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Achievement Data for K-12 Schools

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Achievement Data for K-12 Schools

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Abstract

With the advent of No Child Left Behind legislation, K-12 schools are required to demonstrate a certain percentage of students can reach levels of proficiency, called Annual Yearly Progress (AYP). In South Dakota, the Dakota STEP test is administered in the spring to determine these levels of proficiency. Schools receive feedback from the state on certain aspects of proficiency, but many important pieces are missing for schools to develop effective strategies and to make good decisions.

This project utilizes "raw" Dakota STEP data to focus on 3 basic problems concerning achievement data: 1) provide better tools to help schools improve AYP, 2) provide better tools to help schools improve in areas beyond AYP, and 3) mine data for insights on student achievement trends that may help the education community in general.

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Introduction

No Child Left Behind (NCLB) is legislation that has had a dramatic impact on education in this nation. The primary goal: all students will be proficient or higher in reading and math by 2013-2014. Schools are required to show improvement in student proficiency levels over the course of these next few years as defined by the South Dakota Content Standards in reading and mathematics.

The proficiencies are not measured by group averages, but rather by the number of students who achieved above the proficiency "line." Educators need to develop building/district strategies to get many of the lower achieving students above proficiency. Therefore schools need better information about the students they have in their buildings for better decision-making. Armed with the right information educators can focus effort where they can get the greatest impact.

Developing tools for schools to analyze high-stakes test data used to meet compliance with No Child Left Behind legislation is the goal of this project. Nearly all students in grades 3-8 and grade 11 in South Dakota must take the SAT/STEP test in the spring. By law, schools must have a certain percentage of students above the proficiency line, or Annual Measurable Objective (AMO) in math and reading. When a school/district has enough students above the AMO, they achieve Annual Yearly Progress (AYP). Also, subgroups according to race, economic status, and disabilities must achieve that same percentage above the AMO.

In order to make plans for improvement, schools need good data to determine strategies for improving student achievement. Schools have some data on the state website. Schools also receive raw student achievement data in electronic form from the state (see Appendix A). This project developed tools using the raw data sent to the schools to produce "actionable" data analysis for schools to achieve school improvement.

This project focused on problems at 3 different levels: 1) school/district data to improve AYP status, 2) school and student data trends outside of AYP, and 3) collective data trends for all schools.

All samples, figures, and appendices have had individually identifiable information for students, schools, and districts removed to preserve anonymity. It is also important to note that while the data represents over a fourth of all students in South Dakota, it is not a random sample. Findings, inferences, or conclusions cannot necessarily be applied to the state population as a whole.

Review of Current Situation

Currently the state provides some data on a state website for schools on their status toward AYP posted on the State Report Card.

One status chart displays in a yes or no form whether the school achieved AYP.

Assessment Results	Attendance/Graduation Rates	School Status	Teacher Qualifications

Previous Year School AYP Determination

Measure	Status	Reason For Not Meeting AYP
Math	Y - Met AYP	
Reading	Y - Met AYP	
Attendance	Y - Met AYP	

Current Year School AYP Determination

Measure	Status	Reason For Not Meeting AYP
Math	Y - Met AYP	
Reading	N - Did Not Meet AYP	Missed AMO Target
Attendance	Y - Met AYP	

	Math			Reading		
	Assessment	Participation	AYP	Assessment	Participation	AYP
All Students	Y	Y	Y	Y	Y	Y
White	Y	Y	Y	Y	Y	Y
Black or African American	Y	Y	Y	Y	Y	Y
Asian/Pacific Islander	Y	Y	Y	Y	Y	Y
Native American	Y	Y	Y	Y	Y	Y
Hispanic	Y	Y	Y	Y	Y	Y
Economically Disadvantaged	Y	Y	Y	Y	Y	Y
Students with Disabilities	Y	Y	Y	N	Y	N
Limited English Proficiency	Y	Y	Y	Y	Y	Y

Figure 1: School Status Report

https://sis.ddncampus.net:8081/nclb/portal/portal.xsl?&extractID=5

Another chart provides a more graphic picture of how close a school is to achieving AYP (figure 2). The four groupings of proficiencies (Below Basic—red, Basic—yellow, Proficient—green, and Advanced—blue) are displayed via bar graphs for all the subgroups a school or district is held accountable. A vertical red line displays the AMO the subgroups must achieve. The All Students group clearly achieved the AMO, but the subgroups all show proficiencies below the AMO—yet this school achieved AYP for all areas. Why?

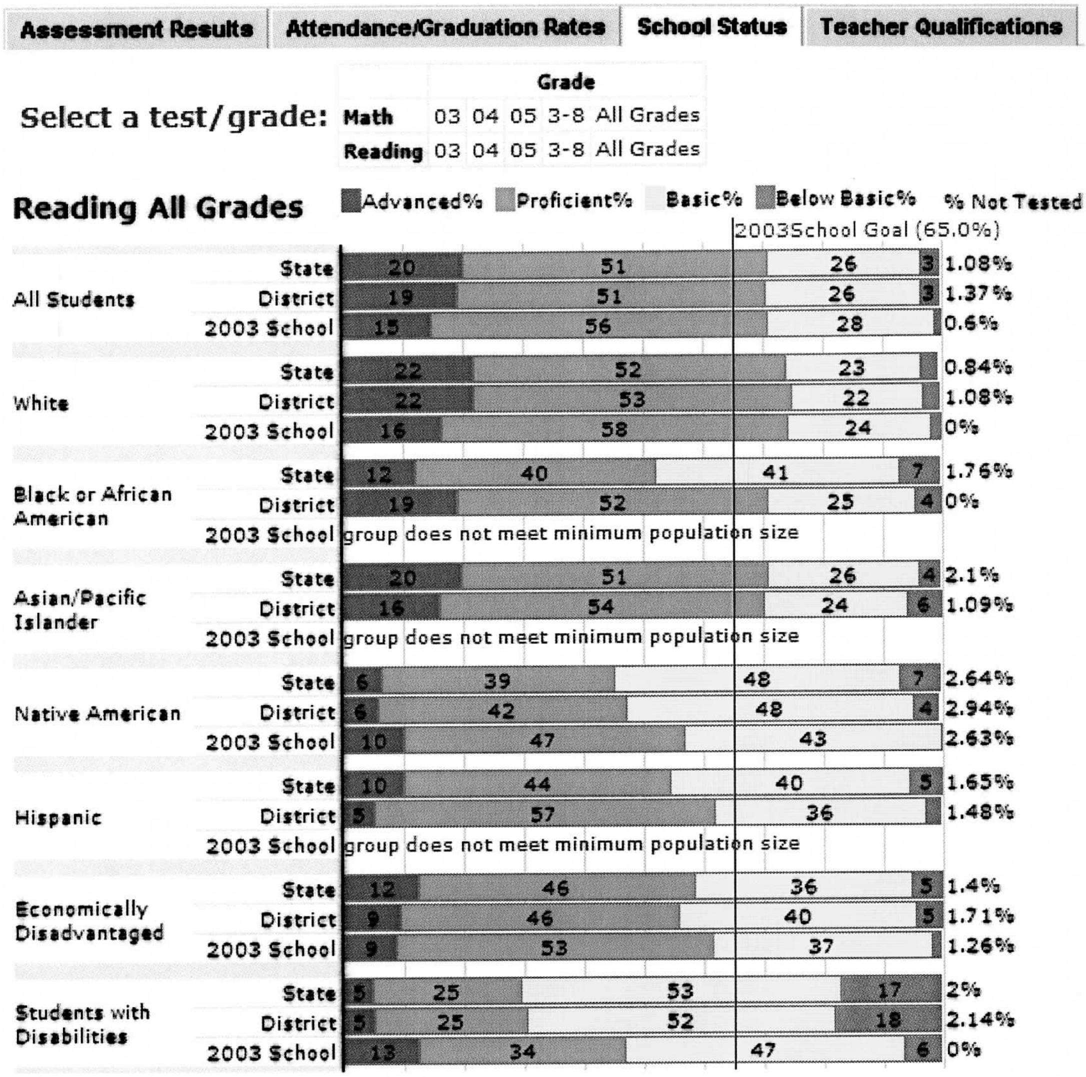


Figure 2: Assessment Results Sample 1

https://sis.ddncampus.net:8081/nclb/portal/portal.xsl?&extractID=5

To further pursue these questions, compare these results with a second school that achieved virtually the same levels of achievement as the first school (figure 3), yet they did not achieve AYP. These results are confusing as it appears that other factors are considered beyond just the AMO factor. What are these factors and how can schools learn about how these factors affect their particular school achievement?

