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MIDDLE SCHOOL STUDENT RECORDS AS  
DROPOUT INDICATORS

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A Dissertation

Presented to

the Morgridge College of Education

University of Denver

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In Partial Fulfillment

of the Requirements for the Degree

Doctor of Philosophy

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by

William Sherman Gregg

August 2010

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Title: MIDDLE SCHOOL STUDENT RECORDS AS  
DROPOUT INDICATORS  
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Degree Date: August 2010

### **Abstract**

Dropping out of school is associated with a wide array of negative outcomes and the extraordinarily high United States dropout rate has brought the issue to the forefront of American education.

This study investigated normally collected middle school data from a suburban Colorado school district to determine the predictive value toward students dropping out or graduating from high school. Accessed was a longitudinal data set of first year in middle school records, 7<sup>th</sup> grade, from 1999-2003 for students that graduated or dropped out from a Colorado suburban high school from 2003-2007. Discriminate function analysis was utilized on 2,195 student school records, that included 106 dropout and 2,089 graduate student academic and demographic data, to determine the strength of the data to predict group membership.

Middle school student's metamorphosis from child to adolescent is a uniquely critical time in a student's growth due to physical, social, psychological, and brain synaptic pruning. Dropping out of school is influenced by a wide array of external and internal school concerns but if clear set of red flags were available for easy identification of at risk students concerned school personal may best bring interventions to bear in the middle school setting. This study found that for this data set there was a slight correlation between grades in Language Arts and Math with a greater predictive power from Social Studies, Science, and Physical Education, subjects often overlooked in other studies. The

conclusion stated that a clear set of warning signals was found with a strong enough probability of dropout identification to be considered as warning indicators and therefore all indicators need to be considered for every child on an individual level.

## **Acknowledgements**

The dissertation process has been a long journey of personal growth that without the support and love of my wife Terri, daughter Kelsey, brother Joel and all family members would not have been successfully completed.

I appreciate the perseverance of Ellie Katz and the other dissertation committee members Kent Seidel, Kathy Green, and Doug Allen for hanging in with me on this longer than expected journey.

I appreciate the support of my friends and fellow educators from Ranch View Middle School and the University of Denver doctoral cohort. Douglas County School District's Janece Rogers provided assistance with accessing data, and Nanci Avitable was fabulous with technical and positive personal support.

This accomplishment is dedicated to Willis, Carita, Patricia, and Richard, whose positive spirit and love are always here within me

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## Chapter One

### General Introduction

“We have one of the highest high school dropout rates of any industrialized nation,” said United States President Barack Obama in his 2009 presidential address to Congress, “Dropping out of high school is no longer an option. It’s not just quitting on yourself, it’s quitting on your country – and this country needs and values the talents of every American.”

“When more than one million students a year drop out of high school, it’s more than a problem, it’s a catastrophe!” stated former Secretary of State Colin Powell, founding chair of America’s Promise Alliance (APA, 2008).

The National Center for Education Statistics states that dropping out of high school is related to a number of negative outcomes. High school graduates consistently outperform non-graduates on a variety of personal and social indicators by substantial margins. A male high school graduate who works until age 65 will earn, on average, nearly \$333,000 more than a dropout, with the high school dropout earning only 37 cents for each dollar earned by an individual with more education. High school dropouts are 3.5 times more likely to be imprisoned at some point during their lifetime. If the male dropout rate was decreased by only 5% the United States could save \$7.7 billion a year through reducing crime related costs (NCES, 2007; EPE, 2007; Bridge land, 2007).

#### *Personal Cost of Dropping Out*

In the short term, adolescents exercising the personal freedom to spread their wings and leave the stressful situation of school by making life choices such as holding a job, changing housing, or starting a family may feel good (Bridgeland, 2007), but the long term reality of dropping out of school narrows a person's choices that often results in poor employment opportunities, poverty, poor health, and a life time of regret (EPE, 2007, U.S. Department of Health and Human Services (HHS), 2000).

Sadly, the reality of the narrowing of personal choices can lead to actions that include drug and alcohol abuse, law breaking, and physical injury, including suicide and unwanted pregnancy (Cohen, 1998; Levin, Belfield, Muennig & Rouse, 2007; Rouse, 2005). The U.S. Department of Health and Human Services suggests that high school dropout rates must be addressed as part of the nation's health promotion and disease prevention agenda to improve the health of young people. Dropouts older than age twenty-four tend to report being in worse health than adults who are not dropouts (HHS, 2000).

Dropouts make up disproportionately higher percentages of the nation's prison and death row inmates (U.S. Department of Labor, 2006). As of 1997, 41% of prison inmates and 31% of probationers, 18 years and older, had not graduated from high school or earned a GED, in comparison with 18% of the general population. Dropouts are also less likely to be in the labor force than those with a high school credential or higher. Employment opportunities are no longer available for individuals who have not earned at least a high school diploma (Harlow, 2003).

High school dropouts' annual income is unlikely to be sufficient to support a family, there is a greater likelihood of long stretches of unemployment, and there are

restricted opportunities for occupational advancement (Rouse, 2005). The average annual income of people ages eighteen through sixty-five, who had not completed high school in 2005, was roughly ten thousand dollars less than those that earned a high school degree. Over their lifetimes, male high school graduates earn up to a third of a million dollars more and college graduates average over a million dollars more than the same age high school dropout. A white male dropout in 2005 earned approximately \$23,000 annually. By comparison, a white male high school graduate earned 48% more, a person with some college education earned 76% more, and a college graduate earned 346% more. (Levin, et al., 2007).

Education leads to more years of life and greater likelihood of receiving health related information and services. Objective 7-1 of Healthy People 2010 is to improve high school completion. Various programs targeting community, school, family, peer or individual domains can reduce rates of school dropout by implementing proven effective strategies and activities, as well as programs highlighted as “best practices” (HHS, 2000).

#### *Social Costs of Drop Outs*

Dropping out of school is not only an individual problem, but also a huge social problem. As noted in the number of dropouts that lose self-esteem, turn to drugs, increase welfare costs, and increase the prison populations, dropouts often become a financial burden to society (Alliance for Excellent Education, 2006; Mensch & Kandel, 1988; Rouse, 2005; Tidwell, 1988).

In 1961, James Conant, former president of Harvard, in *Slums and Suburbs: A Commentary on Schools in Metropolitan Areas* predicted that the growing dropout problem in the inner cities and the nation would be like social dynamite. The explosion

has occurred as shown by multiple indicators. The high school completion rate in the United States has now slipped to tenth place in the world behind such nations as Korea, Norway, the Czech Republic, and Japan (Barton, 2005).

The estimated potential monetary cost to society from dropouts can come from looking at the lifetime costs associated with the typical career criminal, drug abuser, and high-school dropout. The monetary costs associated with social interventions from the judicial system for a typical career criminal could cause expenses that are 1.3 to 1.5 million dollars. A heavy drug user could carry a price tag to society from \$370,000 to \$970,000, and a high-school dropout could cause between \$243,000 to \$388,000 in costs to community agencies. Therefore an example of overall monetary savings to society, by providing successful interventions for high-risk youth, could be valued at over two million dollars (Cohen, 1998). Levin, et al. (2007) charted graduates, from high school and college, to show that their lifetime tax revenues average a seventh of a million dollars more than their associated dropout peers.

The continued expense of high school dropouts to the government is also seen in government's health care systems, Medicaid and Medicare, Eligibility for such programs are generally based on an individual's earnings with a person with higher earnings lowering their eligibility for government program enrollment. Average high school dropouts accrue significantly more in government health expenditures compared to graduates and post high school educated over a lifetime. The differences hold across gender and race with average expenditure per dropout at about \$58,500, with \$22,500 for graduates, \$16,000 for those with some college, and \$4,000 for college graduates (Levin, et al., 2007).

“Given the consequences to society and the individual,” Lehr (2003) says, “the importance of facilitating school completion for all students is a critical concern for researchers, policy makers, and educators across the country”.

In 1999, 14% or 25,372 of Colorado’s older teens, ages 16 through 19, were neither enrolled in school, were high school graduates, or almost half of these teens were unemployed, which leaves Colorado 48th out in the percentage of teens that are high school dropouts compared to 10% dropout rate for the United States as a whole (CCC, 2005).

### *Statement of the Problem*

This study addresses the need for a clear, easily accessed, and verified set of warning signals or red flags, so that educators are be able to identify and target those at-risk students at a time when the students may best be impacted. Targeting interventions with those students that are most at risk, rather than targeting blanket programs at entire schools is one effective strategy to cut long-term personal and social costs (Levin, et al., 2007). Long before students drop out of school with the associated life problems, there may be ways to identify at-risk students in commonly collected school performance indicators. There may be school indicators that include poor choices of peer friendships, low classroom achievement, antiestablishment attention seeking, and weak connection or identification with the school. And yet, many children who perform poorly in school are chronically truant, fail to form meaningful bonds to positive adults and/or peer role models, exhibit risk behaviors, or experience serious problems in adolescence do not necessarily drop out of school (Alexander, 1997; Balfanz, 2007; Cairns, 1989; Goldschmidt, 1999). A strong warning system could be identified as one that minimizes

the misdirection of false positives from the data conclusions, thus increasing the commitment of educators to the need for interventions.

Transescence is the stage of development prior to the onset of puberty and extends through the early stages of adolescence in a student's life, generally thought of as ages 10 through 15. This time of unique physical, social, emotional, and brain development, that the middle school works to meet, may be the best place to identify and intervene with at risk students (Eichhorn, 1966; NMSA, 2003).

### *Research Question*

Did routinely collected middle school student records contain warning signals or "red flags" that indicate probable high school dropout?

### *The Purpose of the Study*

The transescent years are a unique time in a child's physical, brain, emotional, and social development. The middle school structure and teaching methodology provides a setting that lends itself to the probability of successful interventions (Eichhorn, 1968). If the educational staff has a set of clear and loud warning signals, it could make the focus of those interventions that much more targeted. This study did strive to identify a set of red flags that may be able to help school personnel recognize and provide targeted interventions during the middle school years. This will have a positive impact on students' completion of high school by comparing routinely produced information in the middle school records to those of students that did not complete high school. Academic and demographic records were compared for similarities that may suggest common warning indicators. "It's a commitment at the early stages. If a student gives off a warning sign, you make it someone's job that they notice that," said Martha Abele MacIver, a

Johns Hopkins University research scientist studying the dropout data for Colorado. "I don't think it takes that many more resources; it's a commitment to do things differently. (Mac Iver, Balfanz, & Byrnes, 2009) "

### *The Importance of the Study*

While there are many and varied reasons why a student drops out of school, middle school teachers need a high level of confidence in a few indicators. Many prior studies of dropout indicators have been based on extensive surveys of numerous factors including the student's personal traits, their individual social and family life, their life histories, and school lives that are factored into contributing to and potentially triggering their dropping out (Ensminger & Slusarcick, 1992; Goldschmidt & Wang, 1999; Rumberger, 1995). Gleason and Dynarski (2002) suggest that, to be useful, dropout predictors need a high predictive yield. A predictor has a high yield when most students that are flagged eventually fail to graduate and the predictor alone or in combination with other predictors identifies a significant portion of the students who will not graduate. Is there some way to identify those kids likely to drop out of school? Are there common indicators that could provide an easy, dependable way to identify the probable school dropouts? Can interventions by caring school employees be accelerated by reinforcing easily identifiable indicators? We do not know how many potential failures have been thwarted by successful interventions, but the more we can achieve the better. What are the indications of student probable dropout? Are there indicators that are many and varied or clear and identifiable?

In 2004, in response to an extremely low overall statewide graduation rate of about seventy percent and low scores on standardized assessment tests, the Colorado

Board of Education created the Colorado Commission for High School Improvement. “I hope they look beyond their School Accountability Reports,” said Van Schoales, an executive vice president of the Colorado Children’s Campaign (CCC, 2005), referring to the state’s school report cards.

### *Overview of the Remaining Chapters*

Chapter Two provides a review of the literature that was found relevant to this topic. It included a discussion of why and which students may drop out of school. It considered the different school structures and built a case through the consideration of brain research, student physical and social development, and the associated educational needs for Middle School philosophy, the best structure for impacting at-risk students.

Chapter three presents the methodology used to compare commonalities from collected and accessible data derived from the individual dropout student’s middle school records. School personnel could use this as a red flag in identifying students at risk of dropping out of school.

Chapter Four visits the results of the comparisons and works to identify commonalities that could be considered early warning signals of potential dropouts. This chapter reviews the methodology of the study.

Chapter five suggests conclusions that can be drawn from the study, possible next steps, and usages for education of the conclusions.



## Chapter Two

### Literature Review

Bridgeland, DiIulio, and Morison (2006) in *The Silent Epidemic: Perspectives of High School Dropouts* qualitative research, found that dropouts expressed a range of excuses for not finishing high school, such as a lack of connection, boredom, unpreparedness, weak parent support, too much freedom, academic problems, and real world events. They interviewed 467 diverse students, 16 through 25 years of age, who had dropped out of public high schools in large cities, suburbs, and small towns. Bridgeland, DiIulio, and Morison stated that the former students shared their thoughts and reflections with courage and honesty and suggested that the barriers to their graduation were not insurmountable.

Most of these young adults expressed great regret for having left high school and 81% said that graduating from high school was important to success. Seventy-four percent said that if they were able to relive the experience, they would have stayed in school; 47% said that not having a diploma makes it hard to find a good job. They wished they had listened to those who warned them of problems associated with dropping out, or that such voices had been more persistent.

The weak graduation rates, one dropout for every two graduates, driven by students who enter high school barely able to make it out of the ninth grade are typical in many cities. This weakness of middle schools to address student's educational weaknesses and to prepare students for the transition to high school is also a risk factor (APA, 2007). Since completing school is beneficial for a comfortable and prosperous future, how do we decrease the number of dropouts and where is the best place for interventions to occur in order to impact student's success?

#### *Which Students Drop Out*

There is no doubt that a child's earliest experiences in family and school will forever impact the success of their lives and their education. The root causes of early school drop out, away from school, include weak family structures, limited positive parental involvement, and family drug and alcohol problems (Alexander, 2001). Socio-demographic factors such as family socioeconomic status, gender, family type, and other risk factors account for much of the difference in the odds of children dropping out, but these are factors that school educators may not be able to identify or impact (Alexander, 1997).

Identified were certain groups of young people whose members are more likely than others to leave school before graduating.

