

DESCRIBING STATE LEVEL MATHEMATICAL GROWTH USING THE
STUDENT GROWTH PERCENTILE (SGP) METHODOLOGY

by

Darin C. Kelberlau

A DISSERTATION

Presented to the Faculty of

The Graduate College at the University of Nebraska

In Partial Fulfillment of Requirements

For the Degree of Doctor of Philosophy

Major: Psychological Studies in Education

(Quantitative, Qualitative, & Psychometric Methods)

Under the Supervision of Professor Delwyn L. Harnisch

Lincoln, Nebraska

August, 2015

UMI Number: 3712513

All rights reserved

INFORMATION TO ALL USERS

The quality of this reproduction is dependent upon the quality of the copy submitted.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if material had to be removed, a note will indicate the deletion.



UMI 3712513

Published by ProQuest LLC (2015). Copyright in the Dissertation held by the Author.

Microform Edition © ProQuest LLC.

All rights reserved. This work is protected against unauthorized copying under Title 17, United States Code



ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 - 1346

DESCRIBING STATE LEVEL MATHEMATICAL GROWTH USING THE STUDENT GROWTH PERCENTILE (SGP) METHODOLOGY

Darin Charles Kelberlau, Ph.D.

University of Nebraska, 2015

Advisor: Delwyn L. Harnisch

The purpose of this study was to describe growth in student mathematics performance at the student and group levels as measured by the statewide mathematics test in Nebraska. Student groupings analyzed for differences in growth patterns were cohorts (elementary and middle school aged students), growth categories, grade levels, gender, ethnicity, students receiving special education (SPED) services, students receiving support services due to English not being their native language (ELL). Building differences were defined by average number of students per grade level (size), levels of student performance, levels of students receiving SPED services, and levels of students receiving ELL services.

The Student Growth Percentile (SGP) methodology was the growth model employed to quantify learning growth in mathematics as measured by the Nebraska State Accountability (NeSA) mathematics assessment. This methodology meets federal requirements for accountability, provided student level growth scores, and compared students with similar testing history. The NeSA-M results (2010-2014) were analyzed using the SGP approach for grades 3-8. Analyses were run utilizing the open source SGP Package within the R Studio software application.

The SGP assumptions were verified prior to testing for growth differences between student groups. Median SGPs matched expectations, and a variety of

perspectives ensured that performance and growth scores were uncorrelated. These approaches confirmed that no relationship existed between performance and growth. Scatterplots were generated to evaluate possible ceiling and floor effects. The plots demonstrated the possibility of experiencing all levels of growth regardless of performance.

Comparisons between groups of learners revealed significance due to the power of the study. Effect sizes were all small, which suggests little practical significance. The availability of more longitudinal data offers an opportunity for further investigation.

PREVIEW

Acknowledgements

I want to thank many people who played key roles as I completed not only my dissertation, but also my coursework and related tasks over the years. First, I'd like to thank my adviser, committee chair, and mentor, Dr. Delwyn Harnisch. He has provided much guidance in structuring my program and many meaningful experiences in assessment and research design. Without his support and confidence in me, I would not be where I am today.

I also thank Dr. Charles Ansorge for his willingness to serve on my committee. I have great respect for his dedication to teaching, statistics and technology integration. His expertise and approach to designing online courses has greatly influenced me as a teacher.

This study would not have been possible without the work of Dr. Damian Betebenner with The National Center for the Improvement of Educational Assessment, Inc. He has made such an impact on utilizing the SGP methodology with states. His openness in sharing his expertise through replying to emails and taking my calls was of much value to me. I can't thank him enough for assisting me with adding in Nebraska structure to the open source code. This allowed me to move forward with my study and make my analysis as similar to a real state level analysis as possible.

Another very generous educational researcher who shared her expertise in growth models was Dr. Katherine Castellano with Educational Testing Service. It was her paper with Dr. Andrew Ho on growth models that captured my interest on growth models in general, but really was my first glimpse at the Student Growth Percentile methodology.