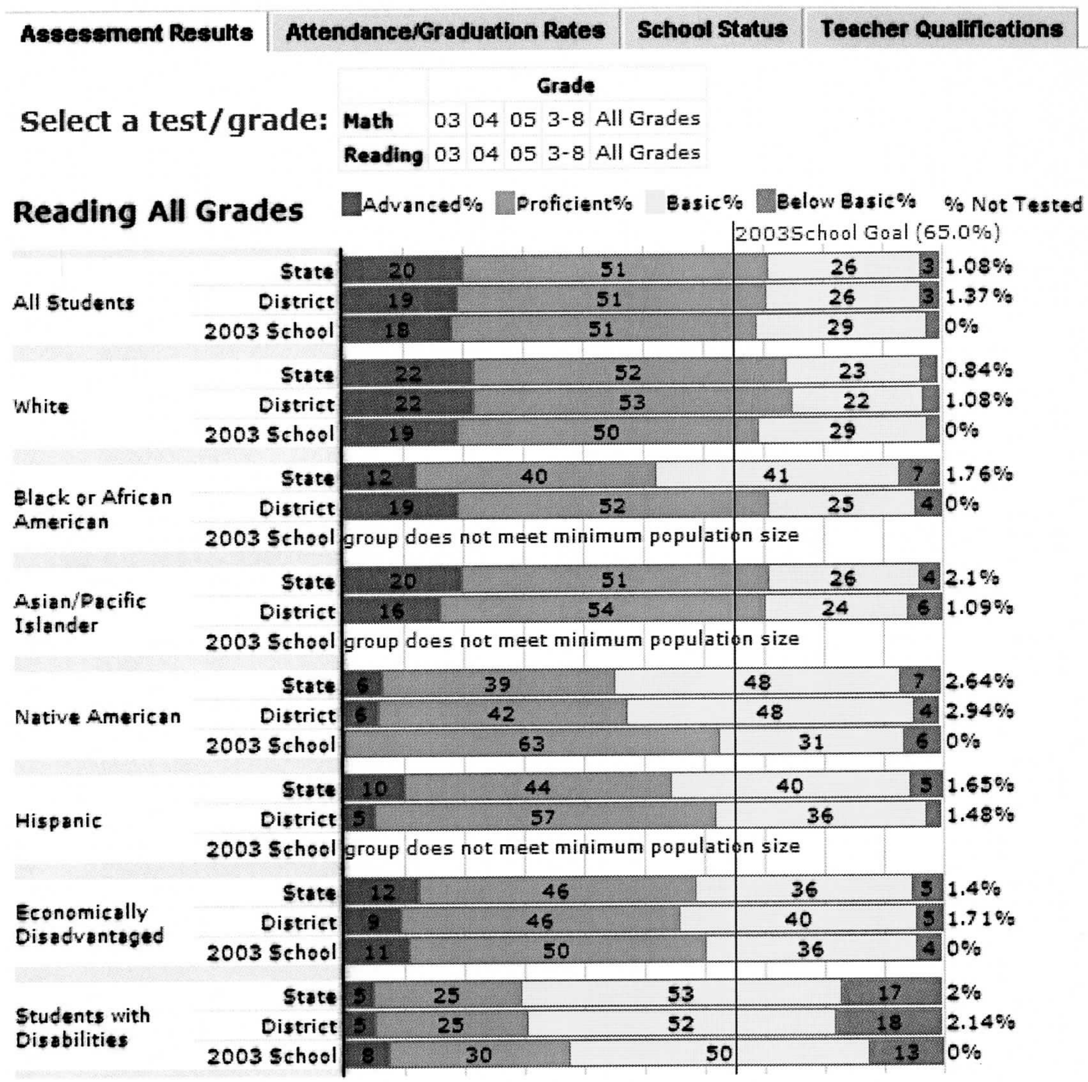


Figure 3: Assessment Results Sample 2

https://sis.ddncampus.net:8081/nclb/portal/portal.xsl?&extractID=5

In order for schools to plan effective strategies to achieve AYP, it is important to understand the other factors that contribute to the AMO. One is Confidence Interval (CI) which takes into account N size of the groups being measured. Small groups are provided a wider variance to the AMO than large groups since individual extremes can affect small groups more dramatically than large groups. Another factor is Safe Harbor, which allows schools who move 10% toward proficiency to achieve AYP no matter how far they are from achieving the AMO. This helps low performing schools, who have little hope of bringing large groups of students up to the AMO, achieve a more realistic goal.

Problem 1: School/District Data to Improve AYP Status

Problem 1 Questions

Clearly the charts do not display all the information needed for schools understand their status for AYP. How close is each subgroup of students to achieving any of the three measures of AYP? How close is this year's achievement to reaching next year's raised AMO? Which student subgroups need to be moved up to higher proficiency levels?

Objectives for Problem 1

Provide schools data that visually describes their proficiency levels for current and upcoming years of data. These proficiency levels are broken into subgroups and displayed along with the AMO, CI, and Safe Harbor objectives. This data allows educators to target specific areas to make the greatest impact for improvement toward AYP.

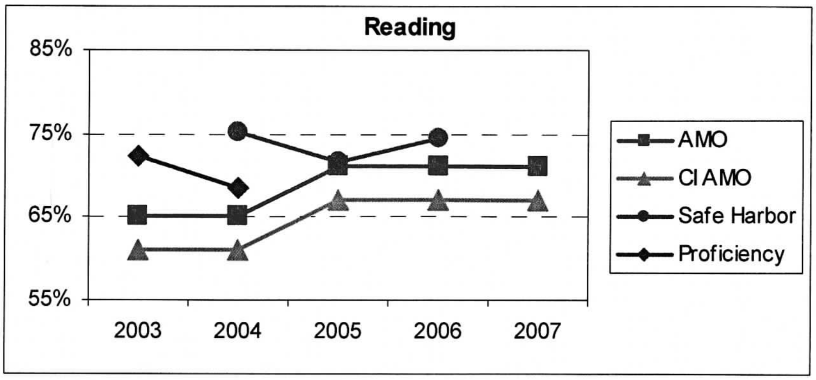
Deliverables for Problem 1

Deliverable 1: Provide tools to display two years of proficiency with the AMO, CI, and Safe Harbor objectives projected up to 5 years.

Deliverable 2: Provide lists of students who need to improve to reach minimum proficiency.

Plan of Action for Problem 1

The tool was initially developed worked exclusively in Excel. The spreadsheet array formulas were used to disaggregate the proficiency counts by grade levels and subgroups. Calculations on the various measures for AMO are plotted for the next few years. Charts were created to give schools a much more accurate picture of where they stood to AYP today and in the future.



SUMMARY	2003	2004	2005	2006	2007
Proficiency	72%	68%			
AMO	65%	65%	71%	71%	71%
CI AMO	61%	61%	67%	67%	67%
Safe Harbor		75%	72%	74%	

Figure 4: Analysis Data for AYP

The blue line displays the percent of students proficient within a building/district; the red line displays the standard AMO; the green line displays AMO with confidence interval; and the purple line displays safe harbor. CI and safe harbor calculations are based on numbers of students, so the future-year projections assume the number of students stay the same. While student numbers are dynamic in most schools, it provides a guideline for tracking current progress to future measures. The tool provides comparable graphs and data of both reading and math for each subgroup of economic, special education, white, Native American, Hispanic, black, and LEP. With this data, a school has a stronger understanding of their strengths and weaknesses for achieving AYP. The data can be efficiently used as a catalyst for developing action strategies.

Because the disaggregation, as well as the charting, is done within Excel, it is quite labor intensive. Our intent was to put much of the disaggregation work into the database MS Access—that goal has been put on hold. The state Department of Education has asked TIE to work with the makers of the state report card to develop a web-based version of the analysis tools. The initial MS Access query work for problem one is listed in Appendix B.

The lists of students achieving at Basic or Below Basic allow teachers to identify the students most crucial in achieving AYP. These lists allow educators to examine specific characteristics of students and develop specific strategies to raise proficiencies. See Appendix B.

Problem 2: School and Student Achievement Data Trends Outside AYP

Problem 2 Questions

What kind of grade level growth emerges with multiple years of student data?

What kind of individual student growth emerges with multiple years of student data?

Objectives for Problem 2

Provide data for cohorts of students who test 2 years in a row. Develop growth averages for whole grades of students and compare that data to the proficiency cuts scores. Establish a "target" slope for growth toward future proficiency levels. Provide lists to track individual students' growth so educators can target strategies toward students.

Deliverables for Problem 2

Deliverable 1: Provide tools to display the average growth of entire grade levels within a schools building.

Deliverable 2: Provide lists of individual student growth.

Plan of Action for Problem 2

AYP data can be problematic in that it examines non-cohort groups of students, e.g. last year's 3rd graders to this year's 3rd graders. An area that would be helpful to educators but often missing in achievement test data is the ability to examine the growth of a cohort of students over time.

Scale Scores and Cut Scores

Students who take the Dakota STEP test for reading and math achieve a raw score for their performance. This score is only applicable to each specific test, so the raw score is converted into a scale score. Scale scores allow limited comparison among grade level tests. Using the scale scores, the state establishes a cut score for each level of proficiency per grade level test. Each student's scale score is compared against cut scores at his/her grade level to determine the student's proficiency.

The state has published tables for the cut scores (see June 2004 sample below). DAKOTA STEP Raw and Scaled Score Cut Points and Performance Standards

Grade 3 – State Performance Standards

Subtest	**Below Basic**	**Basic**	**Proficient**	**Advanced**
Reading Scale Score	498 or Below	499 – 604	605 – 661	662 or Above
Reading Raw Score	0 – 5	6 – 34	35 – 52	53 – 63
Math Scale Score	502 or Below	503 – 589	590 – 643	644 or Above
Math Raw Score	0 – 13	14 – 59	60 – 88	89 – 105

Grade 4 – State Performance Standards

Subtest	**Below Basic**	**Basic**	**Proficient**	**Advanced**
Reading Scale Score	495 or Below	496 – 594	595 – 647	648 or Above
Reading Raw Score	0 – 3	4 – 19	20 – 31	32 – 42
Math Scale Score	512 or Below	513 – 611	612 – 663	664 or Above
Math Raw Score	0 – 7	8 – 49	50 – 79	80 – 105

Table 1: Scaled Score Cut Points

http://www.state.sd.us/doe/CRT/docs/RawScaledScoreCutPointsPerformJune04.doc

Understanding these cut scores and their role in proficiency is important. While useful, these tables are difficult to discern. Visual representations of these cut scores can deepen understanding of achievement growth. These representations can help educators immediately grasp the big picture of how the cut scores are structured for the tests (see figure 5).