- Large cities' students are twice as likely to leave school than non-urban
- One in four Hispanic youths drop out; half leave by eighth grade
- Hispanics are twice as likely as African Americans to drop out
- White and Asian American students are least likely to drop out

Some drop out statistics were:

- Half leave by the tenth grade
- 20% quit by the eighth grade
- 3% quit by the fourth grade
- 25% change schools two or more times, some for discipline reasons
- 20% of dropouts were held back a grade
- Half missed at least 10 days of school
- One-third cut class at least 10 times
- One-quarter were late at least 10 times
- 8% spent time in a juvenile home or shelter
- One-third were put on in-school suspension or suspended
- Over 15% were either expelled or told they couldn't return, 12% of dropouts ran away from home

These statistics seem to raise many questions that can't be answered in the scope of this discussion. Barton (2005) notes a number of school problems and personal factors for dropping out.

- Didn't like school in general or the school they were attending
- Were failing, getting poor grades, or couldn't keep up with schoolwork
- Didn't get along with teachers and/or students
- Had disciplinary problems, were suspended or expelled
- Didn't feel safe in school
- Got a job
- Had a family to support, or had trouble managing both school and work
- Got married, got pregnant, or became a parent
- Had a drug or alcohol problem

Students drop out for many reasons, which may even seem like good ones at the time and may be supported by peers and family in the belief that they have no choice. Research has shown that often factors outside of the school setting, such as a student's social and family background, can increase or decrease the risk of dropping out (Jimerson, et al. 2000). Being poor, a member of a minority group, a male, overage for their grade, or having multiple school transfers are a

few external school indicators showing that students are more likely to drop out of high school. Single parent families, a mother who dropped out of high school, parents who provide low support for learning, parents who do not know their child's friends or their friend's parents, and other parenting issues place students at a greater drop out risk. Teenagers who take on adult responsibilities like becoming a parent, getting married, or holding down a job are also more likely to leave school prior to graduation. Parental involvement has a positive effect on children's school achievement. Children who live with single or stepparents receive less encouragement and less help than children who live with both natural parents. (Janosz, 1997).

Allensworth & Easton (2005) looked at Chicago Public School data from 1998-2004 and suggested there were two indicators that could predict probable student graduation; if the students were on-track for graduation at the end of their first year of high school, and the number of classroom credits earned and number of F's in core subjects. These two indicators did predict 81% of the students that would graduate with their ninth grade cohort four years later. Of equal support to the two indicators of success were that only 22% of the students not on-track at the end of their freshman year graduated in four years.

Paul Graham (2005) subjectively suggests a set of traits that he would ascribe to those students that would become high school graduates:

- Don't give up. Don't get demoralized.
- Don't underestimate your potential. Don't think that you can't do.
- Upwind. Look at the options available now, and choose those that will give you the most promising range of options afterward.
- Associate with smart people. Beware of bad models especially when they

excuse laziness.

- Take intellectual responsibility for yourself. Have ambition. Work on hard problems.
- Treat school like a day job. Don't rebel. Don't lose your cool. Just keep playing.
- Have Curiosity. Put in a lot of time on work that interests you.
- Do something hard enough to stretch you, but only just.
- Involve your friends if you want, but secrecy also has its advantages.
- It's by doing that you learn.
- Desire to be better than other people at something.
- Find good books.
- Get out there and do stuff. Go out and learn.
- Take responsibility for your life.

*Personality factors.*

The individual child's personality make-up is a factor that impacts a student's choice to drop out. Whether it is nature, the idea that a student is predisposed to dropping out due to their genetic makeup, or nurture, the idea that their environmental factors from parental or social pressure, the outcome to not complete high school is the same.

One factor in a student's decision to drop out of school may be motivation (Rumberger, 1987; Tidwell, 1988; Tinto, 1975). Thornberry (1985) harshly suggests that students frustrated with the feelings of not doing their duty by pulling themselves up by their boot straps and becoming a successful high school graduate manifests itself in the two delinquent ways of withdrawal or aggression.

One type of withdrawal, Agnew (1992) suggests, is shown in the Theory of Strain, which suggests that dropping out of school decreases the social and emotional pressures associated with the school setting. Strain Theory states that youths who have few options for personal self worth, who experience failure to achieve a valued goal such as good grades, or see the removal of the positive

consequences from grade success, and the addition of a negative personal or other consequence, can result in strain. When teachers, parents, and peers all apply overwhelming negative input, students lose their belief in the role others play and anger and frustration arise within these relationships. Students may choose to withdraw from the education system that applies such pressure.

Another type of withdrawal happens when students' frustration and anger causes them to reject their place in the social structure. Social Control Theory suggests that dropping out is a rejection of being controlled by the sociological norms of the schooling system. In Montreal's middle grades, a cluster analysis of students' responses was created from a social inventory questionnaire that was given to potential dropout students. From their responses they were divided into four categories (Janosz, et al., 2000):

1. Disengaged dropouts were students who had average levels of school misbehavior, low commitment to school, and average grades.
2. Low achiever dropouts had a weak commitment to schooling, average or lower levels of misbehavior, and had failing grades.
3. Maladjusted dropouts had very high levels of misbehavior, weak commitment to school and poor grades.
4. Quiet dropouts had no misbehavior, good levels of commitment to school, but lower achievement grades.

Janosz, et al. (2000) then identified these same four clusters in a similar analysis of social inventories with an earlier cohort. Across the two cohorts, they found that, the Quiets and the Maladjusted accounted for 77% to 85% of the eventual dropouts.

*School factors that impact dropping out.*

Poor performance in school alone may be responsible for student drop out. School failure in terms of grades, spelling ability, language usage, and general intelligence has been found to lead to drop out. Ability grouping and tracking systems in schools lead poorly skilled students to reject being taught and create their own failure. A strong predictor of eventually dropping out is a course failure in the middle grades because it is something that deeply impacts the perceived control and engagement of the transescent sense of self worth due to the concept of strain theory (Agnew, 1992).

Alexander, et al. (2001) followed a sample of first graders in Baltimore through high school and showed that retention in any grade turned out to have a negative impact on a student's odds of making it through the ninth grade, but retention in the middle grades was particularly problematic. Rumburger (1995) agreed that grade retention was the single most powerful predictor of dropping out. Reardon reported, in 1996, the drop out probability of eighth grade students that took competency testing for retention. The focus was on the tests that eighth graders had to pass to move on to ninth grade. Roderick (1994) reported on event history analysis that repeating a grade was associated with a substantial increase in dropping out. She suggested that because retention made students overage for their grade, the social and emotional impact of being older than their classmates influences their school dropout. Nearly one quarter of the students who ended sixth grade overage had substantial disengagement during middle school and the majority of others had major declines in attendance.

It is fairly tough to learn the material being presented in class if a student is not present. Attendance and therefore absences can have a major impact on student learning and classroom grades, and impacts a student's ability to attain the maximum benefit from the education process and probable discontinuation of formal schooling. This problem of truancy is addressed deeply in state law and school district directives, which state clearly that students, families, schools, and communities must work together to ensure regular daily and punctual school attendance. Attendance is outlined in the Colorado Suburban School District policy JH (DCSD, 2008). Middle school assistant principals are generally designated as attendance officers. The Board of Education authorizes these attendance officers to represent the school district in truancy proceedings. It is the duty of attendance officers to investigate the causes of nonattendance, counsel with students and parents, and to take action necessary to enforce the compulsory school attendance laws of Colorado, within the school district. This includes initiating proceedings to compel attendance and proceedings for enforcement of court orders compelling school attendance. Often absences include academic sanctions where credit for required work, missed during absences, is not allowed for full or partial credit.

When a high school principal considers a student's absences so excessive as to prevent the meeting of course requirements, generally five or more unexcused absences in congruence with C.R.S. 22-33-107(3)(a) (CDE, 2008), credit for the course may be denied. When a student misses more than 10% of instructional time there is a cause for concern (Allensworth & Easton, 2007).



Balfanz (2007) noted that attending school less than 90% of the time in sixth grade increases the chances that students will not graduate; but when a student's attendance dips below 80%, missing 36 days or more in the year, 75% of those truant students did not graduate. Roderick (1993) has found that low-achieving students who displayed a significant rise in absenteeism at the start of the middle grades, a 10-day or more increase in absenteeism over the number of days they were absent in elementary school, were much more likely than other low-achieving students to never graduate.

*Drop out definitions.*

In Colorado, a dropout is a “person who leaves school for any reason, except death, before completion of a high school diploma or its equivalent, and who does not transfer to another public or private school or enroll in an approved home study program. A student is not a dropout if they transfer to a recognized educational program, completes or registers in a program leading to a G.E.D., is committed to an institution that has an educational program, or is so ill that they are unable to participate in a program. A transfer is a student who enrolls in another school, GED program, or a home-based education program. A student is considered a transfer only if there is official documentation of transfer received by the original school.

Students are designated age-out dropouts if they reach the age of 21 before earning a diploma or equivalent” (CDE, 2008). Some students may need extended time in program to graduate due to various concerns, most generally due to a special education Individual Education Program (IEP) and therefore, CDE

calculates a five, six, and seven year graduation rate. Used for this study will be the Colorado Department of Education record of on time graduation rate as a four-year standard from the student's end of eighth grade year. It is the most prevalent graduation rate to be used for state and national accountability and reporting purposes.

Various types of dropout data exist and depending on the definition used, the standard of reporting, political agendas, and the date of information collecting and reporting each can cast very different shades of concern on the picture of U.S. high school dropouts. Within the United States Department of Education, the National Center for Education Statistics (NCES, 2007) did their reporting using the variable of high school completer, which is defined as anyone who has received a regular diploma or an equivalent credential. NCES reported that in 2005, 88% of young adults 18–24 years old were listed as completers and reported that from 1975 through 2005 all completion rates increased in all ethnic and racial groups. (NCES, 2007)

Largely in response to the federal No Child Left Behind Act of 2001 (NCLB), researchers and educators have been trying to create a more rigorous definition of high school graduates. To do so, they have been looking at on-time graduation rates and counting only students with regular diplomas as graduates. To examine on-time graduation rates, researchers used the percentage of the incoming freshman class that graduates with a regular diploma four years later as a measure excluding expelled students. The NCLB Act requires schools, school districts, and the state to report the percentage of students who graduate from high

school in the standard number of years with a regular diploma. This rate is used to determine “Adequate Yearly Progress” (AYP) at the high school level.

Additionally, RCW 28A.655.030 authorizes the Colorado Academic Achievement and Accountability (A+) Commission to set graduation and dropout goals for local school districts as a component of school accountability. The goal for the Class of 2014 is an 85% graduation rate for each of the nine groups of students noted in NCLB. In this report, a graduate is defined as a student who receives a regular high school diploma. The graduation rate calculation for determining AYP is based on the percentage of students who graduate with a regular high school diploma *on time*, which is assigned at the beginning of grade nine. The graduation rate is based on the cohort of students who begin in grade nine and graduate four years later. General Educational Development (GED) certificate is not a regular diploma and students who earn a GED certificate will not be considered graduates. Students receiving special education services may be assigned an expected graduation year beyond four years on a case-by-case basis via their Individualized Education Program, IEP (OSPI P-210 Reporting Manual).

A cohort statistic graduation rate could be based on the Colorado Suburban School District’s comparison of the number of ninth graders enrolled in the fall of 1999 in that school district, to the number of twelfth graders who graduated four years later, in the spring of 2003. As an example in 1999, 58,648 students were enrolled, but 42,302 graduated in 2003 and 16,346 people are therefore, considered cohort non-graduates. This is a cohort graduation rate of 72.1%, which was used to set high school success rates by the United States

Governors Committee published in their Governors' Goals 2000 conference. They set a target of 90% graduation rate and Colorado has fallen short of that goal at 72.1% graduation rate that represents 10,481 students who do not meet the United States Governors' goals.

The Colorado dropout rate is an annual rate, reflecting the percentage of all students enrolled in grades seven through twelve who leave school during a single school year. It is calculated by dividing the number of dropouts by a membership base that includes all students who were in membership any time during the year minus expelled students. As an example, in 2007 the Colorado Suburban School District had 165 students listed as dropouts. Dividing the 165 dropout students by the total number of 22,958 enrolled students from seventh grade through twelfth grade calculates to a drop out rate of 0.7% for that year. This represents a one-year, annual rate only.

The Director of Communications in the studied Colorado Suburban School District stated that dropout rates, graduation rates, and the factors that lend to these figures for all Colorado school districts are based on Colorado Department of Education formulas. All definitions and regulations come directly from the Colorado Department of Education.

The official data for graduation rate and the opposite dropout rate is reported to the federal government through state government education departments from the local school districts. The federal No Child Left Behind Act of 2001 has pushed for revisions of state reporting protocol. The revision in reporting included two new directives. The first was to count into the original

membership base, which generally is the incoming ninth grade class, any students who discontinued attending school, but did enroll in GED programs. In the past, these students were considered as transfers and were subtracted from the cohort base. The second revision was that schools had to have clear documentation of a student's transfer to and enrollment in another program. If not, then the student was to be considered a dropout. This greatly impacted those schools that have students with a high movement rate (CDE, 2008). Examples of these changes are found in the Colorado 2004-2005 statewide graduation rate that was 80.1% and the completer rate at 81.5%. The following year, 2005-2006, under NCLB, Colorado's reported state graduation rate dropped to 74.1% and a completer rate of 80.5% in the school year "This definition reflects a higher standard for schools and districts and prompts us to renew our dedication to improve the rigor and relevance of coursework in all grades and support students in their efforts to achieve a high school diploma," said CDE Commissioner Dwight Jones (CDE, 2006).

#### *Early Warning Indicators*

Given that high school dropouts has been a concern and that dropping out has consistently been linked to student disengagement, it is surprising that the field of early indicators is underdeveloped (Jerald, 2006). Most studies suggest that dropping out of school is a slow, progressive process of disengagement. For many, this begins in early life and goes unnoticed, and what interventions that are brought to bear are ineffective to stop the stream of disconnection (Bridgeland, 2006). State, districts, and local schools all need to develop early warning systems

to help them identify at-risk students who are anticipated to less likely succeed in the school. The No Child Left Behind Act of 2001 (NCLB) requires that the nation's public elementary and secondary school systems be held accountable for achieving high levels of educational proficiency for all students. Mechanisms need to be developed to ensure that such warning systems trigger the appropriate support and provide follow-through until the student is back on track.

In many ways, this study was sparked by the red flags for potential dropouts pointed out by Balfanz, Herzog, and Mac Iver's (2007) study of urban dropouts. Their study suggested a number of identified flags that had both high predictive and high yield power. Balfanz, et al. (2007) believed that they did find a clear set of red flags in their studied urban settings. Their early warning system showed that first year middle school students, with one or more of four indicators, had only a 29% chance of graduating and that the indicators flagged 60% of those who left school without graduating. Their data set followed a universal sample of students enrolled in sixth grade and was composed of 81% minority and 19% non-minority students. Gender demographics were equal with half male and half female with inclusion of English Language Learners and special education students. Balfanz's et al. (2007) research suggested that the four indicators of attending school less than 80% of the time, receiving a poor final behavior grade, failing math, or failing English had a high predictive power.