She, too, was very willing to share with me her knowledge on growth modeling and R so that I could move forward with my research.

Krissy Johnson, SGP Data Analyst with the State of Washington (Office of Superintendent of Public Instruction (OSPI), was kind enough to share with me how SGPs were utilized in her state. She provided ground level look at growth modeling.

I also want to thank all of my colleagues and friends who would frequently ask me how my paper was progressing. Many friends, not really familiar with the research, but showing interest, encouraged me because they knew it was important to me. Many colleagues shared their dissertation experiences as well as words of support as they knew the importance of adding to the body of research in education. Many fellow workers I worked with on a regular basis deserve mentioning. Showing interest and asking me how my research was developing was extremely motivating to me and kept me focused on the end goal.

Finally, thank you to my family. I appreciate so much their willingness to let me take family time for my research. To Kate, my six-year old daughter, asking me if I had homework tonight and Hayden, my ten-year old son, asking me how my paper was coming and when will it ever be done – thank you. My wife, Allison, thank you so much for not only believing in me but also having the patience and understanding to allow me to complete this dissertation.

Finally, a number of talented caring individuals in my life have greatly influenced me and made the completion of this dissertation possible -- thank you!

TABLE OF CONTENTS

Chapter 1 – INTRODUCTION.....	1
Context.....	1
Purpose of Study.....	2
Research Questions.....	3
Assumptions.....	3
Definition of Terms.....	4
Delimitations.....	12
Limitations.....	12
Significance of Study.....	13
Chapter II -- LITERATURE REVIEW	14
Measuring Growth	14
Defining Growth Models.....	18
Value-Added Models (VAM).....	19
Purpose of Growth Models.....	19
Review of Growth Models.....	20
Gain-Based Models.....	21
Conditional Status Models.....	21
Multivariate Models.....	21
Limitations of Growth Models.....	22
Student Growth Percentile (SGP) Methodology.....	23
Student Growth Trajectories or Projections.....	29
Benefits of SGP Methodology	31

Chapter III – METHODS.....	36
Research Design.....	36
Instrumentation	38
Sampling Procedures	41
Data Collection	46
IRB process	49
Data Analysis	49
Chapter IV – RESULTS	53
Introduction.....	53
R / SGP Package Coding for Analyses.....	53
SGP Analysis Steps.....	53
Sampling Information and Demographic Summaries.....	55
SGP Summary Tables on 2014 NeSA-M Analyses.....	55
SGP Model Assumptions.....	55
Research Q1 Summaries	59
Research Q2 Summaries	62
Gender Differences	62
Ethnicity Differences	63
Special Education Differences	64
English Language Learner Differences	65
Building Differences	65
Size – Student Count.....	65
Student Performance.....	67

Special Education Services	68
English Language Learner Services.....	69
Summary	70
Chapter V -- DISCUSSION AND CONCLUSIONS	71
Introduction.....	71
Review of Results and Meaning for Practice.....	71
Summary of Discussion	74
Limitations of Study	74
Further Research	75
Conclusions and Implications	78
REFERENCES	81
APPENDICES	90