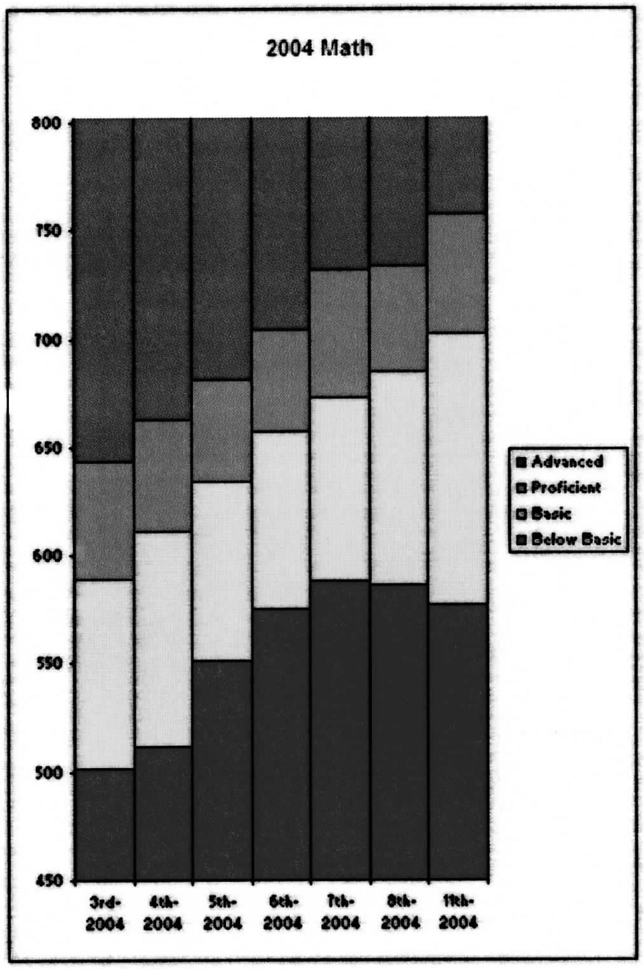


Figure 5: Visual Scale Score Cut Points

Cut scores increase from year to year. In order for a student to stay at their current level of proficiency, their scale scores must increase from year to year. Growth can be determined by looking at increases in scale scores from one year to the next. Determining individual growth by just looking at the raw data is not difficult but time consuming. Doing it for many students is very difficult. Tools to display group and individual growth can help educators determine if current strategies are effective for improving student achievement. Overlaying these growth scores onto these cuts scores gives educators a highly informative visual picture of their students' achievement.

The Problem 2 Deliverable 1 reports are aggregated in MS Access since the process is more complex. Access must determine what students tested both years, compare the scale scores of both years, and produce a growth score. These queries produce individual student growth lists that are exported and sorted by school, grade, and growth scores lowest to highest.

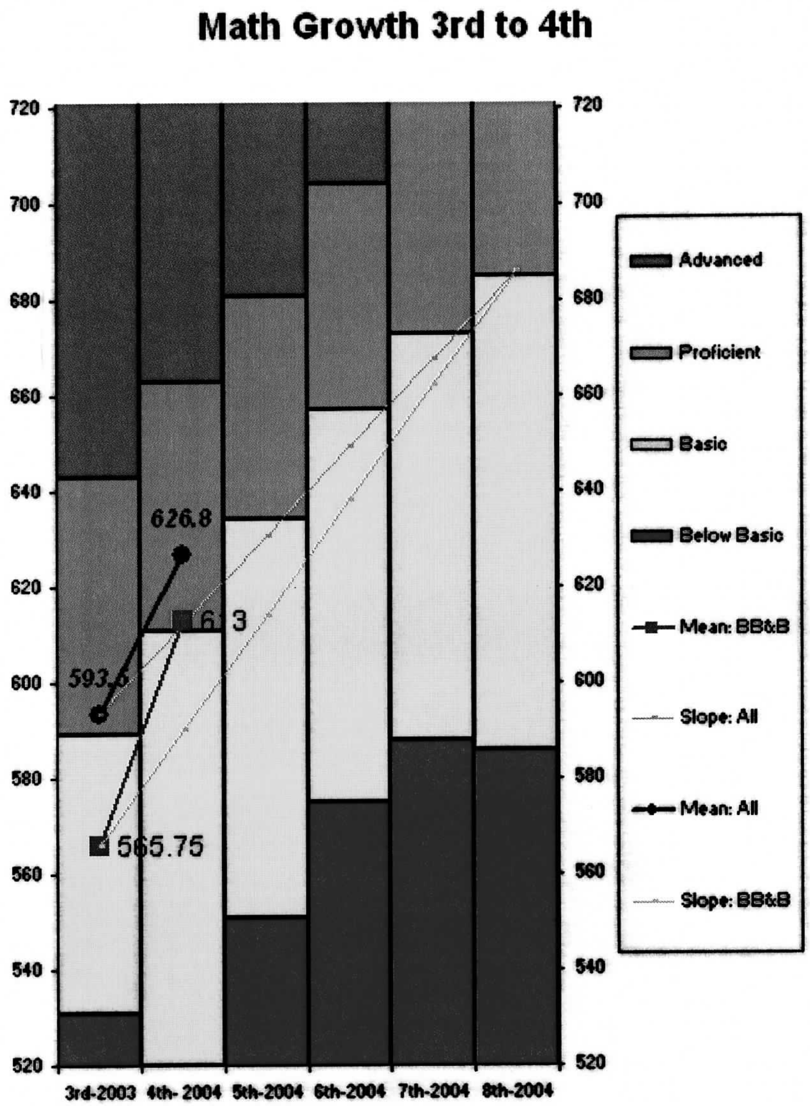


Figure 6: Growth Report Sample

Problem 2 Deliverable 2 uses these lists to create grade level averages and charts these averages in Excel as secondary data embedded on top of the cut score graphs. The averages are charted with 2 groups, one an average of all students, and another as an average of the subgroup Basic and Below Basic students (a subset of the All group). This growth is compared to a graph of minimum growth to reach minimum proficiency in a future. By contrasting the slope of the lines, educators can determine whether a cohort of grade level students is on a slope of high enough growth to sustain those minimum proficiencies in future years. This data analysis provides evidence on whether curriculum and instruction for each grade level provides the right conditions for students to achieve future AMO targets. A steep slope displays strong growth; a shallow slope or even a descending slope displays a potential need for remediation of curriculum and/or instruction. See Appendix C.

Problem 3: Collective Achievement Data Trends for All Schools

Problem 3 Questions

Are there trends for students of low achievement growth or high achievement growth from one year to the next? Do different subgroups of students have higher tendencies for high or low growth? Do attendance, school size, or geography impact growth?

Objectives for Problem 3

Mine the data to find trends and patterns for achievement. Analyze various subgroups for achievement trends. Mine the data for trends in factors like attendance or achievement growth.

Deliverables for Problem 3

Deliverable 1: Provide trends from mined data that can be used by educators for improving achievement.

Plan of Action for Problem 3

As a pool of data is collected from many school districts, there is potential trend data that could aid all educators. Data mining could bring about trends that could help educators target "actionable" strategies to improve achievement. This mined data could come in many different forms.

For example, collective growth patterns could be analyzed. These growth patterns can be compared to proficiency levels, subgroups, or even attendance.

Attendance and Absences

Attendance is a factor that has held high importance for educators in the school system. Students cannot learn if they are not in school. While it may seem common sense, what impact does attendance have on achievement? Does absenteeism have a negative impact on test achievement scores?

The state reports absences with the student data, so the hypothesis would expect *higher* absences to produce *lower* scale scores, or a negative relationship. A query was developed to examine absences and STEP scores. This query focused on 2004 attendance and scores and excluded students who did not take the test as well as students who took alternative tests. Based on this query, scattergrams were created and then the data was brought to Excel and examined for correlation.

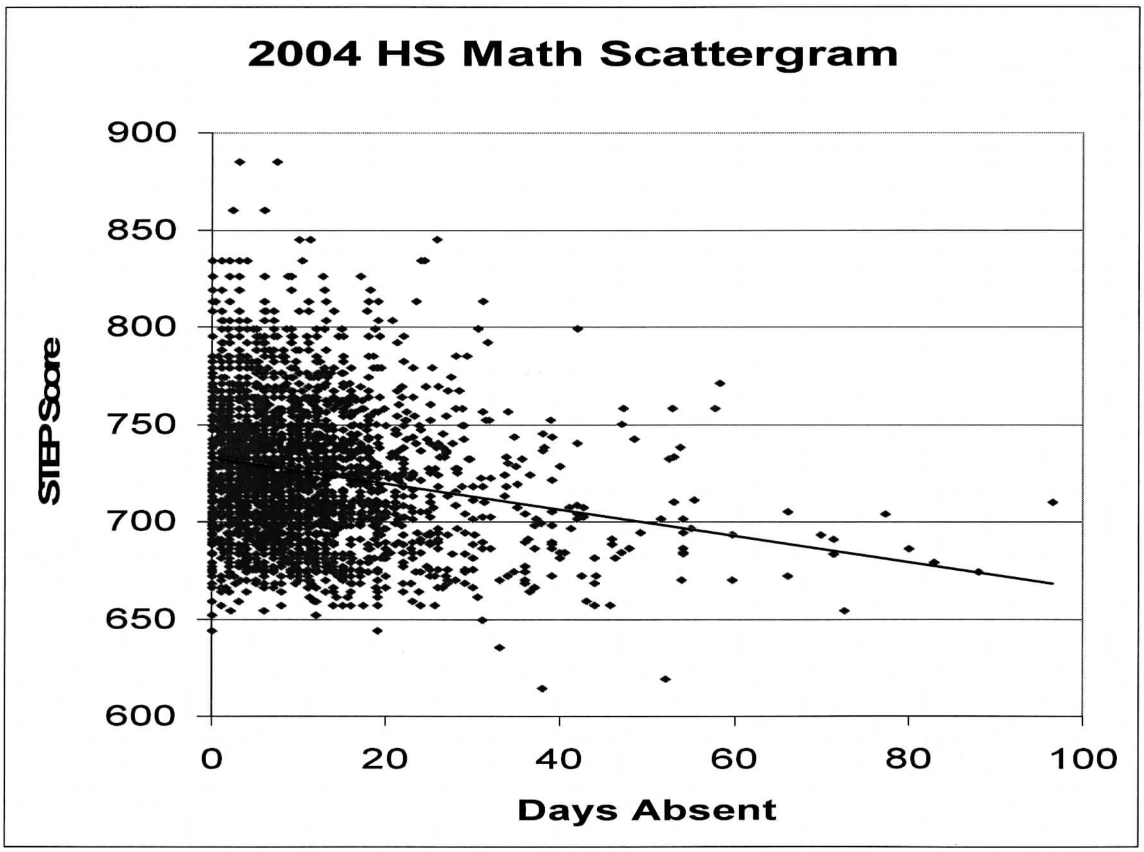


Figure 7: Scattergram of Attendance/Achievement

This example scattergram shows individual scores and a trend line for the data. While statistically significant, there is a relatively weak negative correlation for STEP scores and days absent. Note the presence of some extreme outlier data for absent days, which will be removed from some query analysis.