Balfanz, Herzog, & Mac Iver's (2007) study considered the feasibility of creating an identification and intervention system for urban, middle grades schools to combat student disengagement and increase graduation rates in our

nation's cities. They wondered if a significant number of students in high-poverty school districts could be identified as sixth graders in a reliable and valid manner. Indicators would need to be readily available and interpretable to school teachers and administrators in order to identify those students who, with no interventions, could fall off the graduation path. The student's records were examined in the first year of middle school (sixth grade) in the cohort they followed in the intercity schools of Philadelphia, Boston, and Indianapolis. They followed more than 12,000 of Philadelphia's sixth-grade students from 1996 until 2004. Balfanz et al. (2007) suggests that there is "an Early Warning System" that makes it possible for a student's middle school records to predict, within a reasonable doubt, those who would drop out of high school.

In Balfanz's (2007) study, 97% of the students attended majority-poverty schools and 67% were in concentrated-poverty schools. Available information suggests a close link between poverty and lack of education in the United States (Swanson, 2004). Mississippi has the poorest and least educated population, with 22% living below the poverty level and 23% not having graduated from high school. Alabama, Arkansas, Kentucky, Louisiana, New Mexico, Texas, and West Virginia are examples of other states with a high poverty rate and low percentage of high school graduates. In contrast, Alaska, Connecticut, Minnesota, and New Hampshire have the lowest percent of poverty and the highest percent of educated population. It could be interpreted as statistically significant that within the United States 13% of the population was living below the poverty level and 16% of the population was not graduating from high school. It is also pointed out that while

minority students are more likely to drop out than their white counterparts, they are disproportionately represented in the nation's dropout rates because they are more likely to be poor (Swanson, 2004). Often this discussion implies that urban schools are failing but when Reardon (1996) looked for a systematic relationship and eliminated the lower socio-economic status of the urban dropout student he found that the urban and suburban schools were equivalent.

Balfanz & Legters (2006) suggested that many students begin to fall off the graduation track at the start of adolescence. They may be identified as early as the sixth grade by looking at just four commonly collected, in-school measures of attendance, behavior, and course failure in math and course failure in English. They found that students with any one of these risk factors had less than a 20% chance of graduating within five years after entering ninth grade. Hence, one reason that the ninth grade is the stopping point for so many students is that many of them have already been struggling and disengaging for three years or more before entering high school.

Mac Iver, Balfanz, & Byrnes (2009) used their "Early Warning System" in a study of the Denver Public Schools dropout rate. Their study of 6th graders in 2006-07 found that more than half (54%) of all sixth graders had at least one of the previously identified four warning system risk factors. At the middle school level, more than a third (37%) had received at least one failing semester grade, and one in four (23%) had received at least two.

Other studies like Morris, Ehren, & Lenz (1991) worked to construct a screening model in Florida to predict which fourth through eighth graders could



drop out of school. Their prediction models had classification accuracy ranging from 73% to 88% for the dropout group and 73% to 86% for the no dropout group, which were significantly greater than chance and were considered of practical importance.

Christenson (2002) supports the suggestion that the warning flags for potential group membership as a probable graduate or dropout can be found in a broad identification around student engagement. This is a multi-dimensional construct that looks at four types of personal engagement:

- Academic: time and depth of connectedness to academic tasks
- Behavioral: class participation and time on misbehavior resulting in discipline
- Cognitive: depth of processing academic information and becoming a self-regulated learner
- Psychological: identification with school and a sense of belonging as a successful participating community member

It is understood that home, school, and peers bring to bear a strong positive or negative influence on students' school engagement and instructors should be thought of as facilitators of engagement that Christenson suggests is a promising approach to providing interventions that will promote school completion.

#### *Basic school courses.*

The basic courses outline by the Committee of Ten for the makeup of a good high school program have extended to great importance throughout all levels of school and yet there is wide variation in teaching and student retention in each of the major subject areas considered within this study. Each course has a unique set of skills and knowledge that may connect to each student's interests and intellect differently.

Marks' (2000) sample of 3,669 students representing 143 middle, and high school social studies and mathematics classrooms found low levels of engagement in the classroom. Skip Fennell, President of National Council of Teachers of Mathematics, 2006-2008 said, "Walk into any classroom in this country and ask a teacher what seems to "govern" the mathematics taught. ... They are sure to point to their state or local school district's curriculum frameworks...that contain anywhere from 30 to 100 or so expectations...As most know, No Child Left Behind requires a formal assessment of mathematics for grades 3-8. Thus, one way to determine what's important is simply to teach what's tested."

Guthrie & Davis (2000) in their study of struggling middle school readers believe that students are disengaged because of low motivation for reading. They state that reading instruction is often tedious due to formidable books expecting formal criticism rather than connecting with the reading through personal reactions. They suggest that middle school reading instruction shows an increase in teacher control compared to elementary school, low social support and a sense of competition rather than cooperation. It is suggested that middle school teachers can use engaging, age appropriate instruction that would include rich knowledge goals, connect reading to student experiences, an abundance of materials, and encourage collaboration in many aspects of learning. Using these practices creates a context for engagement in literacy learning.

The National Council for the Social Studies (2008) said that the No Child Left Behind legislation describes the social studies disciplines as core academic subjects but gives no requirement of assessment and notes that since 2002 there

has been a steady reduction in the amount of time spent in teaching social studies. NCSS states that an excellent education in social studies is essential to civic competence and of a free and democratic society. Social studies are most powerful when they are meaningful, integrated, value-based, challenging and active.

How students learn science should guide instruction, programs, policies, and practices. Resnick (1998) states that facts alone do not constitute true knowledge and the thinking power process cannot proceed without something to think about. National Science Teachers Association (2003) states that teachers of science should utilize a meta-cognitive approach to mentally and physically engage their students.

The National Association for Sport and Physical Education (NASPE) believes that the role of quality physical education programs is to develop in all students an understanding of health and fitness that provide learning experiences that meet the developmental needs of youngsters.

*Grading accuracy.*

Grades are used as an indicator for student comparisons, but are grades consistently applied from teacher to teacher, class to class, school to school, and district to district so that grades are a fair tool? Grading practices in measurement texts and assessments specialists emphasize that grades should be based exclusively on measures of current achievement and that growth, ability, effort, conduct, and other non-achievement factors should not be considered. Cross & Frary's (1999) study of 307 middle and high school teachers of academic subjects

support that teachers utilize "hodgepodge" grading practices that include knowledge of material and integrate various levels of attitude, effort and achievement. Their survey also asked 8,664 middle and high school students about teacher grading practices and found that not only did the students understand that "hodgepodge" grading was going on, but were in support of the practice.

Due to the multiple variables that are taken into account for student work assessment and grade assignment, even when using common grading rubrics, there is often no clean, crisp division between binary grade choices of pass or fail. Grading of students could therefore be considered to fall within the realm of fuzzy logic where a student's performance falls between the constraints of two binary variables like A or B (Fourali, 1997).

Ebel & Frisbie (1986) identified the technical difficulties of measuring educational achievement due to differences in educational philosophies and the teacher's intrapersonal conflict when they serve as both student advocates and judges of students. Teachers may be trying to mitigate negative consequences for themselves and for their students. It was also found that teachers assign grades based on student conduct, attitude, and attendance as a control over student behavior.

Some teachers mirror the meaning of school with the world of work and assess grades as if they are paying students for their participation and activities they perform. Teachers connect grades with classroom management where the "good kids" get high marks and the "bad kids" get low marks. Teachers do make

value judgments when assigning grades and are especially concerned about being fair. Teachers, also, are concerned about the consequences of grade use, especially for developing student self-esteem and good attitudes toward future schoolwork (Brookhart, 1993).

“Classroom teachers do not always follow recommended grading practice,” states Brookhart (1993) in her sample of 84 teachers investigating the meaning classroom teachers associate with grades, grading value judgments and differences, if there had been institutional instructions given. The findings indicated that teachers often associated grades with pay students earn for schoolwork they perform. Teachers do make value judgments about the fairness and consequences of marks for developing student self-esteem toward future school work, regardless of whether they had received measurement instruction or not. Wentzel (1993) restates the capricious nature of United States grading in her findings based on 423 students in 6th and 7th grade that indicated that pro-social and antisocial academic behavior are significantly related to GPA through teachers' personal preference for each student, even when IQ, family structure, sex, ethnicity, and days absent from school were taken into account.

Randals & Engelhard (2009) random sample of 234 public school teachers found that grades assigned by teachers in elementary school were generally higher than those by instructors at the middle school. The study examined differences in the two teacher groups' grading practices by measuring their responses to 53 scenarios. Agreements were found within both teaching groups by the studied

item-level analysis that revealed that grading practices may be linked in both settings to student behavior and effort.

McMillan, Myran, & Workman (2002) studied the assessment and grading practices of over 900 teachers, grades 3-5, representing urban, suburban, and rural schools. They note that the studies show the teacher's major factors for assigning grades were in descending order of importance from academic performance, effort, improvement, homework, comparisons with other students, grades assigned by fellow teachers, and borderline cases with all the differences, suggesting that there are a "hodgepodge" of factors used by teachers when assessing and grading students.

Each teacher assigns grades using a wide range of stated and unstated criteria. Specific objectivity is given to every assessment by using professional judgment that is a foundation for all aspects of student assessment in the public school classroom setting. All teacher-created subject assessments and therefore, classroom assessment grade assignment, are based on individual professional values, beliefs, assumptions, and other individual and systemic variables. All categories used within the scope of the educational community contain invariant scores whose definitions may generalize when used to compare against other school populations. McMillan (2000) states that whether a judgment occurs in constructing test questions, scoring essays, creating rubrics, grading participation, combining scores, or interpreting standardized test scores, the core of the teacher grading process is professionals making professional interpretations and decisions. Remembering that all teachers add their own judgments in assigning

grades, the meaning of the studied, academic, semester, grade results should be considered in any comparison of classroom grading data sets.

The Center for Collaborative Education in Boston found that teachers who use the data-driven inquiry process begin to step back and reflect on their next move rather than immediately attributing a problem to causes beyond their control. Reflecting on data inspired teachers to change other practices and encouraged them to look more carefully at student work.

### *Dropout Risk Factors*

Schargel & Thacker & Bell (2007) identified individual external school risk factors as:

#### Personal Psychological Characteristics

- *External locus of control*
- *Low self-esteem*
- *At least one disability*
- *Poor peer support*
- *Depression or other emotional problems*
- *Early sexual activity or promiscuity*
- *Substance abuse*
- 

#### Adult-like Responsibilities

- *Has a child*
- *Must work to help support the family*

#### Family Background

- *Single-parent home*
- *Permissive parenting*
- *Poor parent-child relationships*
- *Family receives public assistance*
- *Neither parent nor guardian is employed*
- *Primary language of the family is not English*
- *A sibling has dropped out of school*

- *Parent(s) did not graduate from high school*
- 

Schargel & Thacker & Bell (2007) stressed that the impact of school climate and culture, school connectedness, school safety, attendance, and school achievement are risk factors that school educational leaders can most directly address such as:

#### Previous School Experience

- *Absent 20 or more days*
- *Retained in at least one grade*
- *Low grades (Cs and Ds or below)*
- *Disciplinary problems or disruptive behavior*
- *Has attended five or more schools*
- 

#### School-Caused Risk Factors

- *Ineffective discipline system*
- *Overburdened school counselors*
- *Negative school climate*
- *Consequences used to control discipline, instead of addressing causes*
- *Disregarding student learning styles*
- *Passive instructional strategies*
- *Lack of relevant curriculum*
- *Low expectations of student achievement*
- *Fear of school violence*
- 

#### *United States Schooling System*

A guiding document in United States education A Nation at Risk reaffirms the beliefs of the country by stating:

All, regardless of race or class or economic status, are entitled to a fair chance and to the tools for developing their individual powers of mind and spirit to the utmost. This promise means that all children by virtue of their own efforts, competently guided, can hope to attain the mature and



informed judgment needed to secure gainful employment, and to manage their own lives, thereby serving not only their own interests but also the progress of society itself. (1983)

The current system that our public schools employ is historically connected to the Greek classical education emphasizing personal and political initiative, Rome's strengths of law and order, and the Prussian educational model. These three were absorbed into the United State's Horace Mann and Henry Barnard common-school movement, which stated beliefs that education for all could create good citizens, unite society, and prevent crime and poverty. Elementary level school was made available not through federal authority, but through individual state departments of education, in various degrees, for all children by the end of the 19<sup>th</sup> century and compulsory for all children by 1918. At the same time, approximately 2% of Americans from the ages of 18 to 24 were enrolled in a college. The National Education Association appointed a Committee of Ten, in 1892, to establish a standard curriculum. They suggested the goals of high school were to prepare all students to do well in life, contribute to their own well-being, provide an educated citizenry for society's good, and to prepare some students for college. Their suggestions included that elementary education should be eight years and secondary education four years within a curriculum that included foreign languages, mathematics, science, English, and history. These are now considered the high school basics.

The outline of the educational system by the Committee of Ten, that has guided the United States educational organization and delivery, is therefore over a century old. What should be taught and how should it be delivered continues

to be a clash between an emphasis on the concrete learning and recalling of facts versus the human process of learning. On one hand was the drill and practice, knowledge based philosophy lead by Edward Thorndike that has an emphasis of grading related to testing. At the other end of educational thinking were John Dewey's progressive tenets that believed in a child-centered approach that focused on the human processes in thinking and learning (Resnick and Hall, 1998).

During the twentieth century, United States education has seen many education reform efforts that have been in response to some perceived crisis that change in education was thought to be able to impact. Wars, economic downturns, business calls for prepared employees, and international competitiveness have all sparked a short period of education alarm. In spite of the number of past reform movements, very little has changed in the past century due to public resistance, organizational constraints, special interest groups, and professional unions. The history of education reform in the United States has been one of tinkering and has had little impact on patterns of teaching and learning, seldom penetrating the educational core of teachers' and students' roles, student groupings, how teachers' work is defined, time allocation and how students' progress is assessed and evaluated (Resnick & Hall, 1998).