LIST OF FIGURES & TABLES

Figure 1.1	Catch-up, Keep-up, Move-up, and Stay-up Definitions	5
Table 1.2	Growth Proficiency Targets	6
Table 1.3	Cohort Groupings By Grade and Year.....	13
Figure 2.1	Sample Score Distributions for Two Consecutive Years	25
Figure 2.2	Illustration of Calculating SGPs for Two Hypothetical Students	27
Table 2.3	Scale Scores for a Student Over Five Years On a State Reading Test.....	28
Table 2.4	Percentile Cut Scores for Grade 7 Reading Based Upon Grades 3, 4, 5, and 6 Scale Scores	28
Table 2.5	Assumptions of Linear and Quantile Regression.....	33
Table 3.1	NeSA-M Cut Scores (Scale Scores) By Grade Level	37
Table 3.2	Describing Various Levels of Student Growth	38
Table 3.3	NeSA-M Test Configuration.....	39
Table 3.4	NeSA-M Number of Items Per Content Strand Per Grade Level	40
Table 3.5	Longitudinal Distributions of Reasons Why Students Did Not Have a Valid Test Score.....	45
Table 3.6	Distribution of the Sample	46
Table 3.7	Defining the Types of Buildings Per Grouping Variable	51
Figure 3.8	Percent of ELL Students per School Building.....	52
Table 4.1	Number of Valid Student Records By Grade Level and Year.....	55
Table 4.2	Number of Students Receiving a SGP Score By Grade Level for 2014.....	55
Table 4.3	Median SGPs By Grade Level for 2014	56
Table 4.4	Correlations (r) Between Most Recent Prior Standardized Scale Score and SGPs and p-values By Grade Level for 2012-2014	57

Figure 4.5	Growth (SGP) and Prior Achievement (Scale Score) -- Grade 4-8	58
Table 4.6	Growth Levels (Baseline SGP) By School Level for 2012-2014	58
Table 4.7	Growth Levels (Baseline SGP) By Grade Level Over Time 2012-2014	59
Table 4.8	Growth Levels (Baseline SGP) By Grade Level for Cohorts From 2012-2014	60
Table 4.9	Median Growth (Baseline SGP) By Gender for 2012-2014	62
Table 4.10	Pairwise Comparisons Growth of Ethnicity Groups	63
Table 4.11	Follow-up Test Results for Different Types of Buildings – Size (Average Student Count)	65
Table 4.12	Building Median SGP By Building Size (Average Grade level) By Year	66
Table 4.13	Kruskal-Wallis Tests for SGP Differences in Building Size in 2012, 2013, and 2014	66
Table 4.14	Pairwise Comparisons for SGP Differences for Building Size in 2012, 2013 and 2014	67
Table 4.15	Follow-up Test Results for Different Types of Buildings – Performance	67
Table 4.16	Follow-up Test Results for Different Types of Buildings – SPED Levels	67
Table 4.17	Follow-up Test Results for Different Types of Buildings – ELL Levels	68

LIST OF APPENDICES

Appendix A	IRB Approval Letter	90
Appendix B	Request for Data from Nebraska Department of Education	92
Appendix C	Steps for RStudio Install and R Code for SGP Package Install	93
Appendix D	R Code for SGP Analysis and Report Generation	94
Appendix E	SGP Technical Overview & Documentation	95
Appendix F	NeSA-M Table of Specifications	96
Appendix G	NeSA-M Student Reference Sheets	97
Appendix H	NeSA-M Technical Reports	98
Appendix I	NeSA-M Raw Score to Scale Score Conversion Tables 2011-14	99
Appendix J	Sample SGP Package Reports	100
Appendix K	SGP Goodness-of-Fit Descriptives Reports -- Grades 4-8	105
Appendix L	SGP Goodness-of-Fit Decile Reports -- Grades 4-8	108

CHAPTER I

INTRODUCTION

Context

An ongoing fundamental purpose of educational systems is to maximize each student's skillset. Measuring student achievement provides school systems with valuable information. These data points provide local districts a way of evaluating curricular programs, instructional programs, district effectiveness, building effectiveness, classroom effectiveness, professional development needs of staff members, and individual student progress.

State departments of education are interested in measuring student growth to incorporate into their federal and state accountability systems. The Nebraska Department of Education (NDE) and State Board of Education developed an accountability system as required by state law 79-760.06, entitled the Nebraska Performance Accountability Systems (NePAS). A description of this system is found later in this study.

