Minnesota Department of Education

Teacher Supply and Demand

Fiscal Year 2013

Report

To the

Legislature

As required by

Minnesota Statutes,

section 127A.05, Subdivision 6

COMMISSIONER:

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Teacher Supply and Demand

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ESTIMATED COST OF PREPARING THIS REPORT

This report provides information, which is maintained and published as Minnesota Rules by the Office of the Revisor of Statutes as a part of its normal business functions. Therefore, the cost information reported here does not include the cost of gathering the data and is limited to the estimated cost of actually analyzing the data, determining recommendations, and preparing this report document.

Special funding was not appropriated for the costs of preparing this report. The estimated cost incurred by the Minnesota Department of Education in preparing this report is $18,226.04.

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The Minnesota Department of Education would like to thank those superintendents and other district or school personnel who responded to the district survey, the leaders of the Minnesota Association of Colleges for Teacher Education (MACTE) for sharing data on program completers, and members of teacher preparation institutions who completed the institution survey. Thanks are also extended to the leaders and staff with the Department of Education who helped to guide this study, helped to obtain the relevant data, and review the findings. The Minnesota Board of teaching generously shared its data and provided input. The study team expresses its appreciation to colleagues in the Minnesota Department of Health for providing historical birth rate data for Minnesota counties. The Minnesota Department of Education also thanks the staff at the Regional Educational Laboratory Midwest for their assistance in designing this study.

This report will be available to the public on the Minnesota Department of Education website (http://education.state.mn.us).

DISCLAIMER

The information presented in this report contains the numbers and percentages that were available in the fall of 2012. The numbers are correct to the best of our knowledge. However, there remains a possibility that data need to be updated to correct for errors in reporting or data entry. Those who identify errors in the data are encouraged to notify the relevant data coordinator at Minnesota Department of Education or other state agency cited as data source.

Contents

LIST OF TABLES

LIST OF FIGURES

2013 REPORT OF TEACHER SUPPLY AND DEMAND IN MINNESOTA'S PUBLIC SCHOOLS

Purpose and Executive Summary

Every two years, the Educator Licensing Division of the Minnesota Department of Education (MDE) is tasked with producing a report on the supply and demand of teachers. By statute, that report must contain data collected by surveying Minnesota public school districts, charter schools, and teacher preparation institutions.

Unlike previous teacher supply-and-demand reports, this report presents the findings of pre-determined research questions. The data for addressing these questions were obtained from data files maintained by the Minnesota Association of Colleges of Teacher Education (MACTE), the Minnesota Board of Teaching (BOT), the Minnesota Center for Health Statistics (MCHS), MDE, and the U.S. Census Bureau. The data from the surveys of districts, charter schools, and teacher preparation institutions also informed findings related to the research questions.

The research questions motivating this study are:

1. What are the five-year trends in teacher staffing? Do these trends vary by teacher race/ethnicity? What are the license areas of shortage and surplus? Do these trends vary by region of the state?
2. Are there differences in the teacher shortage areas in charter schools, rural schools, and urban schools?
3. What barriers do district staff perceive as impairing their ability to hire effective teachers?
4. What factors do teacher preparation institutions cite as influencing their ability to prepare effective teachers now and during the next 10 years?
5. What K–12 public school enrollment trends are expected for particular student subgroups (e.g., racial and ethnic categories and English language learners [ELLs]) for the next three, five, and 10 years?

This report summarizes the findings and highlights the perceived teacher shortage areas and trends as measured by the data collected.

Data Sources and Limitations

The findings are based on analyses of data from the following data sources: BOT, MCHS, MDE, MACTE, and the U.S. Census Bureau. These databases were:

- the database of special permissions maintained by MDE
- county-level birth data available from MCHS' data files and website
- Minnesota Automated Student System (MARSS), Minnesota Financial Reports (MFRs), licensure database, and Staff Automated Reporting system (STAR), all housed at MDE
- county-level intercensal population estimates and Longitudinal Employer-Household Dynamics data from the U.S. Census Bureau

Data also were collected through two surveys:

(1) the survey of 87 percent of Minnesota's public school districts and charter schools, and

(2) the survey of 86 percent of Minnesota's teacher preparation institutions.

The findings based on data from these surveys and agency-mandated data collection systems are considered accurate and reliable. The most uncertain findings are those involving longer-term forecasts (research question 5). Although the forecast model used was the most accurate of those tested, forecasts that extend beyond three years in the future are based on assumed birth rates and the number of women between 15 and 30 years old. Each estimate has some degree of imprecision; thereby affecting the overall forecast accuracy. Education administrators who rely on these forecasts are urged to consider whether migration and birth rates have changed since the 2010–12 period and adjust their personal projections accordingly.

Key Findings

Research Question #1

Overall Picture of Teachers in Minnesota. As of the beginning of the 2011–12 school year, there were 53,133 teachers employed in Minnesota's public schools, a decline of 2.6 percent from five years earlier. Declines in numbers of teachers vary by region from 1 percent to 21 percent. While there have been increases in numbers of Asian/Pacific Islander and Hispanic teachers, the percentage of teachers of color has remained at 3.5 percent of the total teacher population as a result of declines in numbers of African-American and Native American teachers. In the past seven years the percentage of students of color grew to 26 percent in 2011-12 of the total student population, while Caucasian students declined to 74 percent.

Teacher Shortage Areas. Special permissions data indicate that during 2011-12, districts had to hire 3,447 teachers who lacked the necessary licenses for the subjects and the grade levels taught. This corresponds to 6 percent of the entire teaching workforce. The number of teachers requiring special permissions has declined from 2007–08 by about 2 percent. Special permission data and experiences of district hiring officers converge on the following 11 shortage areas:

- Emotional behavior disorders (294 permissions)
- Learning disabilities (265 permissions)
- Developmental disabilities (145 permissions)
- Early childhood special education (91 permissions)
- English as a second language (86 permissions)
- Mathematics (78 permissions)
- School psychologist (66 permissions)
- Spanish (64 permissions)
- Physics (50 permissions)
- Developmental/adapted physical education (45 permissions)
- Chemistry (43 permissions)

Many district hiring officers also mentioned having difficulty finding qualified speech language pathologists (a licensed support position for which special permissions are not granted). The

rank ordering of these hard-to-staff license areas varied slightly from year to year, but they remained within the top 11 or 12 for all five years investigated as part of this study.

Areas of Teacher Surplus. According to district hiring officers and the teacher preparation institutions, the teaching positions that are easiest to fill (or most difficult to place teaching program graduates) are as follows:

- K–6 elementary
- Physical education
- Social studies (high school and grades 5–8)
- Communication arts and literature (high school and grades 5–8)

Demand for Teachers. Several components go into estimating the demand for teachers, including teacher attrition, student enrollments, and student-teacher ratios.

- The annual teacher attrition rate between 2007 and the present has fluctuated between 8 percent and 11 percent, with no clear trend evident. The most recently calculated annual attrition rate among Minnesota teachers is 7.9 percent.
- Student enrollments in Minnesota public schools have decreased by 0.3 percent between 2005–06 and 2011–12. Schools in all but two economic development regions saw decreasing enrollments, and the decreases ranged from 0.9 percent (Southeast region) to 12.3 percent (Upper Minnesota Valley region).
- The population of students enrolled in Minnesota's public schools is becoming more diverse each year. The number of Caucasian students has decreased by 1 percent per year, while the number of students of color increased 3.7 percent since 2005-2006. The five-year period also has seen increases in the percentages of students who are eligible for free or reduced-price lunch, who have limited English proficiency, and/or who have special needs.

Student-Teacher Ratios. The most recent data available (2010) indicate that the average student-teacher ratios have remained steady at 16:4. However, 30 percent of the districts responding to the district survey indicated that they had recently increased their student-teacher ratios.

Taken together, data on these components suggest that there is slightly less demand for teachers at present. Student enrollments have essentially remained unchanged, and the survey data suggest that at least 20 percent of the districts will take steps to reduce their instructional staff (by eliminating positions after attrition, dropping nonessential course offerings, and/or increasing student-teacher ratios).

Teacher Supply. Teachers who held the respective positions the previous year fill approximately 90 percent of the teaching positions available each year. Nine percent of the positions are filled by newly certified teachers trained in a Minnesota teacher preparation institution, teachers transferring from another district, and teachers returning to service (each source fills 3 percent of the vacant positions). The remaining 1 percent consists of teachers licensed in other states and new teachers trained in programs outside of Minnesota.

- Completers of teacher preparation programs:
  - The number of program completers from Minnesota teacher preparation programs has fluctuated between 2007 and 2011, resulting in a 9 percent net decrease. The

percentage decreases are larger for teacher shortage areas (27 percent decrease) compared with the decrease in completers in surplus areas (3 percent decrease).

    - The numbers of new teacher licenses being awarded have decreased by 15.6 percent between 2007 and 2011, even in teacher shortage areas.
- The reserve pool of the total number of active license holders has increased for three traditional teacher shortage areas, remained constant for three areas, and decreased for eight shortage areas.
- The retention rates of teachers have fluctuated during the five years under investigation, with no overall trends apparent.

Taken together, these data on teacher supply suggest an overall reduction in the supply of teachers, especially in teacher shortage areas.

Research Question #2

The numbers of special permissions granted for districts in suburbs, small towns, and rural areas have decreased by 31 percent, 18 percent, and 6 percent, respectively. However, districts in urban areas have seen little overall change in the number of permissions needed to staff schools.

The numbers of permissions needed have increased for charter schools and other types of districts (i.e., cooperatives, education districts, and academies). Regular school districts have seen decreases in the number of permissions needed to staff schools.

The ranking of special permissions needed in regular school districts is similar to that of districts overall: emotional behavior disorders (191 permissions), learning disabilities (168), immersion programs in elementary education (126), developmental disabilities (106), and English as a second language (72).

The top five licensure areas for which charter schools needed special permissions were the same as those for regular school districts with one exception. Mathematics was among the top five for charter schools, but English as a second language was not.

Research Question #3

District hiring officers were asked whether certain standards or policies represented barriers to the hiring and retaining of teachers.

- Sixty-four percent of the responding districts indicated that teacher-licensing standards were either a small or a large barrier.
- Sixty-six percent of the responding districts indicated that teacher-testing requirements were a small barrier or a large barrier to obtaining new teachers.
- Sixty-one percent of the district hiring officers believed that the federal highly qualified requirements were either a small or a large barrier to hiring teachers.

Research Question #4

Teacher-testing requirements were mentioned as a barrier by 72 percent of the teacher preparation institutions. The other major impediments mentioned by 48 percent of the institutions were the cost of higher education for students and the lack of scholarships. A minority of institutions also mentioned resources for complying with accountability provisions (16

percent), resources for faculty (16 percent), low teacher salaries (12 percent), and support for the teaching profession by the public (8 percent).

Research Question #5

Student enrollments in Minnesota's public schools are expected to increase by 4.8 percent during the next 10 years. This figure represents a growth rate that is much more modest than the most recent enrollment forecasts offered by the National Center for Education Statistics (NCES; 2011 forecast to 2021 with a growth rate of 15 percent) and the Minnesota State Demographic Center's 2009 forecast of 7.9 percent.

Between 2012 and 2015, enrollments in elementary schools (Grades K–6) and secondary schools (Grades 7–12) will be on divergent paths, with enrollments in elementary schools increasing by 3 percent and enrollments in secondary schools decreasing by 0.2 percent. In 2015, the students accounting for the previous elementary school increase will begin to enter the secondary grades, thereby reversing the trends in enrollments (elementary grades gradually decreasing but secondary schools gradually increasing).

The relatively small numbers of students in the racial and ethnic groups make separate forecasts for these specific groups too inaccurate to trust. However, it is possible to calculate the number of students of color as whole. It is expected that these students will continue to make up more and more of the student population between now and 2022, with 20 percent growth during the first five years (through 2017) and 11 percent growth for the following five years (2017–2022).

The forecasts of English Language Learners (ELL) also were too inaccurate to trust. The future enrollments of these students are less related to the numbers of ELL students currently in the system and the existing population of immigrants, but rather future immigration rates.

Final Conclusions

The available data suggest a slight decrease in the demand for teachers, as evidenced by district hiring officers' indication that they have increased student-teacher ratios and eliminated vacant positions in recent years. The supply of teachers has also decreased slightly but at a smaller rate than demand. There are slightly fewer licensed teachers in the state than five years ago, and fewer teaching licenses are being issued to prospective teachers. Taken together, these data account for the slight reduction in the numbers of special permissions during the past five years.

However, two trends should be of concern to policymakers. First, there has been a 6 percent increase in the enrollments of students with special needs and an 8.7 percent increase in the number of students with limited English proficiency, whereas there are fewer program completers in the relevant teaching fields and fewer licenses being issued for some of these areas. These data taken together suggest potential increases in shortages in these two fields within the near future. Second, the population of students enrolled in Minnesota's public schools is becoming more diverse, yet the diversity of the teaching workforce remains constant. Research suggests that being exposed to teachers of color can have positive impacts on students of color and Caucasian students alike (Dee, 2001).

1. Overview of the Study

1.1 Legislative Requirement

This study was conducted in compliance with Minnesota Statutes, section 127A.05, subdivision 6, which states the following:

> The commissioner of education shall survey the state's school districts and teacher preparation programs and report to the education committees of the legislature by January 15 of each odd numbered year on the status of teacher early retirement patterns, the teacher shortage, and the substitute teacher shortage, including patterns and shortages in subject areas and regions of the state. The report must also include how districts are making progress in hiring teachers and substitutes in the areas of shortage and a five year projection of teacher demand for each district.

For this study, the Educator Licensing Division within the Minnesota Department of Education (MDE) conducted surveys of public school districts and charter schools in October–November 2012 in an attempt to determine how districts and charter schools were succeeding in staffing their schools with qualified teachers. The Educator Licensing Division also administered a survey to representatives of teacher preparation institutions in Minnesota to gather information on factors that may facilitate or hinder the preparation of highly qualified teachers. This study involved extensive analysis of data already stored within MDE databases.

1.2 Research Questions

As a departure from teacher supply-and-demand studies conducted in the past, the 2012 study did not focus solely on the requirements needed to meet the statute but rather focused on a broader set of questions regarding Minnesota's teacher workforce that were of interest to MDE policymakers, legislators, and other stakeholder groups. Representatives of these stakeholder groups developed five research questions that drove the collection and the analysis of data and the presentation of the findings. These research questions were as follows:

1. What are the five-year trends in teacher staffing? Do these trends vary by teacher race/ethnicity? What are the license areas of shortage and surplus? Do these trends vary by region of the state?
2. Are there differences in the teacher shortage areas in charter schools, rural schools, and urban schools?
3. What barriers do district staff perceive as impairing their ability to hire effective teachers?
4. What factors do teacher preparation institutions cite as influencing their ability to prepare effective teachers now and during the next 10 years?
5. What K–12 public school enrollment trends are expected for particular student subgroups (e.g., racial and ethnic categories, English language learners [ELLs]) for the next three, five, and 10 years?

1.3 Data Collection

The research questions were addressed using a variety of data sources, most of which are databases maintained by MDE. The sources were:

- Minnesota Center for Health Statistics (MCHS, part of the Minnesota Department of Health)
- MDE's 2012 survey of districts on teacher supply and demand
- MDE's 2012 survey of teacher preparation institutions
- Minnesota Association for Colleges of Teacher Education's (MACTE) database on program completers
- Minnesota Automated Reporting Student System (MARSS)
- Minnesota Board of Teaching's (BOT) database containing special permissions to staff vacant teaching positions with non-licensed teachers
- MDE's educator licensure database
- Minnesota Financial Reports (MFRs)
- Staff Automated Reporting system (STAR), and
- the U.S. Census Bureau.

A key to acronyms used throughout this report is presented in Text Box 1 (page 8). The data used to address each question are summarized in the following subsections.

Research Question #1:Teacher Staffing Patterns

Data addressing the first research question come from seven sources:

- The STAR database, which lists staff working in each district and school during the fall and spring of each year and the assignments for each staff
- The special permissions database, which provides a measure of teacher shortage areas
- The teacher licensure database, which provides demographic information on all persons licensed to teach in Minnesota
- Data on student enrollments obtained from the MARSS database
- Student-teacher ratios found in MFRs submitted by districts
- Perception data collected through the district survey
- Teacher education program completer data provided by MACTE

Research Question #2: Shortage Areas in Charter Schools, Rural Schools, and Urban Schools

The question on whether school type or school locale affects the ability to hire teachers was addressed using the same data sources as used for the first question: STAR data, special permissions data, MARSS data, the teacher licensure database, student enrollment data, and district survey data. Separate analyses were performed on the different types of schools.

Text Box 1: Key to Acronyms Used Throughout This Report

APE **Average Percent Error:** a measure of quality of a forecast. APE close to 0 suggest good forecasts.

BOT **Minnesota Board of Teaching:** a Minnesota state agency that has an independent board of directors and is responsible for setting standards and approving teacher preparation programs, and awarding special permissions to teachers, schools, or districts.

ELL **English Language Learners:** students in schools who are also learning to speak and write English

MACTE **Minnesota Association of Colleges of Teacher Education:** the Minnesota chapter of the Association of Colleges of Teacher Education; a professional organization made of representatives of Minnesota's teacher preparation institutions.

MAPE **Mean Absolute Percent Error:** a measure of quality of a forecast, expressed in terms of total distance from 0.

MARSS **Minnesota Automated Reporting Student System:** A database maintained by MDE that stores information on each student in Minnesota, per data provided by districts each year.

MCHS **Minnesota Center for Health Statistics** (at Minnesota Department of Health): a division within the Minnesota Department of Health that collects health-related information from counties and other sources maintains that health-related information.

MDE **Minnesota Department of Education:** Department of Minnesota state government that provides support to education systems and educators throughout the state, helps develop education policy for Minnesota, administers the state's education accountability systems, obtains data from districts, and submits reports to U.S. government agencies.

MFR **Minnesota Financial Reports**: standardized reports submitted by districts each year that summarize the districts' finances.

NCES **National Center for Education Statistics:** a division of U.S. Department of Education, Institute for Education Sciences that administers the National Assessment of Education Progress and numerous surveys, collects data from states, and publishes a number of annual reports, including *The Condition of Education, Education Digest*, and Projections of Education Statistics.

STAR **Staff Automated Reporting:** a system whereby districts report twice per year those teachers currently serving in the school, the courses they teach. For teachers who are no longer teaching in the district, STAR requests a reason for the teachers' departures.

Research Question #3: Barriers to Hiring Effective Teachers

Six closed-ended and two open-ended items on the district survey asked respondents about barriers that prevent them from hiring effective teachers.

Research Question #4: Factors Affecting the Preparation of Effective Teachers

Data collected from the survey of MACTE members were used to gather information about their preparation of effective teachers.

Research Question #5: Enrollment Projections

Enrollment projections were performed after developing the 3-year, 5-year, and 10-year enrollment forecast models that produce the most accurate projections. Analysts used historical data on live births, indicators of economic growth, and prior enrollments to test the accuracy of the various models. These data come from MCHS, the MARSS database, and databases maintained by the U.S. Census Bureau containing intercensal population estimates and estimates of net job growth (the latter from the Census Bureau's Longitudinal Employer-Household Dynamics program).

1.4 Economic Development Regions

This report presents findings from the district survey and the teacher preparation institutions survey in the aggregate. That is, no district or institution was singled out. Otherwise, the smallest unit of analysis for this report is the economic development region, which is a collection of neighboring counties. These regions are portrayed in Text Box 2, p. 10.

1.5 Study Limitations

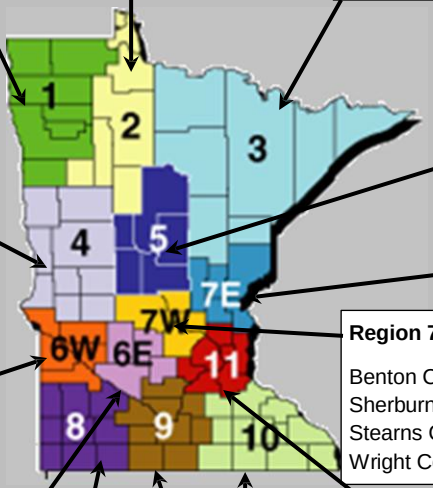
All pre-collected data used in this study come from standard reporting mechanisms within Minnesota or the United States. These data should be considered accurate and unbiased.

School superintendents, charter school administrators, or district hiring officers completed the district survey. The survey was sent to 543 public districts and charter schools. Responses were received from 472 districts and charter schools, resulting in an 87 percent response rate. Even with this good response rate, the completion patterns suggest that charter schools were less likely to respond to the survey than were public districts. Thus, readers should be mindful that these data are more likely reflective of staffing situations within districts, not charter schools.

Representatives of the teacher preparation institutions also completed a brief online survey. Of the 29 teacher preparation institutions in Minnesota, responses were obtained from representatives of 25 of those institutions, resulting in an 86 percent response rate. It should be noted, however, that there was only one respondent from each institution, making it possible that a representative's responses could reflect his or her own personal perspective of a particular teacher preparation program, not the collective perspectives of the programs.

Text Box 2. Economic Development Regions as Defined by the Minnesota Department of Employment and Economic Development

Many reports produced by the state of Minnesota present findings aggregated into multicounty regions. The regions align fairly well with the educational service cooperatives that previously provided support to schools and districts. Presenting findings by region—rather than by county or district—helps to preserve continuity with previous teacher supply-and-demand reports published by MDE and provides a simpler view of trends throughout the state. The regions and associated counties are as follows:



Region 1: Northwest

Kittson County
Marshall County
Norman County
Pennington County
Polk County
Red Lake County
Roseau County

Region 2: Headwaters

Beltrami County
Clearwater County
Hubbard County
Lake of the Woods County
Mahnomen County

Region 3: Arrowhead

Aitkin County
Carlton County
Cook County
Itasca County
Koochiching County
Lake County
St. Louis County

Region 4: West Central

Becker County
Clay County
Douglas County
Grant County
Otter Tail County
Pope County
Stevens County
Traverse County
Wilkin County

Region 5: North Central

Cass County
Crow Wing County
Morrison County
Todd County
Wadena County

Region 7E: East Central

Chisago County
Isanti County
Kanabec County
Mille Lacs County
Pine County

Region 7W: Central

Benton County
Sherburne County
Stearns County
Wright County

Region 6W: Upper Minnesota Valley

Big Stone County
Chippewa County
Lac qui Parle County
Swift County
Yellow Medicine County

Region 11: Metro

Anoka County
Carver County
Dakota County
Hennepin County
Ramsey County
Scott County
Washington County

Region 6E: Southwest Central

Kandiyohi County
McLeod County
Meeker County
Renville County

Region 9: South Central

Blue Earth County
Brown County
Faribault County
Le Sueur County
Martin County
Nicollet County
Sibley County
Waseca County
Watonwan County

Region 10: Southeast

Dodge County
Fillmore County
Freeborn County
Goodhue County
Houston County
Mower County
Olmsted County
Rice County
Steele County
Wabasha County
Winona County

Region 8: Southwest

Cottonwood County
Jackson County
Lincoln County
Lyon County
Murray County
Nobles County
Pipestone County
Redwood County
Rock County

The most uncertain findings are the forecasts that address research question 5. Analysts tested eight credible forecast models using historical data (see Appendix G for a summary of these tests). Analysts chose the forecast model that produced the least biased and most accurate forecasts. The state-level forecasts have mean absolute percent errors (MAPEs) of 0.78 percent, 1.33 percent, and 3.95 percent for the three-, five-, and 10-year forecasts, respectively. Regional level forecasts produced MAPEs of 1.61 percent, 2.59 percent, and 5.26 percent for the three-, five-, and 10-year forecasts, respectively. All of these accuracy statistics are within acceptable ranges.

Even through these forecast models yield good accuracy statistics, there remains some degree of uncertainty regarding the five- and 10-year forecasts because those forecasts involve chains of estimates that themselves include some amount of uncertainty. Therefore, those who use forecast information for planning or capital investments should make adjustments to the forecasts based on their observations of changes in migration patterns and birth rates within their respective areas.

Finally, there may be statistics presented in this report that differ slightly from those presented in earlier reports. These discrepancies may be the result of data updates or using different time referents for counts (e.g., calendar year or school year). Readers are encouraged to accept the most recent figures, given that they represent the most current data available.

1.6 Structure of This Report

The study findings are presented in Section 2 of this report, with subsections devoted to the specific research questions.

Section 2.1 focuses on research question 1. In that section, the findings on staff shortage areas (special permissions data, license data, and district hiring officers' responses to the district survey) will be presented. In addition, this section will present the findings on factors influencing the demand for teachers, such as attrition rates (in general and among recently licensed cohorts of teachers), teachers' reasons for leaving their positions, enrollment patterns, and student-teacher ratios. The findings on components of teacher supply also are included in this section. These include retention rates, the number of program completers emerging from Minnesota's teacher preparation institutions, teachers migrating in from other states, and trends in teacher licensing. This section includes findings for all of Minnesota and separate findings for each economic development region within the state.

Section 2.2 summarizes staffing patterns that are disaggregated by the race/ethnicity of teachers, school type, and school setting. These findings address research question 2.

The district hiring officers' responses to survey items on barriers to hiring effective teachers are discussed in Section 2.3. These findings related to research question 3.

Section 2.4 contains a summary of teacher preparation institutions' views of factors influencing teacher training. That is, data related to research question 4 are presented in this section.

Student enrollment projections—research question 5—are the subject of Section 2.5 of this report. Contained within this section are three-, five-, and 10-year enrollment projections for the state as a whole and students of color.

2. Findings

2.1 Teacher Staffing Patterns Since 2007–08

Research Question 1: What are the five-year trends in teacher staffing? Do these trends vary by teacher race/ethnicity? What are the license areas of shortage and surplus? Do these trends vary by region of the state?