Graduation from high school is an important predictor of an individual's future success, but it is also a key indicator of success of the educational system. Charter, on-line, private, magnet are just some of the types of school restructuring suggestions. Allen & Cosby (2000) suggest that American schools are failing in

organization, in curriculum, in staffing, and in funding as shown by the large dropout rate. They propose “dot-com” leadership that would overhaul the educational system to keep pace with societal changes using the same type of creative, innovative, and risk taking leadership that sparked the paradigm shift associated with the explosive growth of the internet. Along with extended school day and year, curriculum would emphasize basic skills, thinking skills, and personal qualities implemented through a federal experimental schools program.

#### *Dropout Identification and Intervention*

When is the best time in a student’s educational life for interventions to help children avoid school dropout, helping to ensure school success? Early and sustained intervention is integral to the success of students because the decision to leave school without graduating is not an instantaneous one, but rather a process that occurs over many years (Christenson & Thurlow, 2004).

##### *Prior to school intervention.*

Federal Head Start programs target dropout prevention prior to children entering school by providing assistance to children from disadvantaged circumstances with school readiness.

Glascoc (2000) states that only 1 in 2 children with disabilities have utilized the screening tests that could identify them prior to beginning their school years. This precludes them from participation in early intervention programs, whose value is known as reducing high school dropout rates, increasing employment, delaying childbearing, and reducing criminal behavior. The difficulty associated with official identification is that it has been under-utilized

and Glascoe suggests that to elicit and interpret parents' concerns are just as accurate. The earlier the detection of a child's disability the better chance that the child will receive the help he/she may need to continue with their education and not drop out of school. Duchesne, et al. (2007) suggest that a child's early years anxiety level is a prediction of probable high school dropout and that appropriate interventions of stress management and positive self concept can head off school disassociation.

Initiated in 1962, the High Scope Perry Preschool Study, using a group of 123 African American three and four year olds who were born in poverty and at high risk of failing in school, were divided into two program groups. One received a high-quality preschool program and the other received no preschool program. The participants at age 40 showed that the preschool program participants had higher earnings, were more likely to hold a job, had committed fewer crimes, and were more likely to have graduated from high school than adults who did not have preschool (Schweinhart, et al., 2005).

*Elementary school.*

All the research and intuitive beliefs have assisted with United States' students in the elementary grades receiving the interventions and education that puts them on par or above all other school systems at an international level (OECD, 2007). This should not be a surprise when the traditional and current emphasis has been on getting it right in the early years. Elementary schools receive Title I and other funds that assist with positive interventions such as lower class sizes and special services. The No Child Left Behind Act, signed into law

January 2002, along with other goals, attempts to ensure that children are monitored at an early age as to ensure that all children succeed via adequate yearly progress, AYP (NCLB, 2002). Approximately 25 million children, age five through twelve, attend elementary schools in the United States and although each state is charged with the development of each separate state's education program, the overarching similarities emphasize cognitive, social, and moral attitudes and behavioral growth through knowledge acquisition in traditional subjects including arithmetic, reading, technology, writing, art, geography, history, physical education, arts, and languages (NCES, 2007). Emphasis on standards based education with a developmentally appropriate problem solving and creativity *scope and sequence* curriculum and federal accountability mandates of a curriculum that prepares students for standardized testing, which are necessary to insure that all children master the basics, may be impacting student feelings toward themselves and their relationship with school at an early age.

Hamre & Pianta's (2005) research looked at anxiety levels in children during their elementary-school years to determine the predictive value on high school non-completion. The sample of 1,817 children showed that anxiety tended to fluctuate in the elementary years and, as a whole, appears quite useful for predicting high school non-completion. When highly at-risk students, ages five and six, were put on intensive positive instructional and emotional support, their achievement scores and student-teacher relationships were equal to their low-risk peers by the end of their first grade year. At-risk students that were placed in a less supportive setting had lower achievement and more conflict with teachers.

Alexander, Entwisle & Horsey (1997) considered academic disengagement in a longitudinal study of Baltimore first graders in 1982 and followed their educational progress through 1996. This life-course view of education as a long-term process examined the context of probable high school dropouts, the children's attitude and behavior, test scores, their grades, the groupings in classes in which they were assigned, stressful family changes, parents' attitudes, and parents' socialization practices. The study seemed to suggest that those students who received timely interventions at the difficult junctions in their educational and personal lives were more successful at the academic level than their peers.

Jerald (2006) used a longitudinal study of at-risk children to explore multiple predictors of high school dropouts across their development. The proposed model of dropping out emphasizes the importance of the early home environment and the quality of early care giving influencing subsequent development. The results of this study demonstrate the association of the early home environment, the quality of early care-giving, socioeconomic status, IQ, behavior problems, academic achievement, peer relations, and parent involvement with dropping out of high school at or before age nineteen.

United States fourth graders start out at or above the international average in mathematics and science, but by eighth grade they lag behind other countries' eighth graders (OECD, 2007). Anderman & Maehr, (1994) gave surveys to 341 students in the fifth grade in elementary and again in sixth grade in middle school to examine changes in student motivation during the transition from elementary to

middle school. Students were found to be more positively oriented to classroom goals and felt more academically competent in fifth grade in elementary school than in sixth grade in middle school.

*High school.*

A person's greatest growth is during their first decade of life and therefore, it is understandable that there are an overwhelming number of studies that are directed at understanding and facilitating interventions at the elementary level. It is also understandable that because the high school setting is charged with celebrating high school success and recording dropout statistics that an overwhelming percentage of studies concerning school failure are directed at the ninth through twelfth grade years (Rumburger, 1995).

School boards and administrators walk a political policy tight wire stretched between finding ways to raise graduation rates, as they simultaneously work to raise the standards for graduation. Unfortunately, most dropout prevention programs conducted over the previous thirty years have garnered only disappointing results. Many people still consider the two goals to be in conflict. This implies the belief that lowering academic standards and weakening graduation standards can only accomplish rising graduation rates. Recent experience suggests that worries concerning such zero-sum tradeoffs might be misguided. During the last decade, a number of states and districts have raised graduation standards without seeing the plummeting graduation rates that critics of such policies often prophecy.

Croninger & Lee (2001) studied the tenth grade cohort of approximately 11,000 adolescents who attended more than 1,000 high schools between 1990 and 1992. The students were provided with valuable forms of interaction with teachers and had a reduced probability of dropping out of school by nearly half. Using data from the National Educational Longitudinal Study (NELS, 1988), the social capital that teachers provided students who had academic difficulties and socially disadvantaged backgrounds found teacher guidance especially helpful. Social capital was defined by the students as their beliefs about how much their tenth-grade teachers supported their efforts to succeed in school and the teachers' reports about the guidance individual tenth-grade students received from them about school or personal matters. High schools are poorly designed to identify and meet the needs of students who are at-risk of dropping out and the result is an education system that has allowed more than one third of Colorado's ninth graders to fail to graduate from high school in four years (CDE, 2007).

Effective schools provide at-risk students with support that encourages school and educational engagement. Wehlage, et al. (1989) studied fourteen successful schools that demonstrated successful dropout prevention programs that created a supportive environment to help students overcome impediments to membership and engagement:

- *Removed impediments to engagement including absence of economic payoff after graduation, narrow concept of learning, and superficial curriculum.*
- *Mitigated student's needs and problems and connected with student interests and strengths.*
- *Teachers accepted a proactive moral responsibility for educating at-risk youth.*



•  
This study's indicator of school success is the same as the graduation identification used by the suburban public school district in Colorado. The school district's guidelines are a direct reflection of the state guidelines and in correlation with federal No Child Left Behind reporting directives. This was chosen partly because of time and data constraints, but also because in-depth analyses of the school districts' data reveal that the overwhelming majority of graduates get their high school diploma on time (Neild & Balfanz, 2006).

### *Middle School*

Until the early 1900s, formal education for the vast majority of youth ended at the level we now refer to as the middle school. At the end of the 20<sup>th</sup> century there has been a broad educational emphasis calling for unique educational goals and practices on this important period of human transition (NCSS, 1991).

Students entering their middle school years are at a crucial point in their academic and emotional lives. Their experiences in these grades directly affect their chances of success in high school and beyond (Mizell, 1999). Currently, middle schools in Colorado are missing the mark. Students' needs are not being met and, consequently, achievement has stagnated. Rather than serving as a holding tank before going to high school, middle schools must create environments where a student's enthusiasm for learning is nurtured and all students have the opportunity to grow. Students must feel simultaneously challenged and cared for. By the end of eighth grade, they should be ready, both

academically and emotionally, for what awaits them in high school (Christie, 2001). Colorado State Assessment Program (CSAP) demonstrates that student scores improve during elementary school, then level off or decline in middle school. Not only does academic achievement suffer, but student interest in school and attendance also falter by eighth grade. Many students are unprepared for the high school academic and social challenges. High schools have generally not been designed to reverse this trend (Neild, Stoner-Eby, & Furstenberg, 2008, Capstick, 2007).

The ten through fifteen-year-old bodies and minds are in a state of metamorphosis from childhood to adolescents. Children's minds and bodies are growing as they develop through puberty. Along with the physical changes are social changes that deal with the way they see themselves in the world. They are awkward in their growing bodies. Their self-concept and moods wavers between exhilaration and depression.

The middle school movement holds that the child from age eleven through fourteen is a unique being, with unique needs and therefore, must have a unique structure and philosophy for their education to be a success. In the National Middle School Association's *This We Believe*, the structures that needed to be in place for a successful middle school environment were outlined:

- Have success-oriented curriculum
- Be a caring environment
- Bridge the gap between elementary and high school
- Be more exploratory, less specialized
- Emphasizes on interdisciplinary relationships
- Develop a basic skills continuum
- Provide avenues for social and personal development

- Teacher interconnectedness based upon student needs
- Flexibility in structure of daily schedule

The Colorado Children's Campaign believes that the kindergarten through twelfth grade system can improve only if middle schools receive renewed attention and reform. Leaders at all levels must come together to ensure that any academic gains made in elementary school are not lost in the middle grades.

Middle school students, who are under enormous stress that comes naturally from the body and brain growth, are also vital and enthusiastic to authentic learning. It is a huge challenge to teachers to work to meet these needs (Balfanz & Legters, 2006). Middle childhood and early adolescence are a time of important developmental advances that establish children's sense of identity by becoming competent, independent, self-aware individuals involved in the world. Social roles change as individuals compare themselves with their peers in experiences provided by school, clubs, organizations, and programs where they become involved with a wide variety of peers and adults outside their families. As children they come to expect they will succeed or fail at different tasks, but as transescents combat the tumultuous physical and social changes that accompany puberty they can lose confidence in themselves and slip into negative behavior patterns such as truancy and school dropout (Eccles, 1999).

Middle school must take the dropout crisis as a problem that middle schools can solve. Middle school philosophy has it correct. The failure is not of students, but of a failed system that does not do what needs to be done. Middle school must not be a baby high school or a big boy elementary school. It must

stand on its own. As brain development research and the implied difference in teaching style are connected with student failure to graduate, middle school will no longer be the school caught in the middle, but must be its own unique entity. Middle school education has been polarized. For middle school students to thrive, schools must support both students' academic and social-emotional developmental needs. Too often, middle level reforms have prioritized one at the expense of the other.

Another considered factor by Wentzel (1993) is with investigating the effect of antisocial and pro-social behavior on academic achievement in 6th and 7th grade classroom. Taken into account are the possible mediating effects of academically oriented classroom behavior and teachers' preferences for students. GPA and standardized test scores related significantly to the teachers' preferences for the 423 students in the multiple-regression analyses, even when IQ, family structure, sex, ethnicity, and days absent from school are taken into account. Results of regressions suggested that significant correlations between social behavior and academic outcomes can be explained in part by significant relations between social behavior and academic behavior.

The Colorado Children's Campaign states that for the sake of our at-risk students, middle schools must strike an appropriate balance between developmentally appropriate practice and academic rigor. In *Turning Points: Preparing American Youth for the Twenty-First Century*, the Carnegie Council on Adolescent Development (Jackson, et al. 2000) confirms this alarming trend, "A volatile mismatch exists between the organization and curriculum of middle

grades schools, and the intellectual, emotional, and interpersonal needs of young adolescents.”

A comparison of fourth, sixth, and eighth grade CSAP scores from 2002 to 2004 indicate that while fourth and sixth grade scores improve or remain steady, eighth grade scores show a decline in both reading and writing. This suggests that students are losing ground as they move through the middle grades. (Rumberger, 1995)

Kupersmidt & Coie (1990) followed a group of fifth-grade children for seven years until the end of high school and as per other studies, aggression and frequent school absences were significant predictors of early school withdrawal. The significance of their study was to consider the children’s status among their peer group, to see whether they were identified as popular, average, neglected, or rejected children, particularly among the white students. Kupersmidt and Coie (1990) regression models contained sex, race, aggression, frequent school absences, low grades, and rejection. The only significant predictor of juvenile delinquency or of a nonspecific negative outcome was aggression toward peers. The sample revealed that both rejection and aggression predicted the nonspecific negative outcome, but aggression alone to peers best-predicted school dropout.

Roderick (1994) showed that grade retention from kindergarten to sixth grade was associated with nearly one quarter of the overage students dropping out. She suggested that students who ended sixth grade significantly overage in comparison to their class average age experienced substantial disengagement during middle school and could explain a large proportion of the higher dropout

rates among retained youths. Retention in any grade turned out to have a negative impact on a student's odds of making it through the ninth grade, but retention in the middle grades was particularly problematic from both individual and institutional perspectives (Alexander et al, 2001).

Interventions that take place in the elementary, middle school, and early high school years can help students who struggle in school and may not have the support system at home to help them to receive a diploma. Parent and Community Teams (PACT) is an intervention project for high-risk middle school youth and families. Its purpose is to maintain a group that meets frequently to create ongoing support for parents and students concerning issues of adolescent development and, especially, dropout prevention. Despite the evidence about the importance of the middle school years, more students are failing ninth grade than any other grade level (Colorado Children's Campaign, 2005; Capstick, 2007).

Cairns, Cairns, & Neckerman, (1989) did a longitudinal study that examined a sample of students beginning seventh grade in which 14% of the group dropped out of school prior to completing grade eleven. The most vulnerable to early school dropout were characterized in grade seven by low levels of academic performance, high levels of aggressiveness, and affiliated with persons who were also at risk for dropout. Socioeconomic status, race, and early parenthood were also associated with school dropout.