	Reading Absent	Math Absent	N
4th	-0.19	-0.20	2497
5th	-0.21	-0.20	2611
6th	-0.19	-0.22	2781
7th	-0.19	-0.26	2791
8th	-0.18	-0.28	2920
HS	-0.10	-0.19	2407

Table 2: Correlation of Absences/Achievement

The table displays correlations for all the grade levels. One interesting trend is the fact that math and reading are nearly equal for 4th and 5th grades, but a gap begins to widen from 6th grade to high school. It appears that absences have a greater impact with math than with reading in the secondary. It is also worth noting that the greatest impact of absenteeism is with 7th and 8th grade math.

In general terms, database analysis should focus on information that is actionable. Correlations and trend lines are not terribly usable in most schools. Therefore, the next step is to find attendance/achievement data that is more actionable.

One way for schools to find trends is to examine shifts in populations with attendance subgroups in the various proficiency levels. How do the students with relatively higher absenteeism compare with students with lower absentee rates?

Our comparison contrasts students who miss 10 days or less with students who miss more than 10 days. It is difficult to know how students miss 40, 60, or even nearly 100 days of school without more information from the schools themselves. For the sake of this data analysis, students with more than 30 days absent were excluded as outlier data.

Students Absent 10 or Less Days

year	readingLevel	CountOfreadingLevel	districtInclude	
2004	Advanced	3737	Y	28%
2004	Basic	2649	Y	20%
2004	Below Basic	108	Y	1%
2004	Proficient	6835	Y	51%
		13329		

Students Absent Greater than 10 and Less than 30 Days

year	readingLevel	CountOfreadingLevel	districtInclude	Percent	DIFFERENCE
2004	Advanced	932	Y	19%	-9%
2004	Basic	1458	Y	30%	11%
2004	Below Basic	61	Y	1%	0%
2004	Proficient	2340	Y	49%	-2%
		4791			

Table 3: Student Absence Reading Proficiency Levels

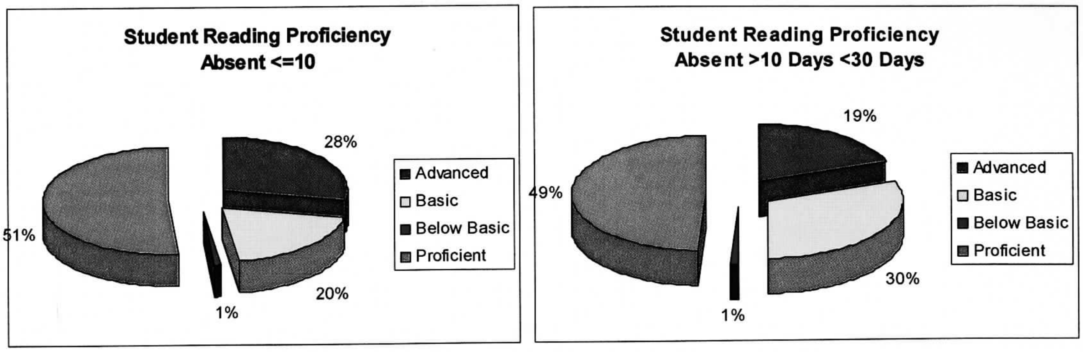


Figure 8: Student Absence Reading Proficiency Level Charts

Note that the Advanced and Proficient groups drop a combined 11% while the Basic group grows the same percentage.

Math displayed slightly more dramatic results.

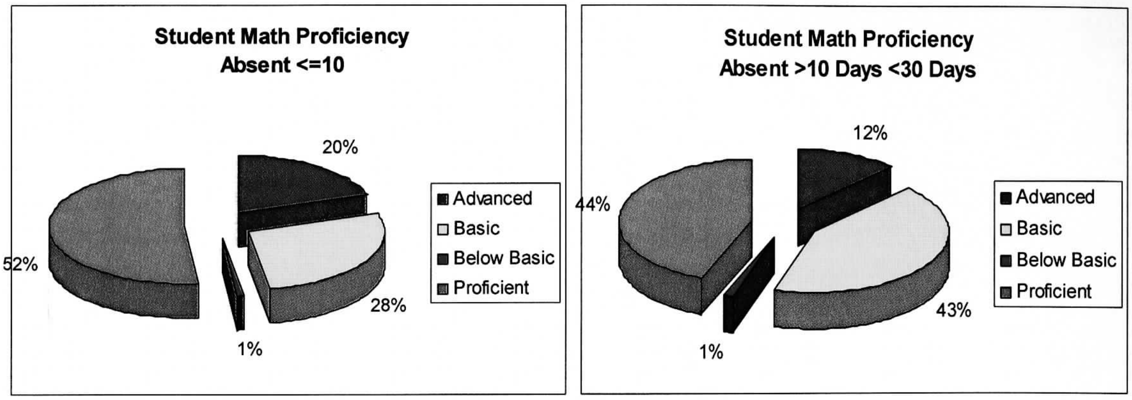
Students Absent 10 or Less Days

year	mathLevel	CountOfmathLevel	districtInclude	percent
2004	Advanced	2631	Y	20%
2004	Basic	3718	Y	28%
2004	Below Basic	90	Y	1%
2004	Proficient	6912	Y	52%
		13351		

Students Absent Greater than 10 and Less than 30 Days

year	mathLevel	CountOfmathLevel	districtInclude	Percent	DIFFERENCE
2004	Advanced	582	Y	12%	-8%
2004	Basic	2059	Y	43%	15%
2004	Below Basic	54	Y	1%	0%
2004	Proficient	2103	Y	44%	-8%
		4798			

Table 4: Student Absence Math Proficiency Levels



Figures 9: Student Absence Math Proficiency Levels Charts

The shift of population in Math from Proficient and Advanced to the Basic level is 16%.

While common sense dictates that absences make a big impact on achievement, this is only partially supported by this data. It does appear that some students are impacted by absences, but not all students. It is important to remember that this comparison is made only with standardized test achievement. It is dangerous to equate these limited findings with the impact of absences on daily measures of achievement such as grades-- it is quite possible that absences would have a much greater impact on other measures of achievement. The data leaves us with many more questions to be answered: What students are affected by absences? Are there common characteristics within this group? Are there "sublevels" within the proficiency levels that are more impacted by absences? Is there a difference in impact with the type of absence?

Achievement Growth

Another factor examined from the data mining is achievement growth (see problem 2). With scale scores, students need to have some growth to "stay even" for each year they progress in school. Flat growth is actually a decline. What about the students who not only don't make flat growth, but rather had a negative growth. What is known about these students?

The proficiency levels for students who displayed negative growth were extracted. The query extracted only students who had scores greater than 10 to eliminate students who did not take the test and students who took alternative tests which produced scores in single digits. The query examined students from 2003 and 2004 and extracted students who had scores from both. It then subtracted the 2003 score from the 2004 score to determine growth. Last it queried only growth numbers less than zero. See Appendix D

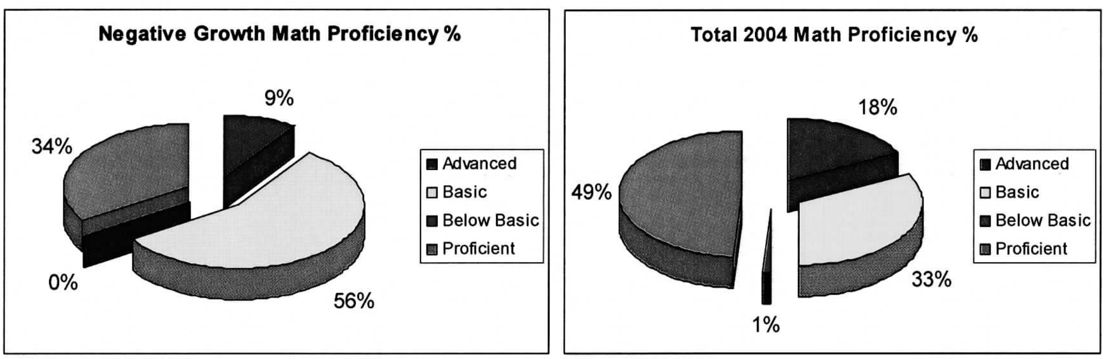


Figure 10: Negative Growth Math Proficiency Levels Charts

While the basic group grew larger than the other groups, a considerable 43% of the students who displayed negative growth were proficient or advanced

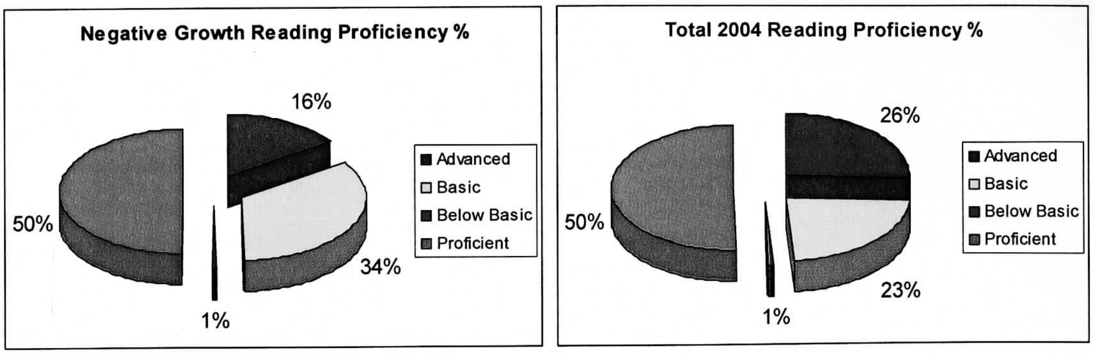


Figure 11: Negative Growth Reading Proficiency Levels Charts

Reading scores showed that 66% of the negative growth students were advanced or proficient.