A general picture of teacher staffing patterns during the past five years is presented first (Section 2.1.1). This information includes the number of teachers in the state per year, the number of teachers within the 13 economic development regions, and the numbers of teachers per licensure area.

Section 2.1.2 shows trends in staffing patterns by teacher race and ethnicity.

Section 2.1.3 includes information from single indicators of areas of teacher shortage and surplus. These indicators include the numbers of special permissions per licensure area and responses of district staff to survey items on areas of teacher shortage and surplus.

Section 2.1.4 focuses on the demand for teachers in Minnesota. The demand factors include trends in teacher attrition, trends in student enrollments, and student-teacher ratios.

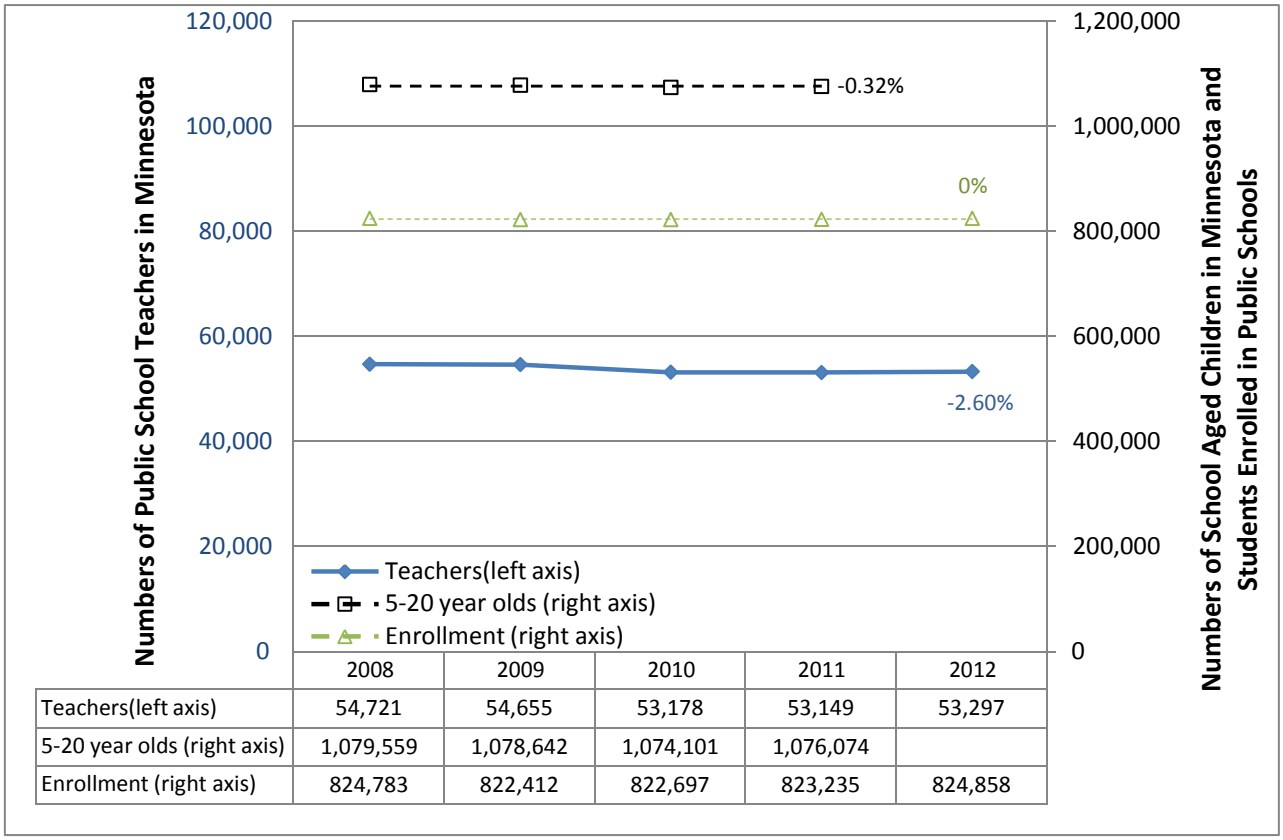
The last section (2.1.5) contains information on trends in teacher supply, including the number of candidates who complete teacher preparation programs each year and new licenses issued to teachers each year.

2.1.1 General Picture of Teacher Staffing Patterns in Minnesota

The employment data reported through the STAR system identify staff serving in a capacity that requires licensure. Staff members serving as teachers were identified from STAR employment and assignment data. Teachers employed by more than one district appear in all districts in which they teach.

The teacher employment numbers for 2011–12 have declined slightly since the 2007–08 school year. Figure 1 (found on page 13) shows that the number of teachers declined from 54,721 in 2007–08 to 53,297 in 2011–12, which is a 2.6 percent decrease across the five school years. In comparison, the approximate number of school-aged Minnesotans (ages 5–20) decreased by just 0.32 percent, and public school enrollments remained essentially unchanged.

Figure 1. The Number of Teachers in Minnesota Public Schools: 2007–08 to 2011–12



	2008	2009	2010	2011	2012
Teachers(left axis)	54,721	54,655	53,178	53,149	53,297
5-20 year olds (right axis)	1,079,559	1,078,642	1,074,101	1,076,074	
Enrollment (right axis)	824,783	822,412	822,697	823,235	824,858

Note. These include long-term substitutes but do not include short-call substitutes (a substitute fulfilling one assignment for less 15 than consecutive days). Prepared from the STAR system and the U.S. Census Bureau, Population Division, intercensal population statistics for 2000–10 and 2010–11.

As seen in Table 1 (page 14), there have been declines in the number of employed teachers for the past five years in all regions across the state. The decline occurred most notably in the Southwest Central (21 percent), Northwest (12 percent), and Upper Minnesota Valley (10 percent) regions. The Metro and East Central regions experienced the smallest decreases, with a 1 percent change in each. As an indication of corresponding changes to the populations within these regions, the changes to public school student enrollments are provided in the far-right column.

Table 2 (page 14) shows the number of active licenses in the broad license areas from 2007–08 to 2011–12. All areas saw a decline except for mathematics licenses, which increased by 2 percent across the state. The areas that saw the largest declines in the number of active licenses were industrial technology (27 percent), business (29 percent), agricultural education (29 percent), family consumer sciences (30 percent), and trade (33 percent).

Table 1. The Number of Teachers per Region: 2007–08 to 2011–12

Region	School Year					Change in Numbers of Teachers From 07–08 to 11–12		Enrollment Changes From 07–08 to 11–12
	2007–08	2008–09	2009–10	2010–11	2011–12			
Total[a]	**54,721**	**54,655**	**53,178**	**53,149**	**53,297**	**-1,437**	**(-3%)**	**+0.01**
01: Northwest	1,119	1,096	996	1,007	988	-131	(-12%)	-3.9%
02: Headwaters	1,064	1,061	1,016	1,016	1,033	-31	(-3%)	-0.9%
03: Arrowhead	2,890	2,873	2,729	2,718	2,696	-194	(-7%)	-3.8%
04: West Central	2,298	2,281	2,162	2,176	2,162	-136	(-6%)	-0.6%
05: North Central	1,815	1,757	1,749	1,757	1,738	-77	(-4%)	-4.1%
06W: Upper MN Valley	1,186	1,137	1,045	1,079	1,063	-123	(-10%)	-5.4%
06E: Southwest Central	613	576	505	485	485	-128	(-21%)	-6.9%
07W: Central	1,746	1,700	1,623	1,628	1,599	-147	(-8%)	-5.5%
07E: East Central	4,416	4,417	4,366	4,363	4,375	-41	(-1%)	+2.6%
08: Southwest	1,526	1,533	1,427	1,440	1,427	-99	(-6%)	-1.8%
09: South Central	2,597	2,582	2,421	2,396	2,401	-196	(-8%)	-1.4%
10: Southeast	4,936	4,928	4,751	4,805	4,831	-105	(-2%)	-0.2%
11: Metro	28,495	28,660	28,220	28,110	28,335	-160	(-1%)	+1.3%

Note. Teachers assigned to more than one district are counted once per district served. Prepared from the STAR system.

[a]Details by year do not sum to the totals because of missing region data.

Table 2. The Number of Total Teaching Licenses by License Area: 2007–08 to 2011–12

License Area	School Year					Change From 07–08 to 11–12
	2007–08	2008–09	2009–10	2010–11	2011–12	
Mathematics	2,242	2,272	2,265	2,257	2,291	49 (+2%)
World language/culture	1,827	1,781	1,740	1,752	1,777	-50 (-3%)
Prekindergarten/elementary	18,611	18,442	17,854	17,435	17,348	-1,263 (-7%)
Natural sciences[a]	3,020	2,938	2,829	2,785	2,789	-231 (-8%)
Special education	9,562	9,350	9,135	8,919	8,669	-893 (-9%)
Social sciences	3,185	3,130	2,948	2,926	2,855	-330 (-10%)
English/Communication arts	4,685	4,500	4,223	4,145	4,059	-626 (-13%)
Visual and performing arts	2,969	2,889	2,707	2,644	2,528	-441 (-15%)
Health/safety/physical education	7,973	7,565	6,941	6,676	6,265	-1,708 (-21%)
Industrial arts	519	481	441	420	379	-140 (-27%)
Business and computer education	1,003	934	829	788	717	-286 (-29%)
Agricultural education	296	278	237	224	209	-87 (-29%)
Family/consumer sciences	907	839	728	676	634	-273 (30%)

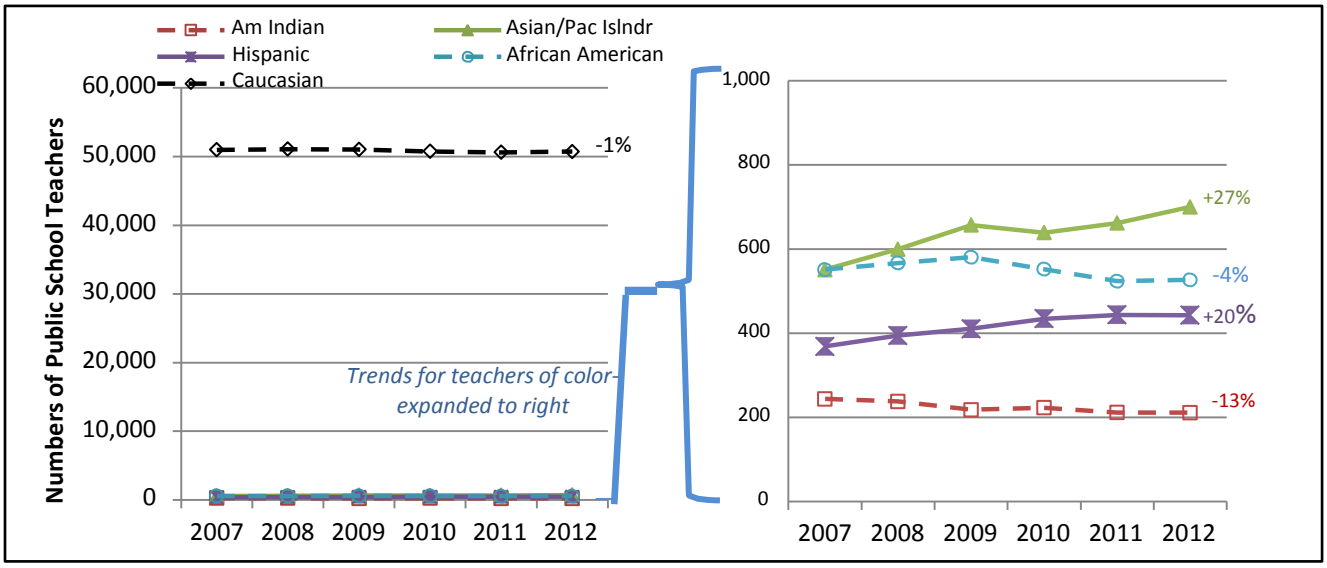
Note. These are counts of licenses, not teachers. Teachers may hold more than one license. Natural sciences include life sciences, physics, general science, chemistry, physical sciences, science 5–9, science 5–8, earth and space science, and general science.

2.1.2 Trends in the Diversity of Minnesota's Teacher Workforce

Part of the first research question 1 asks about trends in the teacher workforce by teachers' race or ethnicity. STAR employment and assignment data were examined to address this question. The data indicate increasing numbers of Asian American/Pacific Islander teachers and Hispanic teachers working in Minnesota's public schools, compared with five years ago (see Figure 2). The numbers of teachers in these groups increased 27 percent and 20 percent, respectively. However, the numbers of African-American and Native American teachers decreased 4 percent and 15 percent, respectively.

Even with the relative increases in the numbers of teachers in some race and ethnic subgroups, the percentage of teachers of color within Minnesota's teacher workforce is still only 3.5 percent. Trends in the diversification of public school teachers in each region are reflected in the percentages for each subgroup in each region in Table 3 (page 16).

Figure 2. The Percentages of Teachers Representing Different Racial and Ethnic Groups: 2006–07 to 2011–12



Note. Prepared from STAR employment and assignment files.

Table 3. The Race and the Ethnicity of Teachers in Minnesota and Economic Development Regions Within the State

Region	Year						Percentage Change
	2007	2008	2009	2010	2011	2012	
Entire state							
Native American	244	238	218	223	211	211	-13%
Asian/Pacific Islander	551	600	657	639	662	700	+27%
Hispanic	368	394	410	434	443	443	+20%
African American	551	567	581	552	524	527	-4%
Caucasian	50,987	51,092	51,043	50,769	60,607	50,729	-1%
01: Northwest							
Native American	3	3	3	2	3	2	-40%
Asian/Pacific Islander	0	0	0	0	0	0	
Hispanic	2	1	0	0	1	1	-50%
African American	0	0	0	0	0	0	
Caucasian	1,096	1.088	1,080	1,047	1,039	1,029	-6%
02: Headwaters							
Native American	54	51	47	47	43	46	-16%
Asian/Pacific Islander	4	2	2	2	1	2	-52%
Hispanic	1	2	3	3	3	2	100%
African American	1	1	1	1	1	1	0%
Caucasian	971	983	977	955	956	971	0%
03: Arrowhead							
Native American	21	32	22	20	20	24	+14%
Asian/Pacific Islander	5	5	5	5	5	7	+41%
Hispanic	6	7	10	10	9	10	+70%
African American	4	4	3	3	3	3	-25%
Caucasian	2,807	2,807	2,811	2,757	2,691	2,721	-3%
04: West Central							
Native American	9	7	9	8	7	5	-41%
Asian/Pacific Islander	1	1	3	6	4	7	+667%
Hispanic	7	2	2	1	1	1	-85%
African American	1	1	1	1	0	0	-100%
Caucasian	2,210	2,202	2,158	2,123	2,127	2,129	-4%

Region	Year						Percentage Change
	2007	2008	2009	2010	2011	2012	
05: North Central							
Native American	6	5	6	1	2	1	-84%
Asian/Pacific Islander	3	3	4	1	7	1	-66%
Hispanic	5	6	3	3	6	2	-62%
African American	0	0	1	1	1	1	+100%
Caucasian	1,791	1,762	1,713	1,392	2,385	1,703	-5%
06E: Southwest Central							
Native American	1	1	0	0	0	0	-100%
Asian/Pacific Islander	0	0	0	0	0	1	+100%
Hispanic	2	2	2	1	1	1	-50%
African American	0	0	0	0	0	0	
Caucasian	1,160	1,141	1,248	1,093	1,084	1,078	-7%
06W: Upper Minnesota Valley							
Native American	0	0	0	0	0	0	
Asian/Pacific Islander	0	0	0	0	0	0	
Hispanic	0	1	1	2	3	3	+300%
African American	0	0	0	0	0	0	
Caucasian	606	605	576	557	542	532	-12%
07E: East Central							
Native American	3	1	2	1	0	2	-33%
Asian/Pacific Islander	1	3	3	2	2	2	+67%
Hispanic	0	0	1	0	0	0	
African American	0	2	1	1	1	1	+50%
Caucasian	1,698	1,699	1,666	1,624	1,605	1,589	-6%
07W: Central							
Native American	6	5	5	6	7	7	+20%
Asian/Pacific Islander	8	11	12	14	17	18	+112%
Hispanic	8	8	13	12	12	12	+46%
African American	9	9	7	8	7	8	-16%
Caucasian	4,185	4,260	4,126	4,273	4,300	4,307	+3%

Region	Year						Percentage Change
	2007	2008	2009	2010	2011	2012	
08: Southwest							
Native American	3	4	3	2	2	2	-42%
Asian/Pacific Islander	1	1	2	2	2	3	+132%
Hispanic	6	9	8	9	4	4	-36%
African American	0	0	0	0	0	0	
Caucasian	1,451	1,445	1,438	1,458	1,457	1,455	0%
09South Central							
Native American	2	2	2	2	2	2	0%
Asian/Pacific Islander	7	7	7	6	5	5	-18%
Hispanic	6	6	7	8	7	5	-13%
African American	2	2	2	2	2	1	-51%
Caucasian	2,497	2,274	2,272	2,206	2,184	2,179	-13%
10: Southeast							
Native American	3	4	4	3	4	2	-43%
Asian/Pacific Islander	17	15	18	18	17	16	-9%
Hispanic	18	18	19	20	21	22	+23%
African American	7	10	13	8	9	11	+59%
Caucasian	4,756	4,768	4,779	4,681	4,752	4,828	+2%
11: Metro Twin Cities							
Native American	132	123	115	125	121	113	-14%
Asian/Pacific Islander	504	552	602	581	602	637	+27%
Hispanic	308	333	343	365	375	379	+23%
African American	527	538	552	526	500	501	-5%
Caucasian	25,760	26,060	26,201	26,282	25,442	26,207	+2%

Note. Data on the race and the ethnicity of teachers come from STAR assignment files. Data files containing these data consider race and ethnicity to be categories for the same characteristic. That is, Hispanic reflects all teachers who were identified as of Hispanic origin, regardless of racial identification.

2.1.3 Single Indicators of Teacher Shortage and Surplus Fields

A common method for determining whether the supply of teachers is adequate for the demand for teachers is to examine a single statistic or indicator which shows whether supply and demand are in or out of balance and the direction of that imbalance. Two single indicators are presented in this report: (1) numbers of special permissions granted by BOT to teachers wanting to teach a subject or grade level for which they are not licensed, and (2) ratings made by district officials to show their difficulties in hiring teachers in different subject areas.

In Minnesota, teachers who wish to teach outside of their areas of licensure must apply to BOT for special permission to teach that subject. Districts and schools offering positions to these applicants must be unable to find a fully licensed individual to fill the teaching vacancy. Thus,

examining the licensure fields for which special permissions are granted and the number of those permissions per field allows MDE to assess which licensure areas are experiencing shortages and the magnitude of those shortages.

Subdivision 6 of Minnesota statute 127A.05 mentions another simple indicator of teacher shortage areas: surveys that ask district hiring officers about their experiences attempting to recruit and hire qualified teachers in various subject areas. These data can provide confirmation from the field about staffing areas for which too few qualified applicants exist.

Special Permissions. The number of special permissions granted is a single indicator of fields for which too few teachers exist (see the definitions of special permissions in Text Box 3).

Text Box 3. Definitions of Special Permissions

Variance: Minnesota Rule 8710.1400. A special permission granted for fully licensed teachers to serve in positions for which they are not licensed (out-of-field).

> A **personnel variance** is a special permission granted to fully licensed teachers to serve in positions for which they are not licensed. To assign a licensed classroom teacher "out-of-field" or "out-of-grade level," the school district or charter school must apply for a personnel variance to the Minnesota Board of Teaching. Personnel variances may be granted to the school district or charter school for an individual for no more than three years. The personnel variance special permission was created with the intent that within three years, a licensed teacher would have the time to become fully licensed in that content area.

Waivers: Minnesota Statutes, 122A.09, subd. 10. A special permission granted for one or more licensed individuals to teach out of their subject area to accommodate experimental (innovative) programs or for an assignment for which there is no appropriate licensure. A waiver is commonly used in an alternative setting (e.g., a care and treatment center, alternative learning center or charter school). Waivers are granted annually and there is no limit on the number of waivers an individual can be granted since there is no license that allows an individual to teach multiple content areas.[1]

Temporary Limited License: Minnesota Rule 8710.1250. A special permission granted to an individual who possesses at least a bachelor's degree with a major or minor in the field. This person has not received teacher preparation. A temporary limited license is valid for one year and may be renewed for up to three school years.

Short-Call Substitute License: Minnesota Rule 8710.1000. A special permission granted to an individual when a district has advertised in good faith for regularly licensed teachers to serve as short-call substitute teachers but has been unable to secure a sufficient number of regularly licensed teachers to meet the district's needs. The license is valid for two years, but only allows the individual to teach a specific assignment for up to 15 days at a time. If an individual has completed a teacher preparation program, but does not meet or intend to pursue a fulltime Minnesota teaching license, he/she may be issued a five-year, short-call substitute license. This may include, but is not limited to, individuals who do not meet testing, coursework, or continuing education requirements or individuals who have retired from teaching.

Non-Licensed Community Expert: Minnesota Statutes, section 122A.25. A special permission granted to a school district to hire an individual who is not a licensed teacher, but has a specific area of expertise that is related to the teaching assignment.

Non-Renewable License: Minnesota Rule 8710.1410. This permission was issued for the first time for the 2006-07 school year. The nonrenewable license allows a professionally licensed individual to teach out-of-field in a subject as s/he works toward full licensure. A district only needs to apply for this license once and does not need to advertise for the position after the first year.

Table 4 and Figure 3 show the number of special permissions granted by BOT between 2007 and 2012.[1] The figure does not include limited short-call substitute licenses and duplicated counts for waivers.[2] The data indicate a 24 percent decrease in the most frequently used permission type (personnel variances). Otherwise, the numbers of all other types of special permissions increased between 13 percent and 136 percent between 2007 and 2012.

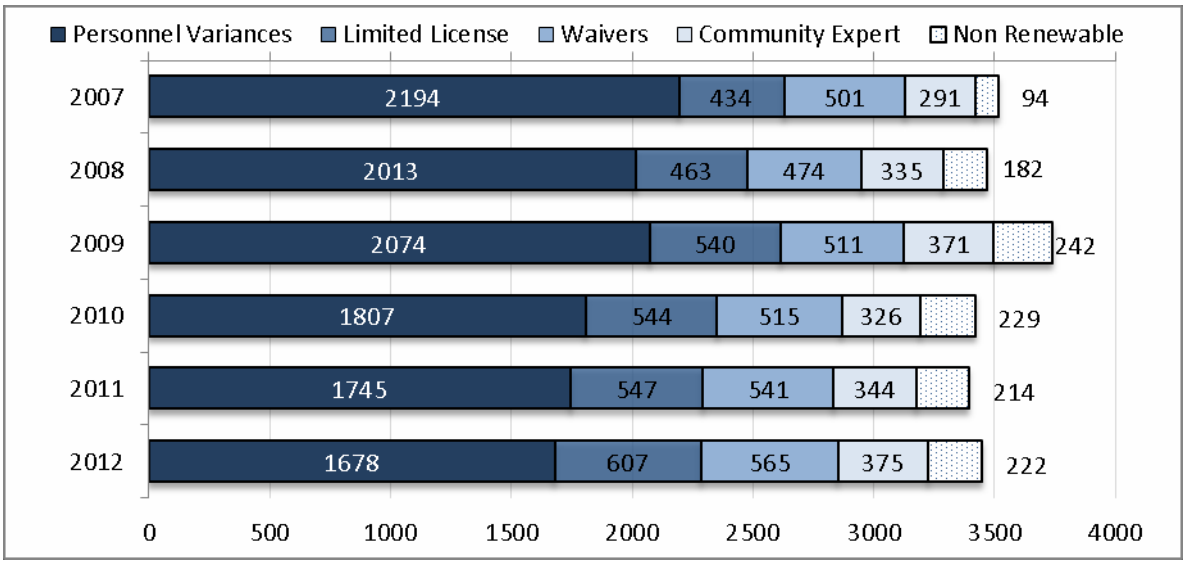
Table 4. Special Permission Trends in All Licensure Areas: 2007–12

Permission Type	2007	2008	2009	2010	2011	2012	Percentage Change 2007–12
Personnel variances	2,194	2,013	2,074	1,807	1,745	1,678	-23.52%
Limited license[a]	434	463	540	544	547	607	39.86%
Waivers[b]	501	474	511	515	541	565	12.77%
Community expert	291	335	371	326	344	375	28.87%
Nonrenewable	94	182	242	229	214	222	136.17%
Total	3,514	3,467	3,738	3,421	3,391	3,447	-1.91%

Note. Prepared from BOT special permissions files, 2006–07 through 2011–12 school years.

[a]Does not include the number of limited short-call substitute licenses issued each year. [b]Experimental program waivers were granted by core subjects for the first time in 2005–06 to align with federal No Child Left Behind requirements. This table reflects the unduplicated count of waivers granted during each year.

Figure 3. BOT Special Permission Trends in All Licensure Areas: 2007–12



Note. Prepared from BOT special permissions files, 2006–07 through 2011–12 school years.

[1] Analysis of special permissions data revealed identical values within the electronic files, including 11 duplicates in the 2006–07 data file, seven in the 2007–08 file, one in the 2008–09 file, four from the 2009–10 file, 21 in the 2010–11 file, and 18 in the 2012–13 file. The findings presented for special permissions, limited licenses, and variances do not include these duplicates.

[2] Total waivers granted with duplicated counts were 2,081 in 2007; 1,958 in 2008; 2,121 in 2009; 2,194 in 2010; 2,335 in 2011; and 2,504 in 2012. There were a total of 3,514 special permissions granted in 2007; 3,467 in 2008; 3,738 in 2009; 3,421 in 2010; 3,391 in 2011; and 3,447 in 2012; representing a slight decrease between 2007 and 2012.

