful dropout prevention programs assign an adult to work with a small number of students (Balfanz & Legters, 2006). Around the country, “advisories” are being formed in some high schools. Advisories are small groups of high school students that meet with a faculty member on a regular basis, like an in-school social support group. These students have regular interaction with a trusted faculty member. The most effective advisories stay together for years. In 2007, Austin, Texas began implementing advisories in many of their comprehensive high schools (Forger, 2010).

Effective Strategy: Strong Parental Support, Involvement, and Communication

A very effective strategy for keeping students in school is strong parental support and involvement. According to Chapin and Yang, the “initial and most proximal source of social support is family” (2009, p. 1). Research shows that parental involvement and support in education and schoolwork is the “crucial variable” and decreases the

likelihood of students dropping out of school (Alliance for Excellent Education, 2011a; Bridgeland et al., 2006; Carpenter & Ramirez, 2007; Christle et al., 2007; Hondo et al.; Jerald, 2006; Lan & Lanthier, 2003; Lever et al., 2004; Mac Iver & Mac Iver, 2009; National Dropout Prevention Center/Network (NDPC/N), 2008a; NCSET, 2010; 2008; Nesman, 2007; Rosenthal, 1995, p. 5; Rumberger, 1995; Srebnik & Elias, 1993).

According to the National Dropout Prevention Center/Network (p. 2) “Family engagement has a direct positive effect on children’s achievement and is the most accurate predictor of a student’s success in school.” Parental engagement has many educational benefits, such as better attendance, academic performance, school behavior, and emotional well-being (Bridgeland et al.). In Rosenthal’s study on social support, most of the impact on staying in school came from the family’s valuing of education, with the valuing from one’s peer group and ethnic group having a lesser influence (1995). In Nesman’s research, caring and supportive parents were most often named as the intervention that encouraged youth to stay in school. Research from Frome and Eccles (1998) showed that a “parent’s beliefs predicted their child’s self-efficacy (confidence) better than actual performance.” This positive relationship between parental support and students’ academic success holds true for all ethnic backgrounds and SES levels (NDPC/N).

The National Parent and Teachers Association (PTA, 2010) is a strong proponent of family involvement and listed the benefits of family engagement in education: High parental involvement is related to increases in academic achievement (regardless of SES,

race, or parents' education), better attendance, better behavior, better graduation rates, and higher teacher expectations.

Parental *expectations* for their children to finish school are another important factor in school completion (Mac Iver & Mac Iver, 2009; NDPC/N, 2010b; Suh & Suh, 2007). Eccles et al. (1983) found that parents' beliefs and expectations are related to their students' expectations and future goals and plans. Rumberger (1995) found that parents' expectations for their children's academic success and their involvement in school work were positively related to high school graduation. Eccles (p. 116) contends that "High parental expectations are linked to high achievement motivation and high achievement behavior." Eccles also found that "parents, especially mothers, had a stronger influence on children's achievement-related beliefs than did teachers" (p. 137). Positive parental attitudes towards school can foster self-discipline, academic self-esteem, and long-term planning (Terry, 2008).

Communication between the school and the parents is vital for student success (Bridgeland, et al., 2006). Often parents do not feel comfortable in the school setting. Schools can respond to the needs of parents and attempt to overcome barriers which may interfere with communication, such as parents' level of comfort, parents' level of literacy, parents' spoken language, and daily commitments of parents (NDPC/N, 2008a). Also, parents may need to be taught how to support their children's education (Terry, 2008). In Sacramento, California (and in other schools around the country), teachers and staff go on home visits to keep parents involved and engaged in the school process (Forger, 2010).

Effective Strategy: Evaluate and Disseminate Best Practices

The *National Dropout Prevention Center/Network*, located at Clemson University in South Carolina, is a well-established national resource and clearinghouse on issues related to dropout prevention. The NDPC/N is involved in active research projects, publications, professional development, and third party Program Assessment and Reviews (PAR). The mission of NDPC/N is to increase high school graduation rates through research and evidence-based solutions. The NDPC/N has identified 15 effective strategies that have made the most positive impact on student dropout rates throughout the nation (2010b):

School and Community Perspective:

1. Systemic Renewal – A continued process of evaluating goals and objectives related to schools as they impact a diverse group of learners.
2. School Community Collaboration – When all groups in a community provide collective support to the school, youth can thrive and achieve.
3. Safe Learning Environments – A safe learning environment provides daily experiences that enhance positive social attitudes and effective interpersonal skills.

Early Interventions:

4. Family Engagement – Family engagement has a direct, positive effect on children's achievement and is the most accurate predictor of a student's success in school.

5. Early Childhood Education – The most effective way to reduce the number of children who will ultimately drop out is to provide the best possible classroom instruction from the beginning of their school experience through the primary grades.
6. Early Literacy Development – Early interventions to help low-achieving students improve their reading and writing skills will establish the necessary foundation for effective learning in other subjects.

Basic Core Strategies:

7. Mentoring/Tutoring – Mentoring is a one-to-one caring, supportive relationship between and mentor and a mentee that is based on trust. Tutoring focuses on academics and is an effective practice when addressing specific skills such as reading, writing, or math.
8. Service Learning – Service-learning connects meaningful community service experiences with academic learning and promotes personal/social growth and civic responsibility.
9. Alternative Schooling – Alternative schooling provides potential dropouts a variety of options that can lead to graduation.
10. After-School Opportunities – Many schools provide after-school and summer enhancement programs that eliminate information loss, inspire interest in a variety of areas, and are especially important for at-risk students.

Making the Most of Instruction:

11. Professional Development – Teachers who work with youth at high risk of academic failure need to feel supported and continue to develop new skills and techniques.
12. Active Learning – Active learning involves students in the learning process. Students find new and creative way to solve problems and achieve success.
13. Educational Technology – Technology offers some of the best opportunities to engage students in authentic learning, addressing multiple intelligences, and adapting to students' different learning styles.
14. Individualized Instruction – An individualized instructional program for each student allows for flexibility in teaching methods and motivational strategies.
15. Career and Technology Education (CTE) – School-to-Work programs recognize that youth need specific skills to prepare them to measure up to the larger demands of today's workplace.

Another organization dedicated to reducing the country's dropout rate is *America's Promise Alliance* (2010). For the past decade, founder Colin L. Powell and his wife, current Board Chair Alma J. Powell, have dedicated their time and energy to this non-profit organization to help children. *America's Promise Alliance* has become the nation's largest partnership focused on the nation's children. The Alliance encompasses more than 300 organizations throughout business, communities, non-profit organizations, and policy makers. The Alliance is committed to children experiencing the *Five Promises* they all need to succeed:

1. Caring Adults
2. Safe Places
3. A Healthy Start
4. Effective Education
5. Opportunities to Help Others

On March 1, 2010, the Alliance (with President Obama, U.S. Secretary of Education Arne Duncan, General Colin Powell, Alma Powell, and hundreds of partners) embarked on a new project to combat the nation's dropout rate: *Grad Nation*. At this event, President Obama stated, "This is a problem we cannot afford to accept and we cannot afford to ignore" (America's Promise Alliance: About the Movement, 2010). The intent of *Grad Nation* is to mobilize America to end the dropout crisis and to prepare young student for the 21st century work force. According to the America's Promise Alliance website "Grad Nation is a national movement to transform awareness of the dropout crisis into sustained, results-driven action. It's a call to action for concerned citizens, businesses, community leaders, policy makers, educators, and the nation. With leadership and focus, this is a solvable problem." The Alliance attempts to raise the awareness of the dropout crisis and "build the public and political will necessary to sustain a successful national movement" (America's Promise Alliance: About the Movement). Through extensive research, *America's Promise Alliance* has identified a plan for reducing the dropout rate.

Ten-Point Plan for Reducing the Dropout Rate:

1. Support accurate graduation and dropout data

2. Establish early-warning systems to support struggling students
3. Provide adult advocates
4. Support parent engagement and individualized graduation plans
5. Establish a rigorous college- and work-preparatory curriculum
6. Provide support options for struggling students
7. Raise compulsory-school-age requirements under state laws
8. Expand college-level learning opportunities in high school
9. Disseminate best practices
10. Make increasing high school graduation a national priority

Current Dropout Prevention Programs

Over the past 20 years, there has been a negligible amount of sophisticated dropout research, most likely the result of massive underreporting of the problem. In 1990, the (then) National Dropout Prevention Center began the process and evaluated the research and practices of 350 dropout prevention programs. In program analyses by Dynarski and Gleason (2002), the researchers found that most dropout prevention programs did not significantly reduce dropouts because the programs were not tailored to the specific needs of students. There have been few longitudinal studies (following students through their school years) as well as few retrospective studies (looking back on students' past school experiences) to determine the best, most efficient times and methods of intervention to use with students.

In 2007, the NDPC/N began an extensive search for exemplary, quality, evidence-based programs proven to be effective for particular risk factors (Hammond, Smink, &

Drew, 2007). To be considered, programs had to be ranked in the top level by at least two outside sources, be currently in operation, target K-12 students, and have consistent, positive evaluation outcomes. Fifty programs were chosen based on these criteria (see Appendix A for a complete list of Exemplary Programs). Many of these effective programs included an academic support component, personal skills building opportunities, and a family support component. Most effective programs used a combination of components with students.

The Institute of Education Sciences *What Works Clearinghouse* (WWC) was established in 2002 as a reliable source of scientific, research-based evidence of what works in education (U.S. Department of Education, 2007). In 2009, the WWC reviewed 29 dropout prevention programs (whole-school-centered reform programs as well as programs targeting the individual student). To be included in the WWC review, the programs had to include dropout prevention as the primary objective and operate in the United States. The three outcome variables were staying in school (measured by enrollment), progressing in school (measured by credits earned), and completing school (measured by receiving a diploma or GED). Of the school centered programs, three programs had a positive effect on staying in school and progressing in school, but not on completing school:

- *Career Academies*: Small learning communities with academic and vocational courses; aimed at high school students; academic and vocational coursework organized around a career theme; may include internships and work-based mentors

- *Talent Development High Schools*: School-wide reform serving all students; use ninth grade academies or small learning communities; transition to high school assistance; extensive academic support and catch-up courses (possible block scheduling second semester to make up a failed core course); a college focus; includes parent and community involvement; social support from a faculty advisor or other adult advocate; interdisciplinary teams of teachers and ongoing professional development for staff
- *Accelerated Middle School*: Additional academic instruction and support for struggling middle school students

The WWC reviewed other programs targeting individual students. Two programs had a significant positive effect on completing school (high school graduation and GED completion):

- *Talent Search*: Low-income middle or high school students or students whose parents did not earn a high school degree; tutoring, academic advising, and study skills assistance; career exploration; college preparation assistance
- *New Chance*: Helps students complete their GED

Other programs with an individual student focus showed significant success with students staying in school and progressing in school, but not on completing school:

- *Check & Connect*: At-risk middle and high school students; students served throughout time in school; tiered interventions; supplemental tutoring; trained monitor meet with each student each week to monitor grades, attendance, and behavior referrals; family outreach

- *Achievement for Latinos Through Academic Success (ALAS)*: Middle school Latino students at risk of dropping out; regular curriculum with extra problem-solving classes; attendance monitoring; regular feedback to parents and teachers; case management; counseling; positive reinforcements and group bonding activities
- *Financial Incentive for Teen Parents to Stay in School*: Teen parents receive cash assistance; no academic component; case management
- *Twelve Together*: Six high-achieving and six low-achieving ninth grade students meet together every week with an adult advisor to discuss school issues, future goals and academic success. Program includes homework assistance, college campus visits, and social events.

In other program evaluations, four high school dropout programs have shown some success with student from high poverty schools: *Talent Development*, *Career Academies*, *First Things First*, and *Project GRAD* (Graduation Really Achieves Dreams) (Legters, Smerdon, & Early, 2009). Strategies in these programs include small learning communities, focus on reading and math instruction, interdisciplinary team of teachers, adult advocates, elective catch-up opportunities, summer programs, career-focused courses, and college preparation assistance scholarship opportunities.

Several dropout prevention programs were aimed at increasing achievement with minority students: *ALAS*, *Coca Cola Valued Youth Program (VYP)*, *Project GRAD*, *Upward Bound*, *AVID* (Advancement Via Individual Determination), and *SCORE* (Fashola & Slavin, 1998).

Srebnik and Elias (1993) advocated for peer tutoring, counseling, cross-age tutoring and buddy programs as successful ways to foster school engagement, an essential element in staying in school. They contend that these types of programs are practical, economical, and replicable in most schools, and that positive peers can be a powerful role model for at-risk students. Examples of these programs include:

- *Valued Youth Program*: At-risk students with limited English skills are assigned as tutors for younger at-risk elementary students. Results of initial project showed higher academic grades, fewer discipline problems, better attendance, and a lower dropout rate for the tutors. Students being tutored also showed increased academic progress (Supik, 1991).
- *Study Buddy Program*: Paired student in the fourth through sixth grades work together several times a week on academics and problem-solving skills. Teachers are available for consultation. Results from initial project showed increased test scores and social skills (Cowen, Hightower, Pedro-Carroll, & Work, 1989).

The dropout prevention programs reviewed here are neither an extensive list of programs nor necessarily the best programs available. They are simply a sample of programs available. Unfortunately, the outcomes of most existing programs are not very encouraging. What is needed is more research and evaluation of new and existing dropout prevention programs to determine and disseminate best research-based practices (Bridgeland et al., 2006).