While basic students contribute a large share of students with negative growth, a very significant percent falls in the advanced and proficient levels. There is not enough data to ensure cause/effect, but this data brings forward many questions for educators: Are there common characteristics for students with negative growth? Are there factors that help predict students of negative growth? What percent of the advanced students have negative growth because they "top out" the test (and have nowhere to go but down)?

To target students of negative growth, educators must look for other factors than proficiency level. Finding predictive factors for negative growth could help educators target more effective strategies for these students.

Examining geography as a factor was not possible as the data focused mostly on districts in a relatively narrow portion of the state. Geographical issues cannot be a factor of study until more data is available.

Results/Conclusions

Problem 1: School/District Data to Improve AYP Status

More precise data and charts were created to help school buildings better gauge the compliance with NCLB legislation. The analysis chart displays a building/district's proficiency progress against multiple measures of AYP: AMO, AMO with confidence interval, safe harbor. The tool provides comparable graphs and data of both reading and math for each subgroup of economic, special education, white, Native American, Hispanic, black, and LEP. With this data, a school has a stronger understanding of their strengths and weaknesses for achieving AYP.

The lists of students achieving at Basic or Below Basic allow teachers to identify the students most crucial in achieving AYP. These lists allow educators to examine specific characteristics of students and develop specific strategies to raise proficiencies.

Problem 2: School and Student Achievement Data Trends Outside AYP

Tools to display group and individual growth can help educators determine if current strategies are effective for improving student achievement. Overlaying these growth scores onto these cuts scores gives educators a highly informative visual picture of their students' achievement.

The averages are charted with 2 groups, one an average of all students, and another as an average of the subgroup Basic and Below Basic students (a subset of the all group). This growth is compared to a graph of minimum growth to reach minimum proficiency in a future. By contrasting the slope of the lines, educators can determine if they are on a slope of high enough growth to sustain those minimum proficiencies in future years.

Problem 3: Collective Achievement Data Trends for All Schools

Our comparison contrasts students who miss 10 days or less with students who miss more than 10 days. Note the Advanced and Proficient groups combined are 11% lower while the Basic group grows the same percentage. The shift of population in Math from Proficient and Advanced to the Basic level is 16%. Also, 43% of the students who displayed negative growth were proficient or advanced. Reading scores showed that 66% of the negative growth students were advanced or proficient.

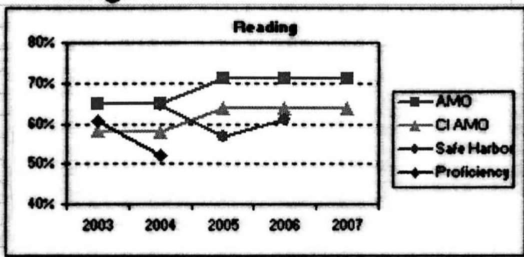
These efforts for mining for trends and patterns in this school achievement data reveal that the surface has only been scratched. There is much potential for discovering more trends and issues that could help all educators with "actionable" strategies and decision-making.

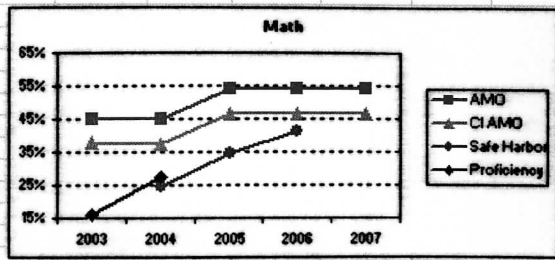
Appendix A: Data Attributes from State Data

Year, simsNumber, dbo_district.number, dbo_district.name, dbo_school.name, dbo_school.number, lastName, firstName, grade, enrollmentStart, enrollmentEnd, genderCode, raceCode, lepCode, migrantCode, mealStatusCode, absentDays, membershipDays, percentEnrolled, exitCode, readingScaleScore, readingLevel, mathScaleScore, mathLevel, seStart, seEnd, seDisabilityCode, seCategory, districtInclude, schoolInclude, districtIEPInclude, schoolIEPInclude

Appendix B (Problem 1)

	A	B	C	D	E	F	G	H	I	J	K	L	M
43								School Name					
44	Building Econ												





	A	B	C	D	E	F	G	H	I	J	K	L	M
57	SUMMARY	2003	2004	2005	2006	2007		SUMMARY	2003	2004	2005	2006	2007
58	Proficiency	61%	52%					Proficiency	16%	27%			
59	AMO	65%	65%	71%	71%	71%		AMO	45%	45%	54%	54%	54%
60	CI AMO	58%	58%	64%	64%	64%		CI AMO	38%	37%	46%	46%	46%
61	Safe Harbor		65%	57%	61%			Safe Harbor		24%	35%	41%	
62													
63		Reading 2003			Reading 2004			Math 2003			Math 2004		
64		Below Bas	8	3%	Below Basic	6	3%	Below Basic	43	16%	Below Basic	6	3%
65	PROFICIEN	Basic	100	36%	Basic	103	45%	Basic	189	68%	Basic	159	70%
66		Proficient	139	51%	Proficient	98	43%	Proficient	43	16%	Proficient	55	24%
67		Advanced	28	10%	Advanced	20	9%	Advanced	1	0%	Advanced	7	3%
68		Total	275		Total	227		Total	276		Total	227	
69		Proficier	167	61%	Proficient	118	52%	Proficient	44	16%	Proficient	62	27%
70		Confidence Interval - Reading AMO						Confidence Interval - Math AMO					
71	CI	AMO =	65%	1- AMO =	35%			AMO =	45%	1- AMO =	55%		
72	2003	N size	CI Adjustmen	PAC	PAC - Roun	CI %		N size	CI Adjustmen	PAC	PAC - Roun	CI %	
73		275	0.07	160.32	160	58%		276	0.07	104.94	105	38%	
74	2004	N size	CI Adjustmen	PAC	PAC - Roun	CI %		N size	CI Adjustmen	PAC	PAC - Roun	CI %	
75		227	0.07	130.81	131	58%		227	0.08	84.69	85	37%	
76		Possible 2005 CI - Reading AMO						Possible 2005 CI - Math AMO					
77	CI	AMO =	71%	1- AMO =	29%			AMO =	54%	1- AMO =	46%		
78	2005	N size	CI Adjustmen	PAC		PAC - Rour	CI %	N size	CI Adjustmen	PAC		PAC - Rour	CI %
79	2006	227	0.07	145.24		145	64%	227	0.08	105.08		105	46%
80	2007	*Assuming numbers of students stay the same						*Assuming numbers of students stay the same					
81	SAFE		2004	2005	2006	2007			2004	2005	2006	2007	
82	HARBOR		170	129	139				68	79	94		
83			65%	57%	61%				24%	35%	41%		

Figure B-1: Analysis Page

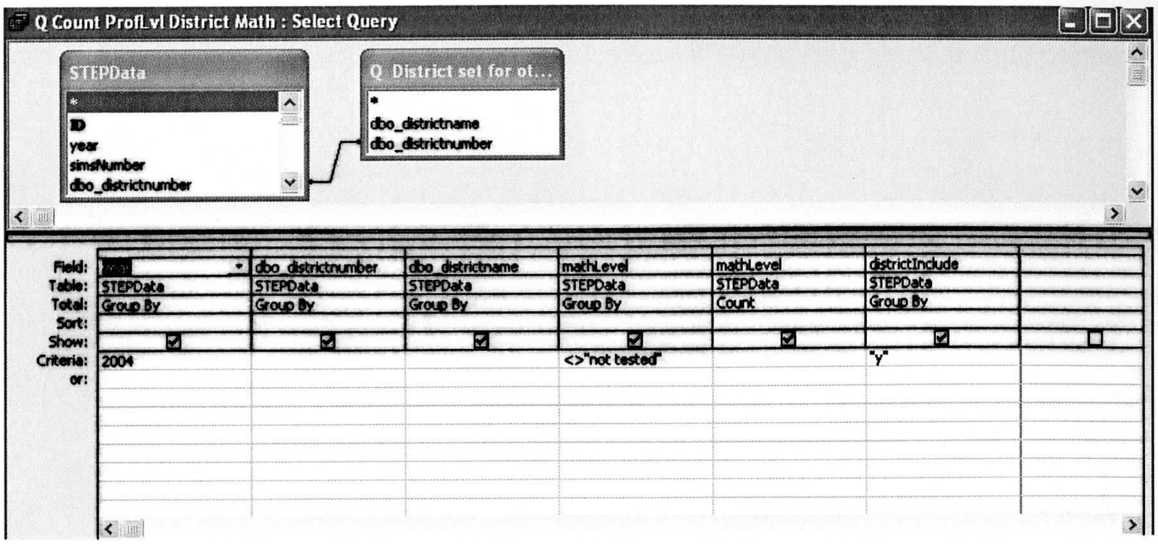


Figure B-2: Query to Count Proficiency Levels for Math

MS Access SQL

SELECT STEPData.year, STEPData.dbo_districtnumber, STEPData.dbo_districtname, STEPData.mathLevel, Count(STEPData.mathLevel) AS CountOfmathLevel, STEPData.districtInclude