Table 5 lists the 15 licensure areas for which the most variances and limited licenses were granted, along with the numbers granted between 2007 and 2012. Generally, each subject area saw overall declines in the numbers of variances and licenses. However, licenses and variances granted for elementary education (immersion programs) increased 179 percent from 2007 to 2012,[3] whereas there was an 18 percent increase for school psychologists. Variances and licenses for reading fluctuated between 2007 and 2012, but by 2012, the numbers of licenses and variances granted was the same as 2007.

Table 5. The Numbers of Variances and Limited Licenses Granted by Subject Area: 2007–12

Licensure Subject Area	2007	2008	2009	2010	2011	2012	Percentage Change
Emotional behavior disorders	331	308	323	271	278	294	-11%
Learning disabilities	271	250	291	287	290	265	-2%
Elementary education (immersion programs only)	73	113	129	175	194	204	+179%
Developmental disabilities	183	168	189	173	177	145	-21%
Early childhood special education	100	115	126	95	94	91	-9%
English as a second language	109	121	94	66	76	86	-21%
Communication arts/literature	93	66	71	70	59	83	-11%
Mathematics	112	100	131	115	88	78	-30%
School psychologist	56	52	52	44	53	66	+18%
Spanish	85	70	87	86	78	64	-25%
Reading	62	50	65	97	82	62	0%
Science 5–8	82	80	80	62	45	53	-35%
Physics	57	38	43	39	37	50	-12%
Developmental/adapted physical education	53	43	50	48	38	45	-15%
Chemistry	73	60	58	45	48	43	-41%

Note. The subject areas listed in this table represent the 15 subject areas in 2012 with the most variances and limited licenses granted in 2012. See Appendix H for counts of variances and limited licenses for all subject areas between 2007 and 2012. [b]The table does not include short-call substitutes. The numbers of identical cases were provided in footnote 1. Prepared from BOT special permissions files, 2006–07 through 2011–12 school years.

Table 6 (page 22) displays similar information as in Table 4, but the data are for each of Minnesota's economic development regions. The most variances were issued to teachers in the Metro region, whereas teachers in the Upper Minnesota Valley region were granted the fewest number of variances. As seen in Table 6, the numbers of variances and limited licenses granted in the Metro region have declined by 17 percent from 2007 to 2012. The North Central region had a 23 percent increase in the numbers of limited licenses and variances granted between 2007 and 2012, while the Northwest region saw an 18 percent increase and the Southwest region saw a 6 percent increase. Meanwhile, the East Central region saw a 41 percent decrease in variances and licenses granted, and the Headwaters region saw a 40 percent decrease. This information also is presented in Figure 4 (page 23).

[3] BOT does not provide special permissions for elementary teachers, unless they are part of a language immersion program within an elementary school.

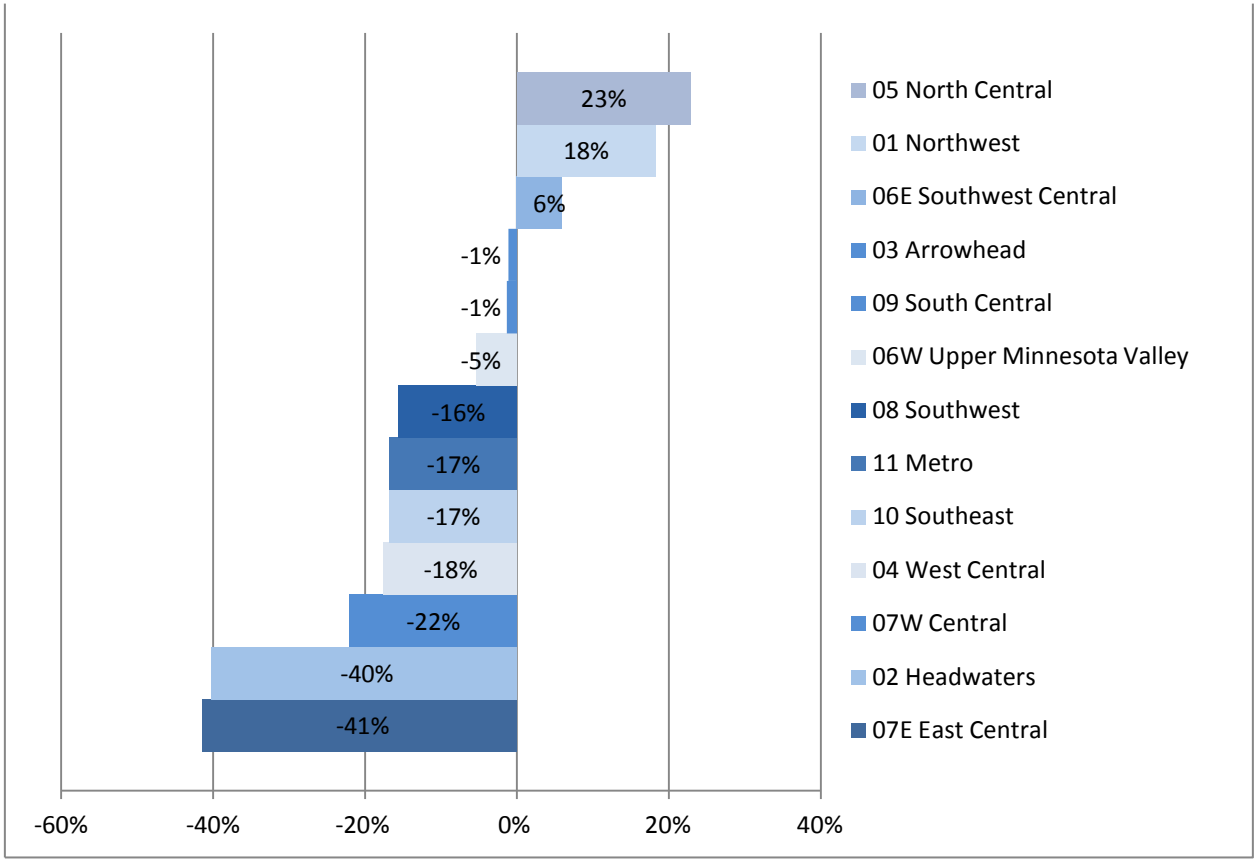
Table 6. The Numbers of Variances and Limited Licenses Granted by Region: 2007–12

Region[a]	2007	2008	2009	2010	2011	2012	Percentage Change
01: Northwest	55	54	54	49	48	65	+18%
02: Headwaters	77	49	63	51	47	46	-40%
03: Arrowhead	182	176	189	174	172	180	-1%
04: West Central	97	89	101	84	66	80	-18%
05: North Central	57	71	57	64	60	70	+23%
06E: Southwest Central	45	59	50	27	44	38	+6%
06W: Upper Minnesota Valley	37	33	34	23	18	35	-5%
07E: East Central	99	91	80	81	59	58	-41%[b]
07W: Central	145	146	141	125	112	113	-22%[b]
08: Southwest	135	131	151	125	134	143	-16%
09: South Central	149	120	143	124	126	147	-1%
10: Southeast	244	198	215	196	216	203	-17%
11: Metro	1,296	1,251	1,306	1,199	1,162	1,079	-17%

Note. The table does not include short-call substitutes. See footnote 1 for numbers of identical cases that were removed from the file. Prepared from BOT special permissions files, 2006–07 through 2011–12 school years.

[a]Twenty-eight cases (1 percent) do not have a district associated with the case in 2012; 28 (1 percent) cases do not have a district associated with the case in 2011; 29 cases (1 percent) do not have a district associated with the case in 2010; 30 cases (1 percent) do not have a district associated with the case in 2009; 8 cases (0.3 percent) do not have a district associated with the case in 2008; and 10 cases (0.3 percent) do not have a district associated with the case in 2007. These cases are not counted in the current table.
[b]These differences reflect downward trends. For other regions, year-to-year changes in the numbers of variances are too inconsistent to conclude, with certainty, a trend.

Figure 4. The Percentage Change in Variances and Limited Licenses Granted by Region: 2006–07 to 2011–12



Note. Prepared from BOT special permissions files, 2006–07 through 2011–12 school years.

District Hiring Officers' Recent Experiences With Recruiting Licensed Staff

The supply-and-demand survey measured district hiring officers' experiences in attempting to find qualified teachers for their vacant positions.[4] The methodology and the nonresponse bias analysis for this survey are in Appendix A. The complete survey, along with frequency distributions for all items, is in Appendix B.

[4] District surveys administered in previous supply-and-demand studies published by MDE asked respondents to provide the actual numbers of vacancies, the numbers of applicants, the numbers of qualified applicants, and the numbers of positions filled with teachers holding appropriate licenses. Respondents filled in these numbers for each licensure field for which they had openings. Since the last administration of district surveys for this purpose, MDE has weighed the time burden placed on districts to complete the survey against the quality of information yielded by the surveys (the highest response rate on these surveys was only 62 percent). Because the information did not justify the burden, MDE decided to shorten the survey considerably and just ask district hiring officials about their perceptions of the difficulty of filling different types of positions in the past and in the future. Higher quality information was obtained by analyzing extant data maintained by MDE.

Most Difficult Positions to Fill in the Past Two Years. The respondents were asked the following question: "How easy or difficult was it to fill vacancies for the 2011–12 and 2012–13 school years in each of the following areas?" The response options were as follows:

- Could not fill all vacancies[5]
- Very difficult
- Somewhat difficult
- Easy
- N/A: No positions in this district or N/A: No vacancies for this position.

District hiring officers gave one of these responses to each of the 104 licensure areas presented. The licensure areas were grouped under the following broad categories: arts, special education, early childhood and elementary education, middle grade levels, high school education, languages, related education, career and technical education, administrative, licensed support staff, and non-licensed support staff.

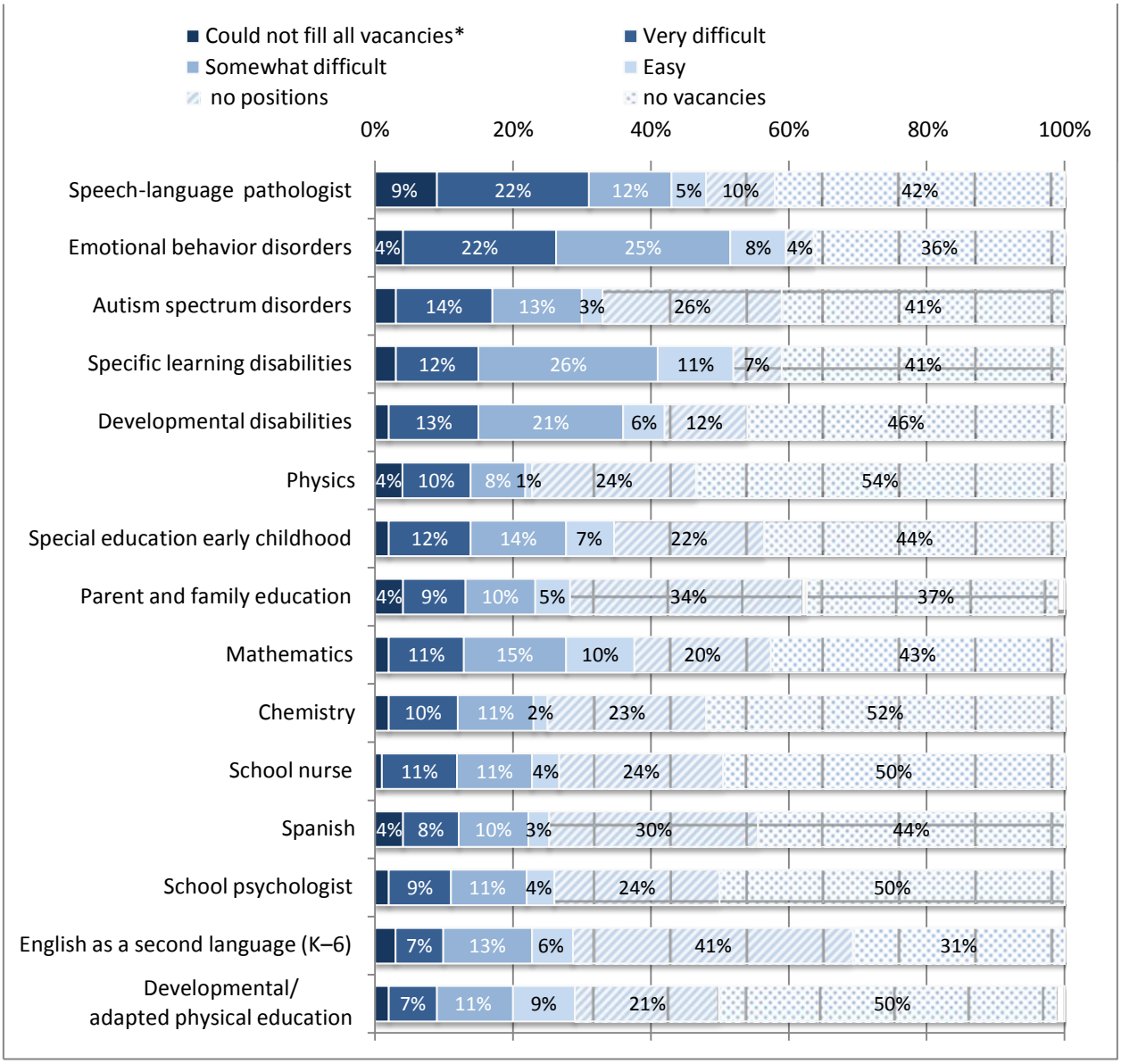
The percentages of districts' responses are displayed in Figure 5 (page 25), according to the percentages of districts indicating that they could not fill a vacancy or that it was very difficult to fill the vacancy. The responses indicate that speech-language pathologist positions were the hardest to fill: 9 percent of the districts were unable to fill vacancies through regular recruitment strategies, and another 22 percent reported that it was very difficult to fill vacancies in this area. District respondents also indicated difficulty in finding licensed teachers to work with students with emotional behavior disorders, with 4 percent of the districts stating that they were unable to fill vacancies without applying for a special permission and another 22 percent reporting that it was very difficult to fill vacancies in this area.[6]

Other special education positions were among this list of positions, with at least 10 percent of the districts reporting that they could not fill or found it very difficult to fill with qualified candidates. Among the specific special education fields, the respondents indicated that autism spectrum disorders (17 percent), developmental disabilities (15 percent), specific learning disabilities (15 percent), and special education for early childhood (14 percent) were fields for which few qualified applicants were found. High school physics, mathematics, and chemistry were also considered hard-to-fill positions (14 percent, 13 percent, and 12 percent, respectively).

[5] For all teaching positions, this response option had an asterisk with the following footnote: "*Or had to apply for special permissions to allow non-licensed teachers to teach this subject."

[6] Many of the same licensure areas remained after eliminating districts that stated that they had no positions in the licensure area or had no vacancies in the past two years. For these alternative figures and rankings, see Figures 24 and 25 in Appendix B.

Figure 5. The Percent Distribution of Responses About the Ease of Filling Vacancies in the Past Two Years Ordered by Difficulty: Fall 2012[a]



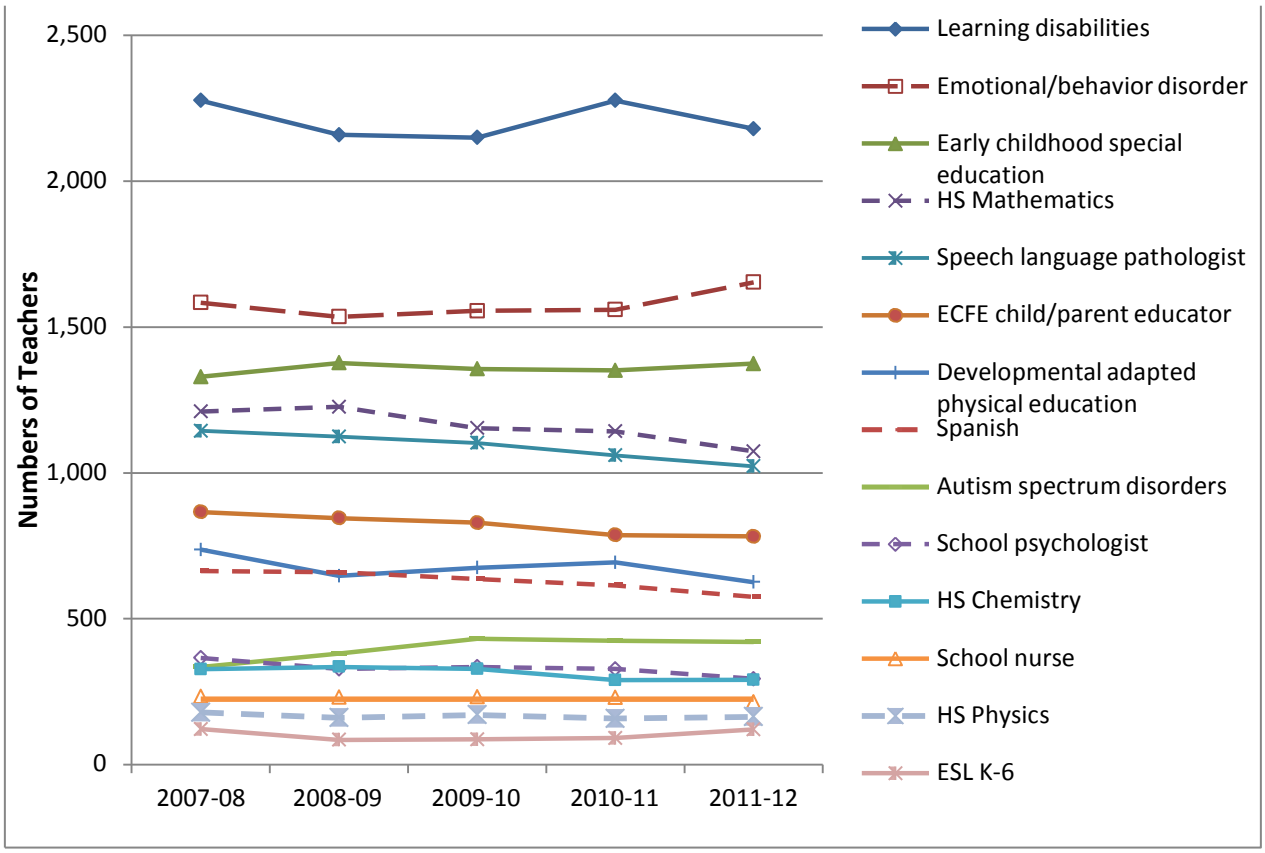
Note. *District responders were asked to mark this option if they had to obtain special permissions to fill a vacancy. License areas sorted based on district hiring officers' perceptions of difficulty in finding qualified applicants for vacancies (sorted from highest to lowest percentage of districts responding could not fill the position or very difficult to fill. Prepared from the MDE supply-and-demand survey, fall 2012.

[a]Similar analyses were performed after removing districts with no vacancies or no positions. Most of the same shortage areas emerged. See Figure 23 in Appendix B.

In addition, the survey included questions about how difficult it had been in the past two years to secure short- and long-term substitute teachers (see Appendix B). Thirty-five percent indicated that it was "easy," 43 percent answered that it was "somewhat difficult," and 22 percent found it "very difficult" to secure short-term substitutes. Twenty-five percent indicated that it was "easy," 52 percent answered that it was "somewhat difficult," and 24 percent found it "very difficult" to secure long-term substitutes.

For the positions that had been identified as hard-to-fill over the past two years in the survey, the STAR assignment data was used to investigate how many licensed school staff members were in each of these areas over time. Figure 6 shows the numbers of staff members in these shortage areas for the past five years. The number of staff in these hard-to-staff fields decreased between eight and 20 percent from 2007-08 to 2011-12 for nine of these positions (HS mathematics, speech language pathologist, early childhood family educator/parent educator, developmental adapted physical education, Spanish, school psychologist, high school Chemistry, school nurse, and high school physics), four positions didn't change by more than 5 percent (learning disabilities, emotional/behavior disorder, early childhood special education, and ESL K-6), and the number of staff for autism spectrum disorders increased by 25.4 percent over the 5 year period. As shown in Table 7 (page 26), the magnitude of shortage in these licensure areas also varied across economic development region.

Figure 6. The Numbers of Licensed School Staff in Areas Identified as Hardest to Fill in the Past Two Years: 2007–08 to 2011–12.



Note. High school mathematics includes the following courses: Calculus, Precalculus/Integrated Math IV, AP/IB Calculus, Prealgebra, Geometry/Integrated Math II, Advanced Algebra/Integrated Math III, and Probability and Statistics/Discrete Math. High School chemistry includes both General Chemistry and AP/IB Chemistry. High school physics includes General Physics, Advanced Physics, AP/IB Chemistry, and Chemistry Special Topics. Prepared from the STAR system.

Table 7. The Percentage of Districts That Indicated That They Were Unable to Fill Vacant Positions With Qualified Candidates or Found It Very Difficult to Do So by Region: Fall 2012

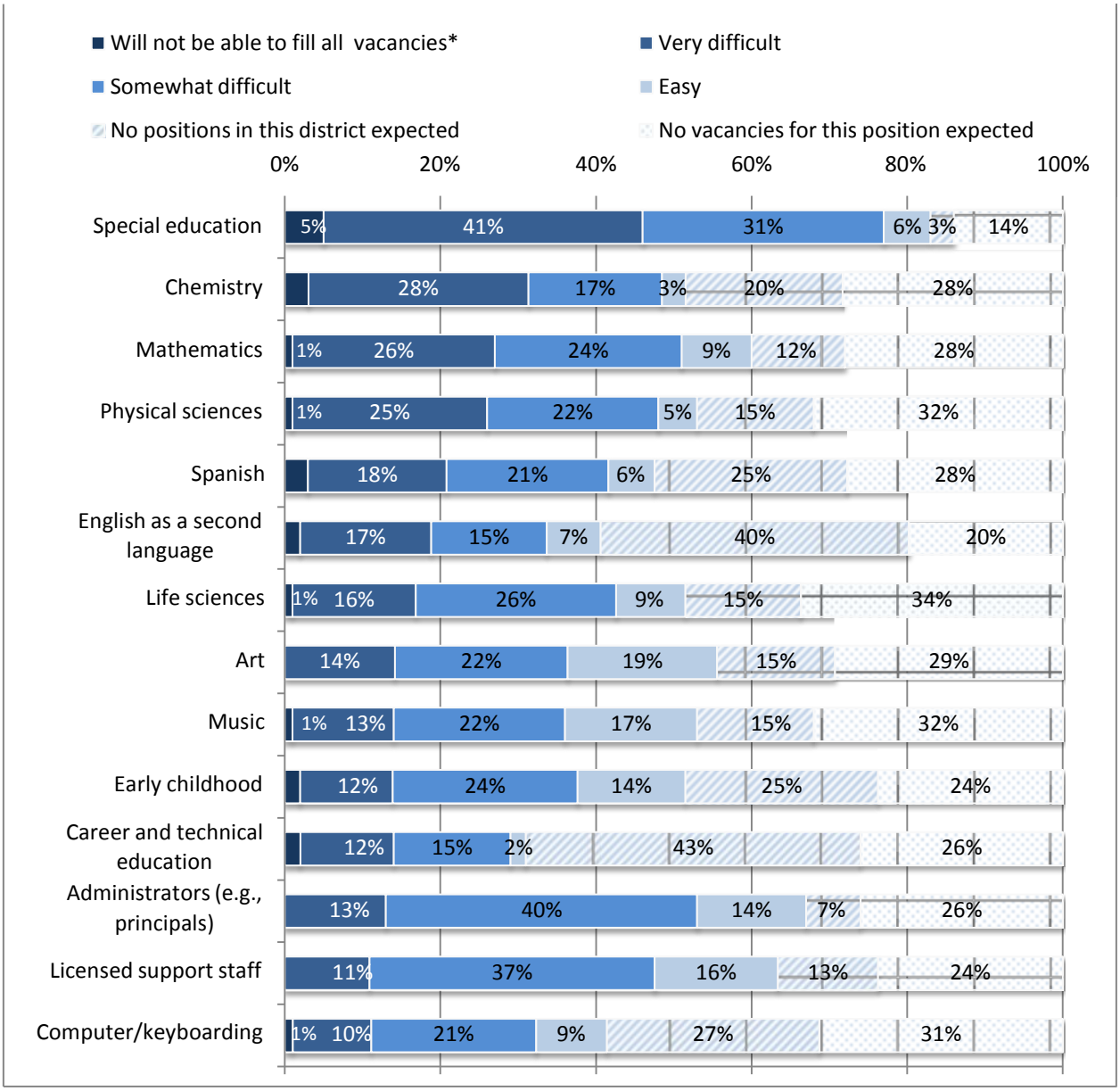
License Area	Overall	01: Northwest	02: Headwaters	03: Arrowhead	04: West Central	05: North Central	06E: Southwest Central	06W: Upper MN Valley	07E: East Central	07W: Central	08: Southwest	09: South Central	10: Southeast	11: Metro
Speech-language pathologist	31	40	25	33	35	32	17	23	41	48	37	29	38	23
Emotional behavior disorders	27	28	13	28	14	20	25	23	59	24	46	34	25	23
Autism spectrum disorders	17	8	19	15	9	8	25	8	0	25	52	20	15	18
Developmental disabilities	15	8	6	20	9	12	17	0	12	18	25	14	23	16
Specific learning disabilities	15	16	0	30	9	16	8	23	6	4	39	6	15	15
High school physics	14	17	13	11	15	8	0	0	6	21	15	23	6	16
Special education early childhood	13	12	13	15	9	24	0	0	12	26	29	9	21	8
Parent and family education	13	15	6	8	12	17	0	23	29	25	39	17	12	4
Spanish	13	39	6	15	12	8	8	8	6	14	14	0	10	14
High school mathematics	12	8	13	13	9	4	17	23	12	7	14	11	10	15
High school chemistry	12	15	19	10	15	13	8	0	0	19	18	14	10	13
School nurse	12	0	6	18	3	16	17	8	0	7	14	3	20	15
School psychologist	11	0	7	13	3	8	8	0	12	7	18	6	16	16
English as a second language (K–6)	10	8	6	13	3	4	25	15	6	14	25	11	10	7

Note. The numbers in table represent the percentages of all responses, even those districts that had no positions or vacancies. The survey requested respondents to use could not fill all vacancies if they needed to request special permissions to fill the positions. Prepared from the MDE supply-and-demand survey, fall 2012.