Using Longitudinal Student Data to Build an Early Warning System

Since dropping out of school is a “slow process of disengagement,” there may be time for educators to intervene in the process and offer more support to struggling students if identified early (Bridgeland et al., 2006, p. 15). Within the last ten years, the practice of systematically gathering longitudinal, student-level data covering a variety of indicators (referred to as risk factors, early-warning data, or on-track measures) in order to generate accurate graduate/dropout data and to determine early warning risk factors has become quite popular (Bridgeland et al.; Curran & Reyna, 2009; Heppen & Therriault, 2008; HGSE, 2001; Jerald, 2006; Lan & Lanthier, 2003; Legters, 2008; National High School Center, 2007). Longitudinal data (information collected over time) can help school officials and researchers see the “gradual and continuous process” and the “chain of negative changes” a student goes through before dropping out (Lan & Lanthier, pp. 314 & 315). Jerald contends that “While there is no single pathway that every dropout follows, there are common patterns, common crisis spots in the pipeline, and common signposts” (p. 15). With longitudinal student data, educators can also assess various risk factors more accurately. According to the National High School Center, longitudinal data systems are “widely recognized by states as the best tool for tracking not only dropout and graduation information, but to gage individual student academic progress as well” (p. 5). Better data will allow educators and policymakers to plan and implement cost-effective programs that more effectively meets the specific needs of at-risk students.

Building an Early Warning System

The first step in collecting longitudinal student-level data is to develop unique statewide student indicators to connect student data over the years. Then a database or data warehouse can be built and other student data added. Students can be individually tracked from elementary school, through middle school, and on to high school graduation. Data should follow individual students as they transfer in and out of schools, so they do not get lost in the system. Programs such as the *NGA Center for Best Practices*, the *American Recovery and Reinvestment Act* (commonly referred to as “stimulus dollars”), and the *Data Quality Campaign* are helping states build their own integrated, longitudinal student databases (Curran & Reyna, 2009; Heppen & Therriault, 2008).

Longitudinal student databases are made up of accessible data routinely collected by schools. Effective databases may include the following information (or appropriate variations) for each student (Heppen & Therriault, 2008; Jerald, 2009):

- Unique student identifier to track individual students
- Demographic information such as race/ethnicity, gender, SES (determined by free/reduced lunch eligibility), special education status, and ELL status
- School attendance percentages
- Enrollment information such as number of schools attended, number of times held back, and graduation/dropout status
- Years over typical age for grade

- Transcript information such as grades in Reading/English and Math, number of courses failed, credits at the end of the ninth grade, on-time promotion from the ninth to tenth grade, and Grade Point Average (GPA)
- Standardized test scores in Reading/English and Math
- Discipline information such as behavior grades, suspensions/expulsions, and office referrals

According to Jerald, collecting and analyzing such data “makes it possible to observe what happens to students who develop risk factors at any point along the way” (p. 9).

Simply knowing which indicators or risk factors have value is the first step. Then analyses must be done to determine at what percent, at what number, or what grade signifies opportunity for effective action. Once accurate student data has been gathered, analyses can be done to determine the significance of different indicators or risk factors common to that local school context using the following variables (Heppen & Therriault, 2008; Jerald, 2006):

1. Percentage of students with each risk factor who dropped out
2. Percentage of students with each risk factor who graduated
3. Percentage of students without each risk factor who dropped out
4. Percentage of students without each risk factor who graduated

Items #1 and #4 represent the predictive value of the risk factors. These are potential indicators and can help predict who will drop out in the future and should be considered for inclusion in a school or district’s early warning system. Factors with high values for items #2 (false positives) and #3 (false negatives) should not be included in an early

warning system. Once false positive and false negative variables are removed, the percentage outcomes by potential indicators can be examined: What percentage of students with each risk factor ended up dropping out? In Balfanz and Herzog's study (2006), the high-yield indicators were defined as 75% or greater (in other words, 75% of students with this risk factor did not graduate). With a plethora of data, researchers can then explore and analyze different combinations of risk factors or indicators as well.

From a long list of potential indicators, a smaller list of high-yield risk factors or indicators can be developed for that particular school context. These high-yield indicators are the basis of building an effective early warning system to look for patterns, identify school climate issues, and help identify and predict with high probability which students are more likely to graduate and which are on the path to dropping out (Bridgeland et al., 2006). Of course a risk factor (or combination of risk factors) is not a true predictor of whether a student will drop out, but rather a measure of the likelihood that a student will drop out. An early warning system can also trigger the necessary early attention and support some potential dropouts might need before they drop out. Longitudinal data and an early warning system can help educators be proactive and determine the best time and methods of intervention. An early warning system can provide names of students in need of dropout interventions as well as the most effective type of intervention needed: if a student is flagged for just one indicator (failure in Math), then academic intervention in that area may be all that is needed. Other students may have become disengaged from school; for these students, the underlying problem may need to be addressed. Data can also be disaggregated to determine how different student subgroups are faring and better

target intervention efforts for them. One important element of effective dropout prevention efforts is to identify the at-risk student early and then target appropriate, comprehensive dropout resources to these students (Heppen & Therriault, 2008; Legters, 2008; Suh & Suh, 2007). According to Heppen and Therriault “students who are flagged early and tracked closely may stay in school with the right support” (p. 10).

To build an early warning system and implement effective and efficient dropout prevention strategies, the research component must come first (Jerald, 2009). Because of cost and time, some school district are tempted to skip this step and simply guess or use generic national risk factors/indicators, but local context does matter; the pathways to dropping out may be different in different school districts across the country (National High School Center, 2007). The research costs of an early warning system is small in comparison to the costs for district-wide interventions to all students; more effective and efficient ways to intervene with at-risk students can save a school system thousands or even millions of dollars. Since local schools have unique needs, an early warning system should be customized to the local school context.

Rather than following a cohort of students for years before having enough longitudinal student data to analyze and build an early warning system, a school or district can start with a “retrospective, longitudinal analysis of their own students’ dropout and graduation patterns” and explore factors associated with whether past students graduated from high school or dropped out (Heppen & Therriault, 2008, p. 8). The goal of this process is to learn as much as possible about a school system’s dropouts. Local schools or districts can then design an early warning system (or sometimes called

an on-track indicator) that most accurately predicts which current and future students are at risk for dropping out and implement the most effective and efficient dropout prevention strategies.

Using the Results of an Early Warning System

Identifying risk factors is just the first step. Then the predictive power of the data needs to be used to guide prevention and intervention strategies throughout schools. Early-warning data can help provide “more effective and efficient use of scarce resources to improve student outcomes” (Alliance for Excellent Education, 2008, p. 3). As Pinkus (2008) concludes “The power of early-warning indicators lies in the willingness and capacity of school leaders and educators to transform insightful data into strategic decision-making that leads to improved student outcomes” (p. 1). There are a variety of ways to provide dropout interventions to students. One effective method uses three stages of tiered dropout interventions (Balfanz & Herzog, 2006; Mac Iver & Mac Iver, 2009). The primary stage is school-wide reform that promotes engaged and relevant learning and is for all students. In this stage, strategies (also called preventive strategies) focus on motivation to succeed, consistent support and attention to students’ progress, and a sense of control for students. For example strategies in this stage could include strong instructional programs, a freshman academy, personalized graduation plans, advisories, close tracking of absences, and teaching and modeling good behaviors. For most students, primary level interventions will be sufficient to prevent dropping out. The secondary stage consists of targeted interventions for small groups of at-risk students (generally about 15-20% of students) who share a particular risk factor or struggle. These

interventions usually address attendance, academic, and behavior issues and could include behavior checklists, alternatives to suspension, anger management groups, attendance check-ins, extra academic assistance, and family involvement. If more than 25-30% of students need secondary or tertiary intervention, then more work is needed at the primary level (Mac Iver & Mac Iver). The tertiary stage consists of intensive interventions: one-on-one tutoring or interventions by specialists in social work, mental health, or some other related area to only 5-10% of students. Alternative strategies can be offered to students who face unique challenges such as being overage for grade (usually from lacking credits). These students may not feel comfortable sitting in a traditional or remedial class of younger students. Strategies for these students could include alternative schools, alternative schedules such as night classes, schools that provide child care, and/or academic/career programs. Putting various tiers of interventions in place requires a “coordinated, integrated and comprehensive” plan for schools (Balfanz & Herzog, slide 39). The tiered stages of dropout intervention strategies suggested look very similar to the strategies used with the *Response to Interventions* (RTI) program used with special education students: students are regularly assessed to determine needs, decisions are data driven, and students’ plans are refined when/if needed.

Recent research done with early warning systems shows that the strongest general indicators of dropping out are poor attendance, course failure, grade retention, and behavior problems, and these factors are often interrelated (Kennelly & Monrad, 2007; Mac Iver & Mac Iver, 2009). According to Robert Balfanz, co-director of the *Everyone Graduates Center* at Johns Hopkins University, “In the high-poverty districts we are

working in we have not found one district where grades, credits, and attendance are not highly predictive” (as cited in Alliance for Excellent Education, 2008. p. 3). Attendance less than 80% is a strong predictor of a student dropping out. Unsatisfactory behavior grades in middle school or suspension in high school is related to dropping out. Failing English or Math in middle school or high school is also related to dropping out (Mac Iver & Mac Iver). In many studies, not being promoted to the tenth grade was a strong predictor of eventually dropping out; most dropouts could be identified by the end of ninth grade (Heppen & Therriault, 2008; Kennelly & Monrad; Mc Iver & Mc Iver; Neild & Balfanz, 2006). In studies by Balfanz and Herzog (2006), sixth grade indicators (poor attendance, failing English or Math, and discipline infractions) could predict at least 50% of potential dropouts. Legters (2008) found in her research that in high-poverty school districts, 75% of eventual dropouts could be identified between the sixth and ninth grades by using an early warning system. These researchers maintain that it is more effective to address problems in the sixth grade than wait until the ninth grade. It is much more difficult to bring students who are off track in the ninth grade back on track to graduation.

In general, the following recommendations may be useful for school systems collecting longitudinal data and building an early warning system (Heppen & Therriault, 2008; Jerald, 2006; Mc Iver & Mc Iver, 2009):

- Create data collection systems that are easy to use
- Monitor data to identify at-risk students
- Support continuous data collection beginning in elementary school (by school, district, and state)

- Train staff on data collection and analyses
- Use an early warning system as a foundational, school-wide practice
- Determine local criteria for who is considered off-track
- Continually improve, monitor, and adjust the predictive power of local indicators (high-yield indicators may change over time; add more information as it becomes available)
- Integrate the early warning system into the school's and district's accountability databases
- Establish appropriate tiered interventions for individual student's needs
- Include information about dropout prevention programs used in the district's early warning system

Early Warning System Examples

In the last ten years, many longitudinal, data-driven, research-based programs and early warning systems have been developed and implemented in schools. In 2003, Lan and Lanthier followed a cohort of eighth to twelfth grade students for four years, examining and comparing these students using nine significant dropout indicators. In a 2007 student cohort study, Suh and Suh began with 180 variables as possible predictors of dropping out. In their analyses, only 16 of these predictors were significantly related to students dropping out. The American School Counselors Association (ASCA) recommends that school counselors identify the risk factors for their students at their schools or districts and tailor dropout prevention interventions to the “unique needs of their student population” (Suh & Suh, p. 9). In other examples, in rural South Carolina, a

graduation coach uses attendance data, standardized test scores, and students retaking classes needed for graduation to identify the students at his high school who are at risk of dropping out and need extra support; he plans to begin using middle school data to identify their at-risk students even earlier (Zehr, 2010, June). A poor school system in Tennessee is using NGA Dropout-Prevention Initiative funds to set up their own early warning system to identify at-risk students (Maxwell, 2010, Jan.). In Arizona, statewide longitudinal student data including transfer data have been collected since the freshman 2000 class (National High School Center, 2007).

To improve high school graduation rates, *America's Promise Alliance* (2010), through their program *Grad Nation* and in consultation with the U.S. Department of Education, will track ten measures that have been proven to predict student success:

- Pre-school enrollment
- Fourth-grade reading scores
- Eighth-grade math and science scores
- Youth service participation
- Health care access
- Adoption of common core standards for college and career readiness
- Successful promotion from ninth grade
- High school graduation
- Minimum two-year post secondary education

Grad Nation also recommends that school systems track school attendance, behavior indicators, and course grades in Math and English (America's Promise Alliance).