At the time of this study, the Nebraska State Board of Education was overseeing the development of a new accountability framework, "A Quality Education System, Today and Tomorrow" (AQuESTT), that defined the vision of the State Board. One portion focused on assessment and included a different method of measuring growth within the state accountability system. This has not yet been determined. Research by Goldschmidt, Choi, and Beaudoin (2012) compared a variety of growth models within accountability systems and came to the overarching conclusion that the model implemented does make a difference (p. 54). In classifying school buildings, the models performed differently across states (Goldschmidt et al., 2012, p.56). Even though

Goldschmidt et al. (2012) found that the various models performed fairly consistently, it is evident that there is a need to investigate how the outcomes from potential growth models might be displayed from the Nebraska mathematics test data. As Goldschmidt et al. stated “no one single model can unequivocally be assumed to provide the best results” (Goldschmidt et al, 2012, p. 54). This growth study focused on the Student Growth Percentile (SGP) methodology on the state mathematics test for the state of Nebraska.

The current study was approved the by the Institutional Review Board (IRB) at the University of Nebraska - Lincoln (UNL) which indicated appropriate precautions were taken for the safety and wellbeing of the participants (Appendix A). Nebraska state mathematics test data were obtained from the Data, Research and Evaluation Department of the NDE by complying to the Data Access and Use Policy and Procedures and completing the Data Request document (Appendix B). The form required studies to be in alignment with the Nebraska State Board of Education’s data policies, Nebraska law and protect the confidentiality of the data.

Purpose of Study

The purpose of this growth study was to investigate the growth by Nebraska students in mathematical achievement as measured by the statewide mathematics test. The Student Growth Percentile (SGP) analyses were applied to the state data and student, as well as group, level results were produced. Two three-year student cohort groups were formed for both elementary (grades 3-4-5) and middle school (grades 6-7-8) aged children. Aggregated results were also investigated for school buildings and other essential student groupings such as grade levels, gender, students receiving special

education services (SPED), English Language learners eligible for support (ELL), and the seven ethnicities utilized by the Nebraska Department of Education (NDE).

Research Questions

This study of mathematical growth addressed one main question with three additional related questions. Each of the questions utilized the Nebraska state mathematics test (NeSA-M) as the instrument to quantify student achievement. The growth model called Student Growth Percentile (SGP) was the chosen model. The focus of this study was to examine the following research questions:

- To what extent did students grow in their mathematical understandings based on the Nebraska state mathematics tests (NeSA-M)?
 - To what extent did elementary and middle school aged students grow in their mathematical understandings based on the Nebraska state mathematics test (NeSA-M) utilizing the SGP Methodology?
- To what extent can the results from the SGP Methodology be utilized to describe growth trends in various groups of Nebraska students?

Assumptions

The study could not assume pure randomization of the students across the state. School building assignment and classifications were used as appeared in the data file provided by the Nebraska Department of Education (NDE). The classifications followed guidelines by the state and provided to the NDE by the school districts.

The underlying statistical foundation for the SGP approach was quantile regression. These are outlined later in this study. Koenker (2005) provided a detailed explanation on quantile regression.

Definition of Terms

Academic Peers -- students who have the same academic history for a given assessment. These peer groupings formed the comparison groups for each student.

Achievement -- Ballou (2008) stated that many social scientists defined achievement in a way that it “represents the student’s mastery of the domain of the test” (p. 2). He added that much of the literature uses the term ‘ability’ in this manner and that the “knowledge and skills acquired through education” should not be confused with “innate ability” (p. 2).

Adequate Yearly Progress (AYP) -- under No Child Left Behind, states created annual targets in reading and mathematics in efforts to have all students reach mastery by Spring, 2014. These targets were state tests results in grades 3-8 and one determined grade level in high school. If AYP was not met, there were federal sanctions imposed upon school buildings and districts.

Adjusted MGP (MSGP or mSGP) -- the middle, typically median, SGP for a particular unit (i.e., classroom, building or district) based upon the academic peer groupings and English language learner status, students with disabilities status, and economic disadvantage status. The state of New York is an example that utilizes an adjusted MGP (mean) statistic for teachers and principals. Refer to the engage^{NY} website for detailed definitions (p. 4).