Most Difficult Positions to Fill in the Next Five Years. District representatives also were asked about the level of difficulty they expect to experience while trying to fill vacancies in some licensure areas in next five years. They were presented with a list of 21 licensure areas (see Appendix B, item 5 for the complete list). Fifteen of these licensure areas had at least 10 percent of the districts indicating that they will not be able to fill all vacancies[7] or that it will be very difficult to fill vacancies in these areas (Figure 7, page 28). These findings mirror those about areas of shortage in the past two years: District staff members expect to have difficulty hiring qualified teachers in special education fields. Five percent of the districts expect that they will not be able to fill all vacancies with qualified staff, and another 41 percent expect that it will be very difficult to do so. Other licensure fields which district hiring officers expect will be in short supply include chemistry (31 percent), mathematics (27 percent), and the physical sciences (26 percent).

[7] The response option *will not be able to fill all vacancies* had the following footnote: "Without applying for special permission(s) to allow non-licensed teacher(s) to teach this subject."

Figure 7. The Percent Distribution of Responses About the Ease of Filling Vacancies in the Next Five Years Sorted From Most Difficult to Least Difficult: Fall 2012[a]



Note. *District responders were asked to mark this option if they had to obtain special permissions to fill a vacancy. District hiring officers were then presented with another item: staff with multiple licenses. This item received the second highest difficulty rating, but it is omitted here because it represents a larger perspective than just licensure areas. Forty-three percent of the districts indicated that they would be unable to recruit such job candidates or would find it very difficult to do so. Prepared from the MDE supply-and-demand survey, fall 2012.

[a]A similar analysis was performed after removing districts that did not expect any vacancies or had no positions in that licensure area. See Figure 25 in Appendix B.

2.1.4 Trends in Teacher Demand

The examination of areas of staff shortages and surpluses using individual indicators provides little information about which components of teacher supply and demand may be contributing to the shortages/surpluses.[8] This section presents the findings related to the demand for teachers.

Teacher demand has multiple components:

- Positions vacated by teachers each year (i.e., attrition, interdistrict mobility, or retirement)
- Positions created or eliminated as a result of changes in student enrollments
- Adjustments to student-teacher ratios that may affect the numbers of positions available in schools each year

The findings related to these components will be described in the following subsections.

Attrition. In 2010–11 (the last year in which complete data are available in STAR), 4,224 teachers left their teaching positions in Minnesota, which represents an 7.9 percent attrition rate. Districts provide some information on teachers' reasons for leaving their positions as part of the STAR reporting process. When completing the fall staffing reports, districts are asked about licensed staff members who were employed the previous year but are no longer in the school. For those teachers, district STAR coordinators are asked to indicate the reason for each teacher's departure from the district.[9]

Not only does the STAR data include the number of teachers leaving each, it also includes the reasons why they left. As seen in Table 8 (page 30), the most prevalent reason for leaving in each year is retirement, which makes up more than 30 percent of all leavers.

The response options and their frequencies are listed in Table 8. The reasons given for teachers' departures have fluctuated a small amount during this time period. The most prevalent reason for leaving is retirement, which makes up more than 30 percent of all leavers.

After retirement, personal reasons represent the next most prevalent reason why teachers left in 2010–11 (22 percent of all leavers). Figure 8 (also page 30) shows the distribution of reasons for leaving as the percentages of teachers who left in 2010–11.

[8] The components to teacher supply and demand are described in more detail in Lindsay, Wan, and Gossin-Wilson (2009). See also MacCullum and Ross (2010).

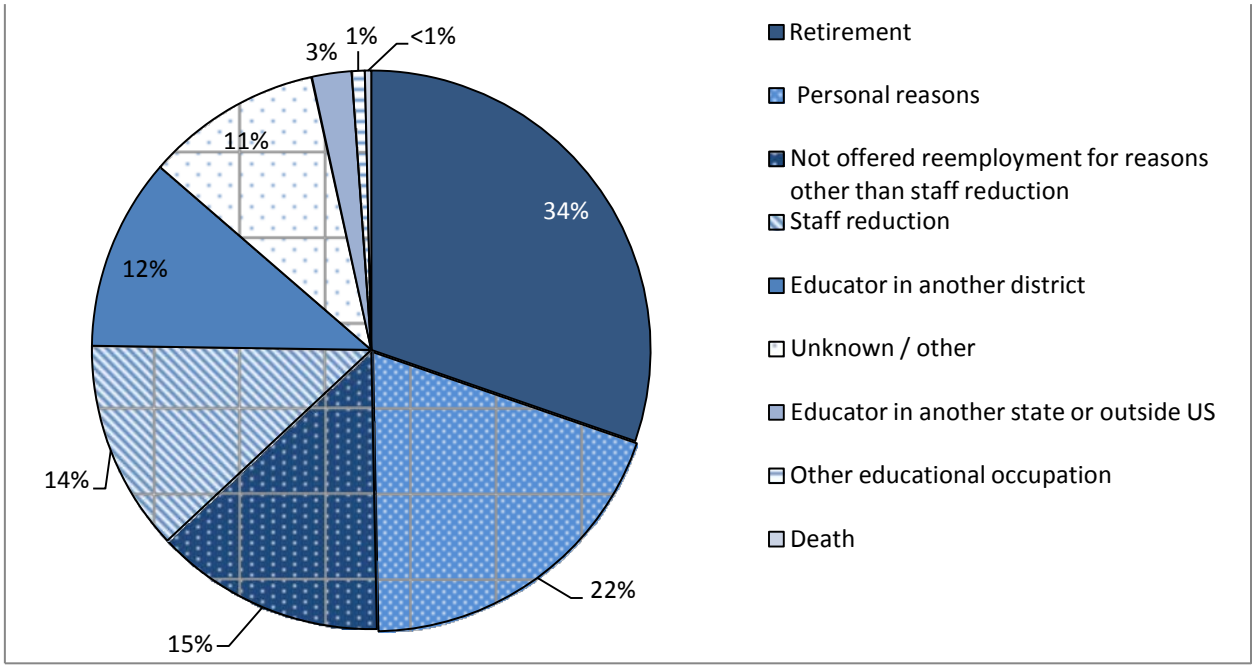
[9] It is important to note that these reasons for leaving represent district STAR coordinators' best information about teachers' departures. The accuracy of this information may vary across districts, depending on whether district hiring officers knew the teacher or whether an exit interview was conducted.

Table 8. The Number of Teachers Leaving by Reason for Leaving: 2007–08 to 2010–11

Reason for Leaving	2007–08 (%)	2008–09 (%)	2009–10 (%)	2010–11 (%)
Total	4,504	3,990	3,656	4,224
Retirement	1,319 (29%)	1,135 (28%)	1,142 (31%)	1,425 (34%)
Personal reasons	1,218 (27%)	908 (23%)	902 (25%)	912 (22%)
Not offered reemployment for reasons other than staff reduction	544 (12%)	673 (17%)	552 (15%)	628 (15%)
Staff reduction	507 (11%)	697 (17%)	509 (14%)	574 (14%)
Educator in another district	703 (16%)	394 (10%)	401 (11%)	523 (13%)
Unknown/other	574 (13%)	477 (12%)	463 (13%)	480 (11%)
Educator outside of Minnesota	129 (3%)	100 (3%)	90 (2%)	109 (3%)
Other educational occupation	59 (1%)	43 (1%)	42 (1%)	36 (1%)
Death	25 (1%)	40 (1%)	18 (<1%)	17 (<1%)

Note. Attrition data for 2011–12 are not complete. The numbers in parentheses represent the percentage within the column. Prepared with data from the STAR system.

Figure 8. The Percent Distribution of the Reasons Why Teachers Left Their Teaching Positions in Minnesota: 2010–11



Note. Attrition data for 2011–12 are not complete. Prepared from the STAR system.

Tables 9 and 10 (on pages 31 and 32 respectively) provide more detailed information on the reasons why teachers left their positions. Table 9 indicates that about one in five teachers (20.2 percent) in the Central region vacated their positions in 2010–11; from Table 10, it appears that 20 percent of those who left their positions in that region did so because of staff reductions. Attrition in the Southwest Central region is also more than twice the state average (17.9 percent versus 7.9 percent statewide; see Table 9). An examination of the reasons given for attrition in that region indicates that 35 percent chose to retire that year, 21 percent left for personal reasons, 17.2 percent had their jobs terminated as part of staff reductions, and another 16.1 percent moved to another district (Table 10).

Table 9. The Percentage of Teachers Leaving for Selected Reasons by Region: 2010–11[a]

Region	Total Teachers by Region	Percentage Leaving for Any Reason	Reason for Leaving[b]				
			Retirement	Personal Reasons	Not Offered Reemployment for Reasons Other Than Staff Reduction	Staff Reduction	Educator in Another District
Total	**53,297**	**4,224 7.9%**	**1,425 2.7%**	**912 1.7%**	**628 1.2%**	**574 1.1%**	**523 1.0%**
01: Northwest	988	97 9.8%	42 4.3%	11 1.1%	12 1.2%	3 0.3%	22 2.2%
02: Headwaters	1,033	82 7.9%	30 2.9%	15 1.5%	13 1.3%	8 0.8%	10 1.0%
03: Arrowhead	2,696	261 9.7%	99 3.7%	50 1.9%	28 1.0%	39 1.4%	20 0.7%
04: West Central	2,162	201 9.3%	60 2.8%	35 1.6%	15 0.7%	16 0.7%	26 1.2%
05: North Central	1,738	162 9.3%	79 4.5%	16 0.9%	13 0.7%	9 0.5%	25 1.4%
06W: Upper MN Valley	1,063	53 5.0%	26 2.4%	4 0.4%	3 0.3%	4 0.4%	8 0.8%
06E: Southwest Central	485	87 17.9%	31 6.4%	19 3.9%	2 0.4%	15 3.1%	14 2.9%
07W: Central	1,599	323 20.2%	106 6.6%	53 3.3%	45 2.8%	69 4.3%	36 2.3%
07E: East Central	4,375	135 3.1%	45 1.0%	29 0.7%	15 0.3%	10 0.2%	24 0.5%
08: Southwest	1,427	160 11.2%	42 2.9%	30 2.1%	9 0.6%	12 0.8%	32 2.2%
09: South Central	2,401	241 10.0%	84 3.5%	48 2.0%	14 0.6%	38 1.6%	42 1.7%
10: Southeast	4,831	430 8.9%	154 3.2%	55 1.1%	41 0.8%	48 1.0%	57 1.2%
11: Metro	28,335	2,503 8.8%	673 2.4%	539 1.9%	406 1.4%	313 1.1%	200 0.7%

Note. Teachers employed by more than one district are counted once per district. The totals do not add up to the total line because teachers leaving more than one district are displayed only once per district they served. Attrition data for 2011–12 are not complete. Prepared from the STAR system.

[a]The percentages in this table indicate the numbers of the *total workforce* who left for a particular reason. The figures in Table 9 represent the number of attritions. [b]The percentages for these categories do not equal the total percentage because these are not an exhaustive list of reasons for leaving.

Table 10. The Numbers of Teachers Leaving by Reason for Leaving and Region: 2010–11

Region	Total	Retirement	Personal Reasons	Not Offered Reemployment for Reasons Other Than Staff Reduction	Staff Reduction	Educator in Another District	Unknown/Other	Educator Outside of Minnesota	Other Educational Occupation	Death
Total	**4,224**	**1,425 33.7%**	**912 21.6%**	**628 14.9%**	**574 13.6%**	**523 12.4%**	**480 11.4%**	**109 2.6%**	**36 0.9%**	**17 0.4%**
01: Northwest	97	42 43.3%	11 11.3%	12 12.4%	3 3.1%	22 22.7%	0 0.0%	6 6.2%	1 1.0%	0 0.0%
02: Headwaters	82	30 36.6%	15 18.3%	13 15.9%	8 9.8%	10 12.2%	1 1.2%	4 4.9%	1 1.2%	0 0.0%
03: Arrowhead	261	99 37.9%	50 19.2%	28 10.7%	39 14.9%	20 7.7%	14 5.4%	6 2.3%	4 1.5%	1 0.4%
04: West Central	201	60 29.9%	35 17.4%	15 7.5%	16 8.0%	26 12.9%	38 18.9%	7 3.5%	3 1.5%	1 0.5%
05: North Central	162	79 48.8%	16 9.9%	13 8.0%	9 5.6%	25 15.4%	13 8.0%	0 0.0%	5 3.1%	2 1.2%
06W: Upper MN Valley	53	26 49.1%	4 7.5%	3 5.7%	4 7.5%	8 15.1%	3 5.7%	1 1.9%	4 7.5%	0 0.0%
06E: Southwest Central	87	31 35.6%	19 21.8%	2 2.3%	15 17.2%	14 16.1%	0 0.0%	5 5.7%	1 1.1%	0 0.0%
07W: Central	323	106 32.8%	53 16.4%	45 13.9%	69 21.4%	36 11.1%	6 1.9%	6 1.9%	1 0.3%	1 0.3%
07E: East Central	135	45 33.3%	29 21.5%	15 11.1%	10 7.4%	24 17.8%	12 8.9%	0 0.0%	0 0.0%	0 0.0%
08: Southwest	160	42 26.3%	30 18.8%	9 5.6%	12 7.5%	32 20.0%	32 20.0%	2 1.3%	1 0.6%	0 0.0%
09: South Central	241	84 34.9%	48 19.9%	14 5.8%	38 15.8%	42 17.4%	6 2.5%	8 3.3%	1 0.4%	0 0.0%
10: Southeast	430	154 35.8%	55 12.8%	41 9.5%	48 11.2%	57 13.3%	58 13.5%	10 2.3%	5 1.2%	2 0.5%
11: Metro	2,503	673 26.9%	539 21.5%	406 16.2%	313 12.5%	200 8.0%	290 11.6%	57 2.3%	15 0.6%	10 0.4%

Note. Attrition data for 2011–12 are not complete. Teachers employed by more than one district are counted only once per district. The totals do not add up to the total line because teachers leaving more than one district are displayed only once per district they served. The percentages represent the percentages for that reason for leavers within that region (i.e., row percentage). Prepared from the STAR system.

In the Northwest and Southwest regions, more than 20 percent of the departing teachers left to take up positions in other districts. More than 40 percent of the departing teachers in the Northwest, North Central, and Upper Minnesota Valley regions chose to retire that year.

The numbers of vacancies that year correspond to the total numbers of teaching positions within a field, suggesting that no particular fields are seeing more or less attrition than others. Table 11 shows the numbers of teachers who vacated their positions during 2010–11 by licensure area and reason for leaving. The list of licensure areas is ranked-ordered according to numbers of positions vacated (decreasing order). The second column (taken from Table 2, page 14) indicates that the rankings correspond to the rankings of total positions in 2009-10.

Table 11. The Numbers of Teachers Leaving for Selected Reasons by License Area: 2010–11

License Area	Rank Ordering of the Number of Positions in 2009–10	Positions Vacated	Reason for Leaving Position				
			Retirement	Personal Reasons	Not Offered Reemployment for Reasons Other Than Staff Reduction	Staff Reduction	Educator in Another District
Prekindergarten/elementary	1	1,402	805	210	126	137	124
Special education	2	808	403	149	100	66	90
Health/safety/physical education	3	554	378	62	37	46	31
English/communication arts/literature	4	439	221	71	55	50	42
Social sciences	5	302	152	41	29	46	34
Natural sciences	6	262	91	58	43	36	34
Visual/performing arts	7	236	118	40	23	36	19
Mathematics	8	204	67	45	38	18	36
World Language/culture	9	141	50	25	14	34	18
Family/consumer science	11	71	50	2	4	15	0
Business	10	63	48	8	4	0	3
Industrial/tech	12	47	30	6	2	5	4
Agricultural education/natural resources	13	29	8	6	4	6	5
Computer/information technology	14	11	1	1	1	4	4

Note. Teachers may hold licenses in more than one area and are counted accordingly. The numbers for these categories do not sum to the total numbers of teachers leaving because this is not an exhaustive list of reasons for leaving. Attrition data for 2011–12 are not complete. Prepared from the STAR system. Natural sciences include life sciences, physics, general science, chemistry, physical sciences, science 5–9, science 5–8, earth and space science, and general science

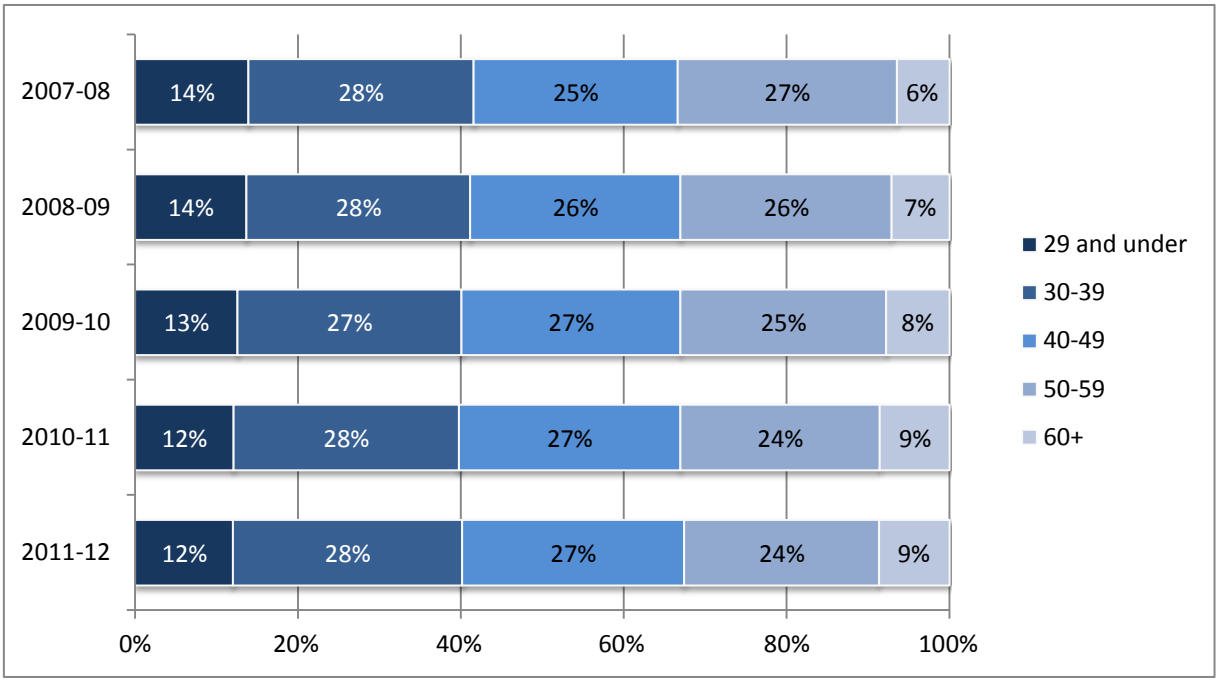
Retirements. Looking more closely at the retirement data, the percentages of all teachers who retired remained relatively constant between the 2007–08 and 2010–11 school years. The average age of teachers' retirement has been steadily increasing each year (Table 12 and Figure 9). The percentages of teachers who are 60 years or older increased from 6 percent in 2007–08 to 9 percent in 2011–12. On the other side of the age groupings, fewer teachers in the workforce were in their 20s in 2011–12 (12 percent) compared with 2008–08 (14 percent).

Table 12. The Percentage of Teachers Who Retired and Average Age of Retirement: 2007–08 to 2010–11

School Year	Percentage of Teachers Who Retired	Average Age of Retirement
2007–08	2.4%	59.9
2008–09	2.1%	60.2
2009–10	2.1%	60.5
2010–11	2.7%	60.9

Note. Attrition data for 2011–12 are not complete. Prepared from the STAR system.

Figure 9. The Percent Distribution of Teachers' Ages: 2007–08 to 2011–12



Note. Prepared from the STAR system.

Attrition Among New Teachers. This teacher supply-and-demand study also examined the numbers of new teachers in the 2006–07, 2007–08, 2008–09, and 2009–10 cohorts who left their positions during their first five years.[10] The cumulative attrition rates for each cohort across time are presented in Table 13.[11] On average,16.8 percent were no longer teaching in Minnesota after their first year, 23.4 percent left teaching within two years of entering the profession, 29 percent left within three years, 31.6 percent left within four years, and 33 percent left within their five years of entering the profession.

Table 13. The Number of First-Year Teachers Who Leave the Profession in Minnesota: 2006–07 to 2011–12

Cohort Year	Number of First-Year Teachers	Return to Teaching 2007–08	Return to Teaching 2008–09	Return to Teaching 2009–10	Return to Teaching 2010–11	Return to Teaching 2011–12
2006–07	2,345	1,992 -15.1%	1,818 -22.5%	1,691 -27.9%	1,631 -30.4%	1,571 -33.0%
2007–08	2,471		2,056 -16.8%	1,860 -24.7%	1,720 -30.4%	1,660 -32.8%
2008–09	2,345			1,888 -19.5%	1,802 -23.2%	1,669 -28.8%
2009–10	1,977				1,656 -16.2%	1,520 -23.1%
2010–11	1,709					1,428 -16.4%
2011–12	1,876					

Note. First-year teachers include those newly licensed in Minnesota and those newly licensed from out of state or country but working in their first assignment in a licensed capacity. The 2011–12 data may be incomplete because of missing attrition data. Prepared from STAR employment and assignment data.

The majority of the teachers from this cohort who left their positions during the first five years did so for personal reasons (averages to 29 percent across years), followed by staff reductions (19 percent), not offered reemployment for reasons other than staff reductions (18 percent), and moved to another district (16 percent). Similar patterns were evident among those teachers in other cohorts who left their positions. Table 14 (page 36) shows the reasons provided by districts for the departure of the teachers in the 2006–07 new teacher cohort within their first five years.

[10] If a teacher left his or her teaching position and returned in another school year, he or she is included as a returning teacher in that year (see section on teacher supply).
[11] Table 13 is similar to tables on the retention of cohorts of new teachers across time that have been presented in previous reports.

Table 14. The Reasons First-Year Teachers in 2006–07 Left Their Teaching Positions: 2006–07 Through 2010–11

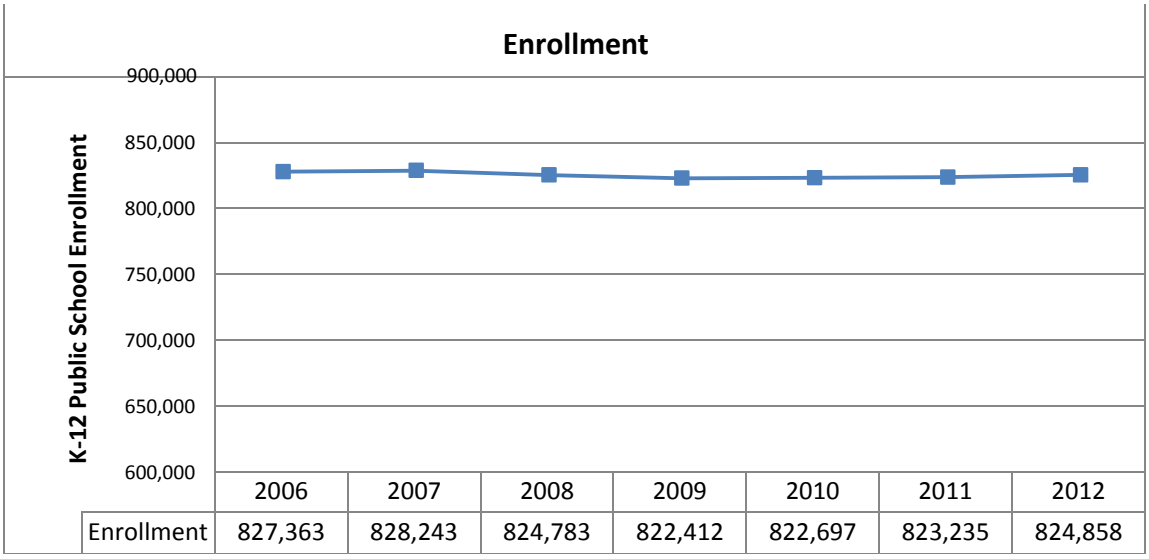
	Not Returning in 2007–08	Not Returning in 2008–09	Not Returning in 2009–10	Not Returning in 2010–11
Total leaving Staff	393	280	168	169
reduction	78	67	21	32
Personal reasons	120	65	59	46
Retirement	0	0	1	1
Death	0	1	0	0
Educator in another district	66	33	28	30
Educator in another state or outside the United States	4	10	6	7
Other educational occupation	2	1	4	2
Not offered reemployment for reasons other than staff reduction	58	67	27	27
Unknown/other	65	36	22	24

Note. If a teacher from the cohort left and returned to teaching in Minnesota before leaving again, he or she is counted for each departure from Minnesota. Attrition data for 2011–12 are not complete. Prepared from STAR employment and assignment data.

Student Enrollments. Enrollments in Minnesota's public schools have changed little since the 2005–06 school year. As seen in Figure 10, there were 827,363 students attending public schools within the state in 2005–06. The enrollments declined to 824,858 in 2011–12, a decrease of only 0.3 percent.