Recent research studies in large, urban public school districts in Philadelphia, Pennsylvania and Chicago, Illinois have identified unique powerful indicators to potentially identify students most likely to drop out of school. In Philadelphia, a Collaboration grew from a 2004 grant funded by the Bill & Melinda Gates foundation and the Carnegie Corporation of New York. The first step in 2005 was to examine data from the School District of Philadelphia to better understand their dropout problem. Researchers from Johns Hopkins University and the University of Pennsylvania summarized their results in the report, *Unfulfilled Promise: The Dimensions and Characteristics of Philadelphia's Dropout Crisis*. Based on these results, in 2006 the Collaborative launched *Project U-Turn* (Project U-Turn @ 2.5, 2009). Components of *Project U-Turn* include comprehensive high school reform (including smaller high school units), high-quality alternative education, accelerated high schools, bridge and literacy programs, credit recovery programs, support for teen parents, summer programs, dropout prevention specialists in high dropout high schools, and increased public awareness. One major focus of *Project U-Turn* was following a cohort of students from the sixth to the twelfth grade “to track individual student data for warning signs of dropping out and ensure appropriate and targeted intervention based on the specific indicators” (p. 6). Researchers analyzed over 20 data sources over the years to identify highest-yield early warning indicators. Students with one of these risk factors had a 75% chance of dropping out. Students with a combination of factors (such as failing a core course in ninth grade and not being promoted to the tenth grade) had an even greater chance of not graduating

on time. The key indicators for their early warning system were the following (Nield & Balfanz, 2006):

- Course failure in English or Math in sixth or eighth grade
- Course failure in the ninth grade
- Not promoted (lacking credits) to the tenth grade (biggest risk factor)
- Eighty percent or less attendance in the sixth, eighth, or ninth grade
- Failing grade in behavior in the sixth grade

Project U-Turn findings include the following:

- One half of the dropouts in the Philadelphia public school system can be identified as early as the sixth grade.
- Eighty percent of the dropouts were either at-risk eighth graders or at-risk ninth graders as identified through the indicators: poor attendance and/or course failure.
- Most dropouts left school in the ninth or tenth grade yet were 17 years old or older
- The percentage of students who drop out greatly decreases if a student starts the tenth grade on time.
- In Philadelphia, PA, attendance and course failure were more powerful indicators than gender, race, or standardized test scores.
- It was much more difficult to predict who will drop out of school in the later grades. Since these students are often OA-UC (over aged and under credited), strategies such as credit recovery courses, second chance schools, and alternative paths to graduation might be helpful

In 2006, the *Keeping Students on Track to Graduation/Early Warning Indicators Project* implemented an early warning system and a tiered-response system in two high-poverty middle schools in Philadelphia, PA (Mc Iver & Mc Iver, 2009). The system (a joint effort of the School District of Philadelphia, the Philadelphia Education Fund, and the *Talent Development Program* at Johns Hopkins University) alerts educators as soon as a student begins to exhibit warning signs of being off track towards graduation. Components of the project include data on early warning indicators for each student, bi-weekly meetings of teachers (to discuss students, plan interventions, and discuss follow-up), and extra adults (volunteers, local college students, retired community members, and social service professionals) to assist with one-on-one interventions. The project posted very positive results and along with the generous support of five million dollars from the PepsiCo Foundation led to the 2008 creation of *Diplomas Now* (Diplomas Now, 2010; Everyone Graduates Center, 2009). *Diplomas Now* added two local community partners, *City Year* and *Communities in Schools*, and is an “innovative school turnaround model that unites three experienced nonprofit organizations to work with the nation’s most challenged middle and high schools to deliver the right interventions to the right students at the right time” (Diplomas Now). The model is based on research by Johns Hopkins University’s Center for Social Organization of Schools and the Philadelphia Education Fund and proposes that by using an early warning system, up to 75% of dropouts can be identified between sixth and ninth grade by the presence of one (or more) of three different indicators: poor attendance, poor behavior, and failure in English or Math. *Diplomas Now* works with teachers and administrators to identify off-track students and

develop comprehensive, customized strategies to get these students back on track.

Diplomas Now is currently operating in Philadelphia, Chicago, Los Angeles, New Orleans, and San Antonio.

The Chicago Public School System (CPS) graduation rate for students who were freshman in 2000 was 54% (Allensworth & Easton, 2005). In 1999, the *Consortium on Chicago School Research* began work on a statistical indicator to gauge whether students, in their first year of high school, were on-track or off-track to graduate on time in four years. It is important to note that being on-track is a “baseline indicator of acceptable, though not necessarily strong, school performance” (Allensworth & Easton, p. 3). Using a longitudinal database, the Consortium tracked every public school student in CPS. After analyzing student data, the Consortium introduced in 2005 an on-track indicator for their local school system. The two most significant indicators for on-time graduation were earning five credits during the freshman year (number needed to be promoted to the tenth grade) and have no more than one semester F (one-half credit) in a core academic class. In the 2003-2004 CPS first-time freshman cohort, approximately 60% of students were on-track by the end of their freshman year (CPS on-track rates varied from 30% to 90% among schools) (Allensworth & Easton). Excluded from analyses were students who were not first-time freshmen, students attending charter school, alternative schools, or special education schools, and students in jail. Students who were on-track by the end of their freshman year were three and one-half times more likely to graduate than off-track students: Eighty-one percent of on-track freshmen graduated in four years compared to 22% of off-track freshmen. The researchers also discovered that the on-track indicator

was a much better predictor of graduation than eighth grade standardized test scores, elementary achievement, race/ethnicity, and SES. Possibly the on-track indicator was “capturing valuable non-academic skills such as the willingness to complete tasks and work with others” (Allensworth & Easton, p. 20). Even in schools with selective enrollment, the on-track indicator was a good predictor of graduation. A simple categorization of students based on their backgrounds (race/ethnicity, SES, standardized test scores, gender, and family backgrounds) is often used to identify students who are likely to drop out of school. As the Chicago researchers found “It seems more productive to think about individual students who are at high risk of failure, rather than assuming that certain types of students will fail in high school” (Allensworth & Easton, p. 16).

In the research by the *Consortium on Chicago School Research*, there was a strong relationship between number of course F’s and graduation. It is often difficult to makeup early core course failures in order to graduate on time. In the 2003-2004 CPS freshman cohort, 85% of freshmen with no F’s, 70% of freshmen with one semester F, 55% of freshmen with two F’s, and less than 33% of freshman with three or more F’s graduated in four years (Allensworth & Easton, 2005). The relationship between course failures and graduation was similar for all subjects.

In 2007, Allensworth and Easton (researchers for the *Consortium on Chicago School Research*) built on their earlier findings. In addition to failure in core courses and number of credits earned freshman year, they added three additional indicators to their on-track indicator: attendance, overall grade point average (GPA) on a four-point scale,

and failures in all courses. After analyzing data from over 24,000 first-time ninth grade students in the 2004-2005 cohort, the Consortium made the following conclusions:

- Attendance during the ninth grade is directly related to graduation and is also highly predictive of course failure. Researchers found the ninth grade attendance rate to be “eight times more predictive of course failure” than eighth grade standardized test scores (p. 16). The vast majority of freshmen with good attendance were on-track towards graduation.
- There is a strong correlation between GPA and course failure. Of students who failed a ninth grade course, 75% had a GPA less than 2.0. Off-track students had an average GPA of 1.5. Overall, GPA was also a strong predictor of graduation.
- Freshmen students with a few F’s, low grades, or poor attendance may be the students “most amenable to intervention because they are struggling but still making some progress in school” (p. 37).

Using the on-track indicator, Chicago researchers can predict 85% of eventual high school dropouts by the end of the ninth grade (Jerald, 2006). The *Consortium on Chicago School Research* recommends that the following students should be targeted for dropout interventions (Allensworth & Easton):

- A student who is absent more than 10% of school days. (Attendance can be checked and at-risk students identified the first month of ninth grade, even before formal grades have been released.)
- A student with a GPA of 2.0 or lower

- A student with one or more semester F's. (Progress reports can be checked to identify struggling students before the end of the semester.)
- A student earning less than five credits during the freshman year (the number needed for promotion to the tenth grade).

Based on the *Consortium on Chicago School Research*, the National High School Center (2008) has created a MS Excel template for schools to easily track relevant student information (available at <http://www.betterhighschools.org/docs/EWStool.xls>). Freshman student data relating to attendance, number of core courses failed, number of all courses failed, number of credits earned, and GPA are entered into the database, and the system generates a report of all freshman students and their on-track/off-track status in each of the different areas. Ideally, this early warning system is integrated into the school's database system for ease of use. With this report, students can be identified early and appropriate interventions applied efficiently and effectively.

Although educators might be tempted to target all students with academic risk factors, the use of an early-warning system can spotlight exact indicators that are the tipping point for student success. An early warning system also helps educators prioritize among students, structure interventions, and identify accurate goals for the interventions.

In New York City, NY, *New Visions for Public Schools*, an education reform organization that supports 63 public schools, has implemented an on-track/off-track measure, based on the *Consortium for Chicago School Research*, for use in their high schools (2011). The status of all students is described using a color: blue for on-track to college, green for on-track to graduation, yellow for almost on-track to graduation, and

red for off-track to graduation. The color-coded metric is easy for students, educators and parents to use and understand. *New Visions for Public Schools* collects and analyzes student data, determines each student's status (a color), and provides a school-wide report to administrators. Teams in each school (composed of administrators, teachers, and counselors) then design strategies and interventions for targeted groups of at-risk students.

Summary

The accountability systems are changing for public schools in the United States. Since the governors from all 50 states have committed to the implementation of a new adjusted cohort rate, the *National Governors Association Graduation Counts Compact*, to track individual students over their school careers, more accurate and uniform graduation, transfer, and dropout data will be available. The U.S. Department of Education is also improving their accountability measures. By the 2010-2011 school year, all states must use this new NGA Compact rate to report NCLB-required state, district, and school report cards. After the 2011-2012 school year, determination and reporting of AYP data will also be required to use the NGA compact rate. All 50 states are already using or are in the process of building and implementing a longitudinal data system to track individual students over time. By building these longitudinal data systems, more student information can be continually added to the databases. Analyses can also be done on the student data to discover local trends and isolate the most significant high-yield indicators or risk factors of students who may drop out of school. Early identification of at-risk students

can help educators design and implement dropout interventions effectively and efficiently.

In Arizona, school districts have been tracking individual students and collecting statewide longitudinal student data since the freshman 2000 class (National High School Center, 2007). School districts have been accumulating demographic data, special programs data (such as ELL, special education, and free/reduced lunch status), attendance percentages, course grades each year, high school GPA, and standardized test scores. Districts also track when a student began in the district, when he/she left the district, student age at time of graduating or leaving the district, and the assigned withdrawal code for each student. More information can continually be added to the school's database. School districts in Arizona are beginning to have a much clearer picture as to the true graduation rate, transfer rate, and dropout rate as well as information about students in each of these groups. Arizona Governor Jan Brewer recently credited "a new data system for public education" as central to "major changes at the K-12 level with the goal of improving the high school graduation rate" (Fischer, 2011).

CHAPTER 3

METHOD

Participants

Participants in this study were 6,751 high school students (a cohort) from a large school district in southern Arizona. Students in this cohort either graduated from a high school in the district on-time during the 2009-2010 school year, transferred to another school, died, or should have graduated during the 2009-2010 school year but did not graduate for a variety of reasons. Students are included in this cohort regardless of whether they transferred out to another school before graduation or transferred into the district after the beginning of ninth grade. As long as these students began ninth grade in the fall of 2006, were enrolled in the school district for at least one day, and their expected on-time graduation was during the 2009- 2010 school year, they are included in this cohort. Membership in a cohort is a determined by the year a student starts ninth grade for the first time. The vast majority of data analyzed in this study were from students who have already graduated, transferred, or dropped out of school and are no longer enrolled in the district. There are a small percentage of students (4.2%) in the 2009-2010 cohort who are still currently enrolled in 2010-2011 as a fifth year student. According to the 2008 American Community Survey (U.S. Census Bureau), median household income for this school district population is \$37,635 compared to \$51,009 for the state of Arizona.

Variables

Official school data for this study were obtained through the school district's Accountability and Research Department. All student identification information (name, student identification number, and high school name) were deleted and not provided to the researcher. Data were collected from 6,751 students in this cohort. An identification number was assigned to each student. General student demographic data including gender, race, ELL status, special education status, and free/reduced lunch status were also collected for students in this cohort. Race was divided into the five categories used by the school district: White, African American, Hispanic, Native American, and Asian/Pacific Islander. If a student was ever enrolled in the ELL, special education, or the free/reduced lunch program in his/her school career, he/she was coded as being in that program. According to a lead research project manager for the district, many students who are still eligible for the free/reduced lunch program decline to use it in high school (personal communication, 2010).

Student status was also collected. The school district has over 30 withdrawal codes from which to choose when a student graduates or leaves school for any reason. Withdrawal codes for each student in the cohort were provided by the Accountability and Research Department. The greatest percentage of students in this cohort graduated on time, and they are coded as graduates (46.8%). Some students transferred out of the system and enrolled in a private, public, or home school; they are coded as transfers (42.5%). The few students who died during their high school years are coded as dead (0.1%). The remaining students are coded as dropouts (10.6%) and are composed of those

who left school and did not enroll in another school or whose status is unknown, leave to complete their GED, leave to go to vocational school, leave because of illness, pregnancy, suspension, expulsion, or incarceration, or are un-coded. Also included in the dropout category are students who have not completed all high school requirements and are still enrolled in school as fifth-year students, students who received a Certificate of Completion or Attendance, and students who are no longer of school age (over 21 years old for non-special education students).

Other school data were collected for students in this cohort, as available. Yearly attendance percentages for the third grade, sixth grade, and ninth grade were collected from students in this cohort. This percentage is figured as the total days present divided by the total days enrolled. Students in this cohort were in the third grade during the 2000-2001 school year and in the sixth grade during the 2003-2004 school year.

English and Math course grades in the sixth and ninth grades were collected and averaged into a standardized yearly score on a four-point scale (0-4). Some students were given a yearly letter grade. Other students had two semester letter grades or three quarter letter grades. These letter grades were re-coded to numeric grades and then averaged to get a yearly numeric grade for each student. Third grade English and Math grades for this cohort were not available since the district did not start collecting elementary grades until the 2004-2005 school year.

Third grade scores from the *Arizona's Instrument to Measure Standards (AIMS)* were also collected. The AIMS is a standardized, state-mandated, Criterion Referenced Test (CRT) designed to measure the academic achievement (in the areas of Math,

Reading, and English) of all students in Arizona. The AIMS is administered in the third, fifth, and eighth grades and in high school. The possible scores are 1: Falls Far Below the Standard, 2: Approaches the Standard, 3: Meets the Standard, 4: Exceeds the Standard. In this particular school district, scores of 1 or 2 are considered to be failing. Less than 1% of AIMS scores were deleted from analysis because these students took off-level tests.