Similar studies conducted in the Philadelphia and Boston area public schools included three major categories of demographic, academic, and engagement factors. Demographics included the subcategories of socioeconomic

status, race/ethnicity, gender, mobility, years over typical age for grade, and special education status. Academic performance included core academic subjects grades, standardized assessment scores, number of high school credits attempted and earned, GPA by semester, year, and cumulatively, on-time promotion from grade nine to grade ten, scores on standardized assessments, end-of-course exams, and exit exams. Educational engagement factors were attendance and discipline indicators such as number of office and counseling referrals and suspensions (Balfanz & Herzog, 2005; Neild & Balfanz, 2006; Neild & Farley, 2004; Neild, Stoner-Eby, & Furstenburg, 2001).

Balfanz and MacIver of Johns Hopkins University and Herzog of the Philadelphia Education Fund followed more than 12,000 of Philadelphia's sixth-grade students from 1996 until 2004. Their findings are outlined in their *Preventing Student Disengagement in Middle Schools*, published in 2006. Their research was supported in part by a grant from the William Penn Foundation and by the Research on Learning and Education (ROLE) Program at the National Science Foundation. Balfanz suggests that there is an Early Warning System that makes it possible for a student's middle school records to predict, within a reasonable doubt, whether that student would drop out of high school. The sixth graders, in the cohort they followed, dropped out or graduated from the school district. In many ways, this study was sparked by the red flags for potential dropouts pointed out by Balfanz, Herzog, and Mac Iver's (2007) study of urban dropouts. The questions of most interest to them were, "Can a significant number of students in high-poverty school districts be identified, absent intervention, who

will fall off the graduation path? How large a role does student disengagement play in falling off the graduation path in the middle grades?” And equally important; “Can students be identified in a reliable and valid manner with indicators readily available and interpretable to school teachers and administrators?” Balfanz’s student records and this study’s records were examined in the students’ first year of middle school. This was sixth grade for Balfanz and seventh grade for the Colorado Suburban School District. Their study was partially replicated in the Colorado suburban setting to find out if the same dropout indicators held true. Do records from high school dropouts, when compared to graduated students records, display commonalities in their first year in middle school? Could those commonalities in student records be indicators that could be utilized by school staff to provide early interventions that could reduce the number of high school dropouts?

Research shows that early academic problems, particularly in grades six through eight, become exacerbated and often lead to greater disengagement in the high school years (LeDoux, 1996, Jensen, 1998, Cahill, 2004). Continued success from elementary to middle school can help students do better in high school and can even predict whether they are college-bound. An example for middle schools to adopt in order to be more student-centered, would be to allow students with unexcused absences, who satisfactorily complete assignments, be able to earn credit for such work. Each middle school, academic department, teaching team, and individual teachers may or may not establish penalties for unexcused absences.



The research conclusions, concerning middle school red flags for potential high school dropouts, in a small way could help improve the quality of middle school education by again stating that the development of adolescences and adults are molded by what happens in the tween years. Few school boards have clear middle school expectations. Middle schools fall short because they are still departmentalized like small high schools. The “plateau effect” has happened in many middle schools saying all is well, business as usual, and that there is a loss of focus on the vitality and enthusiasm needed to maintain the unique type of school for the unique transescent needs of these kids. Hayes Mizell (2002) added to the discussion with a statement that there is deep dissatisfaction with the unimpressive academic achievement of the students in grades five through nine. Few schools could be identified that have lived up to the hope and potential of the middle school philosophy. School staffs are content, unwilling or unmotivated to consider change if student achievement, as measured by state test scores, do not decline by the way things are currently being done.

*Middle school versus junior high school.*

At some point the discussion moves to the best style of school to best meet the struggling student’s needs. The middle school versus junior high school model bears examining in this context.

The 1950’s junior high schools were mini-high schools, focusing on content rather than exploration, departmentalization rather than integration, and an adherence to a rigid schedule. Enrollment disparities caused by the baby boomers birth dynamics between elementary and secondary enrollment saw many

districts add sixth grade to the junior highs and ninth graders into the high school. Students were pushed at an earlier age toward a more academically focused program at the expense of sorely needed social and emotional support and many began to fall through the cracks, both academically and developmentally. Middle schools were created to meet the needs of the transescent student as they grow from a child to an adolescent. The middle school model has a small group of teachers and a homeroom with an emphasis on exploration, integration and success. The junior high school model is just what it says, a small high school that emphasizes departmentalization, collegiate credit & graduation needs. The question is which has a greater probability of success with the at-risk student?

The junior high school model that focuses the student's motivation on the traditional curriculum may be mirrored in the American College Testing Program Reports (ACT) that suggest that it is important for schools to initiate a postsecondary planning process as a vital aspect of early educational planning. This early educational planning, among other college preparation items, could guide students to make informed educational decisions in taking a challenging curriculum. The U.S. Department of Education recommends that students begin planning for college as early as sixth grade. Students who take rigorous courses such as Algebra I can enroll in advanced and higher-level courses in high school. Students in higher-level courses are likely to obtain information about postsecondary opportunities and among minority and first-generation college students; those who take higher-level math courses are more likely to attend college (U.S. Department of Education, 1999, Wimberly & Noeth, 2005).

The National Middle School Association describes in *This We Believe*, an education for 10- to 15-year-olds that will enhance their healthy growth as lifelong learners, ethical and democratic citizens, and increasingly competent, self-sufficient individuals who are optimistic about the future and prepared to succeed in an ever-changing world. To become a fully functioning, self-actualized person the NMSA outlines that each young adolescent should:

- Become actively aware of the larger world, asking significant and relevant questions about that world and wrestling with big ideas and questions for which there may not be one right answer.
- Be able to think rationally and critically and express thoughts clearly.
- Read deeply to independently gather, assess, and interpret information from a variety of sources and read avidly for enjoyment and lifelong learning.
- Use digital tools to explore, communicate, and collaborate with the world and learn from the rich and varied resources available.
- Be a good steward of the earth and its resources and a wise and intelligent consumer of the wide array of goods and services available.
- Understand and use the major concepts, skills, and tools of inquiry in the areas of health and physical education, language arts, world languages, mathematics, natural and physical sciences, and the social sciences.
- Explore music, art, and careers, and recognize their importance to personal growth and learning.
- Develop his or her strengths, particular skills, talents, or interests and have an emerging understanding of his or her potential contributions to society and to personal fulfillment.
- Recognize, articulate, and make responsible, ethical decisions concerning his or her health and wellness needs.
- Respect and value the diverse ways people look, speak, think, and act within the immediate community and around the world.
- Develop the interpersonal and social skills needed to learn, work, and play with others harmoniously and confidently.
- Assume responsibility for his or her own actions and be cognizant of and ready to accept obligations for the welfare of others.
- Understand local, national, and global civic responsibilities and demonstrate active citizenship through participation in endeavors that serve and benefit those larger communities.

Stevenson, in *Teaching Ten to Fourteen Year Olds*, states the importance of ensuring that each student be well known by at least one school adult who is that youngster's advocate and advisor. This vested adult guarantees that every student belongs to a peer group, is successful in academic and social situations, promotes communication within the home, and takes time to connect with the student personally. Johnston, (1997) restates that "It takes a village to raise a child" by writing that successful middle schools are communities that share common values about appropriate behavior, share their wisdom with children, and share a common age appropriate focus. For many youth, early adolescence is one of the last real opportunities to affect their educational and personal trajectory. The middle grade school, one of the key socializing institutions for young adolescents, represents a critical turning point in the lives of American youth (Jackson & Hornbeck, 1989).

#### *Brain growth.*

Young adolescents go through tremendous brain growth and development. Brain development in young adolescents is a good time for middle school teachers to intervene because of the possibility of quick and relatively easy, positive impact that can happen with these students' brain synopsis (Anderman, 1994, Spear, 2000, Dahl, 2004).

The middle school years are an opportune time to impact a student's academic future. The transescent student is not only going through the physical growth of puberty, but also a brain transition. Biological and cognitive changes transform children's bodies and minds in the middle school years (Eccles, 1999).

The body and brain maturation are linked and require a unique interdisciplinary, social, and emotional educational approach (Giedd, 2004). During this wave of growth and change the neural brain networks are going through the fourth stage of neural development. The brain is working to create the most efficient neural patterns in the adolescent brain (Giedd, 2004, Casey, Giedd, & Thomas, 2000). Experiences deeply impact the brain's pruning to become more effective. If students that are at risk of dropping out can be identified during this time, interventions from school staffs could have a monumental impact to help these kids make positive decisions about themselves and their schooling (Dahl, 2004).

In 1988, in *Thompson v Oklahoma*, the U.S. Supreme Court outlawed execution for children who were 15 years of age and younger when they committed their crimes, because a child's thinking had not matured sufficiently to be considered equivalent to that of an adult.

More recent comprehensive neuropsychiatric and psychosocial assessments of death-row inmates and imaging studies exploring brain maturation in adolescents, again played a role in the U.S. Supreme Court's decision to forbid the execution of killers who were 16 or 17 when they committed their crimes (Kaplan, 2005). The Supreme Court considered the impact of brain growth when deciding to overturn the fate of a seventeen-year-old high school junior who, charged with murder, was tried as an adult and sentenced to death. (*Roper v Simmons*, 2005). Young Simmons confessed to breaking in, panicking, and with a younger friend committing a murder. His school friends, who thought they knew him, were surprised. "Adolescents rely for certain tasks, more than adults, on the

amygdala, the area of the brain associated with primitive impulses of aggression, anger and fear," the Supreme Court brief said, "Adults on the other hand tend to process similar information through the frontal cortex, a cerebral area associated with impulse control and good judgment. Second, the regions of the brain associated with impulse control, risk assessment, and moral reasoning develop last, after late adolescence." (AMA, et al. 2004).

Brain science claims that the very fibers that help control the impulses of seventeen-year-old brains aren't finished developing (Beckman, 2004). "The teenage brain is a work in progress," argued Sandra Witelson, a neuroscientist at McMaster University in Ontario, "and it's a work that develops in fits and starts."

Neurological studies have begun to put to bed the belief that when children reach puberty their brains have developed to an adult level. The neural circuitry, or hardware, isn't completely installed in most people until their early twenties (Kwon & Lawson, 2000). Scientists using magnetic resonance imaging (MRI) to study brain function in adolescents found that teenage brains actually work differently from adult brains (Giedd, 2004). Research shows that until about age eleven or twelve the thinking part of the brain continues to grow and thicken to 95% of its final adult size. During these pre-puberty years the brain has the enormous potential to be skilled in many different areas. What the influences are of family, friends, and teachers on this building-up phase, are just beginning to be understood.

Neuroscientist Jay Giedd suggests that the young brain is much like a tree that continues to add extra branches, twigs, and roots. After the young childhood

brain peak, the synaptic gray matter begins to be thinned as the excess connections are eliminated or pruned. Giedd then suggests that during the adolescent years is the time of pruning-down, which he calls the “Use it or lose it” principle. Cells and connections that are used will survive and flourish. This also has huge implications for teens and substance use or abuse (White, 2003). Giedd believes that what teens do during their adolescent years, whether its dropkicking rugby balls or playing football video games, can affect how their brains develop. If a teen is exposed to art, cars, baseball, beer, or bongos, those are connections that will be hard-wired and those are the cells that are going to survive. Life choices start to be whittled away as kids begin to choose what makes them who they are and will be (Giedd, 2004).

With the prefrontal cortex, the area of the transescent brain that controls planning, working memory, organization, and mood, this is a critical time for middle school staffs’ interventions to have an enormous impact on a brain that hasn’t matured. Connections between brain research and classroom instruction could help to ensure that students that are identified as potential dropouts are taught in a way that meets their brain development in the middle school years. Neurophysiologists suggest that the way to hold attention in young adolescents is through sensor motor experiences. Teachers need to work with the understanding of their student’s brain needs. Grabbing a student’s attention throughout an entire unit of study should include all the senses. Instruction should also utilize emotional issue of concern to the students so that their brain synapse and frontal

cortex is engaged and students will focus on positive learning (Montgomery & Whiting, 2000).

Positively impacting student dropout may mean teaching to the individual student's brain development. In the classroom, it could include teaching about the student's own brain development and using assessment methods that help students to be aware of their own thinking. Complex tasks, unique knowledge use, and cultivating higher-level mental skills via Bloom's taxonomy will help to challenge and thus engage the developing adolescent brain (Marzano, Pickering & McTighe, 1993).

#### *Urban versus Suburban*

Jonaton Kozal in a discussion of urban schools said that in "1954, the Supreme Court ruled in *Brown vs. Board of Education of Topeka* that segregated schools were unconstitutional. What seems unmistakable, is that the nation, for all practice and intent, has turned its back upon the moral implications, if not yet the legal ramifications, of the *Brown* decision. The dual society, at least in public education, seems in general to be unquestioned (Kozol, 1985)."

Any difference between urban and suburban schools could be attributed to urban schools being more likely to serve low-income students. Urban children are more likely than suburban students to be exposed to safety and health risks that place their health and wellbeing in jeopardy. They were also more likely to engage in risk-taking behavior and were less likely to feel safe in school, to spend much time on homework, and to require more discipline by teachers in class compared to students in low poverty schools. 8th graders in urban high poverty



schools scored lower on achievement tests, but their 10th-grade counterparts scored about the same as those in other locations (NCES, 2007).

Lankford, Loeb, & Wyckoff, J. (2002) found lesser-qualified teachers in urban settings, leaving low-income, low-achieving and non-white students in classes with many of the least skilled teachers. The striking differences in teacher qualifications were found to happen in spite of average higher salaries within the urban school.

Urban and suburban internal school conditions such as educational organization, teachers, and leadership are factors that Hannawa & Talbert (1993) suggest can identify those settings schools. Brown, Anfara, & Roney (2004) agree in their qualitative, multisite case study that there are stark contrasts between the suburban and urban schools with regard to the technical, managerial, and institutional levels of the schools' organizational wellbeing.

### *Early Warning Systems*

Informal early warning systems traditionally in place such as parent teacher conferences, teacher phone calls, mid-semester grade reports, and administrative contacts raise concerns about student academic progress. Formal early warning systems reflecting to parents and children that the student fits the probable outline for student failure could provide another tool for bringing to bear personal, parental, or school interventions.

Formal early warning systems have allowed schools to capture the actual scope of the dropout challenge one student at a time. The National Governors Association, NGA, (2005) Compact encouraged inclusion of student

demographics and individual student data via a formal district accountability database. Crucial to making NCLB requirements a reality in the states are the state governors that generally oversee the state boards of education. NGA's Center for Best Practices is helping states with technical assistance and policy interpretations.

Interventions for at-risk students at the elementary, middle, and high school level have a positive impact on a child's successful completion of school. Brain research indicates that the pubescence years are a unique time in human development and that the middle school model, built to best facilitate this brain growth, is a unique opportunity to impact a student's graduation. Middle school teachers and administrators will find it helpful to be assured that they are targeting their efforts on students who are most at risk. By adding this study's information to the literature, there will be another step on the road to ensuring that all students graduate from high school with a diploma. If middle school teachers and administrators can find desirable measures, found easily within normal student records in a student's first year, then there should be no excuse for not implementing interventions for those transescent students at risk of dropping out.