However, the general statewide trends mask regional differences in student enrollments. As seen in Table 15 (page 36), enrollments in districts within the seven-county Metro region have increased by 1.6 percent between 2005–06 and 2011–12. Enrollments rose in the Central region by 9.2 percent. Enrollments in the other 11 economic development regions decreased between 0.82 percent (Southeast region) and 18.66 percent (Southwest Central region).

Figure 10. Student Enrollments in Minnesota's Public Schools: 2005–06 Through 2011–12



	2006	2007	2008	2009	2010	2011	2012
Enrollment	827,363	828,243	824,783	822,412	822,697	823,235	824,858

Note. Prepared using MARSS data.

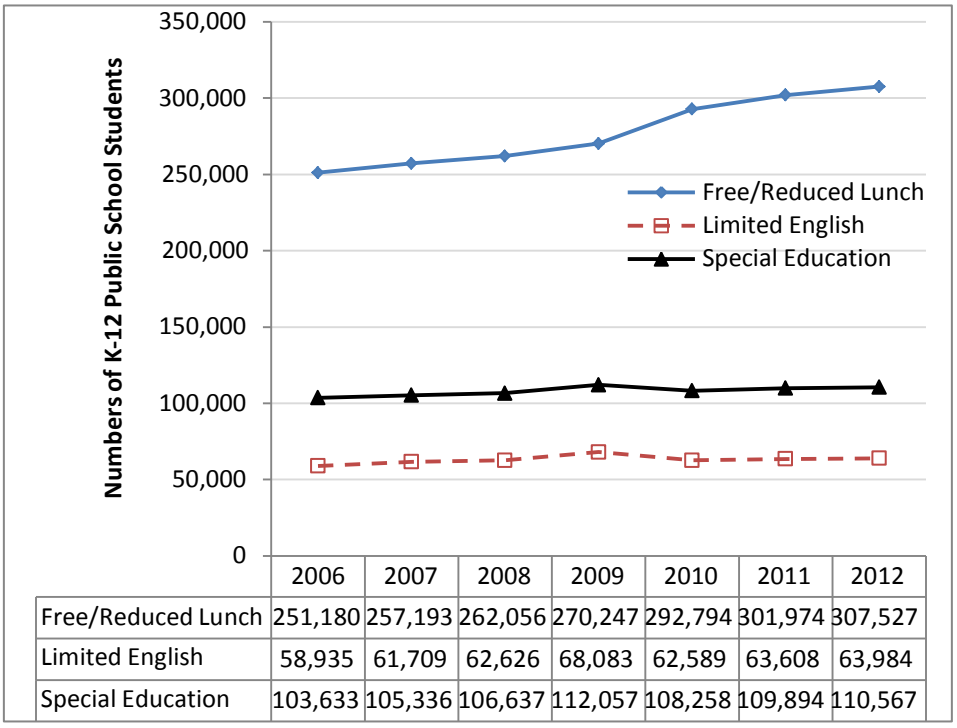
Table 15. Public School Enrollments in Minnesota Regions: 2005–06 to 2011–12

Region	2005–06	2011–12	Change From 2005–06
01: Northwest	15,015	13,987	-6.85%
02: Headwaters	13,394	13,082	-2.33%
03: Arrowhead	45,886	43,094	-6.08%
04: West Central	32,168	31,133	-3.22%
05: North Central	26,558	24,877	-6.33%
06E: Southwest Central	19,454	15,824	-18.66%
06W: Upper Minnesota Valley	8,308	7,283	-12.34%
07E: East Central	28,020	26,243	-6.34%
07W: Central	66,943	73,066	+9.15%
08: Southwest	19,231	18,666	-2.94%
09: South Central	33,403	32,268	-3.40%
10: Southeast	74,847	74,236	-0.82%
11: Metro	444,136	451,189	+1.59%

Note. Prepared using MARSS data.

Enrollments Among Specific Student Populations. The numbers of students enrolled in Minnesota's public schools who represent state-defined special populations are presented in Figure 11 (page 38). Between 2006 and 2012, Minnesota's public schools saw a 22 percent increase in the numbers of students eligible for free or reduced-price lunch (increasing from 30 percent to 37 percent of the total numbers of students). The numbers of students identified as eligible for special education services also increased but only by 6.7 percent (which is presently about 13 percent of the total public school population). Compared with 2005–06, there are 8.7 percent more students with limited English proficiency.

Figure 11. The Number of Minnesota Public School Students Representing Special Populations: 2005–06 to 2011–12

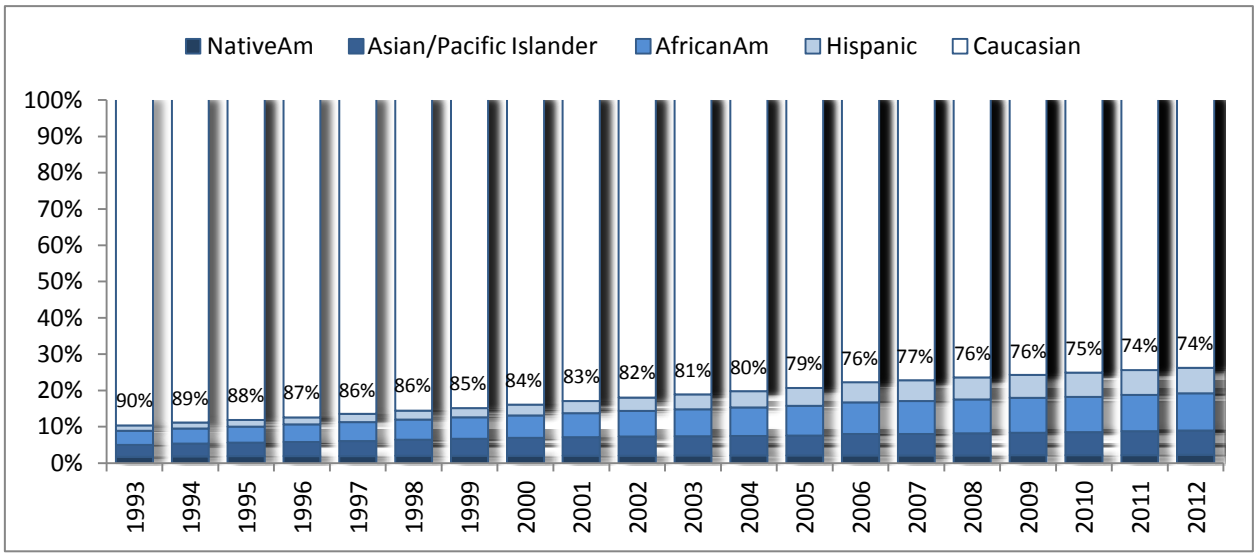


	2006	2007	2008	2009	2010	2011	2012
Free/Reduced Lunch	251,180	257,193	262,056	270,247	292,794	301,974	307,527
Limited English	58,935	61,709	62,626	68,083	62,589	63,608	63,984
Special Education	103,633	105,336	106,637	112,057	108,258	109,894	110,567

Note. Prepared using MARSS data.

Enrollments of Students of Racial and Ethnic Minority Groups. The percentage of students of color in Minnesota's public schools continues to increase by approximately 1 percent per year. Since the 2005–06 school year, the percentage of students of color in Minnesota's public schools has increased 3.7 percent from 22.5 percent to 26.2 percent during the 2011–12 school year. The gradual diversification of Minnesota schools is best indicated with the longer-term trend (see Figure 12 and Table 16 on page 39).

Figure 12. The Percentages of Minnesota Public School Students in Different Racial/Ethnic Groups: 1992–93 to 2011–12



Note. Prepared using MARSS data.

Table 16. The Numbers of Students (and the Percentage of Total Students) in Different Racial/Ethnic Groups in Minnesota's K–12 Public Schools: 2006–12

Racial/Ethnic Group	Year						
	2006	2007	2008	2009	2010	2011	2012
Native American	17,150 (2%)	17,351 (2%)	17,423 (2%)	17,714 (2%)	17,858 (2%)	18,103 (2%)	18,375 (2%)
Asian/Pacific Islander	47,610 (6%)	48,865 (6%)	49,984 (6%)	51,268 (6%)	52,320 (6%)	53,928 (7%)	55,442 (7%)
African American	70,794 (9%)	74,985 (9%)	77,157 (9%)	78,624 (10%)	79,756 (10%)	82,234 (10%)	84,307 (10%)
Hispanic	44,352 (5%)	47,387 (6%)	49,730 (6%)	52,573 (6%)	55,132 (7%)	56,728 (7%)	58,353 (7%)
Caucasian	641,580 (78%)	639,655 (77%)	630,489 (76%)	622,233 (76%)	617,631 (75%)	612,242 (74%)	608,381 (74%)

Note. Prepared using MARSS data.

Student-Teacher Ratios. MFR data indicate that the ratio of students to all instructional staff in public independent schools has remained quite consistent, going from 16.5 in 2006–07 to 16.4 in 2010–11 (Table 17). The Upper Minnesota Valley region has seen an increase in public school teacher-student ratios of 15.2 to 15.9 during this time, and the Headwaters region has had a slight increase from 13.3 to 13.6. The Metro, East Central, and Central regions had the highest ratios at 17.0, 17.0, and 16.9 students per instructional staff, respectively.

Table 17. Average Student-Teacher Ratios in Public School Districts by Region

Region	Average Across Five Years	2006–07	2007–08	2008–09	2009–10	2010–11	Percentage Change
All	16.4	16.5	16.4	16.4	16.4	16.4	-0.1
01: Northwest	14.4	14.5	14.3	14.2	14.4	14.5	0.0
02: Headwaters	13.3	13.3	13.1	13.0	13.4	13.6	+0.3
03: Arrowhead	16.3	16.6	16.5	16.2	16.2	16.2	-0.4
04: West Central	15.1	15.1	15.0	15.1	15.3	15.2	+0.1
05: North Central	15.8	15.9	15.8	16.0	15.8	15.7	-0.2
06W: Upper MN Valley	15.4	15.2	14.9	15.3	15.5	15.9	+0.7
06E: Southwest Central	15.3	15.2	15.3	15.3	15.4	15.3	+0.1
07W: Central	17.0	17.1	17.0	17.0	17.1	16.9	-0.2
07E: East Central	16.9	16.9	16.7	17.0	17.0	17.0	+0.1
08: Southwest	13.9	14.0	14.0	13.9	13.9	13.8	-0.2
09: South Central	16.0	16.1	16.0	15.8	16.0	15.8	-0.3
10: Southeast	16.0	16.1	16.0	16.0	16.2	15.9	-0.2
11: Metro	17.1	17.2	17.1	17.0	16.9	17.0	-0.2

Note. Prepared from MFR data.

In contrast, the fall 2012 district teacher supply-and-demand survey[12] included the following question about student-teacher ratios: “Has your district increased student-teacher ratios as a result of funding constraints (but not changes in enrollment) for the 2011–12 or 2012–13 academic years?” Overall, 30 percent of the districts (33 percent of public, 27 percent of charter, and 22 percent of other district types) indicated having to increase student-teacher ratios in some way. The reasons for the discrepancies between the MFR data and the survey data could be attributable to the lag in MFR publication (data for the last two years are not available yet), to differential changes in student-teacher ratios among different grade bands, or to some districts’ decreasing their student-teacher ratios (which might lead to negligible change overall). Further analyses on this subject should clarify the reason(s) for this discrepancy.

[12] See Section 2.1.3 and Appendices A and B for more information about this survey.

In charter schools across the state, there were 13.9 students per instructional staff in 2010–11, which is down from 14.8 in 2006–07 (Table 18). In 2010–11, charter schools in the South Central region had the lowest average student-teacher ratio at 8.7, and those in the North Central region had the highest at 19.6.

Table 18. Average Student-Teacher Ratios in Charter Schools by Region: 2006–07 to 2010–11

Region	Average Across Five Years	2006–07	2007–08	2008–09	2009–10	2010–11	Change From 2006–07 to 2010–11
All	14.3	14.8	14.6	14.2	13.9	13.9	-0.9
01: Northwest	N/A	N/A	N/A	N/A	N/A	N/A	N/A
02: Headwaters	12.1	12.1	12.1	11.5	11.8	12.4	+0.3
03: Arrowhead	14.7	16.7	14.8	14.3	13.8	13.8	-2.9
04: West Central	15.2	15.8	14.4	15.2	13.8	15.2	-0.6
05: North Central	18.1	19.4	16.5	15.5	15.2	19.6	+0.2
06E: Southwest Central	15.5	16.7	15.1	15.4	16.1	15.3	+1.4
06W: Upper Minnesota Valley	16.0	N/A	19.3	13.4	17.0	14.4	-4.9[a]
07E: East Central	13.3	11.4	9.8	12.7	12.9	16.3	+4.9
07W: Central	13.4	13.8	12.8	13.2	16.0	13.7	+0.1
08: Southwest	N/A	N/A	N/A	N/A	N/A	N/A	N/A
09: South Central	9.1	8.7	9.6	9.6	8.4	8.7	0.0
10: Southeast	13.7	12.8	13.3	14.1	13.1	14.1	+1.3
11: Metro	14.6	15.3	15.2	14.5	14.1	14.1	-1.21

Note. Prepared from MFR data.

[a]This region did not have data for charter schools in 2006–07; a change of -4.9 reflects the difference between 2007–08 and 2010–11.

2.1.5. Components of Teacher Supply

Are the numbers of teachers available in Minnesota sufficient for filling the vacant positions in Minnesota's schools? This is a question of teacher supply, which is the topic of this section.

Traditionally, the teachers who fill teaching positions come from four sources:

- Those teachers who filled the position the previous year (i.e., teachers retained)
- Teachers licensed in other states who seek employment as a teacher in Minnesota
- New teachers who have completed their teacher preparation programs and have been licensed to teach[13]

[13] Many states also support alternative routes to certification or programs geared toward those who have graduated from a postsecondary institution with a major field of emphasis but did not take a course of study in teaching (e.g., Teach For America, The New Teacher Project). These alternative routes often focus on preparing teachers in hard-to-staff licensure areas or hard- to-staff schools. Such teachers often take an intensive initial course of study before practice teaching and then receive provisional certification while they develop additional instructional and planning skills on the job. Minnesota law authorizes alternative routes, but to date no programs have been developed and implemented.

- The reserve pool: the numbers of licensed teachers who are willing and able to fill vacant positions but are not currently doing so

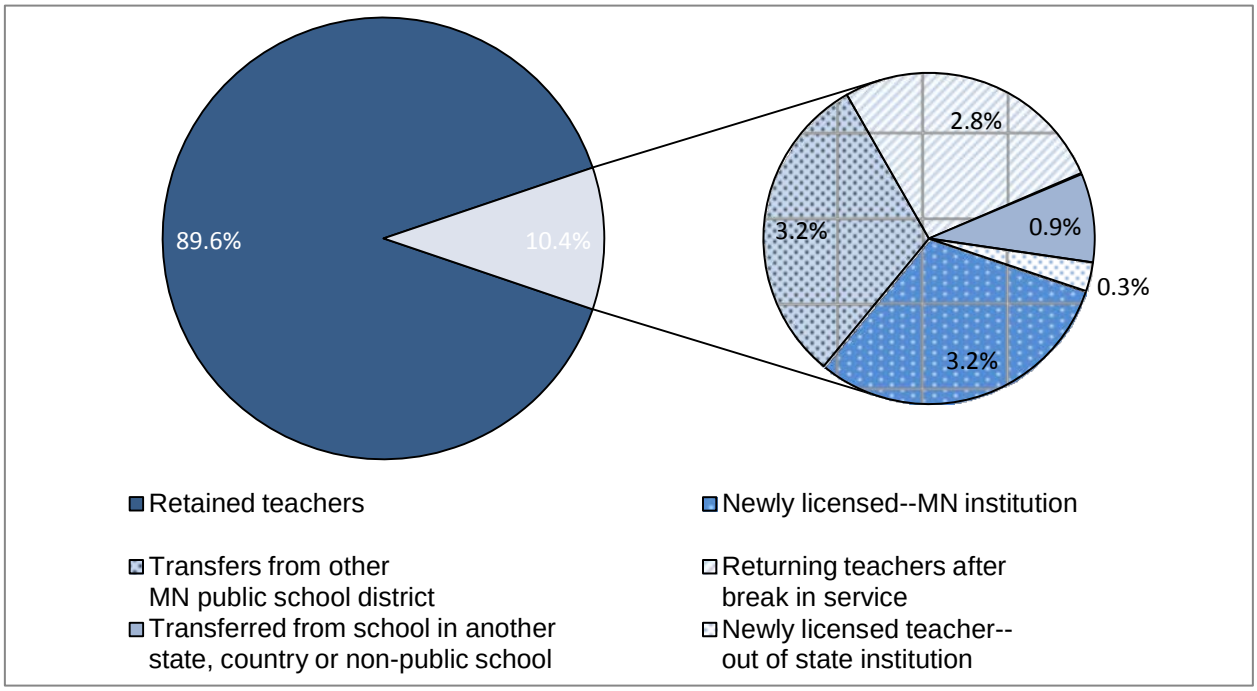
Initial information on the sources of teachers is provided first, based on STAR data. Subsequent subsections focus on each specific source.

Most teaching positions each year are filled by teachers who are returning from the year before. Between 88 percent and 91 percent of the teaching positions in Minnesota are filled by teachers who return to the position they held the previous year.

The most recent and complete STAR data (2011–12) indicates that 89.6 percent of the teachers (47,753 out of a total of 53,297 teachers) retained their position from the previous year.[14] The remaining 10.4 percent (5,544) of teachers were from the following sources (Figure 13):

- Newly licensed staff who were trained in Minnesota teacher preparation institutions: 3.2 percent (1,699)
- "Movers": teachers who transfer from another public school system in Minnesota: 3.2 percent (1,693)
- Teachers returning to the profession after a break in service: 2.8 percent (1,515)
- Fully licensed staff who transfer from a school outside of Minnesota or from a nonpublic school: 0.9 percent (460)
- Newly licensed staff who completed teacher preparation programs outside Minnesota: 0.3 percent (177)

Figure 13. Sources of Minnesota Teachers Who Filled Positions: 2011–12



Note. Prepared with data from STAR system.

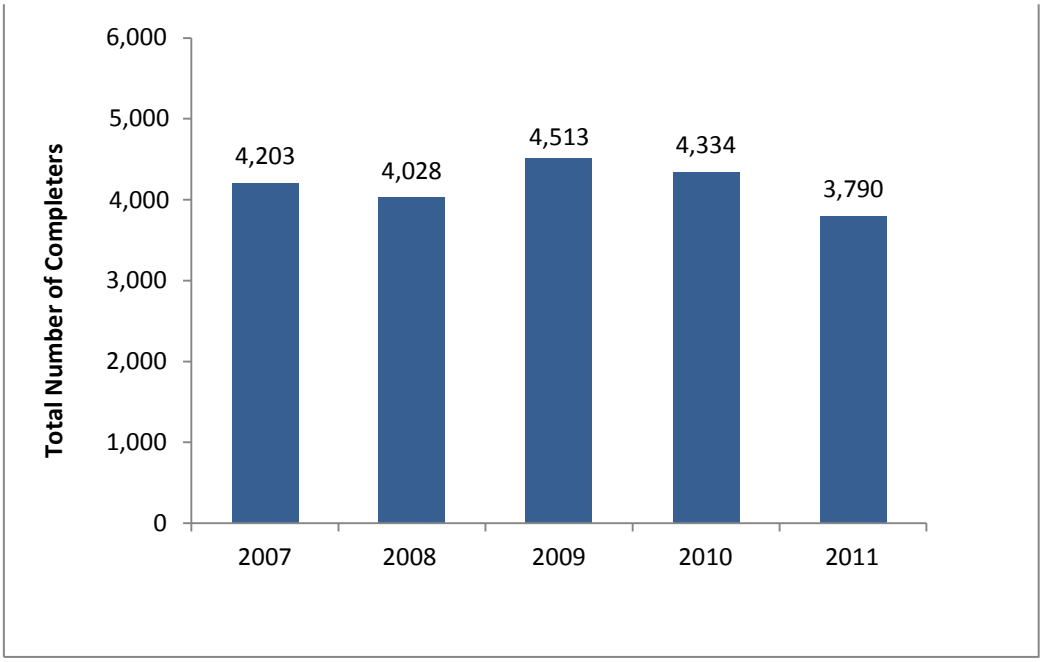
[14] Note that this retention rate was calculated directly from STAR data and not by subtracting the attrition rate from 1. The difference of 2.5 percent (0.896 –(1-.079)) presumably reflects teachers who changed the subjects they taught, teachers who moved from a teaching position within the district to an administrative or support position, and reporting error.

Teacher Retention. An analysis of STAR data indicates that 89 percent of the teachers returned to their positions between the 2009–10 and 2010–11 school years. Information on those teachers who did not return to their positions and the reasons for their departure were discussed in Section 2.1.4.

Program Completers.[15] MACTE collects data from member institutions on enrollments of teacher candidates within programs and the number of teacher candidates who complete the requirements for recommendation for licensure (i.e., completers). MACTE shared the numbers of program completers by license area and by race/ethnicity for this study.

The overall numbers of program completers across all programs and institutions are presented in Figure 14. The annual figures vary from year to year. The number of new licenses granted by Minnesota has decreased by 16 percent in the past five years (Figure 15, page 44). This latter trend suggests a lower supply of teachers to fill vacancies in the years to come.

Figure 14. The Number of Teacher Candidates Who Complete Requirements for Teacher Preparation Programs in a Minnesota Institution: 2007–11



Note. Prepared from MACTE program completer files.

Numbers of Completers by Licensure Area. MACTE data also were disaggregated to allow an examination of trends in the number of program completers in programs linked with particular license fields (see Appendix E for the complete list by each license type over time).[16] The completer data can be used to examine general trends in the number of completers in license

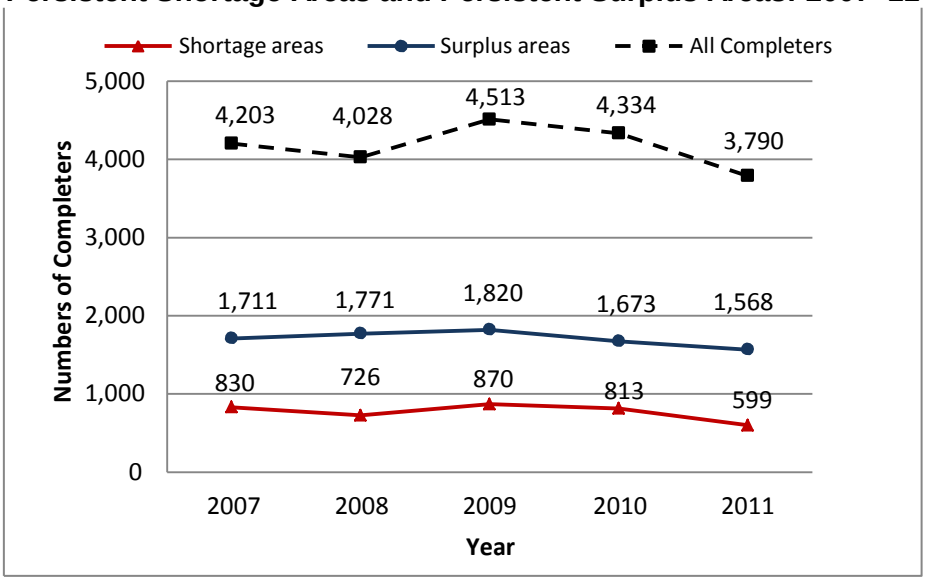
[15] "Program Completer" is a federal definition used to define who should be reported, and means an individual who enrolled in and met all the requirements of a state-approved teacher preparation program. Recommendation to the state for certification or licensure is not used as a criterion for determining who is a program completer.

[16] These completer data come from MACTE. Completer totals for some years are inconsistent with the number of completers provided in MDE's 2011 biennial teacher supply-and-demand study. The source of the inconsistency may involve the timing of program completion and when data were shared with MACTE. Regardless, the inconsistency makes comparison of the present findings with findings listed in past reports tenuous at best.

areas in which there are persistent shortages[17,18] and license areas in which there is a persistent surplus of teachers.[19] The number of completers in the shortage and surplus licensure fields and non-shortage areas are portrayed in Figure 15. Overall, 9.8 percent fewer program completers were produced by teacher preparation institutions compared with 2006–07. Underlying this figure however is a 7 percent increase between 2007 and 2009, followed by a 16 percent decrease. The trend is evident for completers in licensure areas experiencing surpluses (decrease of 8 percent) and especially among completers in teacher shortage areas (decrease of 27 percent).

Trends in the Awarding of Teaching Licenses. Although there may be no overall trends in the numbers of program completers since 2006–07, there is a trend in the numbers of individuals being awarded their teaching licenses (Figure 16, page 45). Trend data show a steady decrease in these numbers, suggesting a general decrease in the supply of teachers in Minnesota. Decreases in numbers of new licenses by licensure area are presented in Table 19 (page 45).