Scores from the *TerraNova*, a standardized test given to this cohort in the ninth grade were also collected. *TerraNova* is a national norm-referenced test that measures how well Arizona students score in comparison to their peers nationwide in the areas of Reading, Language, and Math. Scores are provided in several different forms, but for the purpose of this analysis, a student's stanine score (1-9) was used. According to Kubiszyn and Borich (2007, p. 359) "stanines are ranges or bands within which fixed percentages of scores fall. They are determined by dividing the normal curve into nine portions, each being one-half standard deviation wide."

The number of schools each student attended was also collected. The minimum number would be three: an elementary school, middle school, and high school (or possibly two if student attended a K-8 school and then high school).

A student's GPA (on a four-point scale) at time of graduating or withdrawing from the system was also collected. Students' grade point averages ranged from 0.0 to 4.33 (In some schools, quality points ranging from 0.5-1.0 were added to the numeric course grade for Honors and/or Advanced Placement courses).

Procedures

Chi-Square Tests for Independence

After general demographic data were acquired for the graduates and dropouts, Chi-square tests for independence were used to determine whether categorical variables were significantly related to each other. Analyses were performed between the variables of gender, ethnicity, ELL status, special education status, and free/reduced lunch status with the categorical variable of student status (graduates or dropouts). Effect sizes, using phi coefficient and Cramer's V , were figured for all analyses to determine the strength of association between groups. Since the ethnicity variable had five categories (White, Black, Hispanic, Native American, and Asian), expected counts and reported counts in each category were analyzed to determine if and in which ethnicity category major differences occurred.

Independent-Samples t -Tests

Next, independent-samples t -tests were used to compare the mean scores of two different groups of people. The independent variable (student status) was categorical (graduates and dropouts). The dependent variables were continuous and included attendance percentages for third, sixth, and ninth grades, English and Math course grades in sixth and ninth grades, AIMS scores (in Math, Reading and Writing), *TerraNova* scores (in Math, Reading, and Language), high school GPA, and number of schools attended. Effect sizes, using η^2 and Cohen's d , were calculated to measure the magnitude of the group differences. η^2 can range from 0 to 1 and when multiplied by 100, represents the percent of variance in the dependent variables that is

explained by the independent variable (graduate or dropout). Cohen (1988) recommends the following guidelines for interpreting the values:

- .01 = small effect
- .06 = moderate effect
- .14 = large effect

Correlations: Pearson Product-Moment Coefficient

Correlation analyses were also run to describe the direction and strength of the linear relationships between variables. Pearson product-moment coefficient is usually used with interval data. Pearson correlation coefficients (r) can range from -1 to 1. The closer the value to -1 or to 1, the stronger the relationship between variables. The negative sign does not indicate strength, only direction. Cohen (1988) recommends the following guidelines for interpreting the value strength:

- Small $r = .10$ to $.29$
- Medium $r = .30$ to $.49$
- Large $r = .50$ to 1.0

When the r value of the correlation is squared, the new r^2 is called the *coefficient of determination* and measures the proportion of variability in one variable that can be determined from the relationship with the other variable (Gravetter & Wallnau, 2007).

While the most commonly used correlation is the Pearson correlation, special correlations were used for variables with specific characteristics. The *point-biserial correlation* was used when one of the two variables was dichotomous. The *phi-coefficient*

was used when both variables were dichotomous. Then the regular Pearson formula was applied to both of these special correlations.

Variables involved in the Pearson product-moment correlations include the following continuous data: GPA; Math and English course grades in sixth and ninth grades; Attendance in third, sixth and ninth grades; AIM scores in the areas of Math, Reading, and Writing; and *TerraNova* scores in the areas of Math, Reading, and Language. The following dichotomous variables were also included in the correlation analysis: ELL status, special education (SP-ED) status, free/reduced lunch (Lunch) status, and student status (graduate or dropout).

Dropout Percentages at Different Variable Critical Values

Next, analyses were performed to determine percentages of dropouts and percentages of graduates in different variables and at different critical values or cut-points. For example, consider the variable of GPA. Choosing a critical value of < 2.0 , what percentage of dropouts had a GPA of < 2.0 , and what percentage of graduates had a GPA of < 2.0 ? Balfanz and Herzog's research (2006) defined high-yield indicators as 75% or greater (75% of students with that risk factor did not graduate). To determine these group percentages, first data from the following variables were re-coded into new variables representing different critical values: GPA, attendance (in third, sixth, and ninth grades), English course grades (in sixth and ninth grades), Math course grades (in sixth and ninth grades), AIMS scores (in Math, Reading, and English), and *TerraNova* scores (in Math, Reading, and Language). Then crosstabs frequency analyses were performed to

discover different percentages in the two groups: graduates and dropouts. Some variables reached the 75% critical value, while others did not.

Statistical Characteristics of the Dropout Group

These analyses were just concerned with the group of students labeled as *dropouts* (10.6% of the total cohort). Using available ninth grade predictor variables, analyses were performed to determine percentages of dropouts with different variables as well as combinations of variables and their predictive values. For example: What percentage of dropouts failed ninth grade Math or ninth grade English? What percentage of dropouts had a GPA of ≤ 2.0 ? What percentage of dropouts failed ninth grade Math or failed ninth grade English or had a GPA of ≤ 2.0 ? Ninth grade predictor variables used in these analyses were:

- GPA ≤ 2.0
- *TerraNova* scores of 1 and 2 in Math, Reading, and Language
- Attendance $\leq 80\%$
- Attendance $\leq 85\%$
- Failed ninth grade Math (yearly average)
- Failed ninth grade English (yearly average)
- Failed ninth grade Math or ninth grade English
- Yearly course grade of $\leq D$ (1.0) in ninth grade Math or ninth grade English
- Failed ninth grade Math or failed ninth grade English or GPA ≤ 2.0 or Attendance $\leq 80\%$

- Failed ninth grade Math or failed ninth grade English or $\text{GPA} \leq 2.0$ or Attendance $\leq 85\%$

Logistic Regression Analysis

Multiple regression analysis was not a suitable analysis because the dependent variable was categorical (student status: graduate or dropout). Instead, logistic regression was used to assess the impact of a set of predictor variables on a categorical dependent variable. Four high-yield indicators (GPA, ninth grade Math, and ninth grade English, ninth grade attendance) were combined in a logistic regression analysis to assess their ability to predict dropouts. Logistic regression analyzes just those cases with complete data sets. Because of missing data in many student variables, it would have been difficult to include too many additional variables; percentages of cases with complete data sets would have been very low. These four variables had shown very good predictive ability in other analyses. First, analysis was done to rule out multicollinearity, or high intercorrelations among the predictor (independent) variables. Logistic regression results informed us of the significance level of the total model, the “goodness of fit” of the model, the percentage of variability explained by this set of variables, the significance level of each variable in the model, and the odds ratio (or effect size) for each variable (predictability of each individual variable).

Summary

The purpose of this study was to determine the dropout risk factors most likely to predict students dropping out of school in a large school district in southern Arizona and to build an early warning data system based on these findings in order to help shape and

efficiently plan for future dropout interventions. Research suggests that early warning systems must be built on local school system data. Analyzing retrospective, longitudinal student data for this particular school district will allow educators to better predict and identify potential dropouts and intervene appropriately. The following research questions and hypotheses were proposed for this study.

Research Questions and Hypotheses

Question 1. Do statistically significant differences exist between high school graduates and dropouts in the following areas: gender, race, ELL status, special education status, free/reduced lunch status, attendance percentages in the third, sixth and ninth grades, English and Math course grades in the sixth and ninth grades, standardized test scores in the third and ninth grades, number of schools attended for each student, and high school GPA?

Hypothesis 1. Based on recent research, there will be statistically significant differences between high school graduates and dropouts on the above mentioned variables.

Question 2. If statistically significant differences do exist between high school graduates and dropouts in the areas analyzed, which variables are the most significant predictors for use in an early warning system?

Hypothesis 2. Based on recent research, the most statistically significant differences between high school graduates and dropouts will be in the areas of ninth grade attendance, ninth grade Math course grade, and ninth grade English course grade.

Findings from these research questions will enable local educators to build an effective early warning system to identify potential high school dropouts and intervene more effectively and efficiently in this school district. Analyses reported in Chapter 4 (Results) will enable a better understanding of the highest-yield risk factors for this particular school community and will inform other districts who may wish to consider the same predictors for dropouts.

CHAPTER 4

RESULTS

In the present cohort, when a student graduated or left the school district for whatever reason, he/she was assigned a withdrawal code. The district has over 30 withdrawal codes from which to choose. Using the guidelines of the new *NGA Compact*, for this current study, the students with different withdrawal codes were divided up into four subgroups: graduates, transfers, dead, and dropouts. Table 1 depicts the total number of students in each subgroup, total students, and percentages for each subgroup. Graduates made up the largest percentage of students (46.8%). Students who transferred out of the system and enrolled in private, public, or home school were coded as transfers (42.5%). Several students in this cohort died and were coded as dead (0.1%). The remaining students were coded as dropouts (10.6%) and are composed of those students who leave school and do not enroll in another school or whose status is unknown, leave to complete their GED, leave to go to vocational school, leave because of illness, pregnancy, suspension, expulsion, or incarceration, or are un-coded. The dropout category also includes students who are still enrolled as fifth-year students, those who have received a Certificate of Completion or Certificate of Attendance, and students who are not longer of school age (over 21 years old for non-special education students). For the purposes of this study, most of the analyses will examine just the graduates and dropouts subgroups.

Table 1

Cohort Student Status

Student Status	<i>N</i>	% of Students
Graduates	3157	46.8
Transfers	2870	42.5
Dead	8	0.1
Dropouts	716	10.6
Total	6751	100

Table 2

Demographic Variables of Graduates and Dropouts

Demographic Variables	% of Total Graduates & Dropouts	% of Graduates	% of Dropouts
Gender			
Female	50.8	52.0	45.7
Male	49.2	48.0	54.3
Ethnicity			
White	37.5	39.9	26.5
African American	7.8	7.7	8.2
Hispanic	48.0	46.0	57.0
Native American	3.2	2.4	6.6
Asian/Pacific Islander	3.6	4.0	1.7
ELL Status			
No	77.6	78.9	71.6
Yes	22.4	21.1	28.4
Special Education Status			
No	83.1	85.5	72.8
Yes	16.9	14.5	27.2
Free/Reduced Lunch Status			
No	41.9	45.5	26.0
Yes	58.1	54.5	74.0

General student demographic data were collected for this cohort including gender, race, ELL status, special education status, and free/reduced lunch status. In Table 2, demographic variables are listed by percentages of total graduates and dropouts and then broken down into percentages of graduates and percentages of dropouts.

Chi-Square Tests for Independence

Next, chi-square tests for independence were performed to determine whether categorical demographic variables (gender, ELL status, special education status, free/reduced lunch status, ethnicity) were significantly related to the student status variable: graduate or dropout. There were no missing data in any of the five demographic variables. A chi-square test for independence (with Yates Continuity Correction for 2 by 2 tables) indicated significant associations between student status (graduates and dropouts) and the following:

- Gender, $\chi^2 (1, n = 3873) = 9.14, p = .003, \text{phi} = .05$
- ELL Status, $\chi^2 (1, n = 3873) = 17.24, p < .001, \text{phi} = .07$
- Special Education Status, $\chi^2 (1, n = 3873) = 66.12, p < .001, \text{phi} = .13$
- Free/Reduced Lunch Status, $\chi^2 (1, n = 3873) = 90.74, p < .001, \text{phi} = .15$
- Ethnicity, $\chi^2 (4, n = 3873) = 82.82, p < .001, V = .15$

The associations were all statistically significant, and the effect sizes using phi coefficient and Cramer's V were all considered to be small. Since the ethnicity variable had five categories (White, Black, Hispanic, Native American, and Asian), expected counts and reported counts in each category (depicted by the chi-square test for independence results) were reviewed to determine where the greatest discrepancies existed between

expected and reported counts. In the *graduates* subgroup, the actual counts were greater than the expected counts for the White and Asian ethnicities. In the *dropouts* subgroup, the actual counts were greater than the expected counts for the Hispanic and Native American ethnicities. For the Black ethnicity category, the actual and expected counts were very similar in both graduate and dropout subgroups. Significantly more dropouts were male than female, Hispanic or Native American than White or Asian, special education than non-special education, ELL than non-ELL, and free/reduced lunch than non-free/reduced lunch. Complete details are displayed in Table 3.

Table 3

Student Status and Ethnicity: Expected Counts versus Reported Counts

	White	Black	Hispanic	Native American	Asian
<u>Graduates</u>					
Expected	1183	245	1515	101	113
Actual	1261	242	1451	77	126
<u>Dropouts</u>					
Expected	268	56	344	23	26
Actual	190	59	408	47	12

Independent-Samples *t*-Tests

Independent-samples *t*-tests were conducted to compare the mean differences by the independent variable: student status (graduates and dropouts) on the academic dependent variables (GPA, attendance percentages in the third, sixth, and ninth grades, Math and English course grades in the sixth and ninth grades, AIMS scores in third grade, *TerraNova* scores in ninth grade, and school count). In some variables, equal

variances were assumed for the analyses: sixth grade Math, ninth grade English, AIMS Math-3, *TerraNova* (in the areas of Math, Reading, and Language). In the remaining variables, equal variances were not assumed for these analyses (based on the independent-samples *t*-tests results).