## Chapter Three

### Methodology

This chapter focuses on sample selection and the statistical techniques used to address this study's research questions.

#### *Selection of the School District*

The Colorado Suburban School District was chosen because it fulfilled the general designation of a suburban school district and its data department, along with individual district schools, was willing to assist in this project. A comparison between the Colorado Suburban School District and other Denver area suburban school districts was considered, but rejected because each school district has its own unique goals, objectives, population, history, and leadership that provide for each school district's special circumstances.

The Colorado Suburban School District covers one of the counties that make up the Denver-Aurora Metropolitan Statistical Area. This county is one of the fastest growing in the United States with a 59.7% increase from 175,766 county residents at the time of the 2000 federal census to 280,621 people as estimated by the 2008 demographic census (DCG, 2009). The median income for a household in the county was \$82,929 in 2000 and \$93,819 by the 2008 estimate with poverty within the county being rated as very low. Residents generally

commuted to workplaces elsewhere in the metropolitan area that were mostly outside of the county and facilitated by an intricate traffic network. The growth in family dwellings accounted for a rapid housing sprawl that has gradually displaced the traditional ranching economy of the county (DCG, 2009).

In the October 2008 student count, the Colorado Suburban School District had approximately 54,000 students that were enrolled in 64 traditional neighborhood elementary, middle, and high schools and 11 alternative schools. The school district had approximately 5% of the students receiving free or reduced lunch. The racial makeup of the school district at the same time was: American Indian or Alaska Native 0.56%, Black 2.03%, Asian or Pacific Islander 4.49%, Hispanic 7.34%, and White 85.59%. The total identified percentage of minorities was 14.42% of the student population (CDE, 2008). Schools within the district are generally rated academically high in comparison to other school districts on state and national standards.

#### *Historical Data*

The consolidated student historical data that were accessed for this study did not come directly from the individual schools but from the Colorado Suburban Public School's data center which collects information annually from each school within the district. The combined data are used to produce the Colorado Suburban Public School's annual report of all students enrolled in the school system for the single noted year. Due to district and state protocol (CDE, 2008) there is assurance that the data are correct and that similar data would be easily accessible within the individual schools. These consolidated data were compiled and signed

as correct by the school district's superintendent (CDE, 2008). As per the federal Elementary and Secondary Education Act, which reauthorized No Child Left Behind Act in 2001, these data were collected nationally from all school districts to substantiate each school district's Annual Yearly Progress, AYP.

The variables considered were from the end of the students' seventh school year and were grouped into the two categories of academic and demographic. The academic assessments included final quarter grades reported from Language Arts, Math, Science, Social Studies, and Physical Education. Personal demographics data for each student were age at the end of the school year, gender, and ethnicity. In addition, a measure of AYP was obtained by comparing first and fourth quarter grades and classifying the student as improved, no change, or declined.

There was no attempt to assess other external student data such as information concerning home life, which could include parental levels of educational level or support, number of siblings, or birth order. Student life experiences or traumas were not considered to be within this study's focus. Behavior records and school special education labeling were not considered to determine either dropout or graduate cohort membership. Jerald (2006) suggests that education-related factors like academic performance and educational engagement are important because they are *practical* and because they are *predictive*. Such factors describe something that takes place inside of school rather than something that happens in the home or that students bring with them

from outside, and can be helpful in determining the kinds of interventions that students might need and that education systems can provide.

This study examined the records of students that were identified as dropping out of high school prior to completing their graduation requirements and compared them to a group of students that did graduate within the same time period and school district.

### *Selection of the Population*

The students included in the study sample were Colorado Suburban School District's high school graduate and dropout students who had been enrolled in the district for their seventh grade school year between 1999-2003, were in a traditional middle school setting, and had complete, retained, and available data at an individual level.

The limiting factors needed for this study greatly narrowed the data set. Of the 12,714 students enrolled during the studied period in the Colorado Suburban School District, 11,724 were classified as graduates and 990 as dropouts. The first limiting factor of students enrolled in the district in 7<sup>th</sup> grade lowered that data set to 9,955 total students with 9,423 graduates and 532 dropouts. The second factor of considering only students in traditional school settings lowered the data set to 9,421 students, 9,016 graduates and 405 dropouts. Lost data due to matriculation, data storage, technology changes, and use of only complete records left a final data set of 2,195, which included 2,089 graduate student records and 106 dropout student records.

The eliminated data is thought to not have a skewing effect on the quality of the data due to there being no overt selection bias of graduate and dropout student records. Both groups had approximately the same data loss due to the same elimination issues that are outlined below. No members of the populations were more or less likely to be excluded than others.

*Initial Colorado Suburban School District population.*

Colorado Suburban School District’s official published average annual dropout rate was about 1.0% for the five years of the study, suggesting about 200 students are dropouts in each year (Table 1). For the five years of interest, these approximately one thousand students that failed or were failed by the school system and the corresponding number of successful graduates formed the beginning pool from which the sample for this study was drawn.

Table 1.  
Colorado Suburban School District Graduation and Dropout Rate Data  
Over a Five-Year Span from 2003-2007

Cohort Year	Graduation Class	Graduation Rate	Annual Enrollment*	Identified Dropouts	Dropout Rate
2003	1,942	94.80%	17,439	54	0.3%
2004	2,146	93.20%	19,153	386	2.0%
2005	2,404	94.70%	20,292	165	0.8%
2006	2,463	88.40%	21,951	220	1.0%
2007	2,769	90.60%	22,958	165	0.7%
Total:	11,724	92.34%	101,793	990	0.96%

\*These numbers reflect all students enrolled in the school district in the 7<sup>th</sup>-12<sup>th</sup> grade student count including charter and alternative schools.

Note: Graduation rates and the dropout rates will not equal 100% due to the number of students that do not fall into the definition for either category that may include lost transfers, out of cohort completer, illness, students that earn GED certification or other exclusionary factors. (CDE, 2008).

The Colorado Suburban School District’s great growth in student population is mirrored in the growth from 4 to 9 middle schools since 1999. This impacts the number of students that were in 7<sup>th</sup> grade in 1999 compared to those that graduated in 2007. As records analyzed in this study are from the end of the student’s seventh grade year, any students that were not enrolled for their seventh grade year were excluded. There were 9,423 students that were enrolled in the Colorado Suburban School District for their 7<sup>th</sup> grade year, during the period from 1999-2003, that eventually graduated on time with their grade cohort between 2003-2007(See Table 2). During that time period, 532 students that were in the school district in 7<sup>th</sup> grade did not graduate with their cohort and were listed as dropouts.

Table 2.  
Students that Dropped Out or Graduated in 2003-2007 that were in the Suburban Colorado School District for their 7<sup>th</sup> Grade Year from 1999-2003

Year	Drop Outs	Grads	Traditional Setting Dropouts	Traditional Setting Graduates	MS, Data, Dropouts	MS, Data, Grad
1999	80	1569	42	1522	0	0
2000	81	1696	49	1638	0	4
2001	104	1930	91	1856	38	956
2002	124	2144	103	2021	13	387
2003	143	2074	121	1979	55	742
Total:	532	9423	405	9016	106	2089

*Exclusion criteria of traditional middle school setting.*

This study’s goal of identifying early warning indicators for educators in traditional school settings lead to exclusion of the data from students that were



educated in non-traditional settings such as charter schools, home schooled, or alternative schools (CDE, 2008). The sample was therefore, lowered to 9,016 students who graduated and 405 students who dropped out.

*Matriculation exclusion criteria.*

Demographic data and verification of student enrollment were readily available because they have application at every level of school; but academic, attendance, and behavior data for middle school students often were unavailable. Historically, very few middle school records have ever been transferred or retained at the next level of high school. Although counselors would consider students' academic work and special education labels for class placements, there was and is a feeling that high school is a fresh start for students and that what happened in middle school was not relevant to the high school setting (Capstick, 2008). This has led to the 8<sup>th</sup> grade student's grade data not being part of the body of work that makes up the high school transcript that would be considered for college admittance. Individual middle schools in the Colorado Suburban School District retained few records after students "moved up" to high school, often purging the cumbersome number of hard copy files. Even stronger was the feeling that there was little reason to retain any records from middle school after a student cohort's graduated. The norm was to employ a shredding company to destroy all confidential student and school records (personal conversation, 2009). The shredding of these records as part of the summer cleaning ritual caused great difficulty in accessing students' 7<sup>th</sup> grade records, especially after the students' high school cohort had graduated.

Thus names, gender, ethnicity, and birth dates were available for all students for all years, but the academic, behavioral, and personal data were often lost. Historical middle school grade data before 2001 were lost for most students because it seldom counted for high school graduation; there was no state mandate to maintain the records, and no district interest in keeping the cumbersome student records.

In accessing data for this study, it was difficult to find historical middle school data for a student whose graduation class cohort had completed high school. High school seemed to be thought of as a new beginning when the credits toward graduation began and therefore few records transferred. Once students had left middle school there had been no reason for the middle schools to keep those records either. This practice stopped as the federal mandate for more data through the No Child Left Behind legislation was implemented and as technology evolved from boxes of hard copy student files maintained at the local middle school to electronic data bites that were easily transferred from local middle school servers to long term storage in a large central district server. Mac Iver, et al. (2009) seemed to have a similar problem in Denver when accessing records and finding that data were available for just 38% of the 2006-07 dropouts in the Denver school district. Instability in these measures over time (probably related to variation in data entry procedures at the school level) caused absence data to be available only back to 2004-05.

All students that were enrolled in the school district in 7<sup>th</sup> grade, in traditional middle school setting or in regular education classes or enrolled for at

least one academic quarter with complete academic records, left the total population for this study at 2,195, which included 106 dropout student's records and 2,089 graduate student's records (See Table 2).

### *Data Analysis*

Discriminant function analysis was used to weight and linearly combine the discriminating variables specified in the research questions to classify, as distinctly as possible, the sample cases into one of the two student groups: dropouts or graduates.

All questions investigated in this study employed a two-group design of dropout and graduate students. All analyses were done using casewise deletion for missing values, i.e., if a case did not have complete data for all the variables being considered, it was not included in the computations. Functions with a significance level of  $p \leq 0.05$  were interpreted. Function coefficients, structure coefficients, standardized coefficients, centroids, means, and classification results were examined to interpret significant functions and variables.

Function coefficients are used to obtain a discriminant score by multiplying raw values of the variables by their associated coefficient. This information is then used to obtain group centroids and to classify cases into a group.

The interpretation of structure coefficients was done to identify and name constructs underlying resulting functions. These coefficients represent the bivariate correlations between the variable and the function. There is no set rule regarding a cut off value for the structure coefficients. Tabachnick and Fidell

(1989) suggest 0.30 or greater and this study will subjectively examine structure coefficients above .30.

Standardized coefficients represent the relative contribution of the individual corresponding variable to that function that takes into consideration the simultaneous contribution of the other variables. The absolute value of each coefficient represents the relative contribution of its associated variable to the function. The sign denotes whether the variable is making a positive or negative contribution.

Examination of a classification tables was done to determine how well the functions categorized the students into one of the two groups. This classification assumed a priori group size based on the study groups.

#### *Discriminant Function Analysis*

The following is a list of the underlying assumptions for discriminant function analysis as presented by Klecka (1981):

- (1) Two or more groups
- (2) At least two cases per group
- (3) Any number of discriminating variables, provided that it is less than the total number of cases minus two
- (4) Discriminating variables are measured at the interval level
- (5) No discriminating variable may be a linear combination of other discriminating variables
- (6) The covariance matrices for each group must be (approximately) equal, unless special formulas are used
- (7) Each group has been drawn from a population with a multivariate normal distribution on the discriminating variables

Regarding assumption (1), this study has two groups: drop out and graduate.

Although assumption (2) and (3) imply that small samples are acceptable, they may lead to variable parameter estimates (Norušis, 1988) and the overfitting of functions, making them ungeneralizable (Tabachnick & Fidell, 1989).

Tabachnick and Fidell recommend that the number of cases in the smallest group should notably exceed the number of discriminators. They state that if the smallest group has 20 cases and there are only a few discriminators, the procedure should be robust with respect to multivariate normality. In the present study there were 106 and 2086 cases for the drop out and graduate groups respectively, and the number of variables 9 for question 3 and 5 for question 2 and 3 variables for question 1 is less than the number of cases minus two indicating that the requirements of assumptions (2) and (3) are met.

All the variables used in the analysis are measured at the interval level. Although two may be considered nominal variables, gender and ethnicity, they were entered as dichotomous factors and thus do not violate assumption (4).

Assumption (5) refers to the issue of multicollinearity and singularity. These are conditions that exist when a variable is highly correlated (.90 or above) with another variable or set of variables (Tabachnick & Fidell, 1989). The variable sets for each question were determined to not include variables that were highly correlated with another variable or group of variables within that set.

Assumptions (6) and (7) are considered the most difficult to meet, however discriminant analysis is believed to be robust to some deviation.

Violation of the equality of covariance assumption may distort the derived discriminant functions and cause the separation among groups to be less than optimum (Klecka, 1981). Box's M with  $p < 0.001$  can be used to test this assumption (Tabachnick & Fidell, 1989). This test was significant for all analyses in the present study, however, it was felt that the significance was most likely due to the large sample size and not a violation of the covariance assumption.

The normality assumption is also important in significance testing. Given small and unequal samples the assessment of normality is a judgment call which may be answered by being able to say that the variables are expected to have a normal distribution in the sampled population (Tabachnick & Fidell, 1989) and may be demonstrated by showing that the individual distributions are normal (Norušis, 1988).

Violations of assumptions are not the only situations that can limit the interpretation of discriminant function analysis results. Tabachnick and Fidell (1989) point out that the procedure is sensitive to outliers and recommend that a test for univariate and multivariate outliers be run. The use of casewise deletion may also cause problems. Not only can it lead to small samples, but also those cases having complete data may not be representative of the population (Norušis, 1988).

## Chapter Four

### Results

Investigation of this study's overarching question of - do routinely collected middle school student records contain warning signals or "red flags" that indicate probable high risk of school dropout - has been divided into three sub-questions. Question One: Does the set of demographic variables, i.e. Age, Gender, and Ethnicity, predict dropout or graduate student membership? Question Two: Does the set of demographic variables and GPA, i.e., Year Grade Point Average, Year Progress, Age, Gender, and Ethnicity, predict dropout or graduate student membership? Question Three: Does the set of academic grades and demographic data; i.e., Language Arts, Math, Science, Social Studies, Physical Education, Year Progress, age, gender, and ethnicity, predict dropout student group or graduate student group membership?