Figure 15. The Numbers of Minnesota Program Completers in Persistent Shortage Areas and Persistent Surplus Areas: 2007–11



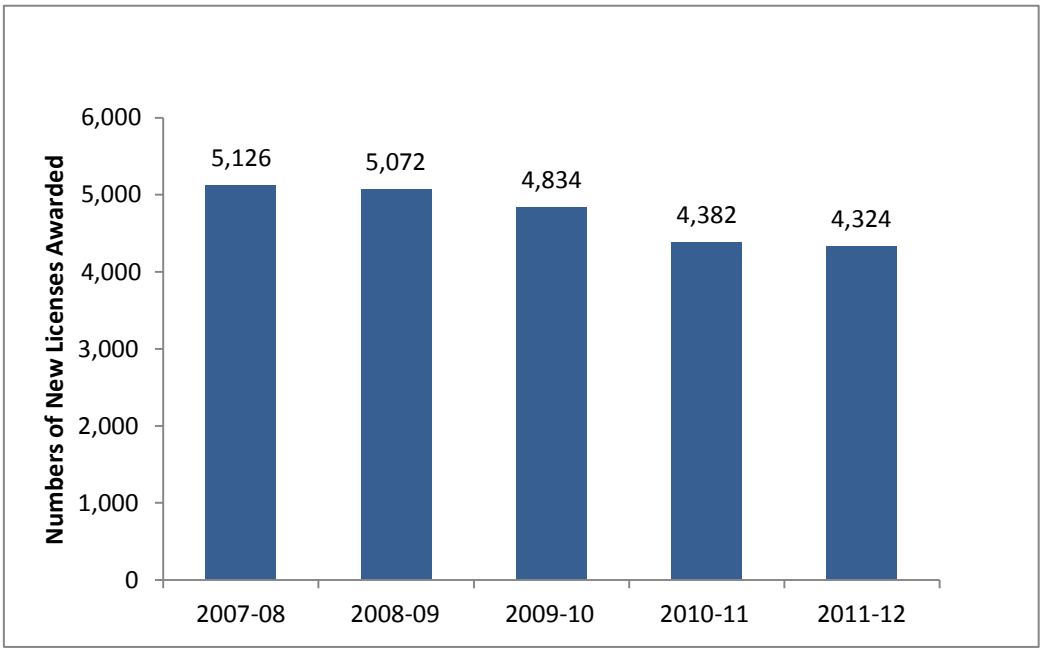
*Note.*Prepared from MACTE program completer files.

[17] Areas with persistent shortages were taken from teacher shortage areas submitted to the U.S. Department of Education each year. These lists provided by all states and sometimes referred to as "TSA's". Teaching candidates who want to obtain a license in those TSAs are eligible for financial aid and loan forgiveness programs. The persistent shortage areas listed here are the TSAs that have appeared on Minnesota's TSA lists since the early 1990s.

[18] The persistent shortage areas listed here are the TSAs that have appeared on most of Minnesota's TSA lists since the early 1990s. The TSAs are Bilingual/Bicultural Education K-12, Chemistry, 9-12 (without 5-8 General Science), Earth and Space Science, 9-12 (without 5-8 General Science), English as a Second Language K-12, Math 5-8 specialty, Mathematics 5-12, Physics, 9-12 (without 5-8 General Science), Science-General 5-8, Science 5-8 specialty, Special Education: Developmental Disabilities K-12, Special Education: Emotional Behavioral Disorders K-12.

[19] Past reports of biennial studies of teacher supply and demand in Minnesota have listed licensure areas in which district survey respondents perceived surpluses of teachers. The surplus areas common among the 2005, 2007, 2009, and 2011 reports are as follows: elementary education K–6 (mentioned in three of four reports), physical education, and social studies.

Figure 16. The Number of New Licenses Granted: 2007–08 to 2011–12



Note. Prepared from MDE licensure data.

Table 19. The Number of New Licenses Granted per License Area: 2007–08 to 2011–12

License Area	School Year					Percentage Change
	2007–08	2008–09	2009–10	2010–11	2011–12	
Family/consumer sciences	12	12	11	6	6	-50.00%
Industrial arts	10	10	9	5	5	-50.00%
Agricultural education	10	10	9	7	7	-30.00%
World language/culture	147	137	174	123	116	-21.09%
Visual and performing arts	175	169	169	145	144	-17.71%
Business and computer education	31	29	40	26	26	-16.13%
Special education	489	475	548	430	417	-14.72%
Prekindergarten/elementary	1,431	1,426	1,280	1,246	1,241	-13.28%
English/communication arts	403	399	449	363	352	-12.66%
Health/safety/physical education	155	155	192	137	137	-11.61%
Mathematics	279	275	258	255	251	-10.04%
Social sciences	391	390	313	366	358	-8.44%
Natural sciences	302	298	306	279	278	-7.95%

Note. Natural sciences include life sciences, physics, general science, chemistry, physical sciences, science 5–9, science 5–8, earth and space science, and general science. Prepared from MDE Licensure data.

Several efforts have been initiated since 2000 that focus on diversifying Minnesota's teaching workforce to keep pace with the increasingly diverse student population within the state. The MACTE data indicate little change since 2006 in the numbers of completers who represent racial or ethnic minority groups (Table 20).[20]

Table 20. The Percentage of Program Completers by Race/Ethnicity: 2006–07 to 2010–11

	2006–07	2007–08	2008–09	2009–10	2010–11
International students/noncitizens	0.5%	0.5%	0.2%	0.2%	0.0%
African American	1.9%	1.0%	1.1%	3.0%	1.5%
American Indian	0.7%	0.5%	0.9%	0.8%	0.3%
Asian American	2.1%	1.8%	2.0%	3.1%	1.8%
Hispanic	0.5%	0.5%	0.2%	0.2%	0.0%
Caucasian	83.1%	87.8%	88.5%	83.4%	91.8%
Unknown	10.9%	7.4%	5.8%	5.2%	3.0%
Other	0.1%	0.1%	0.2%	2.7%	0.4%

Note. Prepared from MACTE completer data files.

[20] The lack of change in racial/ethnic makeup of Minnesota's teaching force also is apparent in numbers licenses granted to those in those in racial or ethnic minority groups since 2007-08. Between 2007–08 and 2011-12, the percentage of new licenses awarded to teachers of color went from 5.15 percent to 4.36 percent.

2.2 Educator Shortage Areas by Locale and District Type

Research Question 2. Are there differences in the teacher shortage areas in charter schools, rural schools, and urban schools?

This section examines whether the numbers of teachers in shortage areas and the types of shortage areas differ for different district types and locales. The data come from BOT's special permissions file.

2.2.1 Variances and Limited Licenses: Locale and District Type

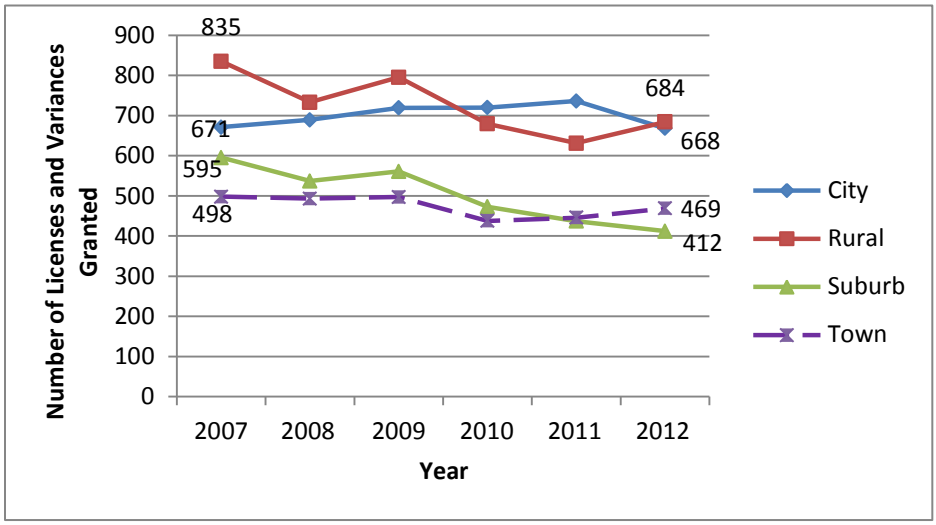
The locale type for each district was determined using locale codes in NCES Common Core of Data.[21] Table 21shows the numbers of variances and limited licenses granted between 2007 and 2012 by locale type. Suburban locales saw a 31 percent decline in permissions granted between 2007 and 2012, whereas districts in cities saw virtually no change. Rural locales saw an 18 percent decline, and town locales saw a 6 percent decline. Figure 17 displays these trends across time.

Table 21. The Numbers of Variances and Limited Licenses Granted by Locale: 2007–12

Locale	2007	2008	2009	2010	2011	2012	Percentage
City	671	689	719	720	736	668	< 1%
Rural	835	733	795	679	631	684	-18%
Suburb	595	537	561	473	437	412	-31%
Town	498	493	497	438	446	469	-6%

Note. Fifty-two cases do not have a district associated with the case in 2012; 42 cases do not have a district associated with the case in 2011; 41 cases do not have a district associated with the case in 2010; 42 cases do not have a district associated with the case in 2009; 24 cases do not have a district associated with the case in 2008; and 29 cases do not have a district associated with the case in 2007. See footnote 1 for numbers of identical cases that were removed from the file. The table does not include short-call substitutes. Prepared from BOT special permissions file.

Figure 17. The Numbers of Variances and Limited Licenses Granted by Locale: 2007–12



Note. Prepared from BOT special permissions files.

[21] For a description of NCES CCD locale codes, see http://nces.ed.gov/ccd/rural_locales.asp .

Table 22 shows the numbers of variances and limited licenses granted by different types of public schools. “Regular public” schools include independent, common, special, and intermediate school districts. Districts included in the “other” category include cooperatives, education districts, and academies. Regular public schools saw a 24 percent decline in the numbers of variances and limited licenses granted compared with a 39 percent increase for charter schools and a 24 percent increase for other schools.

Figure 18 (below) and Figure 19 (page 49) show the five licensure areas that were granted the most variances and limited licenses in 2012. Learning disabilities had the most variances and limited licenses granted for charter schools, whereas emotional behavioral disorders had the most of each for regular public school districts.

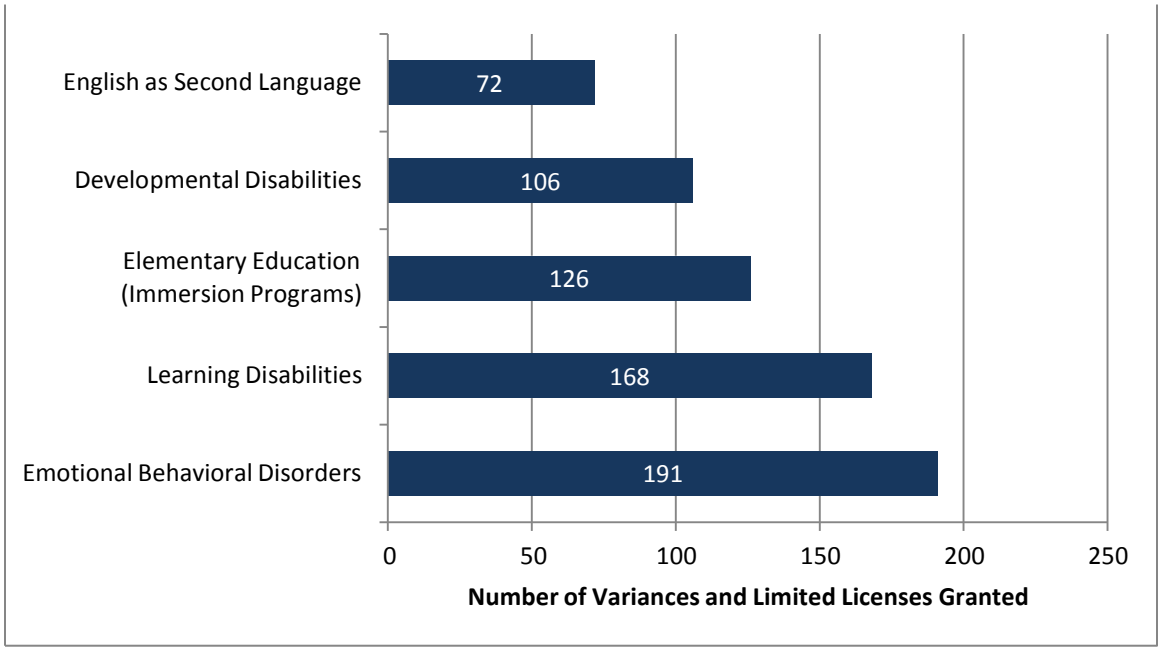
Table 22. The Numbers of Variances and Limited Licenses Granted by District Type: 2007–12

District Type	2007	2008	2009	2010	2011	2012	%
Regular public[a]	2,158	1,997	2,002	1,765	1,712	1,648	-24%
Charter	347	373	490	480	477	484	39%
Other[b]	123	106	122	106	103	153	24%

Note. The table does not include short-call substitutes. See footnote 1 for numbers of identical cases that were removed from the file. Prepared from BOT special permissions files, 2006–07 through 2011–12 school years.

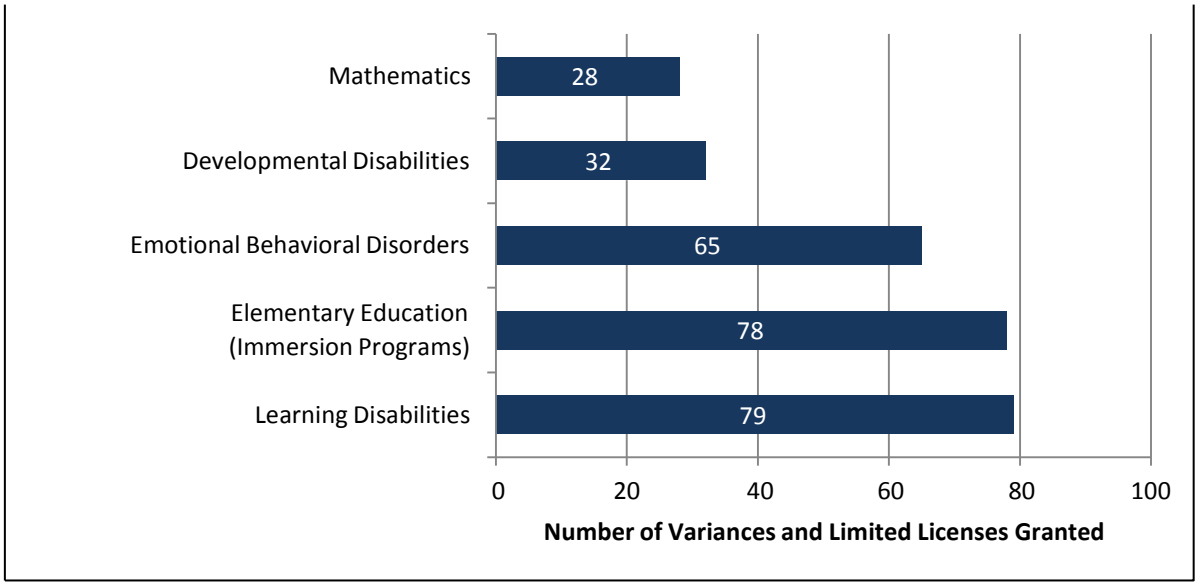
[a] “Regular public“ includes independent, common, special, and intermediate school districts. [b] “Other” includes cooperatives, education districts, and academies.

Figure 18. The Numbers of Variances and Limited Licenses Granted Among Regular School Districts by Licensure Area: 2011–12



Note. The figure represents the top five licensure areas with the most variances and licenses. Prepared from BOT, special permissions files, 2011–12 school years.

Figure 19. The Numbers of Variances and Limited Licenses Granted for Teachers in Charter Schools by License Area: 2011–12



Note. The figure represents the top five licensure areas with the most variances and licenses. Prepared from BOT special permissions files, 2011–12 school years.

2.2.2 Shortage Areas by Locale and District Type

Section 2.1.3 discusses the 14 positions for which at least 10 percent of the district representatives reported they either could not fill all vacancies with a licensed staff member or it was very difficult to fill vacancies. The degree to which these positions were hard to fill varied by both district type and locale (Table 23, page 50). Shortages for speech-language pathologists were less severe in city districts compared with districts in other locales and less severe among charter schools compared with public and other district types. On the other hand, 44 percent of all districts located in towns and 47 percent of other type districts reported that they could not fill or found it very difficult to fill this position with qualified candidates. Compared with public and other district types, charter schools also report less severe shortages for other positions, including emotional behavior disorders, physics, special education early childhood, parent and family education, high school mathematics, chemistry, and school nurses. This is at least partly resulting from the fact that charter schools are less likely to employ some of these positions compared with districts with multiple schools.

Table 23. The Percentage of Districts That Indicated That It Was Very Difficult or Impossible to Fill Vacant Positions With Qualified Candidates by District Type and by Locale: Fall 2012

License Area	Overall	District Type			Locale			
		Public	Charter	Other	City	Suburb	Town	Rural
Speech-language pathologist	31	36	14	47	15	32	44	30
Emotional behavior disorders	27	32	14	26	21	30	39	21
Autism spectrum disorders	17	18	16	11	19	18	22	14
Developmental disabilities	15	18	13	3	16	12	17	14
Specific learning disabilities	15	16	17	5	24	7	16	14
High school physics	14	17	7	8	12	17	8	16
Early childhood special education	13	16	6	16	9	11	22	12
Parent and family education	13	19	1	8	1	14	11	17
Spanish	13	15	11	0	9	18	8	15
High school mathematics	12	13	8	16	10	14	13	12
High school chemistry	12	16	6	8	12	11	7	15
School nurse	12	12	9	19	13	25	14	7
School psychologist	11	11	11	14	12	21	13	8
English as a second language (K–6)	10	13	6	0	4	9	17	9

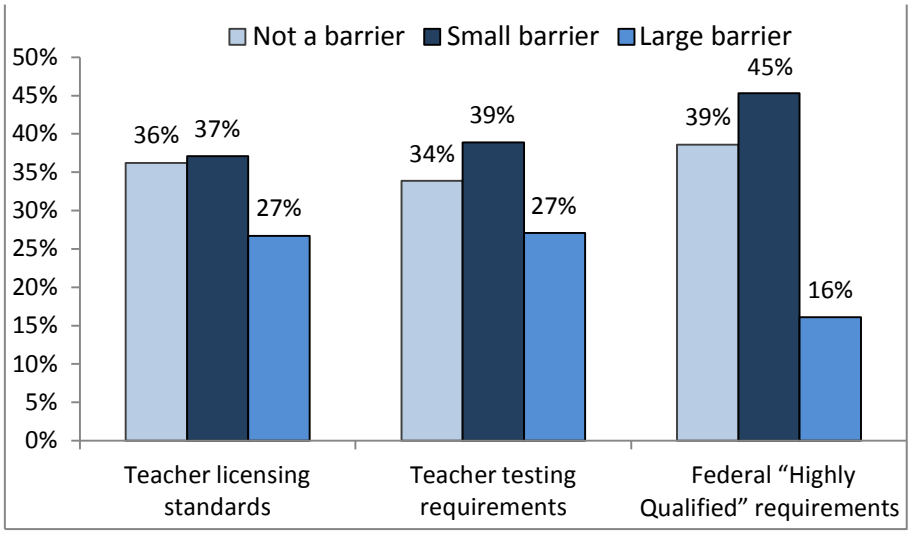
Note. Prepared from MDE supply-and-demand survey, fall 2012.

2.3 Barriers to Hiring Qualified Candidates

Research Question 3. What barriers do district staff perceive as impairing their ability to hire effective teachers?

The third research question was addressed with district hiring officials' responses to questions that appear at the end of the district survey. One series of items asked the district respondents whether specific licensing standards and other requirements were barriers to hiring effective teachers. There were some notable regional differences in the districts' responses to the items about barriers to hiring effective teachers. The degree to which the standards and requirements were a large barrier to hiring effective teachers by region is shown in Figure 20.) The response options were as follows: not a barrier, small barrier, and large barrier. Teacher licensing standards were rated as a large barrier by 27 percent of the districts and as a small barrier by another 37 percent. Similar responses were found for teacher testing requirements: 27 percent indicated this was a large barrier, and 39 percent indicated this was a small barrier. Federal highly qualified requirements were considered a large barrier by 16 percent of the districts and a small barrier by 45 percent of the districts. These were considered a large barrier for *retaining* teachers to a lesser extent (teacher licensing standards, 13 percent; teacher testing requirements, 14 percent; federal highly qualified requirements, 9 percent).

Figure 20. Barriers to Hiring Effective Teachers Reported by Districts



Note. Prepared from MDE supply-and-demand survey, fall 2012.

There were some notable regional differences in the districts' responses to the items about barriers to hiring effective teachers. The degree to which the standards and requirements were a large barrier to hiring effective teachers by region is shown in Table 24 (page 52). Larger percentages of districts in the Northwest, Southwest, West Central, and Headwaters regions generally found these standards and requirements to be a large barrier compared with districts in other regions.

Table 24. The Percentage of Districts Indicating That Standards and Requirements Presented a Large Barrier to Hiring Effective Teachers by Region

Region	Teacher Licensing Standards	Teacher Testing Requirements	Federal Highly Qualified Requirements
Overall	27	27	16
Region 1: Northwest	60	52	32
Region 2: Headwaters	38	31	25
Region 3: Arrowhead	18	26	23
Region 4: West Central	46	47	18
Region 5: North Central	12	12	12
Region 6E: Southwest Central	27	27	27
Region 6W: Upper Minnesota Valley	31	31	15
Region 7E: East Central	6	6	18
Region 7W: Central	18	15	7
Region 8: Southwest	56	44	33
Region 9: South Central	20	29	3
Region 10: Southeast	29	19	12
Region 11: Metro	19	25	13

Note. Prepared from MDE supply-and-demand survey, fall 2012.

Data also were examined to determine whether the responses were different for districts in different locales and different district types. As seen in Table 25, the findings indicate that public independent school districts and charter schools tended to indicate that these standards and requirements were less of a barrier than respondents in other types of districts.

Table 25. The Percentage of Districts Indicating That Specific Standards and Requirements Are a Large Barrier to Hiring Effective Teachers by Locale and by District Type

District Characteristics	Teacher Licensing Standards	Teacher Testing Requirements	Federal Highly Qualified Requirements
Overall	27	27	16
Locale			
Rural	31	27	19
City	25	31	14
Town	27	28	13
Suburb	11	22	14
District type			
Public	27	29	16
Charter	19	21	15
Other	53	36	24

Note. Prepared from MDE supply-and-demand survey, fall 2012.

2.4 Impediments to the Preparation of New Teachers: Input From MACTE Institutions

Research Question 4. What factors do teacher preparation institutions cite as influencing their ability to prepare effective teachers now and during the next 10 years?

An online survey was created to capture the views of representatives of the 29 MACTE institutions on impediments to teacher preparation. Surveys were completed by 25 of these institutions, for a response rate of 86 percent. A copy of this survey, along with the percentage distributions of responses for all items on the survey and a complete listing of all text answers, is in Appendix D.[22]

2.4.1 Program Completers Finding Teaching Positions

As seen in Table 26, the majority of MACTE representatives "agree" or "tend to agree" that program completers at their institutions, in general, were able to find positions within Minnesota schools (16 percent "agree" and 72 percent "tend to agree"). However, nearly two thirds of the institutions indicated that program completers in some licensure areas are experiencing difficulty finding teaching positions (4 percent "agree" and 60 percent "tend to agree").

Table 26. The Percentage Distribution of Responses to Survey Items About Program Completers Finding Teaching Positions: Fall 2012

Survey Item	Disagree	Tend to Disagree	Tend to Agree	Agree
Program completers from my institution are able to find positions within Minnesota schools.	0%	12%	72%	16%
Program completers in some teacher licensure areas are experiencing difficulty in finding teaching positions.	4%	32%	60%	4%

Note. Prepared from MDE survey for MACTE institutions, fall 2012.

[22] The survey covered other topics, including recruitment, admissions, and student teaching placements. Response distributions for these other topics are also displayed in Appendix D.

The survey respondents were asked to identify the licensure areas for which program completers were having difficulty finding teaching positions. Social studies and elementary education were the two areas cited most frequently as areas of difficulty; 11 institutions noted each of these areas (Table 27). Four institutions mentioned physical education, and three institutions mentioned music as difficult areas to place teachers. K–12 art, 5–12 health, and communication arts and literature were each mentioned by one institution.

Table 27. The Number of MACTE Institutions Mentioning Specific Licensure Areas Difficult to Place Program Completers: Fall 2012

Licensure Area	Number of Institutions (Out of 25)
Social studies	11
Elementary	11
Physical education	4
Music	3
5–12 health	1
K–12 art	1
Communication arts and literature	1

Note. Prepared from MDE survey of teacher preparation institutions, fall 2012.

2.4.2 Challenges for MACTE Institutions

MACTE survey respondents were asked to describe the factors that inhibit their ability to prepare teachers in shortage areas.[23] The comments were categorized by topic. Testing requirements were cited as a challenging factor by 18 of the 25 institutions, and 12 noted high costs and the need for scholarships. The numbers of institutions mentioning each topic are shown in Table 28.

Table 28. The Numbers of MACTE Institutions Describing Various Factors That Challenge Their Capacity to Prepare Teachers in Teacher Shortage Areas: Fall 2012

Factor	Number of Institutions (out of 25)
Testing requirements	18
Costs/need for scholarships	12
Resources needed to comply with accountability requirements	4
Faculty shortages/resources for faculty	4
Low teacher salaries	3
Public support for the teaching profession	2
Other factor	6

Note. Prepared from MDE survey for teacher preparation institutions, fall 2012.

[23] The survey item was as follows: "Are there institutional or public policy-related factors you believe present challenges for your institution's capacity to prepare teachers in teacher shortage areas over the next 10 years? Examples might include a shortage of faculty, testing requirements for licensure, program accountability expectations, the need for scholarships, resource constraints, public support, etc. If yes, please describe."

All of the responses are presented in Appendix D and grouped by factor. A few representative comments collected by the survey are presented here.