The sample sizes varied across all variables because of missing data. The decision was made to *exclude cases pairwise*, which means that cases (or persons) were excluded only if they were missing data required for that specific analysis. These cases (or persons) were included in analyses for which they had the required information. Missing data ranged from a low of 19.2% for GPA to an unexplained high of 88.5% for sixth grade English course grades. (The next highest variable was 58.5% for third grade AIMS Reading.) The extent and nature of missing data should be reported in all research, as well as the procedures used to handle missing data. In this study, some data were missing because of the likelihood that many of these students were at other schools in the third and sixth grades. When a student enters this school district, their district data begin at that point; any previous data (before they enrolled in the school district) are “missing” from the database. Some data may be missing because a student was absent on the particular day that a standardized test was given and did not make up that portion of the test. Also, in a large school district, there are many different people with varying skill levels inputting data at many different times and given different instructions. There may not be a system in place to determine if data were not entered for a particular school for some reason. Other missing data are unexplained. For some reason, there is a large percentage (88.5%) of missing course grades in sixth grade English. The researcher made the

decision to retain this variable in analysis (exclude cases pairwise) since results of a variety of analyses did not show any extraneous findings; the results with this variable (with a high percentage of missing data) were compatible with similar variables. Missing data will be discussed in further detail in Chapter 5 (Discussion). Table 4 shows the percentages of missing data for all dependent variables in this study.

Table 4

Missing Data: Percentages for all Students

Dependent Variable	Missing Data Percentage
GPA	19.2
Attendance – 3	43.1
Attendance – 6	36.9
Attendance – 9	20.7
Math – 6	44.8
Math – 9	32.9
English – 6	88.5
English – 9	34.0
AIMS-Math – 3	57.7
AIMS-Reading – 3	57.5
AIMS-Writing – 3	58.5
<i>TerraNova</i> -Math – 9	36.9
<i>TerraNova</i> -Reading – 9	37.0
<i>TerraNova</i> -Language – 9	37.1

Table 5 shows the results of the independent-samples *t*-tests analyses. In all comparisons, there were statistically significant differences by student status (graduate or dropout) on all dependent variables, $p < .001$ (2-tailed). The means, standard deviations, and *N* are shown for both groups. The *t* value, significance value (*p*), mean difference, and the 95% confidence intervals (upper and lower levels) of the mean differences are

also depicted in Table 5. To determine the magnitude of the group differences, Cohen's d was used to determine the effect sizes for each group comparison. According to Cohen (1988), .01 = small effect, .06 = moderate effect, and .14 = large effect. Three of the independent-samples t -tests reached the large effect level (as denoted in bold type in Table 5): English – ninth grade (.18), Math – ninth grade (.17), and GPA (.16). Moderate effects were seen in the variables of Math – sixth grade (.12), *TerraNova* – Math (.09), *TerraNova* – Language (.08), *TerraNova* – Reading (.07), English – sixth grade (.07), Attendance – ninth grade (.06), and AIMS – Math (.06). Small effects were seen in the areas of AIMS – Reading (.05), AIMS – Writing (.04), Attendance – sixth grade (.03), Attendance – third grade (.03), with the smallest effect seen in School Count (.02).

Table 5

Independent-Samples t-Tests

Variables	Grad. <i>M</i>	Grad. <i>SD</i>	D.O. <i>M</i>	D.O. <i>SD</i>	<i>N</i> Grad:DO	<i>t</i>	<i>p</i> <	Mean Diff.	95% CL Lower	95% CL Upper	Cohens <i>D</i>
GPA	2.98	0.78	1.74	1.02	3108:525	26.47	.001	1.23	1.14	1.32	.16
Attend. %											
3	95.18	0.04	92.25	0.07	1976:416	8.05	.001	0.03	0.02	0.04	.03
6	94.67	0.05	90.64	0.08	2212:441	10.25	.001	0.04	0.03	0.05	.03
9	96.63	0.04	89.15	0.11	2770:514	15.61	.001	0.07	0.06	0.08	.06
Math											
6	2.84	1.05	1.73	1.10	2012:333	17.80	.001	1.11	0.99	1.23	.12
9	2.31	1.20	0.86	1.05	2584:360	24.12	.001	1.45	1.33	1.57	.17
English											
6	3.26	1.00	2.29	1.21	427:65	6.10	.001	0.97	0.65	1.28	.07
9	2.61	1.08	1.13	1.08	2494:380	24.89	.001	1.48	1.36	1.59	.18
AIMS-3											
Math	2.77	0.96	2.05	0.95	1591:242	10.93	.001	0.72	0.59	0.85	.06
Reading	2.99	0.90	2.37	0.95	1591:233	9.42	.001	0.62	0.50	0.76	.05
Writing	2.92	0.80	2.30	0.96	1566:225	9.21	.001	0.62	0.49	0.75	.04
TerraNova-9											
Math	5.29	1.79	3.52	1.68	2645:332	17.04	.001	1.76	1.56	1.97	.09
Reading	5.46	1.80	3.87	1.80	2633:333	15.28	.001	1.59	1.39	1.80	.07
Lang.	5.39	1.84	3.66	1.70	2633:333	16.27	.001	1.73	1.52	1.93	.08
School Cnt.	3.63	1.74	4.50	2.44	3157:716	-9.01	.001	-0.87	-1.06	-0.68	.02

Note. Cohen's *D*: 0.01 =small effect; 0.06 =moderate effect; **0.14** =large effect

Correlations: Pearson Product-Moment Coefficient

Next, the relationships among variables were investigated using the Pearson product-moment correlation coefficient. Pearson product-moment coefficient is usually used with continuous or interval data. Pearson correlation coefficients (r) can range from -1 to 1; the closer the value to -1 or to 1, the stronger the relationship between variables. When the r value of the correlation is squared, the new r^2 is called the *coefficient of determination* and measures the proportion of variability in one variable that can be determined from the relationship with the other variable (Gravetter & Wallnau, 2007).

While the most commonly used correlation is the Pearson correlation, special correlations were used with variables with specific characteristics. The *point-biserial correlation* was used when one of the two variables is dichotomous. The *phi-coefficient* was used when both variables are dichotomous. Then the regular Pearson formula was applied to both of these special correlations.

Correlation analyses were performed between the following continuous variables: GPA; Math course grades in sixth and ninth grades; English (Engl.) course grades in sixth and ninth grades; Attendance (Att.) in third, sixth and ninth grades; AIMS scores in the areas of Math, Reading, and Writing; and *TerraNova* (TN) scores in the areas of Math, Reading, and Language, ELL status, special education (SPD) status, free/reduced lunch (Lun) status, and student status (Stat): graduate or dropout. Many of the correlation coefficients for the dichotomous variables were negative values because the variables of ELL status, special education status, and free/reduced lunch status were all coded with a “0” if the student had *never* been in that program and “1” if he/she was or had ever been

in that program. Student status was coded with a “1” for graduate and a “4” for dropout.

Table 6 depicts the Pearson product-moment coefficient (r) for all variables analyzed.

All correlations were statistically significant, $p < .001$ (2-tailed) except for ELL status with the following variables: attendance in third grade, sixth grade, and ninth grade and sixth grade English. Table 6 also denotes the large correlations ($r = .50-1.0$) by displaying these values in bold type. The highest correlations were seen between

- All three areas of the *TerraNova* test: Language and Reading (.85), Language and Math (.74), and Reading and Math (.73)
- GPA and English – 9th grade (.79)
- GPA and Math – 9th grade (.76)
- Math – 9th grade and English – 9th grade (.73)

One important point to consider when viewing results of a correlation analysis is the possibility of multicollinearity. Predictor variables should relate strongly to the dependent variable and less strongly to each other. When variables have correlations of .8 or .9, they may be measuring the same thing and providing redundant information, a sign of multicollinearity. Several of these high correlation coefficients may point to multicollinearity among similar variables.

Since the overarching emphasis of this study was to determine the highest-yield variables related to student status (dropout or graduate), analyses of variables most highly correlated to student status and their relationship strength was an important result to take into account. The three highest variables related to student status were GPA (-.47), Attendance – 9th grade (-.43), and ninth grade English (-.42), all medium correlations.

Table 6

Correlation Analyses

Var.	GPA	Math 6 th	Math 9 th	Eng. 6 th	Eng. 9 th	Att. 3 rd	Att. 6 th	Att. 9 th	AIMS Math	AIMS Read	AIMS Write	TN Ma	TN Re	TN Lang	ELL	SPD	Lun	Stat				
GPA	1	.55	.76	.47	.79	.21	.28	.48	.43	.40	.38	.55	.53	.54	-.17	-.08	-.30	-.47				
Math-6		1	.52	.58	.50	.19	.30	.29	.45	.40	.41	.53	.47	.49	-.13	-.15	-.28	-.35				
Math-9			1	.41	.73	.18	.20	.38	.42	.35	.33	.59	.47	.49	-.14	-.06	-.30	-.37				
Engl.-6				1	.39	.16	.36	.30	.27	.28	.31	.35	.36	.38	-.06•	-.18	-.22	-.30				
Engl.-9					1	.18	.23	.44	.37	.35	.33	.45	.47	.47	-.09	-.06	-.28	-.42				
Att.-3						1	.50	.28	.18	.15	.14	.16	.12	.15	-.03•	-.06	-.15	-.22				
Att.-6								1	.41	.19	.16	.19	.17	.18	-.02•	-.15	-.19	-.26				
Att.-9									1	.24	.22	.23	.26	.25	-.01•	-.10	-.20	-.43				
AIMS-M										1	.70	.67	.59	.59	-.16	-.28	-.33	-.25				
AIMS-R												1	.73	.57	.61	.60	-.18	-.28	-.29	-.22		
AIMS-W														1	.52	.57	.55	-.14	-.32	-.25	-.24	
TN-M															1	.73	.74	-.26	-.29	-.37	-.30	
TN-R																1	.85	-.32	-.29	-.37	-.27	
TN-L																	1	-.28	-.30	-.36	-.29	
ELL																		1	-.03	.31	.07	
SPD																			1	.10	.13	
Lunch																				1	.15	
Status																					1	

Note. All correlations are significant, $p < .001$ (2-tailed), except as designated by •
 (.50-1.0) = large correlations; (.30-.49) = medium correlations; (.10-.29) = small correlations

Dropout Percentages at Different Variable Critical Values

Using the recommendations of Balfanz and Herzog (2006), individual variables were manipulated to discover which variables reached 75% and at what critical values or cut-points. A cut-point of 75% means that 75% of these students with that individual variable did not graduate on time and were labeled as dropouts. The two variables of “high school GPA < 1.4” and “ninth grade attendance < 82%” both reached (or exceeded) the 75% critical value. Seventy-five percent of all students in this cohort with < 82% attendance in ninth grade and 75.5 % of students with a high school GPA < 1.4 did not graduate on time and were labeled as dropouts. See Table 7 for variables, critical values, *N*, percentages of students who dropped out at these critical values, and percentages of students who did graduate at these critical values.

Table 7

Critical Value at 75%

	Critical Value	<i>N</i>	% Who Dropped Out	% Who Graduated
Attendance 9 th grade	< 82%	3283	75.0	25.0
GPA	< 1.4	3629	75.5	24.5

Since there were so many variables that approached the 75% cut-point, results were also gathered for the individual variables with critical values between 50% and 74%; between 50-75% of students at this critical value did not graduate on time. In this category were the following variables: third grade attendance of less than 80%, sixth

grade attendance of less than 80%, ninth grade attendance of less than 90%, ninth grade English course grade of less than 1.0, and ninth grade math course grade of less than 0.5. While these variable critical values did not reach the 75% level, they are important to consider when identifying possible dropouts and planning interventions. See Table 8 for all critical values, *N*, percentage of students who dropped out at these critical values, and percentage of students who graduated at these critical values.

Table 8

Critical Values at 50% - 74%

	Critical Value	<i>N</i>	% Who Dropped Out	% Who Graduated
Attendance 3 rd Grade	< 70%	2392	66.7	33.3
	< 80%		57.1	42.0
Attendance 6 th Grade	< 60%	2653	71.4	28.6
	< 80%		57.5	42.5
Attendance 9 th grade	< 85%	3283	68.8	31.2
	< 90%		57.8	42.2
Math 9 th Grade	< 0.5	2944	51.1	48.9
English 9 th Grade	< 0.5	2874	64.8	35.2
	< 1.0		56.4	43.6

Statistical Characteristics of the Dropout Group

Analyses were performed on the students labeled as *dropouts* (10.6% of the total cohort) to examine which ninth grade predictor variables and combinations of predictor variables best identified these students. Based on earlier results in this study as well as

recent research in this field (Allensworth & Easton, 2007; Mac Iver & Mac Iver, 2009; Nield & Balfanz, 2006), ninth grade predictor variables chosen for these analyses were: $GPA \leq 2.0$; ninth grade attendance $\leq 80\%$ and $\leq 85\%$; failing ninth grade Math; failing ninth grade English; a D (1.0) or lower in ninth grade Math; a D (1.0) or lower in ninth grade English; and *TerraNova* scores of 1 and 2 in Math, Reading, and Language. Percentages of individual variables were figured as well as percentages for combinations of variables. As shown in Table 9, individual variable percentages range from 10% to 69%, but increased when combined together (50%-87%).

The standardized tests given to this cohort of students in the ninth grade, *TerraNova*, yielded low individual predictive values (10-14%). This result is compatible with recent research in the field suggesting that standardized test scores do not predict students dropping out of school as well as course grades, attendance, and GPA (Allensworth & Easton, 2005; Nield & Balfanz, 2006). Because of their low predictability, *TerraNova* scores were not used in the combinations of predictive variables in Table 10.