#### *Summary of Research Findings*

This study examines the differences between two groups of students by analyzing available historical data on the variables Language Arts, Math, Science, Social Studies, Physical Education, Year Progress, GPA, age, gender, and ethnicity.

Table 3 presents the mean and standard deviation for the dropout students, graduate students, and for the combined total data set. The dropout student mean for all data sets was at least a full grade point average below the graduate student mean, with the exception of Physical Education and yet the standard deviation indicates that there is probable cross over.

Language Arts and Math combined total data set, with their curriculum emphasis on concrete knowledge level learning, were both slightly below the “B” level at 2.97 and 2.86 respectively. Science and Social Studies combined data set, with their curriculum emphasis on conceptual learning, were both slightly above the “B” level at 3.04 and 3.16 respectively. Physical Education, with its curriculum emphasis on kinetic learning, showed a markedly higher grade point average of “A minus” at 3.68 for the total data set. The overall Grade Point Average, GPA, which averages all student class grades from core classes and multiple elective courses the student may choose, showed a slightly above “B” average of 3.15 for the combined groups.

The average age of this cohort of students was 13.27 at the end of the 7<sup>th</sup> grade school year. The youngest was 11.38 and the oldest 14.61 years. The dropout students were slightly older than the graduates at this time point at 13.35 versus 13.26 years.



Table 3.  
Descriptive Statistics for Dropouts, Graduates, and the Total Sample

	Dropout Students		Graduated Students		Total Data Set	
	N=106		n=2089		n=2195	
	Mean	SD*	Mean	SD*	Mean	SD*
LArts	1.92	1.30	3.03	1.10	2.97	1.13
Math	1.80	1.24	2.91	1.09	2.86	1.12
Science	1.76	1.22	3.10	1.01	3.04	1.06
SStudies	1.99	1.34	3.22	.98	3.16	1.04
PE	3.06	.98	3.71	.59	3.68	.63
GPA	2.15	.94	3.21	.75	3.15	.79
Age	13.35	.39	13.26	.35	13.26	.35

\* Stands for Standard Deviation

The degree of progress, no change, or decline from the 1<sup>st</sup> quarter to 4<sup>th</sup> quarter grading period was approximately equal in each division for the graduate group. However, 44.3% of the dropout group showed a decline in their grade point average from the beginning of their 7<sup>th</sup> grade school year to the last quarter. (See Table 4).

Table 4.  
Progress Category by Group

	Improvement	No Progress	Decline
<b>Dropout</b>			
Count N=106	30	29	47
% within Dropouts	28.3%	27.4%	44.3%
% within Total	4.5%	3.8%	6.1%
<b>Graduates</b>			
Count N=2089	644	726	719
% within Graduates	30.8%	34.8%	34.4%
% within Total	95.5%	96.2%	93.9%
<b>Total</b>			
Count N=2195	674	755	766
% within Group	30.7%	34.4%	34.9%
% within Total	100.0%	100.0%	100.0%

Table 5 shows a larger number of boys in the dropout group at 61.3% and a larger number of girls in the non-dropout group at 52.6%.

Table 5.  
Percentages by Gender by Group

	Female	Male
<b>Dropout</b>		
Count N=106	41	65
% within Group	38.7%	61.3%
% within Total	3.6%	6.1%
<b>Graduates</b>		
Count N=2089	1096	993
% within Group	52.5%	47.5%
% within Total	96.4%	93.9%
<b>Total N=</b>		
Count=2195	1137	1058
% within Group	51.8%	48.2%
% within Total	100.0%	100.0%

### *Results for Research Questions*

#### *Question one: Demographics only.*

Does the set of demographic variables, i.e., age, gender, and ethnicity, predict dropout student group or graduate student group membership?

Discriminant scores obtained for each individual using the function coefficients resulted in a centroid of 0.02 for the graduate group and 0.47 for the dropouts. Examinations of the standardized and structure coefficients indicate that all variables are related to the function and that ethnicity is contributing the most to the function.

The canonical correlation indicated that about 1% of the variance was explained by the function ( $r = 0.11, p < .001$ ) and therefore 99% was not

explained, which suggests that there may be other factors that need to be considered and that this function, although statistically significant, are not meaningful.

Table 6.  
Standardized, Structure, and Function Coefficients for Question One:  
Demographics

	Standardized Coefficient	Structure Coefficient	Function Coefficient
Age	0.47	0.49	1.33
Gender	0.51	0.56	1.03
Egroup	0.72	0.67	2.24
Constant			-18.38

The classification results shown in Table 7 indicate that the classification function, although correctly identify 95.2% of the total sample, does not identify dropouts as indicated by 0.0% prediction. This classification shows that 100% of the dropouts could be predicted to be in the graduate group with 0.0% accurately identified as being in the dropout group by demographics alone. The classification results for the graduate group were perfect with a predictive power of 100% and all 2089 of the graduated students fitting the profile of the graduate group. The weakness of the demographic data to identify dropouts was shown by the possibility of 106 of the 106 dropout students to be identified as graduates.

Table 7.  
Predicted Group Membership for Question One: Demographics

Group	Dropout	Graduate	Total
Dropout n	0	106	106
Graduate n	0	2089	2089
Dropout %	0.0%	100%	100.0%
Graduate %	0.0%	100%	100.0%

---

a. 95.2% of original grouped cases correctly classified

*Question two: GPA and demographics.*

Does the set of demographic variables and GPA, i.e., Year Grade Point Average, Age, Gender, and Ethnicity, predict dropout or graduate student membership?

Discriminant scores obtained for each individual using the function coefficients resulting in a centroid for the graduate group was 0.07 and for the dropouts it was -1.41. The structure coefficients show a strong relationship between GPA and the function (0.94) (see Table 8). The other four variables were well below the 0.30 significance cut-off level used in this study.

The function explained about 9% of the variance ( $r = .30$ ,  $p = <.001$ ), which suggests that the relationship to group identification was weak.

Table 8.  
Standardized, Structure, and Function Coefficients for Question Two:  
Demographics and GPA

	Standardized Coefficient	Structure Coefficient	Function Coefficient
GPA	1.03	0.94	1.36
Progress	0.25	-0.10	0.30
Age	-0.18	-0.16	-0.36
Gender	0.06	-0.19	0.12
Egroup	-0.21	-0.22	-0.64
Constant			-0.14

The classification results in Table 9 indicate that the classification function correctly identified 94.2% of the total sample. The group membership prediction showed that 84.9% of the dropouts were predicted to be in the graduate group,

correctly identifying only 16% of the dropout students. The predicted membership for the graduate group was high with a predictive power of over 98.2%.

Table 9.  
Predicted Group Membership for Question Two: Demographics & GPA

Group	Dropout	Graduate	Total
Dropout n	16	90	106
Graduate n	38	2051	2089
Dropout %	15.1%	84.9%	100.0%
Graduate %	1.8%	98.2%	100.0%

a. 94.2% of original grouped cases correctly classified

*Question three: academic and demographic variables (minus GPA).*

Does the set of academic grades, i.e., Language Arts, Math, Science, Social Studies, Physical Education, Year Progress, and demographic data; i.e., age, gender, ethnicity, predict dropout student group or graduate student group membership?

The function coefficient can be evaluated for each individual to aid in classification for dropouts or graduates. The centroids based on this function were 0.08 for graduates and 1.50 for dropouts. Examination of the structure coefficients found the highest relationship with the function were for those variables identified as grades, which includes LA, Math, Science, Social Studies and PE. The standardized coefficients for LA, Math and gender suggest that these factors have a fairly small influence (0.02, 0.01 and 0.00 respectively). While Science (0.48), PE (0.40) and Social Studies (0.36) show a markedly higher contribution. A subjective interpretation may be that these three subjects may represent an underlying construct of how the grade was assigned or the unique requirements of

the courses as compared to the other courses. These three subjects areas are often assessed based on active participation compared to the variables of Math and Language Arts that are often assessed on concrete knowledge.

The canonical correlation indicated that about 10% of the variance was explained by the function ( $r = 0.32, p < .001$ ) and therefore 90% was not explained. The relationship was weak and suggests that there are other factors that may impact student dropout.

Table 10.  
Standardized, Structure, and Function Coefficients for Question Three: Grades (not GPA) and Demographic Variables

	Standardized Coefficient	Structure Coefficient	Function Coefficient
LArts	0.02	0.64	0.01
Math	0.01	0.64	0.00
Science	0.48	0.84	0.47
SStudies	0.36	0.78	0.36
PE	0.40	0.68	0.65
Progress	0.15	-0.10	0.18
Age	-0.12	-0.15	-0.33
Gender	0.00	-0.18	0.01
Egroup	-0.17	-0.21	-0.45
Constant			-0.92

The classification results shown in Table 11 indicate that the classification function, although correctly identifying over 90% of the total sample, does a poor job of identifying dropouts. This fairly weak classification shows that 82.1% of the dropouts were predicted to be in the graduate group with only 17.9% accurately identified as being in the dropout group. The classification results for the graduate group were very high with a predictive power of over 98%, although

40 of the graduated students fit the profile of those in the dropout group.

Table 11.  
Predicted Group Membership for Question 3; Academics & Demographics

Group	Dropout	Graduate	Total
Dropout n	19	87	106
Graduate n	40	2049	2089
Dropout %	17.9%	82.1%	100.0%
Graduate %	1.9%	98.1%	100.0%

94.2% of original grouped cases correctly classified

## Chapter Five

### Findings

The findings for this study, that examines a Colorado suburban school district's 7<sup>th</sup> grade students' academic and demographic record data to identify warning signs that would indicate the probability of being either a graduate or a dropout, suggestions for future studies, and meaning to education, are outlined in this chapter.

At the end of each school year, after being a middle school classroom teacher for three decades, I often wondered about the future of “my kids.” I hoped that through my teaching style and targeted interventions that I had done my part to ensure their success as high school students and citizens of the world. I seldom followed their progress into high school to know if they became successful graduates or dropouts. During the year they were in my charge, I could identify the disruptive kids that used their talents to distract their peers and themselves so neither would need to see their academic weaknesses. I could sometimes find the often absent, quiet kids that did nothing to bring attention to themselves or their weaknesses. I could also find, through their loudly announced anger, the confrontational kids who clearly stated they would chose to do or not do what they damn well pleased. Kids from those three groups, disruptive, quiet, and



angry, I considered at risk of not being successful in school and would work to make connections. The rest of the students who participated in class instruction, completed assigned tasks and “did school”, I identified as probably being on track to being successful. My work on this study comes out of my desire to know if there is a clear checklist that would assure that my colleagues and I have done our best to ensure each child’s success.

This work found that a student’s academic data could predict their membership in the dropout or graduate group to a very small degree. Demographic data, language arts, and math grades did little to help with that identification, but grades in physical education, science, and social studies showed a higher predictive value.

Question One considered a set of demographic variables that included age, gender, and ethnicity. The canonical correlation for this analysis explained only 1% of the variance. Age at the end of the student’s 7<sup>th</sup> grade year showed no predictive value. Gender differences showed a greater percent of males were in the dropout group and a greater number of females in the graduate group, but was not statistically significant to determine group placement. Student ethnic identification was considered through the combination of identified minorities due to the low percent of minority students in the school district compared to white students. Individual ethnic groupings of Black, Hispanic, Asian, etc. might have been insightful, but was not possible in this homogeneous suburban district. These findings suggest that demographics were not a major discriminating factor.

Question Two looked at demographic variables together with the Year Grade Point Average to predict dropout or graduate student group membership, looking for a correlation with students overall academic achievement and age, gender, or ethnicity that may indicate dropout or graduate group placement and was found to have a low statistical correlation of 9%. As noted in question one, the demographics did not display a predictive coefficient, but grade point average did.

This led to Question Three that breaks down the GPA into the contributing grades in six academic variables of math, language arts, science, social studies, physical education, and year progress. Demographic data, for the third time, showed a negligible predictive value in question three and surprisingly so did Math, Language Arts, and year progress. Science, PE, and Social Studies had higher standardized coefficients at 0.48, 0.40 and 0.36 respectively.

### *Discussion*

The analysis of Colorado Suburban School District data that were studied here suggests that there are no clear and easily accessible “red flags” for probable dropout or graduation when academic and demographic indicators were considered alone. If clear and discernable profiles had been identified then these areas would be addressed via school, parental, and/or individual intervention so that each student would be able to graduate.

The findings of this study suggest that academic subjects other than math and language arts, such as social studies, science, and physical education should

be considered as possible “red flags” although the findings in the studied Colorado Suburban School District may be unique to that setting.

A comparison between this study and Balfanz, Herzog, and Mac Iver’s (2007) study of urban dropouts finds a number of similarities and differences and draw slightly different conclusions. Similarities between Balfanz, et al. (2007) and this study include a data set of academic grades and demographics from first year middle school students, a universal sample of students, inclusion of English Language Learners, and special education students. Differences with Balfanz, et al. is that their study utilized four categorical indicators of student academics, demographics, attendance, and behavior. For this study, attendance and behavioral indicators were not included for reasons earlier noted. Although the demographic genders were approximately equal with half male and half female the demographic ethnicity studied in the urban and the suburban settings were almost direct opposites. The urban setting was identified as 81% minority and 19% non-minority students and the suburban setting found to be 80% white and 20% was a combination of ethnic groups labeled as the non-white minority.

Balfanz’s four indicators of attending school less than 80% of the time, receiving a poor final behavior grade, failing math, or failing English had a high predictive power flagging 60% of those who left school without graduating. They concluded that “an Early Warning System” makes it possible for a student’s middle school records to predict, within a reasonable doubt, those who would drop out of high school. This study would agree that there may be indicators in academic records, but their predictive value was considerably weaker. Other

subjects not considered by Balfanz, et al. have a stronger predictive value and should be included as an at-risk indicator for middle school students.

Mac Iver, Balfanz, and Byrnes' (2009) more current study of the 2006-07 Denver dropout data, to determine how many of that year's dropouts were displaying early warning signs and its application to the 9<sup>th</sup> grade and 6th grade cohorts, concentrated on their early warning system's ABC's, which they identified as attendance, behavior, and course failure. Failure rates among Denver 6th grade students were highest in Mathematics and Language Arts, 19% and 17% respectively, with somewhat fewer students having a failing grade in Science or Social Studies, 16% and 13% respectively. This is particularly interesting because the Colorado Suburban School District utilized in this study is a neighboring suburb in the Denver metropolitan area, but the current study reached different conclusions from the neighboring data. Mac Iver, Balfanz, and Byrnes (2009) suggested it was crucial to begin systematic interventions at four Denver metropolitan urban districts after their study of the 2006-07 sixth grade student's records found that over a third of the students exhibited at least one of their ABC early warning indicators. They recommended the need for a coherent, systematic, integrated approach with district-supported, user-friendly, real-time data systems that would assure that no struggling student would fall through the cracks. Their suggestion is a three-tiered approach similar to Response to Intervention (RTI) and Positive Behavior interventions and Supports, PBIS framework (Mac Iver, p. 30).