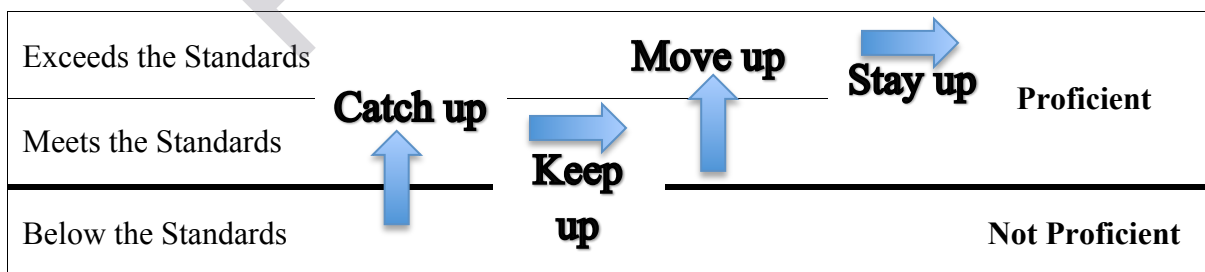
AQuESTT -- “Accountability for a Quality Education System, Today and Tomorrow” – the framework currently being created by stakeholders and approved by the Nebraska State Board of Education will provide the foundational vision for “a next generation accountability system” (Nebraska Department of Education [NDE], 2012).

One tenet, assessment, is of most importance to this study as NDE develops a system to measure student achievement growth with the state assessments. Detailed information can be found on the NDE's AQuESTT website (AQuESTT for Nebraska).

Catch-up Growth -- one of the four Performance Level Growth Targets (Catch-Up, Keep-up, Move-up and Stay-Up) consists of students who have experienced a normal grade progression and a student growth percentile statistic in which they were at the performance level of "Below the Standards" in the previous year and earned a proficient performance level for the current year. Additionally, students in this category are those that experienced growth at or above the growth score needed to be at these performance levels within three years or by grade 11, whichever comes first. This growth projection predicts future student performance based on recent experienced growth. This concept was adapted from Betebenner's (2011) definition in conjunction with the state of Nebraska's testing configuration (p. 7). Figure 1.1 illustrates the definitions of this method honoring growth of students across and within achievement levels.

Figure 1.1

Catch-up, Keep-up, Move-up, and Stay-up Definitions



Note: Adapted from documents from the Colorado and Washington Departments of Education

Table 1.2 associates the growth categories to the performance levels of previous performance and needed performance.

Table 1.2

Growth Proficiency Targets

Category	Previous Year's Performance Level	Performance Level Needed in 3 Years
Catching Up	Below the Standards	Meets the Standards
Keeping Up	Meets the Standards	Meets the Standards
Moving Up	Meets the Standards	Exceeds the Standards
Staying Up	Exceeds the Standards	Exceeds the Standards

Note: Adapted from a document from Washington Department of Education

Economically Disadvantaged Students -- students whose families participate in an economic assistance program such as the Free- or Reduced Lunch Program. These determinations are established at the district level and reported to the Nebraska Department of Education (NDE).

English Language Learners (ELL) -- NDE defines ELL as:

“...students who have a native language other than English, OR who come from an environment where a language other than English has had a significant impact on their level of English proficiency, AND whose difficulties in speaking reading, writing, or understanding the English language may be sufficient to deny the individual (i) the ability to meet the state’s proficient level of achievement on state assessments, (ii) the ability to successfully achieve in classrooms where the language of instruction is English, or, (iii) the opportunity to participate fully in society” (2013, p. 3).

This designation is provided by the school districts to the Nebraska Department of Education.

Elementary and Secondary Education Act of 1965 (ESEA) -- a federal act of Congress to provide access to high standards for all students and establishes a high level of accountability. Within this act are several programs that assist states in their focus on student poverty, students with disabilities, mobility, and struggling students. The current reauthorization of ESEA (2001), is called No Child Left Behind.