In these analyses, ninth grade attendance alone (at the 80% and 85% levels) was not as significant a predictor of dropping out as course grades and overall GPA. For the analysis of ninth grade English and Math grades, two grade points were analyzed: failure for the entire year (0.0 yearly average) and a D (1.0) or lower for the entire year. This decision was made to capture those students who may have failed one semester (one-half unit) of Math or English but passed the other semester. While these students may not have failed for the entire year, they were still at a major disadvantage: they had to make

up a semester of a required core course before moving on to the next sequential Math or English course. Making up just one semester (one-half unit) of a core course may be done in summer school or in an extra “catch-up” course (if offered) but it is often difficult to do. Some courses (especially in Math) must be taken sequentially and cannot be taken simultaneously (Algebra IA and Algebra IB, for example).

Logistic Regression Analysis

Because of a categorical dependent variable (student status: graduate or dropout), multiple regression was not a suitable analysis. After ruling out any problems of multicollinearity between variables (through multiple regression techniques), a direct logistic regression was performed to assess the impact of four high school factors on the likelihood that students would drop out of high school. The model contained four independent variables (GPA, ninth grade math grade, and ninth grade English grade, ninth grade attendance). A test of the full model containing all four predictors against a constant-only model was statistically significant, $\chi^2(4, N = 2753) = 759.04, p < .001$, indicating that the model was able to distinguish between dropouts and graduates. The model as a whole explained 47.5% (Nagelkerke R squared) of the variance in student status and correctly classified 91.9% of cases. As shown in Table 9, all four of the independent variables made a unique statistically significant contribution to the model. First, the B values should be checked to determine if they are positive or negative. In these analyses, negative B values indicate that an increase in the independent variable will result in a decreased probability of a student becoming a dropout. In logistic regression, the odds ratio, $\text{Exp}(B)$, is interpretable as an effect size; the closer the odds

ratio is to 1, the smaller the effect. The ninth grade Math grade and ninth grade English grade variables had the largest effect size, with both having an odds ratio or $\text{Exp}(B)$ of 0.77, followed by the ninth grade attendance variable, with an odds ratio or $\text{Exp}(B)$ of 0.45. The odds ratio of 0.77 for ninth grade Math and English course grades indicates that for every additional letter grade decreases, students were 0.77 times more likely to drop out of school, controlling for other factors in the model.

Table 9

Logistic Regression Predicting Dropouts

	B	S.E.	Wald	<i>df</i>	<i>p</i>	Odds Ratio	95% C.I. for Odds Ratio	
							Lower	Upper
GPA	-1.47	.15	98.78	1	<.001	.23	.17	.31
Math-9 th	-.26	.09	7.77	1	.01	.77	.64	.93
English-9 th	-.26	.10	6.74	1	.01	.77	.64	.94
Attend-9 th	-.81	.13	36.68	1	<.001	.45	.34	.58
Constant	9.93	1.24	64.02	1	<.001	20563.04		

Table 10

Predictor Variables and Combinations for the Dropout Group

Predictor Variables	<i>n</i> (# of dropouts with this variable)	<i>N</i> (Total number of dropouts with reported scores)	% of Dropouts with this variable
GPA \leq 2.0	336	525	64%
Attendance – 9 th			
\leq 80%	82	514	16%
\leq 85%	130	514	25%
Failed 9 th Math	148	360	41%
Failed 9 th English	105	380	28%
\leq D – 9 th Math	264	380	69%
\leq D – 9 th English	228	380	60%
<i>TerraNova</i> Math	41	332	12%
<i>TerraNova</i> Reading	34	332	10%
<i>TerraNova</i> Language	47	333	14%
Failed 9 th Math OR Failed 9 th English	190	380	50%
D (1.0) or below in 9 th Math OR 9 th English	309	380	81%
Failed 9 th Math OR Failed 9 th English OR GPA \leq 2.0 OR Attend.-9 th \leq 80%	406	525	77%
(Attend.-9 th \leq 85%)	420	525	80%
D or lower in 9 th Math OR D or lower in 9 th English OR GPA \leq 2.0 OR Attend.-9 th \leq 80%	448	525	85%
(Attend.-9 th \leq 85%)	459	525	87%

CHAPTER 5

DISCUSSION

The final chapter provides a summary of the high school dropout problem, relevant research in the field, and this current study's research questions. This chapter concludes with a discussion of these results and relationships to prior research, steps used to implement an early warning system, implications for local educators, limitations of the study, and a summary.

Problem Statement

Nationwide, approximately 1.3 million high school students drop out of school every year (America's Promise Alliance, 2010a; Bridgeland et al., 2006). Dropping out of high school before graduation is a serious problem for the student, community, and the nation. Dropouts represent a loss of human potential and productivity and reduce our country's ability to compete in an increasingly global economy (Alliance for Excellent Education, 2010c). In our increasingly technological society, the demand for educated, skilled workers is rising while there is a decreased need for unskilled labor (Lan & Lanthier, 2001). The Alliance for Excellent Education (2009, July) reports that 90% of the nation's fastest-growing and highest-paying jobs require some postsecondary education. Dropouts are unlikely to have the skills needed to compete in today's job market, and jobs that are available to them are likely to be low-paying with few advancement possibilities.

High school dropouts are more likely to live in poverty, be unemployed, receive public assistance, and be incarcerated than high school graduates (Bridgeland et al.,

2006). They are also more likely to have poor physical and mental health, more likely to be single parents and/or divorced, have a shorter life span, and are less likely to vote or volunteer than graduates (Alliance for Excellent Education, 2009, August; Bridgeland et al.).

Keeping students in school through graduation would save taxpayers millions of dollars, reduce crime, expand tax revenues, and improve citizenship (Jerald, 2006). For example, if dropouts from the class of 2009 had graduated, the country would benefit from \$335 billion in income over these students' lives (Alliance for Excellent Education, 2009, August). Because of the abundance of negative outcomes associated with dropping out of high school as well as the growing awareness of the high economic costs associated with dropping out, this issue has become one of national importance for our society. Policy makers, educational researchers, and politicians are devoting much time and effort to understand the reasons and risk factors associated with dropping out, to implement a uniform measurement of graduation rates, and to identify best prevention/intervention strategies for all students.

Relevant Research in the Field

Within the last ten years, the practice of systematically gathering longitudinal, student-level data covering a variety of indicators in order to generate accurate graduate/dropout data and to determine early warning risk factors has become quite prevalent (Bridgeland et al., 2006; Curran & Reyna, 2009; Heppen & Therriault, 2008; Jerald, 2006; National High School Center, 2007). Longitudinal data can help educators see the process a student goes through before dropping out and more accurately assess

various risk factors. Schools and districts can follow a cohort of students for years to gather relevant data or rely on “retrospective, longitudinal analysis of their own students’ dropout and graduation patterns” to determine factors associated with past student graduates and dropouts (Heppen & Therriault, p. 8). Longitudinal student databases are made up of accessible data routinely collected by schools. Effective databases may include the following information for each student: unique student identifier to track students; demographic information such as race, gender, age, SES, ELL status, and special education status; enrollment information; school attendance percentages; transcript information such as core course grades, GPA, and credits accumulated; standardized test scores; and discipline information.

Once the database has been built, analyses can be done to determine the significance of different potential indicators or risk factors common to that local school context. From a long list of potential indicators, a smaller list of high-yield risk factors or indicators can be identified for that particular school context. Once these high-yield indicators are identified, they can help educators build an early warning system to help identify and predict with high probability which students are most likely to drop out of school (Bridgeland et al., 2006). An early warning system can trigger the early attention and support some potential dropouts might need before they drop out. The Alliance for Excellent Educations asserts that an early warning system can help provide “more effective and efficient use of scarce resources to improve student outcomes” (2008, p. 3).

Recent research in dropout prevention shows that the strongest general indicators of dropout out to school are poor attendance, course failures, and behavior problems

(Mac Iver & Mac Iver, 2009). Balfanz and Herzog (2006) found that grades, credits, and attendance were highly predictive of dropping out of school. Heppen and Therriault (2008) found that failing the ninth grade is a strong predictor of eventually dropping out. Several researchers found that sixth grade indicators (poor attendance, failing Math or English, and discipline infractions) were highly predictive of potential dropouts (Balfanz, Herzog, & Mac Iver, 2007; Mac Iver & Mac Iver).

In a large collaboration in Chicago, Illinois, the *Consortium on Chicago School Research* has been tracking every public school student in the Chicago Public School system for over ten years and has build an early warning system to determine in the ninth grade if a student is on-track or off-track towards graduation. Their warning system uses the variables of course failures, attendance, GPA, and on-time promotion to the tenth grade (Allensworth and Easton, 2007). Using the on-track indicators, Chicago researchers claim to be able to predict 85% of eventual dropouts by the end of the ninth grade (Jerald, 2006).

In Arizona, school districts have been tracking individual students and collecting statewide longitudinal student data since the freshman 2000 class (National High School Center, 2007). Districts collect demographic data, special programs data (ELL, special education, and free/reduced lunch), yearly attendance percentages, course grades each year, standardized test scores for each grade, and high school GPA. Arizona school districts also know when a student began and exited from that district and the assigned withdrawal code for each student.

Research Questions

The purpose of this study was to identify the dropout risk factors most likely to predict students dropping out of school in a large school district in southern Arizona. Analyzing retrospective, longitudinal student data from this particular school district will enable an early warning system to be built and allow educators to better predict and identify potential dropouts and intervene appropriately.

Research Questions and Hypotheses

Question 1. Do statistically significant differences exist between high school graduates and dropouts in the following areas: gender, race, ELL status, special education status, free/reduced lunch status, attendance percentages in the third, sixth and ninth grades, English and Math course grades in the sixth and ninth grades, standardized test scores in the third and ninth grades, number of schools attended for each student, and high school GPA?

Hypothesis 1. Based on recent research, there will be statistically significant differences between high school graduates and dropouts on the above mentioned variables.

Question 2. If statistically significant differences do exist between high school graduates and dropouts in the areas analyzed, which variables are the most significant predictors for use in an early warning system?

Hypothesis 2. Based on recent research, the most statistically significant differences between high school graduates and dropouts will be in the areas of ninth grade attendance, ninth grade Math course grade, and ninth grade English grade

Findings from these research questions will enable local educators to build an effective early warning system to identify potential high school dropouts and intervene more effectively and efficiently in this school district.

Results and Discussion

The results and discussion of each of the research questions are summarized in the following subsections. Finally, results are combined to build an early warning system for this school district.

Research Question 1

To examine the differences between high school graduates and dropouts, two analyses were performed. First chi-square tests for independence were used to determine whether student status (dropouts or graduates) and the demographic variables (gender, ethnicity, ELL status, special education status, and free/reduced lunch status) were related to each other. Using the student information from the graduate and dropout subgroups ($n = 3873$), chi-square tests for independence showed that all demographic variables were statistically significantly related to the student status variable. Significantly more dropouts were male than female, Hispanic or Native American than White or Asian, special education than non-special education, ELL than non-ELL, and free/reduced lunch than non-free/reduced lunch. When examining the phi coefficient and Cramer's V (for the ethnicity variable), the effect sizes were all considered to be small. The largest effect size coefficients were seen in the areas of free/reduced lunch (a measurement of poverty) at .15 and ethnicity at .15. Since ethnicity had five categories, further analysis of the *actual* and *expected* counts showed that the significant differences occurred in the following

areas: In the *graduates* subgroup, there were significantly more White and Asian students in the actual count versus the expected count. In the *dropouts* group, there were significantly more Hispanic and Native American students in the actual count versus the expected count. The Black students had very similar actual and expected counts in both the graduates and dropouts groups. In most of the current literature, the highest percentages of dropouts are in the high-poverty schools (Alliance for Excellent Education, 2010; Balfanz & Herzog, 2006; Jerald, 2006; Mac Iver & Mac Iver, 2009) and in the Hispanic, Native American, and Black minority ethnicity subgroups (Alliance for Excellent Education, 2010; Bridgeland et al., 2006;). White and Asian students and students not living in poverty tend to have a higher graduation rate than Black, Hispanic, and Native American students and students who live in poverty. The only result that was not consistent with current research was concerning the Black student subgroup; the differences between expected and actual counts were very similar (a difference of three students) in both the graduate and dropout groups. This finding could partly be explained by the relatively low percentage of Black students in the graduate/dropout total (7.8%) as well as the overall cohort percentage (8.3%). Another explanation may be related to the fact that some of the students in this school district have parents who work at a large local military base (exact percentage of students was unavailable). These students (of military parents) are more likely to be of an ethnic minority than students not of military parents; forty percent of students in the Department of Defense Education Activity schools in the United States and abroad are Black or Hispanic (“Military Base Schools,” 2007). In an examination of one local district elementary school whose student population consists of

100% students of military parents, the percentage of Black students was 14.7%, compared to 7.8% for the dropout/graduate group in this cohort of students. Recent research suggests that the culture and structure of military life as well as the discipline of military families can support engagement in children's lives and play a role in student success ("Military Base Schools"). Possibly the fact that some of these Black students had parents who work at the military base explains the results discrepancies between this study's cohort and the literature reviewed. In summary, the phi coefficient analysis showed a significant difference between graduates and dropouts in all demographic variables with the highest effect sizes seen in free/reduced lunch status and ethnicity (Hispanics and Native American students having more significantly more dropouts, and White and Asian students having more graduates).