RTI is the practice of providing scientific, research-based instruction and intervention matched to students' needs, with important educational decision based on students' levels of performance and learning rates over time.

Such a tiered intervention system can readily be accomplished in the middle school as opposed to the junior high school model. The middle school concept mirrors the recommendations for intervention success outlined by Mac Iver (2009). Quality middle schools emphasize a relevant curriculum, engaged adults, a positive school climate, teacher teaming, project learning, and different types of grading systems in a student centered environment (NMSA, 2003, Guthrie & Davis, 2003; Christie, 2001; Eichhorn, 1966) .

RTI has been described as just such an approach for establishing and redesigning teaching and learning environments so that they are effective, efficient, relevant, and durable for all students, families, and educators (Sugai, 2007) Rtl incorporates:

- Universal systematic screening for all students.
- Data-based decision making and problem solving.
- Continuous progress monitoring on a frequent and regular basis.
- Student performance to guide teaching and learning decisions.
- Continuum of evidence-based interventions.
- Implementation of the full continuum of intervention practices.
- Integrated Academic & behavior support system.

*Urban versus suburban setting.*

Successful students, throughout their school lives, have an evolving network of physical, psychological, and social factors that assist them during both difficult and successful times. This network is most important during the middle school growth years and is most often provided by family, friends, and school

personnel. For dropout students, their safety net had some gaps that allowed them to fail in the school setting. McMillan and Reed (1994) investigated “resilience” which they identified in severely at-risk group of students that recovered from life problems and developed healthy, stable, successful characteristics that assisted them in school. They discussed the four resiliency factors as personal attributes, positive use of time, family support, and school support. One factor that all resilient middle school students describe is a relationship with an adult at school, who provides them with support and direction.

The Matthew Effect is a term that has been used to describe the phenomenon where the rich get rich, but the poor get poorer. This was specifically noted by Stanovich’s (1986) language disabilities and reading studies that found early student learning success leads to further success, while early learning failure lead to students falling further and further behind. The phenomenon was heightened when students had to be able to read to learn subject matter as opposed to learning to read for reading’s sake. Their reading difficulty inhibited performance on many academic tasks and had cognitive, behavioral, and motivational consequences that slowed the development of other cognitive skills. This difficulty in most other school subjects that snowballed from early reading weakness was found to lead to a much higher dropout rate than their early learning peers.

The Matthew Effect can be mitigated with more personal relationships between teacher and students. Findings from Chicago have indicated that student

course performance is related to relationships with teachers, the relevance of classroom instruction to the future, teachers' sense of joint responsibility for student success, and the degree of "coherence in instructional programming" across the school (Allensworth & Easton, 2007, p. 33).

Due to the large percentages of students that have dropped out of urban school districts and the national uproar that resulted, it is understandable that the majority of recent studies have focused on early warning signals in those urban centers' schools. Future studies could investigate the difference between suburban and urban school settings. This study was conducted in a generally economically affluent, ethnically white, generally conservative, suburban setting next to the urban center of Denver, Colorado.

Many of America's middle-class families that have moved from the cities to the suburbs, in part because parents see the suburban public schools as safer, more orderly, and more wholesome refuges from the disorder and social collapse they believe are endemic to urban school districts Greene & Forester (2009), found those perceptions unfounded. Using hard data on high school students from the National Longitudinal Study of Adolescent Health, a comprehensive and rigorous study of the behavior of American high school students, found that suburban public high school students have sex, drink, smoke, use illegal drugs, and engage in delinquent behavior as often as urban public high school students. Greene and Forester conclude that shiny new schools armed with expensive textbooks and staffed by teachers who have mastered the latest educational fads don't seem to be associated with substantial differences in student behavior.

A topic for future studies is the question of whether children in the suburban or the urban setting face a more daunting array of environmental challenges as they become young adolescents. Are there higher degrees of teacher turnover and vacancies, more chaotic, disorganized, under-resourced classrooms or a wider range of push and pull factors that may promote school disengagement in either setting? Under the requirements of No Child Left Behind (NCLB), all children expect to be taught by a highly qualified teacher, but state and federal reports show that highly qualified teachers are not distributed uniformly across schools districts in the United States.

*Subject grading.*

This study in the Colorado Suburban School District noted that the structure coefficients for Social Studies, Science, and PE were the highest and these variables made the greatest relative contribution to prediction for graduation or dropout. These subjects Balfanz, et al (2007) chose to not directly investigate. A subjective interpretation is that those three subjects with the greatest contribution to dropout group identification may have an underlying construct of how the grade was assigned or the unique requirements of the courses, as compared to the non-predictive courses. An explanation may be that these three subjects areas are often assessed based on active participation, compared to the variables of Math and Language Arts that are often assessed on concrete demonstration of knowledge.



*Grading system.*

Hodgepodge grading and fuzzy logic were earlier mentioned to discuss individual grade reliability, but the concepts may be applied to the greater issues of graduation and dropout prediction for the larger studied group. Hodgepodge grading was the acknowledgement that teachers take into account a multiple of other factors when assigning individual grades to students. Generally, those other factors are individualized to reflect the teacher's perceptions of the student personally, behaviorally, socially, and academically. Noting that hodgepodge grading is an accepted individual factor, more so than the large data set that is constructed in this study from about 3000 individual student grades, must consider the impact of hodgepodge grading on predictions for needed interventions. The findings in this study support the concept of fuzzy logic in the educational grading system because not all students were cleanly identified into either one or the other binary group as a dropout or as a graduate.

Due to a district choice to redefine the middle school grading system, the recent middle school grade data from the Colorado Suburban School District could be more insightful. In the summer of 2004, before the beginning of the 2004-2005 school year, the suburban school district worked to create more clarity as to the meaning of each student's individual grade. Instead of the traditional composite grade that lumped a student's knowledge and work habits together, the school district chose to divide the end of academic period report into two separate grades. Students received one knowledge level mark that reflected what a student knew about the subject matter and how they did on a test, and the second grade

was how hard a student worked. Did they complete assignments and participate in class? This unique set of data, although not available for this study, could provide further clarity in analyzing student academic achievement.

*Other dropout indicators.*

Grading was created as a communications tool of student's progress and each grade is individually a dropout indicator. Grades themselves are red flags and should be used as a fair assessment and communication tool of students' personal progress.

Investigated in this study was a very narrow set of dropout indicators leaving a broad array of factors that should be considered for student success. Numerous other areas of consideration concerning the impact on student success arose during the research for this study and allude to the complexity of the dropout puzzle such as:

- Parental Impact
- Ethnic and Economic Concerns
- Health Status & Physical Disabilities
- Drugs, Alcohol and Tobacco Use and Abuse
- Early or Late Child Development Issues
- Extracurricular Activities and School Social Involvement
- Sexual Activity and Teen Childbearing
- School Agents: Administration, Teachers, and Councilors
- Student Mobility and Homelessness
- Grade Retention and Graduation Examinations
- Private, Alternative and Home Schools
- School Population Size and Configuration
- Rural School Districts
- Underage Dropout and Mandatory Attendance Age

This study reinforces that there is not a clear set of warning signals that are easily available. School success is much more complicated. Disengagement from

school is a long process that is expressed by different students in numerous ways. The literature suggests that many students may demonstrate being on the dropout path through failing classes, behavioral problems, or attendance issues, but a percentage would not be identified through the use of a simple formula. Bernhardt (2004) states schools cannot use student achievement measures, only because the context of the child and their environment is missing. Broader data provides power to make better decisions, work intelligently, work effectively, and change things in better ways so that concerned adults can know the impact of their hard work and how it benefits children.

*Response to intervention.*

Dropout rates are lower at schools with more personal relationships between teacher and students and less differentiation in curriculum among students (Croninger & Lee, 2001). Findings from Chicago have indicated that student course performance is related to relationships with teachers, the relevance of classroom instruction to the future, and teachers' sense of joint responsibility for student success (Allensworth & Easton, 2007).

Mac Iver, Balfanz, and Byrnes (2009) analysis, from the 2006-07 academic year in four Denver metropolitan and one southern Colorado urban districts with early warning signals, problems with attendance, behavior, or course failure, could help inform district planning for interventions to address the reasons behind a dropout outcome. First year middle school students, either sixth or seventh grade, had the equivalent of one full year failure ranging from 9% to 23% among the four Denver area districts. At least a third of the district's students exhibit at

least one of the early warning dropout indicators. They suggest it is crucial to begin coherent, systematic, integrated approach in the middle school to assure that no student falls through the cracks. They consider it important to build consensus among school staffs on the need for integrated whole school reform, student support structures, and research-based practices, including teacher teaming, project learning, different types of grading systems, and opportunities for students to make up missed work, all of which could help to keep all students on track for on-time graduation.

It is suggested here that that type of system is found in the Response to Intervention (RTI) model that may be misunderstood and under-utilized due to its identification as a clearinghouse to special education testing and labeling. This research showed that few dropout students could be easily identified through their academic records and therefore, identification and providing interventions to at-risk students is not an easy process. A network of broad range supports must be in place for all children to be successful. The national Response to Intervention (RTI) model seems to offer that promise by utilizing a specific assessment plan that would include for all students, screening, diagnostic, progress monitoring, and outcome-based assessment. The RTI assessment model has 4 major parts included within this warning and intervention system:

- Identification of students from the beginning of the year
- On-going instructional planning to meet the needs of students.
- Monitoring student progress with interventions and instruction.
- Evaluation if the levels of instruction help student achieve.

The federal laws of the No Child Left Behind Act of 2001 and the Individuals With Disabilities Education Improvement Act (IDEA) of 2004 direct schools to focus on helping all children before they become so far behind that a referral to special education services is warranted. Both laws underscore the importance of providing high quality, scientifically based instruction, and interventions while holding schools accountable for the progress of all students. IDEA 2004 puts “It’s money where its mouth is,” by creating the option of using up to 15% of federal special education funds for “early intervening services” for students who need additional academic and behavioral support to succeed in the general education setting, even though they may not have been identified as needing special education. IDEA 2004 encourages utilizing the Response-to-Intervention (RTI) Model’s instructional strategies that encourage providing a system of interventions, which helps students progress that are a dropout risk or not raising to meet their full potential. RTI’s on-going strategy of data analysis for problem-solving among all vested parties should include the easily accessible data considered within this study.

The Colorado Department of Education agrees, in their statement, that all children can learn and achieve high standards as a result of effective teaching with interventions at the earliest indication of need as necessary for student success. CDE expects RTI to be used as a guiding framework in all districts by August of 2009. Denver Public Schools and the Colorado Suburban School District have formed a partnership with the national RTI organization, with both school districts supporting that RTI is a dynamic problem-solving process and structure for

providing a continuum of evidence-based, instruction and interventions, with increasing levels of intensity and duration, based on student need.

*Limitations to this study.*

Initially, the attempt was made to use all of Balfanz's ABC's of early warning indicators; attendance, behavior, and course failure, but insufficient data was available in attendance and behavioral areas due to the limiting factors of access to complete data.

The challenges overcome through the technological changes that happened during the decade of this study were earlier outlined and seem to be unique to the decade of time in which this study was conducted. The challenges concerning data collection, storage, and retrieval of thousands of student's records have generally been overcome through the development of school district master servers that can house massive quantities of data in a central, accessible location. The will by which educators continue to collect and store such quantities of student data may be impacted by how useful that collected data is judged to be by those same educators. Implied by this study is that value can be placed on the warning signs available within the data, but are not the exclusive red flags needed to assess and develop the need for interventions for all students.

Large amounts of student data were unavailable for this study, due to the above noted factors. It does not appear that the data that was lost skewed the final data set. Approximately the same percent of student records were lost in both the dropout and graduate data groups. Eighteen percent of the graduation data was complete with the original number for the five years at 11,724 graduates and 2089

complete data sets available. Eleven percent of the dropout data was complete over the same time period with 990 dropouts and 106 complete data sets.

Social and economic status is broadly agreed upon as an indicator for dropout or graduate prediction. The assumption was made in this study that those individuals in the Colorado Suburban School District would be considered in the economic collective of the suburb, non-metropolitan picture. An individual student's social and economic background was not considered here, but investigation into the safety net that may be provided to students with solid and broad family support or the compensating factors that a successful student utilizes when their social support is low would be worthy of study. Equally, further light could be shed upon student success if the nuances around an individual's educational wellbeing, in the face of their monetary poverty or wealth, would be a terrific topic to investigate. Discriminate function analysis of similar data from similar suburban school districts could find similar results from students' probable membership in either as a dropout or graduate. This study worked to identify early warning indicators for first year middle school students, but with the update in data resources at-risk, student data could be accessed as students enter from other districts.

### *Conclusion*

John F. Kennedy pronounced "Let us think of education as the means of developing our greatest abilities, because in each of us there is a private hope and dream which, fulfilled, can be translated into benefit for everyone and greater strength for our nation."

The reasons why students drop out of schools are as many and varied as the students themselves. This study looked for red flag indicators from a Colorado Suburban School District's middle school settings and found that a very weak set of descriptors could be identified, which suggests that many other factors should be considered to predict possible student dropout. Programs are needed to provide a wide range of proactive interventions for the middle school student without narrowly identified red flags. Interventions must be inclusive of students and not just rely upon exclusionary Early Warning Systems. Early warning indicators may be statistically significant, but the practical value is low-use at an individual level.

The middle school program is one that considers all students at their own individual levels and is structured for flexibility to meet student needs as they arise in the middle years. The middle school model would allow a teacher to oversee individual student needs, if teachers were not assigning grades that have questionable value or were not working so hard to prepare students for testing, for which the student, teacher, school and school system is held accountable . High schools would do well to adopt more of the middle school philosophy of caring for the individual student.

This study finds that in the Colorado Suburban School District there were factors within a given set of historical data that were capable of predicting students as either being members of the identified dropout group or as members of the graduation group. This identification had a very low predictability level



with a much larger probability of non-identification. The suggestion is therefore that grades could be utilized as predictors, but must not be considered exclusively as the only red flags for students at risk of being unsuccessful in completing school.

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