Growth -- change in student(s) achievement over time, typically from one school year to another school year. This study focused on Spring, 2011 to Spring, 2012 to Spring, 2013 to Spring, 2014.

Growth Models -- “a collection of definitions, calculations or rules that summarizes student performance over two or more time points and supports interpretations about students, their classrooms, their educators or their schools” (Castellano & Ho, 2013a, p.16).

High Growth -- for this study, a student or group of students where the SGP or mSGP exceeds 65. This threshold does vary across states but this was the most common.

Keep-up Growth -- one of the four Performance Level Growth Targets (Catch-Up, Keep-up, Move-up and Stay-Up). This category consists of students who have experienced a normal grade progression and a student growth percentile statistic in which they were at the “Meets the Standards” level in the previous year and earned a “Meets the Standards” level for the current year. Also included are those that experienced growth at or above the growth score needed to be at this level in each of the next three years or by grade 11, whichever comes first. The growth projection predicts future student performance based on recent experienced growth. This concept was adapted from Betebenner’s (2011) definition for use with the state of Nebraska’s testing configuration (p. 7). Figure 1.1 and Table 1.3 (refer to Catch-up Growth in this chapter) provide visual descriptions of the definitions.

Low Growth -- for this study, a student or group of students where the SGP or mSGP is less than 36. This threshold varies among states, but was the most common.

Median Growth Percentile (MGP or MSGP or mSGP) -- the middle, typically median, SGP for a particular unit (i.e., classroom, building or district) based upon the academic peers. This measure does not take into account individual student differences such as ethnicity, poverty, or disabilities and is sometimes referred to as an “unadjusted” median growth percentile.

Move-up Growth -- one of the four Performance Level Growth Targets (Catch-Up, Keep-up, Move-up and Stay-Up). This category consists of students who have experienced a normal grade progression and a student growth percentile statistic in which they were at the “Meets the Standards” performance level in the previous year and earned the “Exceeds the Standards” performance level for the current year. Students in this category included those that experienced growth at or above the growth score needed to be at the “Exceeds the Standards” level within the next three years or by grade 11, whichever comes first. The growth projection predicts future student performance based on recent experienced growth. This concept was adapted from Betebenner’s (2011) definition for use with the state of Nebraska’s testing configuration (p. 7). Figure 1.2 and Table 1.3 (refer to Catch-up Growth in this chapter) provide visual descriptions of the definitions.

Nebraska State Accountability -- Mathematics (NeSA-M) -- state test administered to all students in grades three through eight and eleven. The assessments were required in the amended Quality Education Accountability Act, 79-760, for the purpose of comparative accountability (SAA-14, 2014). These assessments were to measure student achievement on the Nebraska State Mathematics Standards (adopted by the Nebraska State Board of Education in 2009). NDE provided guidance to scheduling the NeSA-M

tests on two consecutive days (within the same week and preferably not Monday) or for older students, two sessions within the same day with a break in between. Special considerations were specific to each student's Individual Education Plan (IEP) or for ELL students (SAA-14, 2014, p. 14). In 2011 and 2012, local school districts were given the option to test paper/pencil or online. Based on Moon's (2013) comparability study of paper / pencil and online testing, policy makers in Nebraska required school districts to administer the NeSA-M tests online beginning in 2013 and for future test administrations. There were few exceptions in administering online testing for Nebraska students. NDE outlined exempt groups (listed below are those that are pertinent to this growth study):

- Students taking the alternate math test.
- Students with disabilities whose IEPs require paper/pencil testing.
- Students with 504 plans that require paper/pencil testing.
- English Language Learners whose accommodations require paper/pencil testing.
- Students contracted to institutions where online access is not allowed (SAA-14, 2014, p. 25).

Further administration and security procedures are referenced in the NDE provided document, Update: Standards, Assessment, and Accountability (SAA) -- Volume 14 (SAA-14).