FROM [Q District set for other queries] INNER JOIN STEPData ON [Q District set for other queries].dbo_districtnumber = STEPData.dbo_districtnumber

GROUP BY STEPData.year, STEPData.dbo_districtnumber, STEPData.dbo_districtname, STEPData.mathLevel, STEPData.districtInclude

HAVING (((STEPData.year)=2004) AND ((STEPData.mathLevel)<>"not tested") AND ((STEPData.districtInclude)="y"));

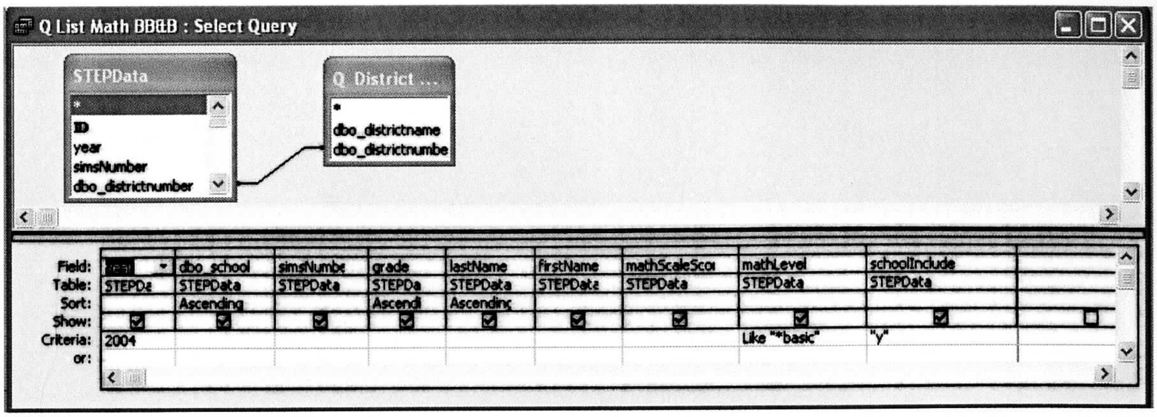


Figure B-3: Query for Basic & Below Basic Math List

MS Access SQL

SELECT STEPData.year, STEPData.dbo_schoolname, STEPData.simsNumber, STEPData.grade, STEPData.lastName, STEPData.firstName, STEPData.mathScaleScore, STEPData.mathLevel, STEPData.schoolInclude

FROM [Q District set for other queries] INNER JOIN STEPData ON [Q District set for other queries].dbo_districtnumber = STEPData.dbo_districtnumber

WHERE (((STEPData.year)=2004) AND ((STEPData.mathLevel) Like "*basic") AND ((STEPData.schoolInclude)="y"))

ORDER BY STEPData.dbo_schoolname, STEPData.grade, STEPData.lastName;

Reading Basic and Below Basic List

year	*grade*	*simsNumb*	*lastName*	*firstName*	*readingScaleScore*	*readingLevel*	*schoolInclude*
2004	3				577	Basic	Y
2004	3				585	Basic	Y
2004	3				582	Basic	Y
2004	3				571	Basic	Y
2004	3				599	Basic	Y
2004	3				571	Basic	Y
2004	3				574	Basic	Y
2004	3				571	Basic	Y
2004	4				572	Basic	Y
2004	4				577	Basic	Y
2004	4				552	Below Basic	Y
2004	4				596	Basic	Y
2004	4				572	Basic	Y
2004	4				572	Basic	Y
2004	5				629	Basic	Y
2004	5				610	Basic	Y
2004	5				606	Basic	Y
2004	5				598	Basic	Y

Figure B-4: Report for Basic & Below Basic Lists

Appendix C (Problem 2)

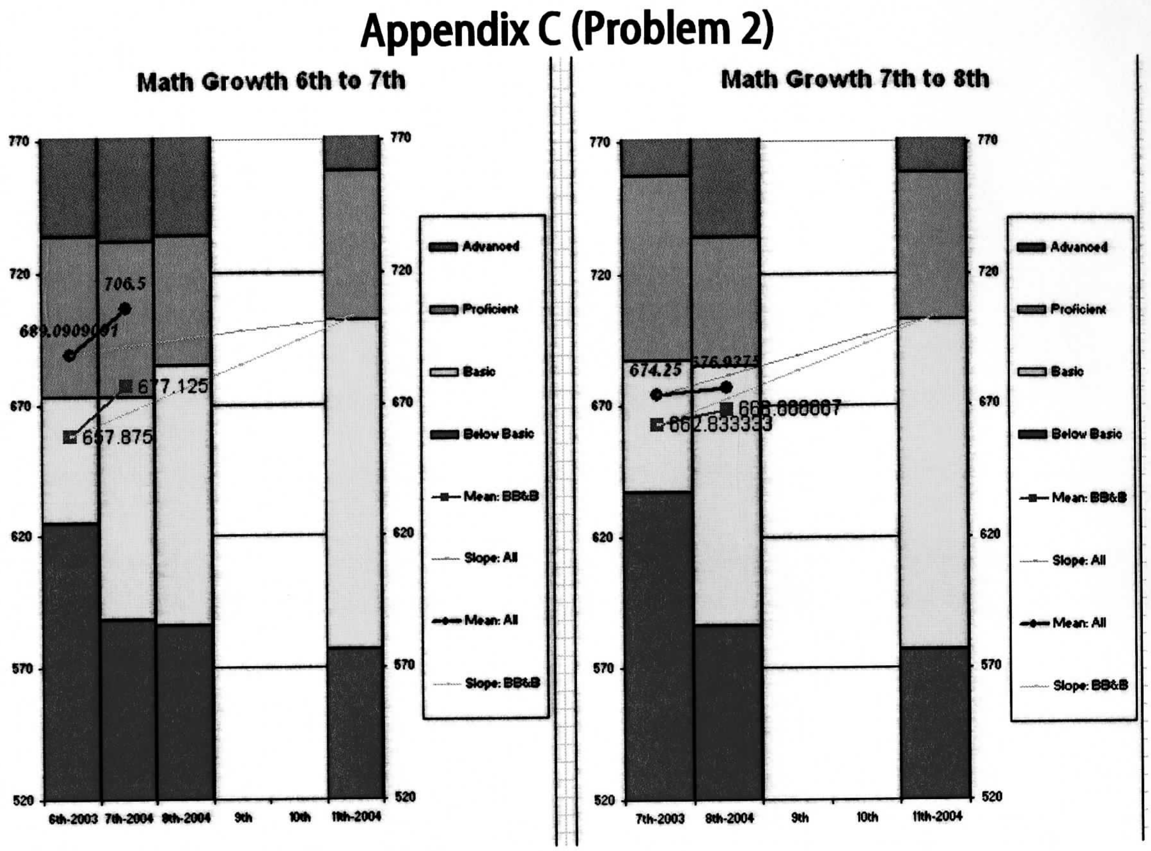


Figure C-1: Growth Charts with Grade Averages

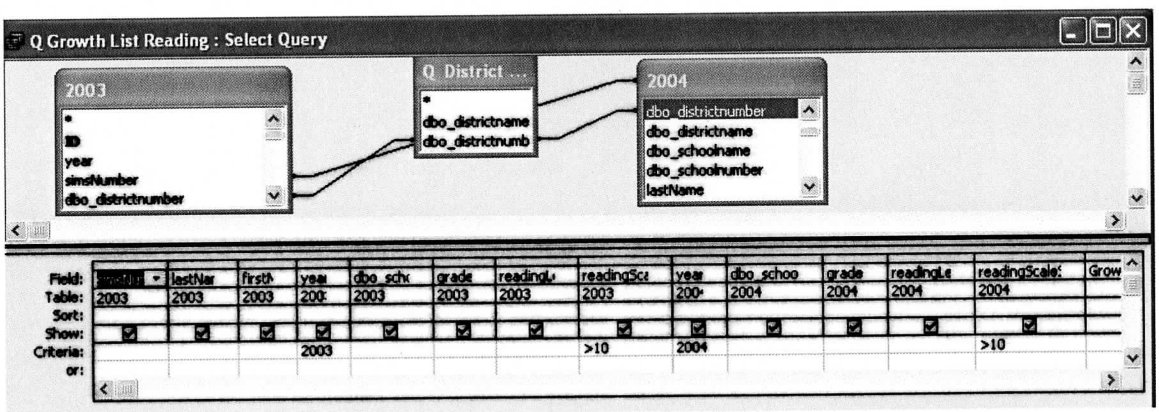


Figure C-2: Query to Produce Growth List for Reading

MS Access SQL

SELECT [2003].simsNumber, [2003].lastName, [2003].firstName, [2003].year, [2003].dbo_schoolname, [2003].grade, [2003].readingLevel,

[2003].readingScaleScore, [2004].year, [2004].dbo_schoolname, [2004].grade, [2004].readingLevel, [2004].readingScaleScore, [2004.readingScaleScore]-[2003.readingScaleScore] AS Growth, [2004].dbo_districtnumber, [2004].dbo_districtname

FROM [Q District set for other queries] INNER JOIN (STEPData AS 2003 INNER JOIN STEPData AS 2004 ON [2003].simsNumber = [2004].simsNumber) ON ([Q District set for other queries].dbo_districtnumber = [2003].dbo_districtnumber) AND ([Q District set for other queries].dbo_districtnumber = [2004].dbo_districtnumber)