A second analysis, independent samples *t*-tests, was performed to compare the mean differences by student status (graduates and dropouts) on the academic variables: GPA; attendance in the third, sixth, and ninth grades; Math and English course grades in the sixth and ninth grades; AIMS scores in the third grade, *TerraNova* scores in the ninth grade, and school count. Results showed statistically significant difference between student status (graduate and dropout) on all academic variables. To determine the magnitude of group differences, Cohen's *d* was used to determine the effect sizes for each group comparison. Three of the academic variables had a large effect: ninth grade English grade (.18), ninth grade Math grade (.17), and GPA (.16). Overall, these results were not surprising. In recent major studies around the county, course grades in ninth grade and GPA were both found to be leading predictors of dropping out of school

(Allensworth & Easton, 2007; Nield & Balfanz, 2006; Mad Iver & Mac Iver, 2009).

Several variables in the independent samples *t*-tests did produce surprising outcomes. Ninth grade attendance had a medium effect size (.06), sixth grade and third grade attendance had small effect sizes (.03), and school count had the smallest effect size seen (.02). Recent research does show that attendance at all levels (Allensworth & Easton; Mac Iver & Mac Iver; Nield & Balfanz) and high school mobility are major factors related to dropping out (Jerald, 2006; NCSET, 2010; Sterns & Glennie, 2006). According to a research project manager for the district, in this southern Arizona district, mobility is high for a large percentage of *all* students, not just those who drop out of school (personal communication, 2010).

Research Question 2

To discover which variables were the highest-yield risk factors and should be included in an early warning system, four analyses were performed. First correlation analyses were done to describe the direction and strength of the linear relationships between variables. All correlations were statistically significant except for ELL status with the following variables: attendance in third, sixth and ninth grades and sixth grade English. It is an interesting result that attendance percentages were not negatively affected at any time point measured by the fact that a student was in the ELL program. Possibly good attendance was highly valued by these families of students learning English.

Because of possible multicollinearity between similar variables (for example, ninth grade Math and ninth grade English), the researcher made the determination to just

evaluate the results of the variables with the highest correlation coefficients to student status. These predictor variables were GPA (-.47), ninth grade attendance (-.43), and ninth grade English (-.42). These results are very congruent with results in other major studies around the country (Allensworth & Easton, 2007; Jerald, 2006; Mac Iver & Mac Iver, 2009; Nield & Balfanz, 2006).

Next, the percentages of dropouts and graduates at different variables levels were examined. Balfanz and Herzog (2006) defined a high-yield variable as one in which 75% or more of students with that variable or at the variable level do not graduate on time. In this analysis, variables were manipulated to discover at what critical values the percentages of dropouts reached the 75% point. The two variables that reached the 75% point and making them high-yield variables for this analysis were “GPA < 1.4” and “ninth grade attendance < 82%.” A 1.4 GPA can be viewed as mostly Cs and Ds or some similar combination of grades. Attendance < 82% averages out to missing approximately one day of school each week. There were other variables that approached the 75% level which might be informative for educators to study. Again, these were not surprising results and were consistent with other recent major study results (Allensworth & Easton, 2007; Mac Iver & Mac Iver, 2009).

Next, analyses were performed on just the students in the *dropout* group to examine the predictive power of a variety of high school variables and combinations of variables that led students to drop out. The single variables with the highest predictive power in these analyses were ninth grade Math \leq D (69% of dropouts had this characteristic), ninth grade English \leq D (60%), GPA \leq 2.0 (64%), failing ninth grade

Math or English (50%), and failing ninth grade Math (41%). As a group, the three sections of the standardized test given to this cohort in ninth grade, the *TerraNova*, were not very predictive of dropping out (10-14%). When variables were combined, the percentages increased greatly. Seventy-seven percent of students in the dropout group failed ninth grade Math or failed ninth grade English or had a $\text{GPA} \leq 2.0$ or attended school $< 80\%$ of the time. When the Math or English course grade variable was changed from an F to a D, GPA remained at ≤ 2.0 , and school attendance changed to $< 85\%$, the percentage of students in the dropout group with one of these variables increased to 87%. Again course grades and GPA were high-yield indicators with the greatest ability to predict a student dropping out of school, a finding compatible with recent research (Allensworth & Easton, 2007). The ninth grade attendance variable did yield surprising results. Of students in the dropout group, only 16% had attendance at less than 80%, and only 25% had attendance at less than 85%. In this particular analysis, attendance percentage was not one of the highest-yield indicators.

Finally, logistic regression analysis was performed to assess the impact of four high-yield high school variables (GPA, ninth grade Math grade, ninth grade English grade, and ninth grade attendance) on the categorical dependent variable, student status (graduate or dropout). Logistic regression allowed the researcher to assess the likelihood that students drop out of school using the four variables in the model. After ruling out any issues of multicollinearity between variables, the full model was determined to be statistically significant and able to distinguish between graduates and dropouts. The model as a whole explained 45.5% (Nagelkerke R squared) of the variance in student

dropouts and correctly classified 91.9% of cases. All four independent variables made a significant contribution to the model with the strongest predictors (largest effect size) of dropping out being ninth grade Math and English course grades, followed by ninth grade attendance. Again, these results showing the strong predictability of the GPA, attendance, and course grades variables were congruent with recent research in the field (Allensworth & Easton, 2007; Mac Iver & Mac Iver, 2009).

General Discussion

The purpose of this study was to examine factors relating to dropouts and graduates in a single cohort of students to determine which factors were the best early predictors of students dropping out of high school. This study intended to replicate aspects of recent major studies done around the country (in Chicago and Philadelphia, for example) in a large school district in southern Arizona. Researchers in the field recommend collecting *local* student data to better predict graduates and dropouts in their specific locale (Heppen & Therriault, 2008, July; Jerald, 2006; National High School Center, 2007). The results of a study done on local students can then be used to build an early warning system to assist administration, counselors, dropout prevention specialists, and social workers to better target dropout interventions to their students.

The data were examined using a variety of statistical methods. Each analysis had a different purpose, and the results yielded a different perspective with which to view the dropout problem. The researcher expected to see similarities among results of the different analyses. These results, especially similarity among results of different analyses, were then used to build an early warning system for this school district.

The first analysis was done to discover the relationship among student demographic variables and student status. There were statistically significant differences in all group comparisons: A greater proportion of dropouts were in the following groups: males (compared to females), special education (compared to non-special education), eligible for free/reduced lunch (compared to not eligible), and Hispanic or Native American (compared to White or Asian). In the analyses that followed, the researcher saw that while these demographic variables were significant predictors, they do not identify or predict dropouts as well as some of the academic variables.

Evaluations of the remaining five analyses show many common shared results. While each of these analyses measures a different aspect of the student variables and cannot necessarily be compared to each other, exploration of these results further confirmed the credibility of certain variables as predictors of potential student dropouts.

In Table 11, the five remaining analyses are displayed as well as the most significant results relating to student status (two to four results, depending on the analysis). GPA is listed as the most often represented result in all five analyses. A student's GPA represents how he/she is doing in all subjects combined. When a student struggles with just one subject (English, for example), interventions may be easier to target because the failure is in just one area. A greater sense of *failure* may be felt if a student has poor grades in most or all subjects. This student may begin to feel that "school is just not for me."

The variables of failing ninth grade Math and failing ninth grade English are also common results relating to student status. Passing these classes in the ninth grade is

important for future graduation for several reasons. First, in most school systems, students need four credits in each of these areas for graduation. Failing one of these core classes puts a student *behind* causing him/her to have to “double-up” or attend summer school to catch-up. With all the other pressures and stressors introduced in high school, being behind academically so early in one’s high school career may contribute to feelings of hopelessness and despair. Second, as mentioned earlier, some subject areas do not yield themselves well to “doubling-up.” For example, some Math courses must be taken sequentially (Algebra I and Algebra II) and cannot be taken simultaneously. A student failing ninth grade Math may have to attend summer school or investigate other creative options, if available.

Ninth grade attendance had one of the strongest correlations to student status as well as a strong effect size in the logistic regression analysis. In the critical value analysis, ninth grade attendance $< 82\%$ reached the 75% critical value; in other words, 75% of students who attended school $< 82\%$ of the time ended up dropping out.

In the analysis of *dropouts* only, the variable of students receiving a grade of $\leq D$ (1.0) in Math or English for the year proved to be a potentially good indicator as 69% of dropouts had $\leq D$ in ninth grade Math, and 60% of dropouts had $\leq D$ in ninth grade English. The variable was added to capture those students who might have failed just one semester (half credit) of Math or English. These students would still be behind and have to make up that missing credit somehow.

Table 11

Analyses Results Relating to Student Status

	GPA	9 th Engl.	9 th Math	9 th Attend.	9 th Eng. ≤ D	9 th Math ≤ D
Ind. Samples <i>t</i> -Tests (large effect)	.16	.18	.17			
Correlation (top four)	-.47	-.42	-.37	-.43		
Critical Values (reach 75%)	< 1.4			< 82%		
Char. of Dropouts (single variable)	64%		41%		60%	69%
Logistic Reg. Exp(B)	.23	.77	.77	.45		

Building an Early Warning System for this School District

After identifying the highest-yield risk factors or indicators for student dropout, the predictive power of the data needs to be used to guide both prevention and intervention strategies in the schools. As Pinkus concluded “The power of early warning indicators lies in the willingness and capacity of school leaders and educators to transform insightful data into strategic decision-making that leads to improved student outcomes” (2008, p. 1).

One effective method to provide dropout interventions to students and to incorporate early warning indicators is to use three stages of tiered dropout interventions

(Balfanz & Herzog, 2006; Mac Iver & Mac Iver, 2009). Tier One is for all students and promotes engaged and relevant learning. In this stage, prevention strategies focus on motivation for student success, continued support and attention to all students' progress, and a sense of autonomy or control for students. Strategies in this tier could include strong instructional programs, personalized graduation plans, advisories or mentors, close tracking of absences, teaching/modeling desired behaviors, and parental involvement. For most students, effective Tier One strategies will prevent students from dropping out of school early.

Tier Two interventions are designed to help students who begin to struggle academically or with attendance issues despite Tier One strategies. These students can and should be identified as early as possible in the school year, using the early warning indicators discovered by the analyses described in this study. The first progress report period in the ninth grade (four-and-a-half weeks for many districts) is usually not a permanent part of a student's school record, but rather an indicator of progress up to that point. Attendance percentages, course grades, and GPA from this first grading period could be gathered for all ninth graders and a system set up (through a database or Excel spreadsheet) to identify struggling students based on early warning system data. The following student indicators were determined to be the best predictors of students dropping out of school in this southern Arizona school district:

- Attendance \leq 80-85% (depending on analysis). These percentages (80-85%) amount to a student missing approximately four days in the first progress report period. These students should be flagged for Tier Two interventions.

- GPA ≤ 1.4 to ≤ 2.0 (depending on analysis). This GPA includes all courses the student is currently taking during the semester. Students with a GPA ≤ 2.0 should be flagged for Tier Two interventions.
- Failure (0.0) or a D (1.0) in Math or English for the year. Failure in Math or English was shown to be a significant predictor of dropping of school in several of the analyses done. In one analysis, a strong majority of dropouts (60-69%) had made $\leq D$ in one or both of these two core subjects. Some of the D students may have actually failed one semester of the core class. For this reason, all students with $\leq D$ in Math or English at the first progress report period should be flagged for Tier Two interventions.

Tier Two interventions are intended for a small group of at-risk students (generally about 15-20% of all students) with identifiable needs. Administrators, counselors, and/or dropout prevention specialists could meet with these students to assess individual student needs and recommended strategies. Interventions at this tier depend on the individual student's needs. For attendance issues, simply talking to the student to attempt to discover the reason for the high rate of absenteeism might be a good first step. Has the student been sick? Are there family issues interfering with the student getting to school? Are there transportation issues or peer relationship issues? Parents should be involved to make sure they are aware of the attendance issues and to garner their support. Daily attendance checks at the school level to monitor students' progress could be helpful as well.

For students with academic issues, talking with the students to discover their view of the problem may be the best first step as there are many possible research-based reasons for academic struggles. Are there English language proficiency issues interfering with academic success? If the student is eligible for Special Education, is he/she receiving necessary accommodations? Are there major knowledge gaps in curriculum learned? Is the student's reading level proficient for the course requirements? Are there adjustment issues with starting a new school? Does the student have the necessary school supplies (calculator, computer access) to complete assignments? Does the student have anxiety over high-stakes testing? Would the student benefit from additional teacher assistance, one-on-one tutoring, or extra-help courses? Are there other factors influencing academics? Parents and teachers should be involved in this process as well.

After a thorough investigation of the presenting problem(s), Tier Two interventions or strategies can be implemented immediately, with parent and teacher involvement, before the first official high school report card is distributed. Educators (counselors, dropout prevention specialists, and/or administrators) should continue monitoring student variables at the nine week grading period as well as the thirteen-and-a-half-week grading period to continue interventions and capture any additional students who may begin to struggle.

Students who do not respond to attendance and academic interventions in Tier Two may need intensive Tier Three interventions. Parent and teacher involvement should be continued. Intensive Tier Three interventions (to approximately 5-10% of students) are usually one-on-one with the student. Social workers and/or outside services may be

employed to help these individual students. Interventions by educators should continue throughout the year based on the early warning system data.

Implications for Local Educators

The researcher intends to share these study results with local educators to help them identify and intervene at the student level and assess the effectiveness of dropout strategies in a timely manner. In this present southern Arizona school district, each high school employs a *dropout prevention specialist* whose major responsibility is to help students graduate on time (using a variety of strategies). Student-level data from their own school district may enable these dropout prevention specialists to make better, more accurate, data-driven decisions. To the researcher's knowledge, there are no current data on dropout predictor variables in this school district. Study results could be shared by the researcher with just the coordinators of the dropout prevention program or possibly to all the dropout prevention specialists at an in-service or professional learning opportunity.