Nebraska Performance Accountability System (NePAS) -- In August 2012, the Nebraska State Board of Education adopted NePAS as the state accountability system required by state law 79-760.06. This model provided numerous average scale scores and state rankings for all state tests and graduation rates. Student achievement was categorized within three categories: status, improvement and growth. "Status" was

defined by the average scale score associated with the appropriate student grouping.

“Improvement” was the difference of average scale score for two consecutive testing years. Improvement scores compare different students over time within the same grade level. NDE defines “growth” as the average of differences in scale scores for the same students over two consecutive testing seasons. Improvement and growth defined in this manner would be categorized in the simple gain growth model discussed later in this study. This growth model component is the focus for this study. A comprehensive account of all components of this state accountability system is found in the Nebraska Performance Accountability System (NePAS) document provided by the NDE (Nebraska Performance Accountability System (NePAS), 2012).

No Child Left Behind (NCLB) -- The No Child Left Behind Act of 2001 requires all states to develop statewide standardized tests in key areas for all kids in designated grade levels. This allows states to receive federal funding. Each state determines their own level of rigor and is charged with having all students at proficiency in reading and mathematics by Spring 2014.

Not Proficient -- student performance within the “Below the Standards” as measured by the Nebraska statewide test.

Proficiency -- student performance within the “Meets the Standards” or “Exceeds the Standards” as measured by the Nebraska statewide test.

Scale Score -- a transformed score that can be used to compare scores from an assessment from one year to another (refer to Appendix I).

Status -- academic achievement at one particular point in time for a student or group of students. In this study, it is measured by the NeSA-M scale score or average scale score for the appropriate group.

Student Growth Percentiles (SGP) -- describes a student's growth from one year to the next, relative to other students with the same test history (see Academic Peers). For example, a SGP of 62 means that a student's growth was the same or greater than 62% of similar students. The comparative group of students to which this definition refers is those tested that school year. The Office of Superintendent of Public Instruction (OSPI) in Washington refers to this as a cohort-based SGP.

Student Growth Percentiles (SGP) Baseline -- describes a student's growth from one year to the next, relative to all students in the same grade level over previous years. This grouping creates one super-cohort. OSPI refers to this as a baseline-referenced SGP.

Stay-up Growth -- one of the four Performance Level Growth Targets (Catch-Up, Keep-up, Move-up and Stay-Up). This category consists of students who have experienced a normal grade progression and a student growth percentile statistic in which they were at the "Exceeds the Standards" performance level in the previous year and earned an "Exceeds the Standards" level for the current year **or** experienced growth at or above the growth score needed to be at the "Exceeds the Standards" level in each of the next three years or by grade 11, whichever comes first. Figure 1.1 and Table 1.3 (refer to Catch-up Growth in this chapter) provide visual descriptions of the definitions.

Students with Disabilities (SPED) -- students that meet the verification guidelines as outlined by Rule 51 (Rule 51, 2014). These determinations are made at the district level and reported to NDE.

Title I -- a program administered by the United States Department of Education (USDE) within the Elementary and Secondary Education Act to provide funding to schools and districts that have a high percentage of students living in poverty.

Typical Growth -- for this study, a student or group of students where the SGP or MGP falls between 36 and 65, inclusively. These boundaries vary by state, but range is most common.

Delimitations

This study will not address how the SGP methodology might or might not be used for teacher and / or principal evaluations. Also, there are variations available to reporting SGPs at the student level and many more as data is aggregated. Unless otherwise noted, the configurations and setup were the default settings within the SGP analysis package. The researcher considered many options states currently employ for this study. The common results greatly influenced this initial analysis using the SGP methodology of measuring growth on Nebraska state math results.

Limitations

To ensure student data were not identifiable, NDE did not release poverty or district associations. Therefore, this study did not analyze potential student achievement differences between school districts or poverty levels of student groups.

Individual school districts reported all student level classifications to the NDE. There are specific guidelines for each variable but one should note they were self-reported.

The study included four years of statewide test data for grades three through eight. This allowed for two three-year cohorts of students per educational level to be used to