WHERE ((([2003].year)=2003) AND (([2003].readingScaleScore)>10) AND (([2004].year)=2004) AND (([2004].readingScaleScore)>10));]

Sample Math Growth List from Report

Math Growth List

2004grade 4

simsNumber	*Growth*	*lastName*	*firstName*	*year*	*2003school*	*2003grade*	*2003.mathLevel*	*2003.mathSS*	*year*	*2004.mathLevel*	*2004.mathSS*
	5			2003		3	Advanced	671	2004	Advanced	676
	12			2003		3	Proficient	641	2004	Proficient	653
	17			2003		3	Advanced	662	2004	Advanced	679
	17			2003		3	Proficient	634	2004	Proficient	651
	22			2003		3	Proficient	627	2004	Proficient	649
	24			2003		3	Proficient	629	2004	Proficient	653
	38			2003		3	Advanced	655	2004	Advanced	693
	40			2003		3	Proficient	636	2004	Advanced	676
	40			2003		3	Proficient	613	2004	Proficient	653
	53			2003		3	Basic	573	2004	Proficient	626
	66			2003		3	Proficient	638	2004	Advanced	704
	69			2003		3	Basic	579	2004	Proficient	648
	81			2003		3	Proficient	601	2004	Advanced	682

Summary for '2004.grade' = 4 (13 detail records)

Avg	*627.62*	*664.846153846154*

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Figure C-3: Query to Produce Growth List for Reading

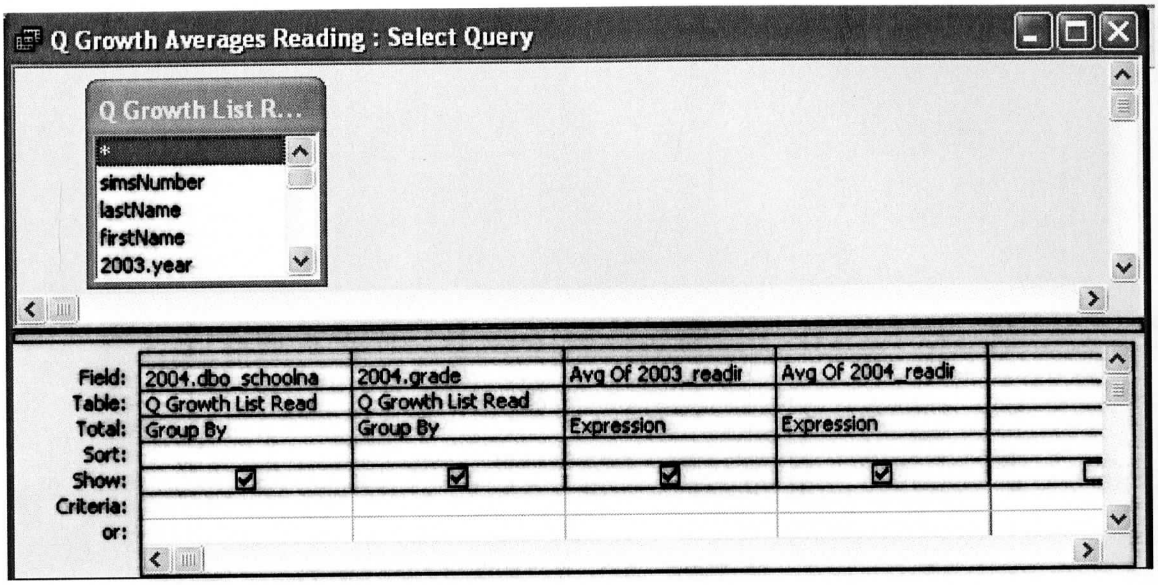


Figure C-4: Query to Average Growth Scores per Grade Per Building

MS Access SQL

SELECT DISTINCTROW [Q Growth List Reading].[2004].dbo_schoolname, [Q Growth List Reading].[2004].grade, Avg([2003].readingScaleScore) AS [Avg Of 2003_readingScaleScore], Avg([2004].readingScaleScore) AS [Avg Of 2004_readingScaleScore]

FROM [Q Growth List Reading]

GROUP BY [Q Growth List Reading].[2004].dbo_schoolname, [Q Growth List Reading].[2004].grade;

Appendix D (Problem 3)

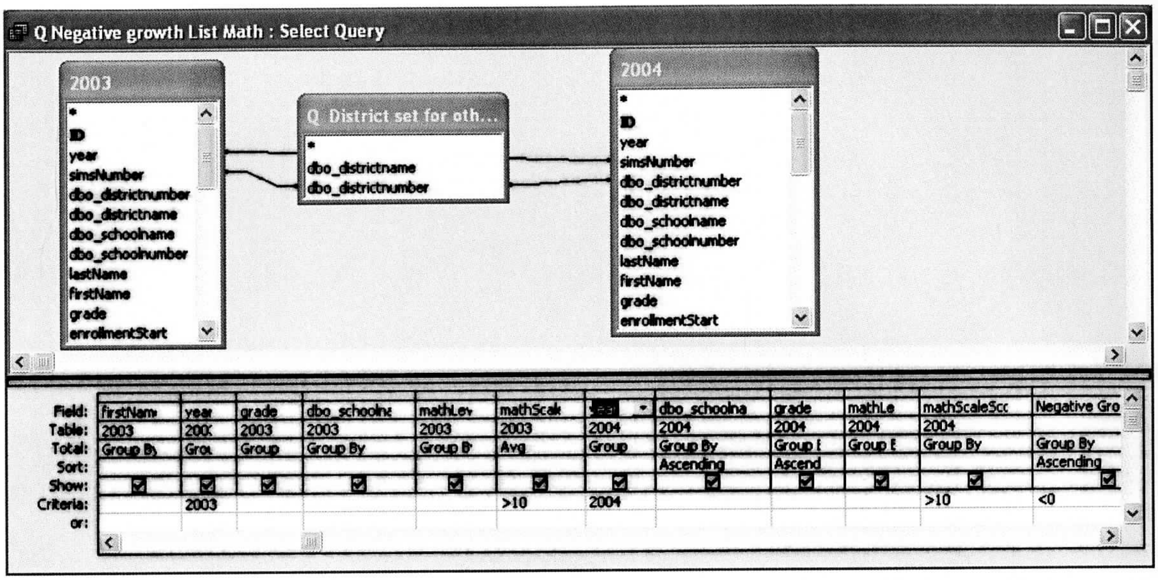


Figure D-1: Negative Growth List Math

MS Access SQL

SELECT [2004].dbo_districtnumber, [2003].simsNumber, [2003].lastName, [2003].firstName, [2003].year, [2003].grade, [2003].dbo_schoolname, [2003].mathLevel, Avg([2003].mathScaleScore) AS AvgOfmathScaleScore, [2004].year, [2004].dbo_schoolname, [2004].grade, [2004].mathLevel, [2004].mathScaleScore, [STEPData_1.mathScaleScore]-[STEPData.mathScaleScore] AS [Negative Growth]

FROM [Q District set for other queries] INNER JOIN (STEPData AS 2003 INNER JOIN STEPData AS 2004 ON [2003].simsNumber = [2004].simsNumber) ON ([Q District set for other queries].dbo_districtnumber = [2004].dbo_districtnumber) AND ([Q District set for other queries].dbo_districtnumber = [2003].dbo_districtnumber)

GROUP BY [2004].dbo_districtnumber, [2003].simsNumber, [2003].lastName, [2003].firstName, [2003].year, [2003].grade, [2003].dbo_schoolname,

[2003].mathLevel, [2004].year, [2004].dbo_schoolname, [2004].grade, [2004].mathLevel, [2004].mathScaleScore, [STEPData_1.mathScaleScore]-[STEPData.mathScaleScore], [2003].dbo_schoolnumber, [2003].dbo_districtnumber

HAVING ((([2003].year)=2003) AND ((Avg([2003].mathScaleScore))>10) AND (([2004].year)=2004) AND (([2004].mathScaleScore)>10) AND (([STEPData_1.mathScaleScore]-[STEPData.mathScaleScore])<0))
ORDER BY [2004].dbo_districtnumber, [2004].dbo_schoolname, [2004].grade, [STEPData_1.mathScaleScore]-[STEPData.mathScaleScore], [2003].dbo_schoolnumber;

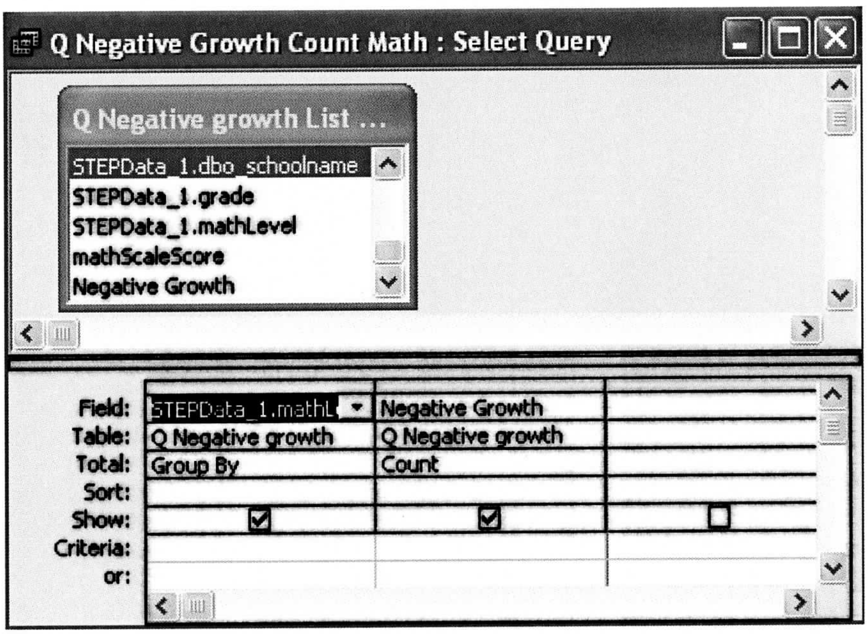


Figure D-2: Query for Counting Proficiency Levels for Negative Growth

MS Access SQL

SELECT [Q Negative growth List Math].STEPData_1.mathLevel, Count([Q Negative growth List Math].[Negative Growth]) AS [CountOfNegative Growth]
FROM [Q Negative growth List Math]
GROUP BY [Q Negative growth List Math].STEPData_1.mathLevel;