- Testing requirements
  - "Students are having difficulty with MTLE [Minnesota Teacher Licensure Exam] basic skills tests. This did not seem to be the case with the PPST [Pre-Professionals Skill Test] (why did we change?) Secondary students are having problems with the math section (the non-math licensure students) and students of color are having difficulty on all sections. The cut-off scores for many/most content tests are 1 SD above the 'norm'. However, since we are encouraged/required to accept only the 'best and brightest students' into our programs in the first place, and these are the tested students—one SD above norm actually narrows the candidate pool even more! In my opinion, we are losing excellent candidates due to skewed testing requirements."
  - "MTLE Testing limits the access of well qualified candidates in some fields. We have experienced many issues related to MTLE testing. The following are a few examples. Candidates for whom English is not a first language find the timing on the exams to be very challenging. As a result, we are losing some excellent teacher candidates who come from under-represented populations due to the testing issues. Similarly, some candidates are unable to complete the testing requirements successfully due to the on-screen reading requirements in a timed setting. The cost associated with all of the testing (Basic Skills, Pedagogy, and Content) is discouraging some excellent candidates from pursuing teacher preparation."
  - "Testing requirements are a factor. Our program and our candidates expect to meet rigorous standards, but we do expect them to be fair, relevant, and affordable. There does seem to be a lack of public support, and it is puzzling. Standards go up, and MN programs and candidates work to meet them. The typical response that follows is a statement that the standards still must be too low. Makes no sense and is unfair and disrespectful to candidates and programs."
- Costs/need for scholarships
  - "Incentives for students in mathematics or science fields would be a wonderful place to start. Some kind of paid fellowships or internships in math and science fields or specific scholarships other than TEACH grants would be very welcome."
  - "Scholarships and other forms of financial incentives would definitely be helpful in attracting students for high demand areas."
  - "Many students cannot afford to quit working to do student teaching and the only financial aid available is loans."
  - "The need for scholarships challenges our capacity to prepare teachers in teacher shortage areas. We especially note the need for scholarship support as we recruit underrepresented individuals."
- Resources needed to comply with accountability requirements
  - "Accountability may be the second major factor. Accountability is needed, but the amount and detail of reporting required by teachers and by teacher education programs appears to exceed what should be needed for quality control. This effort reduces the resources available for teacher preparation and for teaching."
  - "Program accountability measures have grown in recent years. The increased demands for data reporting have resulted in institutional investments in additional

personnel and assessment data systems. This is a large cost for institutions and limits the capacity of an institution to respond to the needs of the state since new programs demand such a high level of investment. In the current economy, costs are always critical factors to be considered by institutions as they add programs."

- Low teacher salaries
  - "Low starting salaries in math/science compared to the corporate sector."
  - "Teacher salaries: While teacher salaries in MN are competitive nationally, it is difficult to convince families that investing in a college degree will be handsomely rewarded with a career in teaching. This is especially true among immigrant families who have very big dreams for their children who achieve a high education degree and for graduates in the mathematics and science fields where starting salaries in industry far exceed starting salaries in teaching."
- Faculty shortages/resources for faculty
  - "We have limited resources for faculty with the proper credentials in need area in content area departments. I am working hard to change that, but it takes time and unified effort."
  - "It is difficult to find qualified faculty with both teaching experience at specific grade levels (5–8 for middle school endorsement or 9–12 for secondary with no overlap allowed) and who are academically trained in field specific graduate studies (i.e., master's or terminal degree in literature vs. English education) as rule is currently interpreted by BOT."
- Public support for teaching profession
  - "The media coverage about teaching seems to have created a public discourse that describes teachers the source of the achievement gap, as people who care more about protecting their jobs than doing right by children, as an underachieving group of college graduate who are not qualified for their job. This discourse has created a job market that is not attracting people into the field of teaching. People are led to believe that the low-salaried, high accountability job is not a career for them, unless they can "drop in" to it for a short term service activity (like a Peace Corps term of two-years and then out). Legislative / Policy discourse: legislators and business leaders in our community have contributed to the public discourse of distrusting teachers and calling for the "best and the brightest" to replace the tired and ineffective. Morale among teachers is at an all-time low, and potential teachers are being steered away from teaching as a career. The "best and the brightest" are not attracted to a profession that they see being pilloried. Policies supporting alternative routes into are attempting to attract people to teaching, but then create a mindset that anyone can teach with limited preparation and that all you have to do is "serve" for two years and then move on. This short-term approach to creating a teaching workforce that is effective will potentially backfire in the long-run by creating a revolving door of lesser experienced teachers."

2.4.3 Suggestions for Improving the Supply of Teacher Candidates in Shortage Areas

Institutions' respondents were asked to make suggestions about policies or programs that might improve recruiting, admission, and the preparation of teacher candidates in shortage areas.[24] The comments were categorized by topic. The most frequently mentioned suggestions were (1) financial incentives/scholarships/loan forgiveness (8 institutions) and (2) testing requirements (6 institutions). The numbers of institutions making suggestions about each topic are shown in Table 29.

Table 29. The Numbers of Teacher Preparation Institutions Suggesting Various Policies or Programs to Improve the Preparation of Teachers in Teacher Shortage Areas: Fall 2012

Suggestion Category	Number of Institutions (Out of 25)
Financial incentives/scholarships/loan forgiveness	8
Change testing requirements	6
Better communication about shortage areas	3
STEM programs	2
Enhance respect for the teaching profession	2
Preparation/recruitment before college	2
Simplify accountability requirements	1
Compensation for cooperating teachers (for student teachers)	1
Differentiated teacher salary schedules	1

Note. Prepared from MDE survey of Teacher Preparation institutions, fall 2012.

All of the responses are presented in Appendix D and grouped by suggestion category. A few representative comments about selected types of suggestions are presented in the sections that follow.

- Financial incentives/scholarships/loan forgiveness
  - "Scholarships and loan forgiveness programs for candidates in shortage areas with a required minimum number of years in teaching (Ex. 10% per year loan forgiveness up to 10 years)"
  - "State supported loan-forgiveness programs may help attract more candidates of color into teacher preparation programs. These programs should be linked to the candidates' promise to teach in particular parts of the state."
  - "The ability to have loan forgiveness programs for candidates preparing for teacher shortage areas would be helpful. A state-supported loan reduction program for all candidates at all institutions would encourage more individuals to seek teaching licenses in these challenge areas."

[24] The survey item was as follows: "Please use the space below to offer comments on this survey or insights on teacher supply and demand in Minnesota, including suggestions for policies or programs that might improve recruiting, admission and preparation of teacher candidates in shortage areas."

- Change testing requirements
    - “I would also strongly encourage a change with using the MTLE basic skills exam as a licensing requirement. Investing more interest and focus on performance assessments such as edTPA [Teacher Performance Assessment] will help us establish a pool of prepared educators.”
    - “Revise the MTLE cut scores to where Pearson and the teaching panels recommended them.”
    - “We need to change our system for preparing and licensing teachers to an assets model where there are multiple opportunities and pathways for demonstrating competencies instead of a 'gotcha' model where we use multiple strategies for demonstrating an individual cannot be a teacher.”
    - Better communication about shortage areas
    - “There needs to be clarity and accuracy about what and where shortage areas actually are.”
    - “It would be helpful to receive reports and other current information MDE may have on teacher and school leader supply and demand. IHE and MDE could also benefit from joint efforts of recruiting.”
- STEM programs [Science, Technology, Engineering, Math]
    - “We are trying to recruit students into math and science out of traditional math/ science majors and to offer the option of a transition from undergrad to graduate course work. If MACTE and MDE could work together to perhaps create a condensed licensure option in these areas, where MSEPTS [Minnesota Standards for Effective Practice in Teaching] could be offered in intensive type courses or categorized in new ways, that might help in the development of more creative and attractive program development. And the paid fellowship idea as I indicated above could really help. And this needs to be meaningful money—like a like a $15,000 or $20,000 paid internship in a school for a year during which licensure coursework would be taught—basically a residency model.”
    - “For math and science there needs to be more efforts early on in a college student's STEM preparation to engage them in "trying on teaching" through summer programs; working with Lego Robotic as mentors; service learning with STEM teachers. These early experiences are powerful and can refocus a college student on what they might really love to do. There needs to be more alternative programs for "filling in the areas to meet the MSEP's" for working adults that would like to transition to STEM teaching....they have to be available when they can come to the classes and their needs to be a financial bridge for STEM candidates to move through student teaching. Lastly, for student from under-represented minority groups to move into STEM teaching there needs to be a combination of financial support, pre-college feeder programs and summer STEM experiences to engage more middle and high schoolers to pursue STEM...it can't be just one program...you have to think through and offer a comprehensive program to increase numbers of teachers of color.”
- Enhance respect for the teaching profession
    - “Our shared work as leaders in Minnesota might benefit from a renewed investment in the honoring, respect, and investment in the public servants and leaders that accept the responsibility of being a teacher. As we work together to build

professional capital so we can serve the full potential and capacity of the next generation, in edifying the profession we will attract talented candidates. Respect by the greater community and professional authority in enlivening workplaces will build the profession and the communities in which the next generation of teachers will serve."

2.5 Projections of Student Enrollments Through 2022

Research Question 5. What K–12 public school enrollment trends are expected for particular student subgroups (e.g., racial and ethnic categories and English language learners [ELLs]) for the next 3, 5, and 10 years?

To address research question 5, Minnesota public school enrollment data going back to the 1992–93 school year were applied to a series of forecast models. The accuracy of these models was tested, and one model outperformed the others when attempting to predict enrollments 3, 5, and 10 years into the future at different levels of aggregation (county, region, and state). See Appendix G for more information on tests performed on forecast models.

The best-performing model is that which is currently used for enrollment projections in many other states and by NCES at the U.S. Department of Education. The foundation of that model is the grade progression ratio (GPR), or the percentage of students who progress from each specific grade level to the next, averaged across years.[25]

This section presents the findings from the GPR-based forecasts. The first subsection presents the enrollment forecasts at the state and region level for three, five, and 10 years (i.e., 2014–15, 2016–17, and 2021–22 school years). The second subsection focuses on the three-, five-, and 10-year forecasts for Caucasian students versus students of racial or ethnic minority groups.

Readers are again cautioned against placing too much certainty in the forecasts presented here. Forecast models based on GPRs were found to have mean absolute percent errors of 0.78 percent, 1.33 percent, and 3.94 percent for statewide forecasts at three years, five years, and 10 years, respectively.

2.5.1 Statewide Enrollment Forecasts

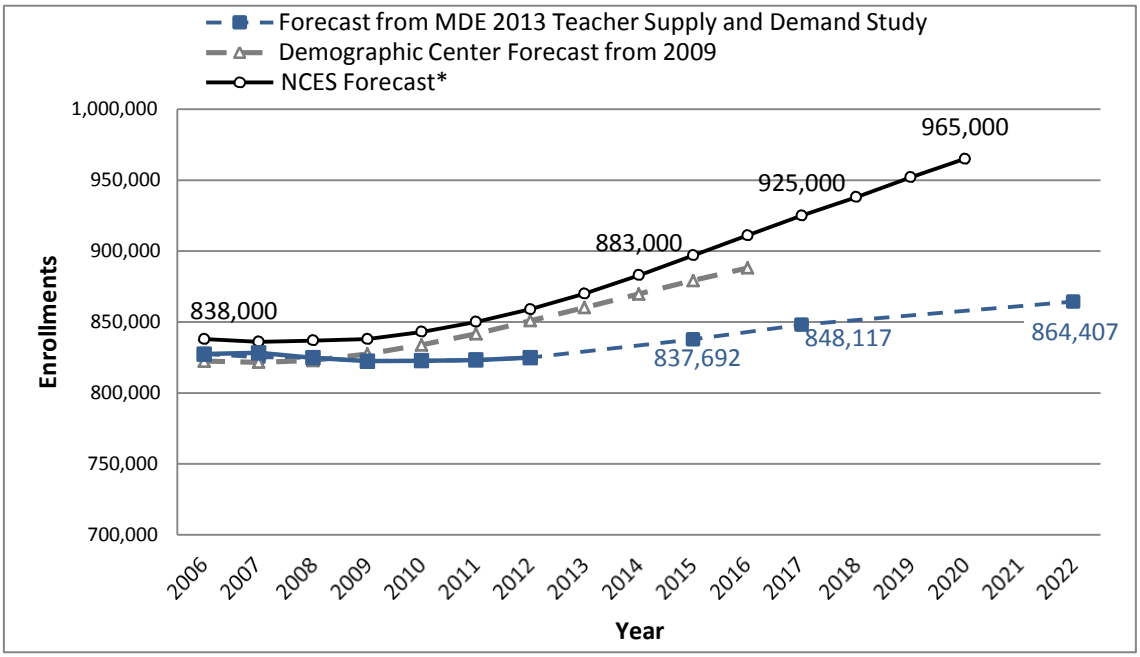
The forecasts based on the GPR model suggest that K–12 enrollments in Minnesota public schools will increase during the next 10 years by approximately 4.8 percent, from 824,858 in 2012 to 864,407 in 2022.[26] As seen in Figure 21 (page 61), the enrollment projections published by the Minnesota State Demographic Center in 2009 also suggested an increase in enrollments, but at a higher rate (8.1 percent). The difference between the two forecasts can be attributable to the less-than-expected numbers of births in Minnesota (see Figure 24 in Appendix F).

NCES also publishes enrollment projections for the United States as a whole and for individual states. Their forecasts are produced using a similar model as used in these forecasts, with two exceptions: (1) the NCES forecasts do not include the most recent enrollment information collected by MDE or the most recent data on live births from Minnesota, and (2) the NCES forecasts include children served in publicly funded preschools. As shown in Figure 21, the forecasts performed for this report and those of NCES diverge during the earliest forecast periods and continue along different trajectories across time.

[25] This forecast model is sometimes called the survival approach, referring to the numbers of students who "survive" to the next grade level (citation).

[26] Statewide average GPRs based on historical data are as follows: 0.908 (birth to kindergarten); 1.011 (kindergarten to Grade 1); 1.000 (Grade 1 to Grade 2); 1.063 (Grade 2 to Grade 3); 1.006 (Grade 3 to Grade 4); 1.008 (Grade 4 to Grade 5); 1.010 (Grade 5 to Grade 6); 1.024 (Grade 6 to Grade 7); 1.004 (Grade 7 to Grade 8); 1.043 (Grade 8 to Grade 9); 0.998 (Grade 9 to Grade 10); 0.979 (Grade 10 to Grade 11); and 1.042 (Grade 11 to Grade 12).

Figure 21. Statewide Enrollment Forecasts for K–12 Public Schools

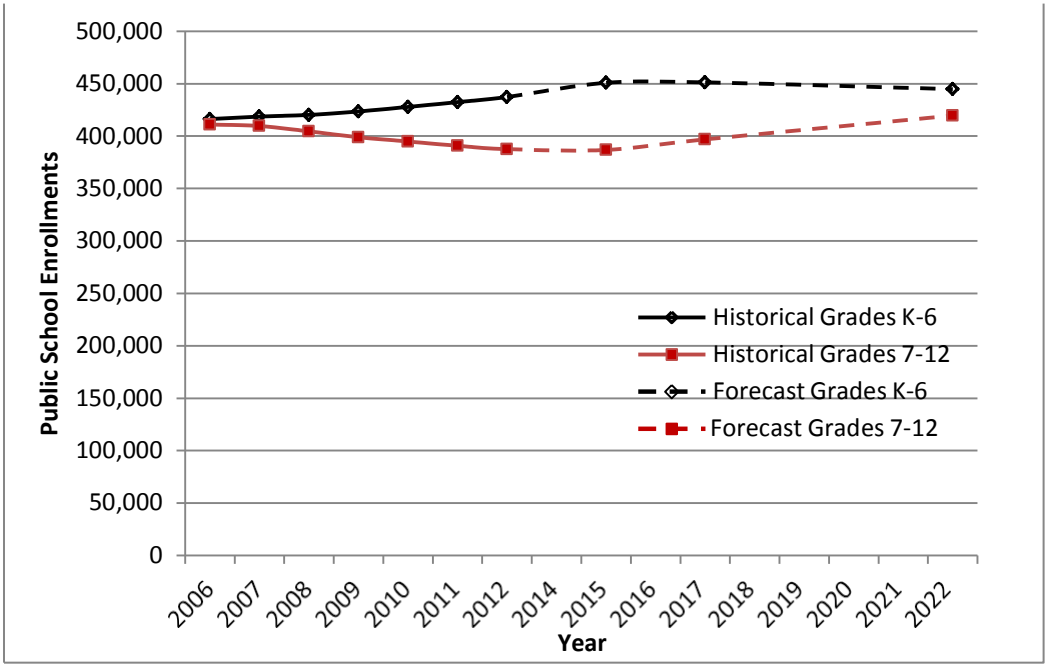


Note. *NCES forecasts include prekindergarten children as well. Prepared from the following: (1) Minnesota forecasts based on historical GPRs calculated using annual enrollment counts from 1990 to 2012 (enrollment counts found in MARSS); (2) the Minnesota State Demographic Center's projections from 2009: http://www.demography.state.mn.us/documents/K12EnrollmentsProjectedtoRise.pdf; and (3) NCES forecasts: http://nces.ed.gov/pubs2011/2011026.pdf.

Figure 22 (page 62) shows the separate forecasts for Minnesota public school students in Grades K–6 and Grades 7–12.[27] The forecast model suggests that the modest statewide enrollment decreases experienced in the middle and high school grades in recent years will level off, and by 2015, the increasing enrollments seen at the elementary grades should make their way into schools serving secondary-level students. According to the model, starting from 2012, elementary schools statewide will increases by only 1.7 percent during the next 10 years, while secondary schools will experience an overall increase of 8.3 percent.

[27] The grade-level groupings are chosen to be consistent with those used in the Minnesota State Demographic Center's 2009 forecasts.

Figure 22. Historical and Forecast Numbers of Students Enrolled in Minnesota's Public Elementary and Secondary Schools



Note. Prepared from forecasts performed by MDE, based on historical enrollments (MARSS data), birth data (Minnesota Center for Health Statistics), numbers of females between 15-44 (U.S. Census Bureau), and GPRs.

2.5.2 Forecasts of Enrollments of Student Subgroups.

Attempts were made to forecast the numbers of students of different racial and ethnic groups using historical enrollment data. These forecasts were considered too inaccurate, presumably because of the relatively small numbers of students in these groups. However, forecast models that used historical enrollment data but focused just on Caucasian students did yield relatively accurate forecasts.

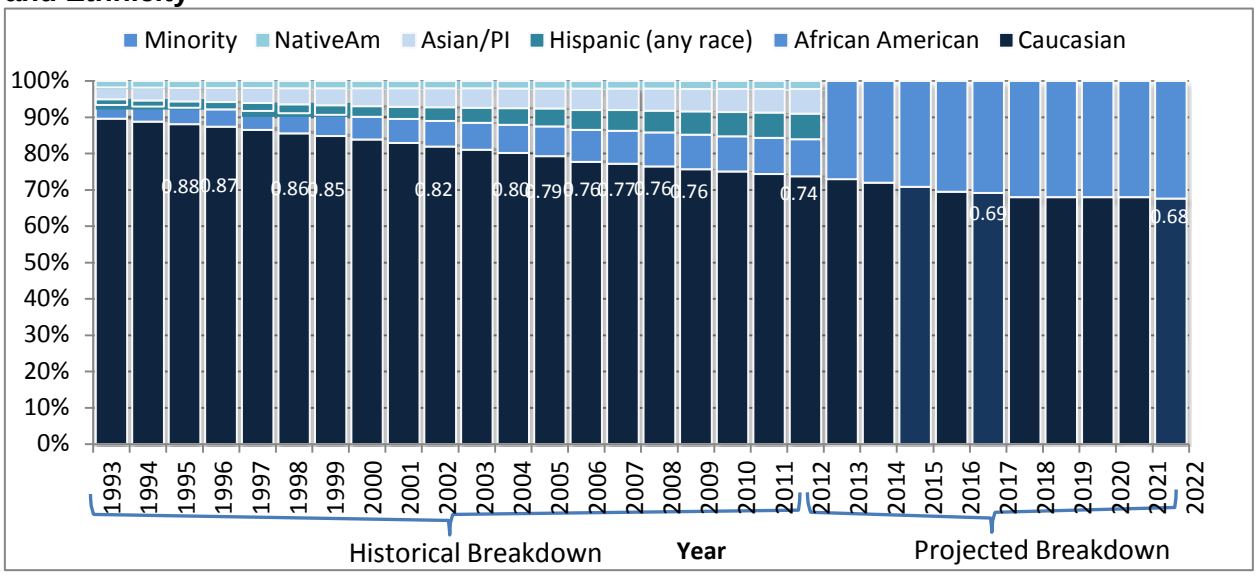
The model was used to forecast enrollments of Caucasian students in 2015, 2017, and 2022. Then the numbers of students of color were calculated by subtraction: total enrollment forecast – forecast for Caucasian students. These forecasts are presented in Table 30 (page 63). The forecasted ratios of Caucasian students versus students of racial and ethnic minority groups are displayed in Figure 23 (also on page 63). In that figure, the bars for 2015, 2017, and 2022 are the forecast values, and therefore only show percentages for Caucasian students and students representing a racial/ethnic minority group. The bars for the intervening years (2013, 2014, 2016, 2018-2021) are lightly-shaded to signify that they are based on extrapolations between the forecast values.

Table 30. Enrollment Estimates and Forecasts for Caucasian Students and Students Representing Racial/Ethnic Minority Groups

Basis for Enrollment Estimates	Year	Total Enrollment	Caucasian	Racial/Ethnic Minority
Actual	2007	828,243	639,655	188,588
	2008	824,783	630,489	194,294
	2009	822,412	622,233	200,179
	2010	822,697	617,631	205,066
	2011	823,235	612,242	210,993
	2012	824,858	608,381	216,477
Forecasts	*2013*	.	.	.
	2014	.	.	.
	2015	*837,692*	*593,505*	*257,467*
	2016	.	.	.
	2017	*848,117*	*586,563*	*283,175*
	2018	.	.	.
	2019	.	.	.
	2020	.	.	.
	2021	.	.	.
	2022	*864,407*	*584,363*	*351,179*

Note. Prepared from forecasts performed by MDE, based on historical enrollments (MARSS data), birth data (Minnesota Department of Health), the numbers of females between 15 and 44 years old (U.S. Census Bureau), and GPRs.

Figure 23. Statewide Percentages of Minnesota Students—Actual and Forecast—by Race and Ethnicity



Note. Prepared from MDE analyses of historical enrollments, forecasts of births, and GPRs.

3. Summary and Conclusions

This study of teacher supply and demand in Minnesota's public schools was organized around a set of research questions that was generated by various stakeholders. The findings are summarized, by research question, in the sections that follow.

3.1 Summary

Research Question #1: What are the teacher staffing patterns in Minnesota?

Overall Picture of Teachers in Minnesota. As of the beginning of the 2011–12 school year, there were 53,133 teachers employed in Minnesota's public schools. This is a 2.6 percent decline from five years earlier. However, some regions of the state are seeing dramatic reductions in the numbers of teachers, including the South Central region (21 percent decrease), the Northwest region (12 percent decrease), and the Upper Minnesota Valley region (10 percent decrease).

Only 3.5 percent of Minnesota's teachers are members of racial and ethnic minority groups, and the majority of these teachers of color work within the seven-county Twin Cities Metro region. Underlying that statistic are different trends for different racial/ethnic groups. Between 2007 and 2012, the numbers of Asian/Pacific Islander and Hispanic teachers have been increasing, whereas numbers of African-American and Native American teachers appears to be decreasing.

Teacher Shortage Areas. Special permissions data suggest that during the 2011–12 school year, districts had to hire 3,447 teachers who lacked the necessary license for the subjects and the grade levels taught. This corresponds to 6 percent of the entire teaching workforce. The number of teachers requiring special permissions has declined from 2007–08 by about 2 percent. Special permission data and the experiences of district hiring officers converge on the following 11 shortage areas:

- Emotional behavior disorders (294 permissions)
- Learning disabilities (265 permissions)
- Developmental disabilities (145 permissions)
- Early childhood special education (91 permissions)
- English as a second language (86 permissions)
- Mathematics (78 permissions)
- School psychologist (66 permissions)
- Spanish (64 permissions)
- Physics (50 permissions)
- Developmental/adapted physical education (45 permissions)
- Chemistry (43 permissions)

Many district hiring officers also mentioned having difficulty finding qualified speech language pathologists (a licensed support position for which special permissions are not granted).

The rank ordering of these hard-to-staff license areas varied slightly from year to year, but they remained within the top 11 or 12 for all five years investigated as part of this study.

Areas of Teacher Surplus. According to district hiring officers and teacher preparation institutions, the teaching positions that are easiest to fill (or most difficult to place teaching program graduates) are as follows:

- K–6 elementary
- Physical education
- Social studies (high school and Grades 5–8)
- Communication arts and literature (high school and Grades 5–8)

Demand for Teachers. Several components go into estimating the demand for teachers, including teacher attrition, student enrollments, and student-teacher ratios.

- The teacher attrition rate between 2007 and the present has fluctuated between 8 percent and 11 percent, with no clear trend evident. The attrition rate among Minnesota teachers was 7.9 percent in 2010-2011.
- Student enrollments statewide have remained essentially unchanged since 2005–06 (decrease of 0.3 percent). Schools in all but two economic development regions saw decreasing enrollments, and the decreases ranged from 0.8 percent (Southeast region) to 18.7 percent (Southwest Central region).
- The population of students enrolled in Minnesota's public schools is becoming more diverse each year. The number of Caucasian students has decreased by 1 percent per year. The five-year period also has seen increases in the percentages of students who are eligible for free or reduced-price lunch, who have limited English proficiency, and/or who have special needs.

Student-Teacher Ratios. The most recent data (2010) indicate that the average student-teacher ratios have remained steady at 16:4. However, 30 percent of the districts responding to the district survey indicated that they had recently increased their student-teacher ratios.

Taken together, data on these components suggest that there is slightly less demand for teachers at present. Student enrollments have decreased slightly, and the survey data suggest that at least 20 percent of the districts will take steps to reduce their instructional staff (by eliminating positions after attrition, dropping nonessential course offerings, and/or increasing student-teacher ratios)

Teacher Supply. Teachers who held the respective positions the previous year fill approximately 90 percent of the teaching positions available each year. Nine percent of the positions are filled by newly certified teachers trained in a Minnesota teacher preparation institution, teachers transferring from another district, and teachers returning to service (each source each fills 3 percent of vacant positions). The remaining 1 percent consists of teachers licensed in other states and new teachers trained in programs outside of Minnesota.