Results of this study will also be made available to the district's Accountability and Research Department. The results can then be distributed by that office to administrators, counselors, social workers, and whoever else might benefit from knowledge of these results.

Missing Data

One limitation of this study is the amount of missing data in many of the variables analyzed. Best practices call for the extent and nature of missing data as well as procedures used to manage the missing data to always be reported in research studies (Schlomer, Bauman, & Card, 2010).

There were no missing data in any of the demographic variables: race, gender, ELL status, free/reduced lunch status, and special education status. Since this was a longitudinal study, and data were collected for the same student at numerous times, some data were missing at one or more waves of data collections. Missing data from earlier grades when many students in the cohort were not yet enrolled in the school system is understandable. When a student enters this school district, their district data begin at that point; any previous data (before the student enrolled in the school district) are counted as “missing.” Some data may be missing because a student was absent on the particular day that a standardized test was given and did not make up that portion of the test. Also, in a large school district such as this district in southern Arizona, there are many different people with varying skill levels inputting data at many different times and with various distractions. Missing data may be a result of inadequate database training. Recent missing data, with no explanation for the cause, are more difficult to understand.

Schlomer et al. (2010) contend that there are two considerations that determine whether missing data are problematic. The first consideration is whether the remaining data set has adequate statistical power, and the second consideration is the pattern of data “missingness.” This data set was quite large, composed of a total of 6,751 students (3,873 were in the graduate/dropout used in most of the analyses). “Data missingness” because of item non-responses or patterns of missing data were not detected in this study. There are numerous methods of handling missing data (deletion methods, nonstochastic imputation methods, and stochastic imputation methods), many involving complicated procedures or additional statistical software packages. Since the sample sizes varied

across all variables because of missing data, the decision was made to *exclude cases pairwise*, which means that cases (or persons) were excluded only if they were missing data required for that specific analysis. These cases (or persons) were included in analyses for which they had the required information.

Consultation was made with several research scientists from Johns Hopkins University's Center for Social Organizations of Schools who are currently working with dropout data and doing similar studies on a much grander level. Mr. Vaughan Byrnes, a data analyst, agreed that missing data in large longitudinal data sets is a common problem. His recommendation for developing a set of warning signs (early warning system) for a district to use was to use the data the districts "have on hand to use." This researcher stated that if the purpose was one of pure research, he might fill in the missing data using multiple imputation methods, but since the "end goal is one of practical use by district administrators," he recommended looking at attendance for those with attendance data and course grades for those with grades data (personal communication, 2011).

Dr. Doug Mac Iver, a research scientist from Johns Hopkins University's Center for Social Organization of Schools understood the problem of missing data as well. He said his studies usually involved following students *forward* to see if they graduated and only considered predictor variables that the district intended to collect for every student. His data would then tend to have minimal missing data, although some missing in the later years. His final comment was "for our purposes, missing data on some of these variables in later grades or earlier grades was irrelevant" (personal communication, 2011).

In this study, the largest percentage of missing data was in the sixth grade English course grade variable (88.5%). Even with this large percentage of missing data, there were still 478 students in the remaining group *with* a sixth grade English course grade. In a variety of analyses, the results did not show any extraneous findings with this sixth grade English variable; the analyses results of students *with* sixth grade English grades were compatible with similar variables (for example, the sixth grade Math course grade). After consultation with the researchers at Johns Hopkins University and not detecting any patterns of missing data or any extraneous findings, the decision was made by the researcher to retain this variable for all analyses, excluding cases pairwise.

Other Limitations of the Study

While using longitudinal student data has been shown to be one of the best methods to predict potential dropouts in a local school context, further research must be conducted to confirm the findings and enhance generalizability to local cohorts as well as other school contexts. This study provides a starting point to predict and intervene with the potential dropouts in this southern Arizona school district. The context of this study's findings will be helpful in shaping future research and in providing considerations by which to weigh the findings. The limitations that follow provide this context.

1. Only one cohort of students was used in this research. Studying several cohorts from the same locale would enhance and further confirm or refute the findings of this research.
2. Several requested variables were unavailable to the researcher by the district's Accountability and Research Department. The "number of discipline

infractions/suspensions/expulsions” variable for individual students was not available. Dropouts often exhibit an early history with problem behaviors: aggression, problems with teachers, suspensions, expulsion, and/or juvenile matters (Bridgeland et al., 2006; Carpenter & Ramirez, 2007; Jerald, 2006; Mac Iver & Mac Iver, 2009). These data would have enhanced the research findings of this study. Also, the related variables of “number of times a student has been held back in grade” and “on-time promotion from the ninth to tenth grade” were not available to the researcher. Both of these variables have proven to be important variables related to predicting dropouts (Bridgeland et al.; Heppen & Therriault, 2008; Hickman et al., 2008; Jerald,). According to an Accountability and Research Department lead research project manager, the tracking of students who repeat a grade as well as on-time promotion from the ninth to tenth grade was done inconsistently throughout the district, and accurate analysis of this variable would be difficult, if not impossible (personal communication, 2010). Perhaps a more standardized procedure for tracking students who repeat a grade would be beneficial in this school district.

3. The researcher was not able to determine which special education and ELL students were allowed extra time to graduate and still be counted as graduating on time. Not all special education students are allowed extra time to graduate, and this information is documented in a student’s IEP. Also, some students who arrive in the country late are allowed extra time to learn English and can have extra time to graduate. The researcher did not have access to this information. So of the fifth-

year students (4.2% of total cohort) who are counted as dropouts in this analysis, some may actually be special education or ELL students who are allowed extra time to graduate and should not be coded as dropouts.

Conclusion

As the nation becomes aware of the negative implications of high school dropouts in society and recognizes the academic and economic imperatives of improving high school graduation rates, policy makers, educational researchers, and politicians are attempting to better understand the risk factors associated with dropping out and to identify the most helpful, cost-effective approaches to secondary school dropout reform. Within the last ten years, the practice of gathering longitudinal student data, developing a uniform measurement of graduation and dropout rates, and making data-driven decisions has received increased research attention. With improved longitudinal student data, early warning risk factors can be determined and used to better predict which students are likely to drop out of school, and interventions can better target these students.

For educational psychology researchers, there are several promising considerations and areas for future research. First, while results of this study point to ninth grade variables (course grades, ninth grade attendance, and GPA) as the most significant predictors of potential dropouts, is ninth grade the most effective time to intervene? Since research shows that more students drop out in the ninth grade than any other grade, one logically would expect to see academic struggles (low GPA, course failures, and poor attendance) immediately prior to dropping out. Since dropping out is a long-term process, what we may be measuring are students who are actually in the

process of dropping out, perhaps past the critical decision point. (A student filling out dropout paperwork is a very high predictor of that student dropping out of school, but it is probably much too late for effective interventions.)

Educational psychology researchers must attempt to determine what are the best predictors and best intervention strategies to *affect the dropout rate*; predictors alone do not determine this. Results of this study show that ninth grade variables are the highest predictors of students (mostly ninth graders) dropping out of school. This finding alone does not inform us if interventions at this time are the timeliest methods to affect the dropout rate.

Possibly, strategies at an earlier age would be more helpful for students. Would strategies in middle school (when risk factors are few and first noticed) actually be a more effective time to intervene to prevent students from eventually dropping out? Although in this study the sixth grade predictors were not as significant as the ninth grade predictors in identifying dropouts, earlier predictors might trigger earlier interventions that could improve the dropout rate. Educational psychologists could further research the best sixth grade predictors of dropping out as well as the long-term effectiveness of intensive interventions with students at this age who are just beginning to exhibit risk factors.

This research made several contributions to educational psychology in the field of dropout prevention. This study explained the importance of a standardized definition of a *dropout* and a uniform method of measuring dropouts in order to attempt to improve the country's dropout rate. By replicating aspects of larger dropout studies done around the

country, this study in southern Arizona confirmed the importance of collecting individual longitudinal student data to determine accurate dropout and graduate data and the value of accurate and complete data for meaningful results. High percentages of missing data can lead to inaccurate results and ineffective interventions. Disciplined data tracking at all levels in a school district must be strongly encouraged and expected. Results of this study also provided the most significant predictors of a student dropping out of school in this southern Arizona school district as well as possible tiered interventions that could be implemented.

Further research must be done to discover the most timely, meaningful interventions that improve the dropout rate, to develop an early warning system that accurately identifies at-risk students as early as possible, to make correct data-driven decisions, and to offer timely assistance to students in need. Graduating from high school with a meaningful diploma is one of the first steps in preparation for the challenges and opportunities of work, college, and life.

APPENDIX A: EXEMPLARY PROGRAMS

Across Ages

Adolescent Sexuality & Pregnancy Prevention Program

Adolescent Transitions Program

Advancement Via Individual Determination (AVID)

Athletes Training and Learning to Avoid Steroids (ATLAS)

Big Brothers Big Sisters

Brief Strategic Family Therapy

Career Academy

CASASTART

Check & Connect

Children of Divorce Intervention Program

Coca-Cola Valued Youth Program

Cognitive Behavioral Therapy for Child Sexual Abuse

Coping Power

Families & Schools Together (FAST)

Family Matters

Fast Track

Functional Family Therapy

Good Behavior Game

Guiding Good Choices (formerly Preparing for the Drug-Free Years)

Helping the Noncompliant Child

Keepin' it REAL

Life Skills Training

Linking Interests of Families & Teachers

Los Angeles' Better Educated Student for Tomorrow (LA's BEST)

Midwestern Prevention Project (Project STAR)

Multidimensional Family Therapy

Multidimensional Treatment Foster Care

APPENDIX A: EXEMPLARY PROGRAMS - Continued

Multisystemic Therapy
Nurse-Family Partnership
Parenting Wisely
Prevention Treatment Program
Project Graduation Really Achieves Dreams (Project GRAD)
Project Toward No Drug Abuse
Project Towards No Tobacco Use
Prolonged Exposure Therapy for PTSD
Promoting Alternative Thinking Strategies (PATHS)
Quantum Opportunities
Responding in Peaceful and Positive Ways
Safe Dates
Schools & Families Educating Children (SAFE Children)
Skills, Opportunities, and Recognition (SOAR)
School Transitional Environment Program (STEP)
Strengthening Families Program
Strengthening Families Program for Parents and Youth 10-14
Success for All
Teen Outreach Program
The Incredible Years
Too Good for Violence
Trauma-Focused Cognitive Behavioral Therapy

APPENDIX B:
 COMPULSORY SCHOOL ATTENDANCE LAWS AND EXEMPTIONS
 (By State: 2010)

State	Required School Attendance Age	Exemptions
Alabama	7-17	Legally and regularly employed
Alaska	7-16	None
Arizona	6-16	At least 14 with parental consent; employed
Arkansas	5-17	If 17 must complete school year
California	6-18	None
Colorado	6-17	Has current school certificate or work permit
Connecticut	5-18	At least 16 with parental consent
Delaware	5-16	None
D.C.	5-18	None
Florida	6-16	16 if student files a formal declaration of intent with school district
Georgia	6-16	None
Hawaii	6-18	At least 15
Idaho	7-16	None
Illinois	7-17	Employed and excused by school official
Indiana	7-18	16 with consent of parent and principal; 14 if parent agrees and State Labor Bureau issues a certificate
Iowa	6-16	None
Kansas	7-18	At least 16 with parental consent
Kentucky	6-16	None
Louisiana	7-18	At least 17 with parental consent
Maine	7-17	At least 15 or completed ninth grade
Maryland	5-16	None
Massachusetts	6-16	At least 14
Michigan	6-18	No exemptions
Minnesota	7-16	None
Mississippi	6-17	Children who are five by Sept. 1 must be enrolled in kindergarten
Missouri	7-17	At least 14 with parental consent and superintendent approval
Montana	7-16	At least 16 or completion of eighth grade
Nebraska	6-18	At least 16 with parental consent or eighth grade completion; special homeschooling legislation

APPENDIX B: Continued

Nevada	7-18	Completion of eighth grade or at least 14 and board of trustees approval; 14 if work is necessary for own/parents' support
New Hampshire	6-18	None
New Jersey	6-16	None
New Mexico	5-18	None
New York	6-16	None
North Carolina	7-16	None
North Dakota	7-16	If it is necessary to support family
Ohio	6-18	At least 16 with the permission of parent and superintendent
Oklahoma	5-18	At least 16 if excused by written joint agreement
Oregon	7-18	16 with the consent of school administration and parent; 21 for a child with a disability
Pennsylvania	8-17	16 if employed with a certificate; 15 if in farm work or domestic service with permit; 14 if completed elementary school with permit and recommended by superintendent
Rhode Island	6-16	At least 16 with written consent
South Carolina	5-17	At least 16 if further attendance is determined by court to be disruptive, unproductive or not in best interest of child
South Dakota	6-18	At least 16 or completion of eighth grade if member of certain religious organizations
Tennessee	6-17	None
Texas	6-18	None
Utah	6-18	At least 16 or eighth grade completed; students who are homeschooled and are minors are exempt
Vermont	6-16	Completed tenth grade or 15 and completed sixth grade and services needed for family support
Virginia	5-18	Any pupil exempt with parents' consent or a believes the minor cannot benefit from education at school
Washington	8-18	16 with parental consent, or student is emancipated, or has received certificate of competence
West Virginia	6-16	None
Wisconsin	6-18	None
Wyoming	7-16	None

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