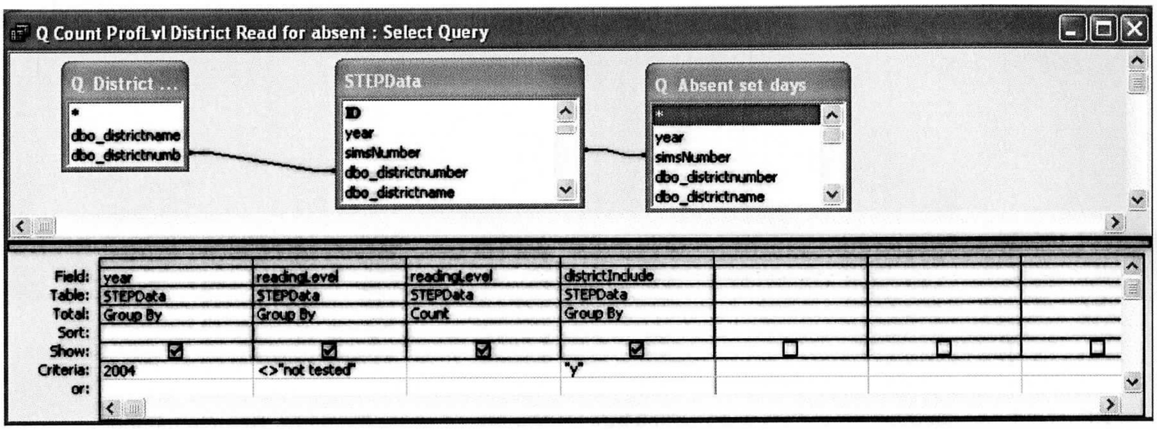


Figure D-3: Query to Count Proficiency Levels Based on Absences

MS Access SQL

SELECT STEPData.year, STEPData.readingLevel, Count(STEPData.readingLevel) AS CountOfreadingLevel, STEPData.districtInclude
FROM [Q District set for other queries] INNER JOIN (STEPData INNER JOIN [Q Absent set days] ON STEPData.simsNumber = [Q Absent set days].simsNumber) ON [Q District set for other queries].dbo_districtnumber = STEPData.dbo_districtnumber
GROUP BY STEPData.year, STEPData.readingLevel, STEPData.districtInclude
HAVING (((STEPData.year)=2004) AND ((STEPData.readingLevel)<>"not tested") AND ((STEPData.districtInclude)="y"));

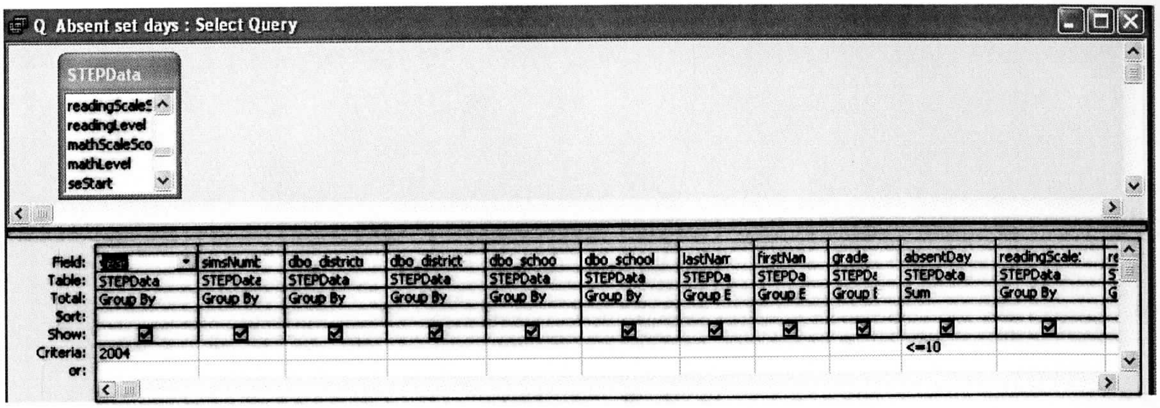


Figure D-4: Query to Define Absence Levels

MS Access SQL

```
SELECT STEPData.year, STEPData.simsNumber, STEPData.dbo_districtnumber,
STEPData.dbo_districtname, STEPData.dbo_schoolname,
STEPData.dbo_schoolnumber, STEPData.lastName, STEPData.firstName,
STEPData.grade, Sum(STEPData.absentDays) AS SumOfabsentDays,
STEPData.readingScaleScore, STEPData.readingLevel,
STEPData.mathScaleScore, STEPData.mathLevel, STEPData.districtInclude
FROM STEPData
GROUP BY STEPData.year, STEPData.simsNumber,
STEPData.dbo_districtnumber, STEPData.dbo_districtname,
STEPData.dbo_schoolname, STEPData.dbo_schoolnumber, STEPData.lastName,
STEPData.firstName, STEPData.grade, STEPData.readingScaleScore,
STEPData.readingLevel, STEPData.mathScaleScore, STEPData.mathLevel,
STEPData.districtInclude
HAVING (((STEPData.year)=2004) AND ((Sum(STEPData.absentDays))<=10)
AND ((STEPData.districtInclude)="y"));
```

Appendix E

WBS Work Breakdown Structure

1. Data Setup

    1.1 Database developed

    1.2 Data input

    1.3 Data cleanup

2. Tool Prototype Design

    2.1 Analysis Tool Prototype

    2.2 Generate Analysis Lists

    2.3 Growth Tool Prototype

    2.4 Generate Growth Lists

3. Tool Development

    3.1 Analysis Tool Development

    3.2 Growth Tool Development

4. Mining Data

4.1 Mine data for subgroup trends

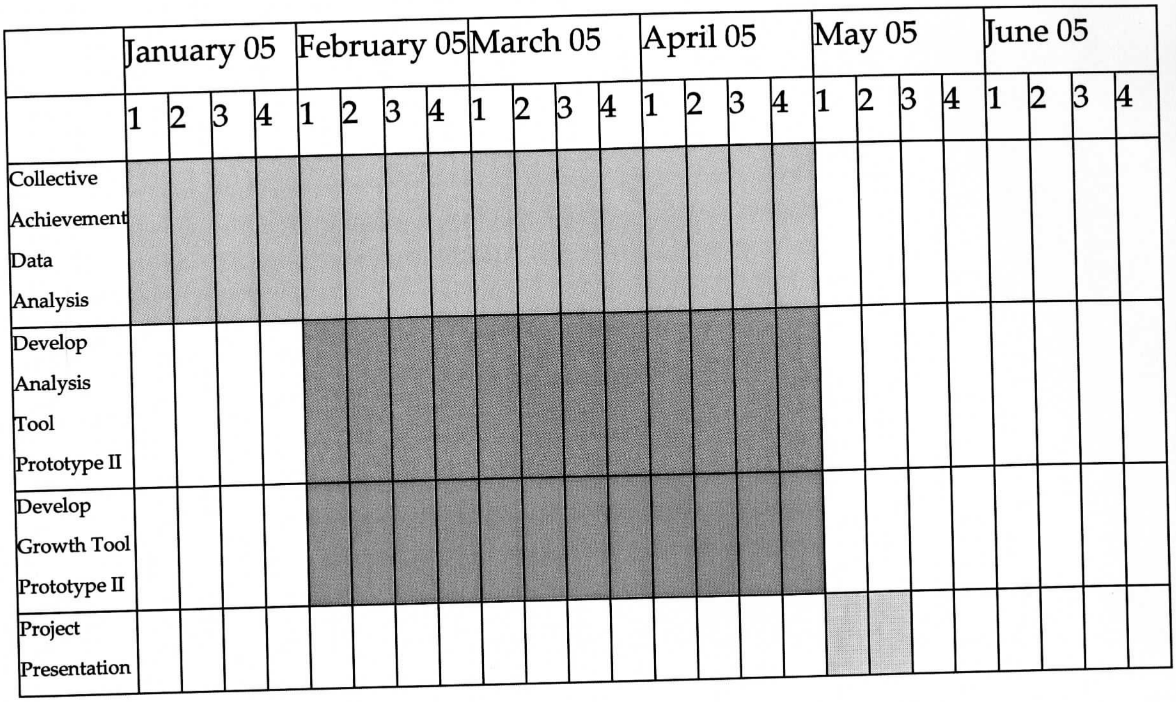
4.2 Mine data for attendance trends

5. Present Project

Appendix F
Development of K-12 Achievement Data Tools

Legend	Problem 1 Projects	Problem 2 Projects	Problem 3 Projects	Support Project for All Problems

	July 04				August 04				September 04				October 04				November 04				December 04			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Develop centralized database for disparate school data																								
Input Data & Clearnup																								
Develop Analysis Tool Prototype I																								
Develop Analysis Lists																								
Develop Growth Tool Prototype I																								
Develop Growth Lists																								
Collective Achievement Data Analysis																								


January 05
February 05
March 05
April 05
May 05
June 05
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
Collective Achievement Data Analysis
Develop Analysis Tool Prototype II
Develop Growth Tool Prototype II
Project Presentation