- The numbers of program completers from Minnesota teacher preparation programs has fluctuated between 2007 and 2011, resulting in a 9.8 percent net decrease. For all supply sources, the percentage of decreases are larger for teacher shortage areas (27 percent decrease) compared with the decrease in completers in surplus areas (3 percent decrease).
- The numbers of new teacher licenses being awarded have decreased by 15.6 percent between 2007 and 2011, even in teacher shortage areas.

- The reserve pool (the number of active license holders willing and able to teach but not currently doing so) has increased for three traditional teacher shortage areas, remained constant for three areas, and decreased for eight shortage areas.
- The retention rates of teachers have fluctuated during the five years under investigation, with no overall trends apparent.

Taken together, these data on teacher supply suggest an overall reduction in the supply of teachers, especially in teacher shortage areas.

Research Question #2: Do shortage areas vary by district type or locale?

The numbers of special permissions granted for districts in suburbs, small towns, and rural areas has decreased by 31 percent, 18 percent, and 6 percent, respectively. However, districts in urban areas have seen little overall change in the numbers of permissions needed to staff schools.

The numbers of permissions needed has increased for charter schools and other types of districts (i.e., cooperatives, education districts, and academies). Regular public districts have seen decreases in numbers of permissions needed to staff schools.

The ranking of special permissions needed in regular school districts is similar to that of districts overall: emotional behavior disorders (191 permissions), learning disabilities (168), immersion programs in elementary education (126), developmental disabilities (106) and English as a second language (72).

The top five licensure areas for which charter schools needed special permissions were the same as those for regular districts with one exception. Mathematics was among the top five for charter schools, but English as a second language was not.

Research Question #3: What barriers are impairing districts' ability to hire effective teachers?

District hiring officers were asked whether certain standards or policies represented barriers to the hiring and retaining of teachers.

- Sixty-four percent of the districts indicated that teacher licensing standards were either a small barrier or large barrier.
- Sixty-six percent of the responding districts indicated that teacher testing requirements were a small barrier or large barrier to obtaining new teachers.
- Sixty-one percent of the district hiring officers believed that the federal highly qualified requirements were a small or large barrier to hiring teachers.

Research Question #4: What factors influence teacher preparation institutions' ability to prepare effective teachers?

Teacher-testing requirements were mentioned as a barrier by 72 percent of the institutions. The other major impediments mentioned by 48 percent of the institutions were the cost of higher education for students and the lack of scholarships. A minority of institutions also mentioned resources for complying with accountability provisions (16 percent), resources for faculty

(16 percent), low teacher salaries (12 percent), and support for the teaching profession by the public (8 percent).

Research Question #5: What are the forecasts for student enrollments for the next 10 years?

Student enrollments in Minnesota's public schools are expected to increase by 4.8 percent. This figure represents a growth rate that is much more modest than the most recent enrollment forecasts offered by NCES (2011 forecast to 2021 with a growth rate of 15 percent) and the Minnesota State Demographic Center's 2009 forecast of 7.9 percent.

Between the years 2012 and 2015, enrollments in elementary schools (Grades K–6) will increase by 3 percent, but then decrease to a net increase of just 1.7 percent for the full ten-year period. At the state level, secondary schools (Grades 7–12) will experience a 0.2 percent decrease between 2012 and 2015. Between 2015 and 2022 however, enrollments in Minnesota's secondary schools are anticipated to increase by 8.3 percent.

The relatively small numbers of students in the racial and ethnic groups make separate forecasts for these specific groups too inaccurate to trust. However, it is possible to calculate the numbers of students of color as whole. It is expected that these students will continue to make up more and more of the student population between now and 2022, with 31 percent growth during the first five years (through 2017) and 24 percent growth for the following five years (2017–2022).

The forecasts of ELLs also were too inaccurate to trust. The future enrollments of these students are less related to the numbers of ELL students currently in the system and the existing population of immigrants, but rather future immigration rates.

3.2 Final Conclusions

The available data suggest a slight decrease in the demand for teachers, as evidenced by district hiring officers' indication that they have increased student-teacher ratios and eliminated vacant positions in recent years. The supply of teachers has also decreased slightly but at a smaller rate than demand. There are slightly fewer licensed teachers in the state than five years ago, and fewer teaching licenses are being issued to prospective teachers. Taken together, these data account for the slight reduction in the numbers of special permissions in the last five years.

However, two trends should be of concern to policymakers. First, there has been a 6.7 percent increase in enrollments of students with special needs and an 8.6 percent increase in the number of students with limited English proficiency, whereas there are fewer program completers in the relevant teaching fields and fewer licenses being issued for some of these areas. These data taken together suggest potential increases in shortages in these two fields within the near future. Second, the population of students enrolled in Minnesota's public schools is becoming more diverse, yet the diversity of the teaching workforce remains constant. Research suggests that being exposed to teachers of color can have positive impacts on students of color and Caucasian students alike (Dee, 2001).

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Appendix A. Methodology for the District Survey

The Minnesota teacher supply-and-demand district survey was used to collect district hiring officials' perceptions of staff shortage. The survey went through multiple revisions before being fielded. Minnesota education officials consulted with experts from American Institutes for Research out of concern that the prior district survey had a low response rate and that the information the survey was not valid. The review of the survey had several goals: (1) increase district response rates from 2011; (2) identify and delete information on the survey that could be collected elsewhere; and (3) revise the survey so that the information collected from district representatives would be useful and valid. The first step was the review of MDE's other data sources (e.g., the STAR database) to identify areas of overlap between existing data and the district survey. Next, meetings across the course of several weeks were conducted with MDE officials to discuss possible changes to the design and questions of the survey. The survey went through multiple revisions.

After all the questions and the design was finalized, two cognitive interviews were conducted with district hiring officials who would actually complete the survey to ensure that the questions were easily understood and that there were no problems with the survey. Each interview lasted approximately one hour. The survey went through additional revisions based on the feedback received during the cognitive interviews, and then the final survey was finalized.

The survey was administered online by MDE in fall 2012. It was determined that STAR coordinators for each district would be the best recipients of the survey because they would be able to easily identify the best person with knowledge of district hiring decisions. A list of STAR coordinators for each district was obtained, and a pre-notification e-mail was sent out approximately one week prior to the survey being administered. The texts of the e-mails were tailored with each STAR coordinator's name by using a mail merge.

The online survey was created using Voveci. STAR coordinators received an e-mail approximately one week after the pre-notification e-mail that explained the purposes of the district survey and to whom the survey should be forwarded to. A unique username and password was given with the survey link in the e-mail. This allowed for the survey to be saved and accessed from multiple computers in case more than one person needed to complete the survey. Response rates were monitored daily, and weekly reminder e-mails were sent out to districts that had not yet responded.

The data collection procedures employed are those recommended by Dillman (2007) to ensure high response rates. First, MDE leaders sent an e-mail notification and invitation to participate in the survey. The initial e-mail described the survey and its purpose, emphasized the importance of their participation, ensured confidentiality of responses, and provided instructions on how to participate. Three follow-up e-mail messages were sent to the non-responding districts, and these e-mails emphasized the benefits of the survey and encouraging participation.

The sampling frame consisted of a list of 539 e-mail addresses for STAR representatives for public, charter, special and other districts in Minnesota. MDE sent e-mail invitations to take the online survey to all of these e-mail addresses. Completed surveys were obtained from 472 districts, for a response rate of 88 percent. Data about the economic development region, district type, and location for 585 districts were used to evaluate the representativeness of the districts for which there was a completed survey. Data were collected from 80 percent of all the districts that were on the sampling frame of e-mail addresses and/or the district data file (472

out of 591 total districts). Table 31 shows the percent distribution of districts by locale, district type, and region. The sample of districts for which data were collected was similar to all Minnesota districts in terms of these characteristics. However, public school districts are somewhat overrepresented, and charter and other types of districts are underrepresented in this survey. For instance, 58.0 percent of all Minnesota districts are independent public school districts, but 64.7 percent of the completed surveys were from these districts. See Table 31 for more details about the responding and non-responding districts.

Table 31. The Number and the Percentage of Minnesota Districts Participating and Not Participating in the Survey, by District and Regional Characteristics

District Characteristics	All Districts (*N* = 591)		Responding Districts (*N* = 470)		Non-responding Districts (*N* = 121)		Difference Between Responding Districts and All Districts
	#	%	#	%	#	%	
Locale							
City	95	16.1%	72	15.3%	23	19.0%	-0.8%
Rural	283	47.9%	231	49.1%	52	43.0%	1.3%
Suburb	75	12.7%	57	12.1%	18	14.9%	-0.6%
Town	123	20.8%	100	21.3%	23	19.0%	0.5%
District type							
Independent school districts	343	58.0%	304	64.7%	39	32.2%	6.6%
Charter	168	28.4%	122	26.0%	46	38.0%	-2.5%
Other	74	12.5%	38	8.1%	36	29.8%	4.4%
Region							
R1: Northwest	33	5.6%	26	5.5%	7	5.8%	0.1%
R2: Headwaters	18	3.0%	16	3.4%	2	1.7%	-0.4%
R3: Arrowhead	48	8.1%	40	8.5%	8	6.6%	-0.4%
R4: West Central	42	7.1%	35	7.4%	7	5.8%	-0.3%
R5: North Central	32	5.4%	25	5.3%	7	5.8%	0.1%
R6E: Southwest Central	18	3.0%	12	2.6%	6	5.0%	0.5%
R6W: Upper Minnesota Valley	15	2.5%	13	2.8%	2	1.7%	-0.2%
R7E: East Central	20	3.4%	17	3.6%	3	2.5%	-0.2%
R7W: Central	38	6.4%	28	6.0%	10	8.3%	0.5%
R8: Southwest	39	6.6%	28	6.0%	11	9.1%	0.6%
R9: South Central	43	7.3%	36	7.7%	7	5.8%	-0.4%
R10: Southeast	63	10.7%	49	10.4%	14	11.6%	0.2%
R11: Metro	176	29.8%	139	29.6%	37	30.6%	0.2%

Note. The details do not always sum to the totals because of missing information for small numbers of districts. Prepared from the MDE Teacher Supply-and-Demand District Survey, 2012.

Appendix B. Supply-and-Demand Survey for Districts

The survey is appended with response percent distributions.

Minnesota Department of Education

Supply and Demand Survey for Districts

Name of person completing survey	
Title of person completing survey	
Telephone	
E-mail address	
County	
District or charter school name	

Staff Shortages

1. How easy or difficult was it to fill vacancies for the 2011–12 and 2012–13 school years in each of the following areas? *Select one answer for each row.*

					N/A	
Arts	Easy	Somewhat difficult	Very difficult	Could not fill all vacancies*	No positions in this district	No vacancies for this position
Dance	2%	3%	2%	1%	68%	24%
Orchestra	2%	3%	1%	0%	66%	28%
Band	10%	10%	4%	0%	23%	53%
Music vocal	11%	11%	6%	1%	18%	53%
Theatre	4%	4%	3%	0%	53%	37%
Visual arts	13%	6%	4%	3%	26%	49%

*Or had to apply for special permission(s) to allow nonlicensed teacher(s) to teach this subject.

Special Education	Easy	Somewhat difficult	Very difficult	Could not fill all vacancies*	N/A	
					No positions in this district	No vacancies for this position
Academic and behavioral strategist **	4%	5%	3%	0%	58%	30%
Autism spectrum disorders	3%	13%	14%	3%	26%	41%
Blind or visually impaired	0%	4%	6%	2%	47%	41%
Career and technical with disabilities	0%	5%	5%	1%	46%	42%
Deaf or hard of hearing	2%	8%	4%	2%	39%	45%
Developmental/adapted physical education	9%	11%	7%	2%	21%	50%
Developmental disabilities	6%	21%	13%	2%	12%	46%
Emotional behavior disorders	8%	25%	22%	4%	4%	36%
Physical and health disabilities	2%	10%	6%	1%	24%	57%
Special education director	8%	7%	2%	1%	22%	60%
Speech-language pathologist	5%	12%	22%	9%	10%	42%
Special education early childhood	7%	14%	12%	2%	22%	44%
Specific learning disabilities	11%	26%	12%	3%	7%	41%

*Or had to apply for special permission(s) to allow nonlicensed teacher(s) to teach this subject.

**This is a newly established license. A teacher of special education, an academic and behavioral strategist is authorized to provide evaluation and specially designed instruction to eligible children and youth with disabilities, from kindergarten through age 21, who have a range of mild to moderate needs in the areas of academics, behavior, social, emotional, communication, and functional performance. These students come from the primary disability areas of autism spectrum disorders (ASD), developmental cognitive disability (DCD), emotional or behavioral disorders (EBD), other health disorders (OHD), and specific learning disabilities (SLD). This teacher is not prepared to serve needs beyond those that are moderate in these disability areas.

Early Childhood and Elementary Education	Easy	Somewhat difficult	Very difficult	Could not fill all vacancies*	N/A	
					No positions in this district	No vacancies for this position
Early childhood education	15%	15%	7%	1%	25%	38%
K–6 elementary	59%	10%	2%	<1%	15%	14%
K–8 world languages	4%	8%	5%	3%	42%	39%
Reading specialist/ interventionist (K–6)	14%	13%	4%	0%	33%	36%
Math specialist/interventionist (K–6)	10%	10%	4%	0%	44%	32%
Computer/keyboarding (K–6)	5%	6%	3%	3%	41%	44%
Bilingual/bicultural education (K–6)	1%	2%	2%	2%	63%	29%
Immersion education (K–6)	1%	2%	3%	1%	69%	25%
English as a second language (K–6)	6%	13%	7%	3%	41%	31%

*Or had to apply for special permission(s) to allow nonlicensed teacher(s) to teach this subject.

Middle Grade Levels	Easy	Somewhat difficult	Very difficult	Could not fill all vacancies*	N/A	
					No positions in this district	No vacancies for this position
5–8 communication arts and literature (English)	21%	12%	2%	0%	22%	43%
5–8 mathematics	14%	15%	8%	1%	20%	42%
5–8 science	11%	15%	8%	1%	21%	45%
5–8 social studies	19%	5%	1%	0%	21%	52%
Agriculture (middle-level)	1%	2%	3%	1%	59%	35%
Business (middle-level)	1%	3%	2%	1%	50%	43%
Family and consumer science (middle-level)	2%	4%	3%	2%	46%	44%
Reading specialist/ interventionist (middle-level)	5%	10%	3%	0%	45%	37%
Computer/keyboarding (middle-level)	2%	6%	2%	2%	37%	52%
Industrial arts (middle-level)	3%	5%	5%	1%	41%	46%
Bilingual/bicultural education (middle-level)	0%	2%	2%	0%	68%	26%
Immersion education (middle-level)	0%	1%	1%	1%	71%	25%
English as a second language (middle-level)	3%	8%	5%	2%	43%	38%

*Or had to apply for special permission(s) to allow nonlicensed teacher(s) to teach this subject.

High School Education	Easy	Somewhat difficult	Very difficult	Could not fill all vacancies*	N/A	
					No positions in this district	No vacancies for this position
Agriculture	2%	3%	5%	1%	51%	38%
Business	3%	7%	2%	1%	33%	55%
Chemistry	2%	11%	10%	2%	23%	52%
Communication arts and literature (English)	22%	11%	3%	1%	20%	43%
Earth and space science	4%	10%	5%	0%	25%	56%
Family and consumer science	3%	6%	3%	2%	38%	49%
Life sciences	7%	13%	5%	1%	20%	54%
Mathematics	10%	15%	11%	2%	20%	43%
Physics	1%	8%	10%	4%	24%	54%
Social studies	24%	5%	1%	1%	21%	48%
Reading specialist/ interventionist (high school)	3%	6%	3%	0%	53%	36%
Computer/keyboarding (high school)	3%	4%	1%	1%	37%	54%
Industrial arts	3%	5%	6%	2%	34%	50%
Bilingual/bicultural education(high school)	1%	2%	2%	0%	67%	28%
Immersion education(high school)	0%	0%	0%	0%	73%	26%
English as a second language(high school)	2%	7%	4%	3%	49%	34%

*Or had to apply for special permission(s) to allow nonlicensed teacher(s) to teach this subject.

Languages	Easy	Somewhat difficult	Very difficult	Could not fill all vacancies	N/A	
					No positions in this district	No vacancies for this position
American Sign Language	<1%	1%	3%	1%	76%	18%
Arabic	<1%	<1%	1%	<1%	84%	14%
Chinese	<1%	1%	3%	2%	80%	14%
French	1%	3%	1%	1%	72%	22%
German	1%	3%	1%	0%	70%	25%
Greek	0%	0%	0%	0%	85%	15%
Hebrew	0%	0%	0%	<1%	85%	14%
Italian	0%	0%	0%	0%	86%	14%
Japanese	<1%	<1%	<1%	<1%	84%	15%
Latin	0%	<1%	1%	0%	84%	15%
Norwegian	0%	0%	0%	0%	86%	14%
Ojibwa	<1%	<1%	1%	<1%	83%	16%
Polish	0%	0%	0%	0%	86%	14%
Russian	0%	<1%	0%	0%	85%	15%
Spanish	3%	10%	8%	4%	30%	44%
Swedish	0%	0%	0%	0%	86%	14%

*Or had to apply for special permission(s) to allow nonlicensed teacher(s) to teach this subject.

Related Education	Easy	Somewhat difficult	Very difficult	Could not fill all vacancies*	N/A	
					No positions in this district	No vacancies for this position
Adult basic education	4%	8%	2%	0%	54%	32%
Driver and traffic safety	3%	3%	3%	1%	52%	37%
Health	11%	10%	2%	1%	21%	56%
Library media specialist	6%	8%	4%	2%	31%	50%
Parent and family education	5%	10%	9%	4%	34%	37%
Physical education	28%	8%	2%	1%	11%	49%

*Or had to apply for special permission(s) to allow nonlicensed teacher(s) to teach this subject.

Career and Technical Education	Easy	Somewhat difficult	Very difficult	Could not fill all vacancies*	N/A: No positions in this district	N/A: No vacancies for this position
Communication technology careers	1%	2%	1%	0%	62%	33%
Construction careers	0%	2%	2%	0%	61%	35%
Creative design careers	0%	1%	1%	0%	73%	25%
Hospitality service careers	0%	1%	0%	0%	77%	21%
Manufacturing careers	0%	1%	1%	0%	71%	26%
Medical careers	0%	1%	2%	0%	73%	24%
Transportation careers	0%	1%	1%	0%	76%	22%

*Or had to apply for special permission(s) to allow nonlicensed teacher(s) to teach this subject.

Administrative	Easy	Somewhat difficult	Very difficult	Could not fill all vacancies	N/A: No positions in this district	N/A: No vacancies for this position
Community education director	2%	6%	2%	1%	35%	55%
Coordinator of work-based learning	1%	4%	2%	1%	54%	38%
Principal	17%	15%	3%	1%	10%	55%
Assistant principal	10%	7%	1%	0%	49%	33%
Superintendent	5%	9%	2%	0%	19%	65%
Assistant superintendent	0%	2%	0%	0%	70%	27%
Human resources director	3%	3%	<1%	0%	50%	44%
Athletic director	5%	6%	1%	0%	28%	60%
Finance director/manager	6%	6%	4%	0%	15%	69%

Licensed Support Staff	Easy	Somewhat difficult	Very difficult	Could not fill all vacancies*	N/A: No positions in this district	N/A: No vacancies for this position
School counselor	10%	10%	3%	1%	25%	50%
School nurse	4%	11%	11%	1%	24%	50%
School psychologist	4%	11%	9%	2%	24%	50%
School social worker	6%	13%	4%	0%	28%	49%

*Or had to apply for special permission(s) to allow nonlicensed person to fill a position.

Nonlicensed Support Staff	Easy	Somewhat difficult	Very difficult	Could not fill all vacancies	N/A: No positions in this district	N/A: No vacancies for this position
Assessment coordinator	6%	8%	2%	0%	39%	45%
Curriculum coordinator	5%	6%	1%	0%	46%	43%
Dean of students	10%	3%	1%	0%	53%	32%
Gifted and talented coordinator	3%	5%	2%	0%	55%	36%

Other Staff?	Easy	Somewhat difficult	Very difficult	Could not fill all vacancies*	N/A: No positions in this district	N/A: No vacancies for this position
Other, specify _____	○	○	○	○	○	○
Other, specify _____	○	○	○	○	○	○

*Or had to apply for special permission(s) to allow nonlicensed teacher(s) to teach this subject.

2. Was your district forced to reduce your existing teacher workforce* for the 2011–12 or 2012–13 academic years due to funding constraints (but not due to decreasing enrollment)?

*Include positions that were occupied by a teacher but were eliminated due to funding constraints (i.e., "reductions in force"). Do not include teacher positions that were eliminated due to decreasing enrollment or inability to find a qualified teacher.

Yes	25%
No	75%

[IF YES]

2a. What positions were targeted for reduction? *Please type subject areas in the box below.*

3. Did your district eliminate specific courses for the 2011–12 or 2012–13 academic years due to funding constraints (but not due to decreasing enrollment)?

Yes	13%
No	87%

[IF YES]

3a. In what subjects have you eliminated courses? *Please type answer in the box below.*

4. Has your district increased student-teacher ratios due to funding constraints (but not due to changes in enrollment) for the 2011–12 or 2012–13 academic years?

Yes	30%
No	70%

[IF YES]
4a. In what subjects have you increased the student-teacher ratio? *Please type answer in the box below.*

Future Staffing Needs

5. Next, consider your staffing needs for the <u>next five years</u>. In general, how easy or difficult do you think it will be for you to fill the vacancies in your district with applicants in each of the following fields or broad categories? *For staffing needs other than those listed below, please use the "Other" category and specify any other staffing needs you anticipate.*

					N/A	
	Easy	Somewhat difficult	Very difficult	Will not be able to fill all vacancies*	No positions in this district expected	No vacancies for this position expected
Art	19%	22%	14%	0%	15%	29%
Music	17%	22%	13%	1%	15%	32%
Special education	6%	31%	41%	5%	3%	14%
Early childhood	14%	24%	12%	2%	25%	24%
Elementary education	63%	12%	2%	<1%	15%	8%
Computer/keyboarding	9%	21%	10%	1%	27%	31%
Chemistry	3%	17%	28%	3%	20%	28%
Life sciences	9%	26%	16%	1%	15%	34%
Physical sciences	5%	22%	25%	1%	15%	32%
Mathematics	9%	24%	26%	1%	12%	28%
Communication arts and literature (English)	28%	22%	6%	1%	13%	30%
Social studies	38%	11%	2%	<1%	14%	35%
Spanish	6%	21%	18%	3%	25%	28%
A Chinese language	0%	2%	5%	3%	75%	14%
American Sign Language	0%	4%	6%	2%	72%	14%
Career and technical education	2%	15%	12%	2%	43%	26%
English as a second language	7%	15%	17%	2%	40%	20%
Immersion education	<1%	3%	5%	1%	77%	14%
Administrators (e.g., principals)	14%	40%	13%	0%	7%	26%
Licensed support staff	16%	37%	11%	<1%	13%	24%
Staff with multiple licenses	2%	24%	40%	3%	13%	18%
Other: Specify below	○	○	○	○	○	○
Other: Specify below		○	○	○	○	○

*Without applying for special permission(s) to allow nonlicensed teacher(s) to teach this subject.

6. If there are any other staff positions that you anticipate will be very difficult to fill over the next five years, please list them in the box below. Include any positions not listed above or not defined in sufficient specificity (e.g., a certain type of special education teacher).

7. <u>In the next five years</u>, how likely is it that your district will do the following?

	Not at all likely	Somewhat likely	Very likely	Don't know
Reduce your existing teacher workforce* due to funding constraints (but not due to decreasing enrollment)	23%	36%	24%	16%
Eliminate specific courses due to funding constraints (but not due to decreasing enrollment)	30%	36%	18%	16%
Increase student-teacher ratios due to funding constraints (but not due to changes in enrollment)	23%	41%	23%	14%
Open additional teaching positions (i.e., adding positions above and beyond replacements for those who retire, leave the district, or exit the profession)	50%	19%	11%	20%

*Include positions that were occupied by a teacher but will be eliminated due to funding constraints (i.e., "reductions in force"). Do not include teacher positions that will be eliminated due to decreasing enrollment or inability to find a qualified teacher.

Substitute Teachers

8. How much difficulty did your district have during the 2011–12 or 2012–13 academic years in securing substitute teachers? *Mark one response for each row.*

	Easy	Somewhat difficult	Very difficult
Short-term substitute	35%	43%	22%
Long-term substitute (>15 days)	25%	52%	24%

9. How much difficulty do you anticipate having to secure substitute teachers <u>in the next five years</u>? *Mark one response for each row.*

	Easy	Somewhat difficult	Very difficult
Short-term substitute	28%	46%	27%
Long-term substitute (>15 days)	20%	52%	27%

Barriers to Hiring **and Retaining** Effective Teachers

10. To what extent are the following factors barriers for your district in hiring and retaining effective teachers?

	Not a barrier	Small barrier	Large barrier
Hiring			
a. Teacher licensing standards	36%	37%	27%
b. Teacher testing requirements	34%	39%	27%
c. Federal "Highly Qualified" requirements	39%	45%	16%
Retaining			
a. Teacher licensing standards	59%	29%	13%
b. Teacher testing requirements	59%	28%	14%
c. Federal "Highly Qualified" requirements	57%	35%	9%

11. Tell us in the space below other factors that are barriers for your district in hiring and retaining effective teachers. *Please type answer in the boxes below.*

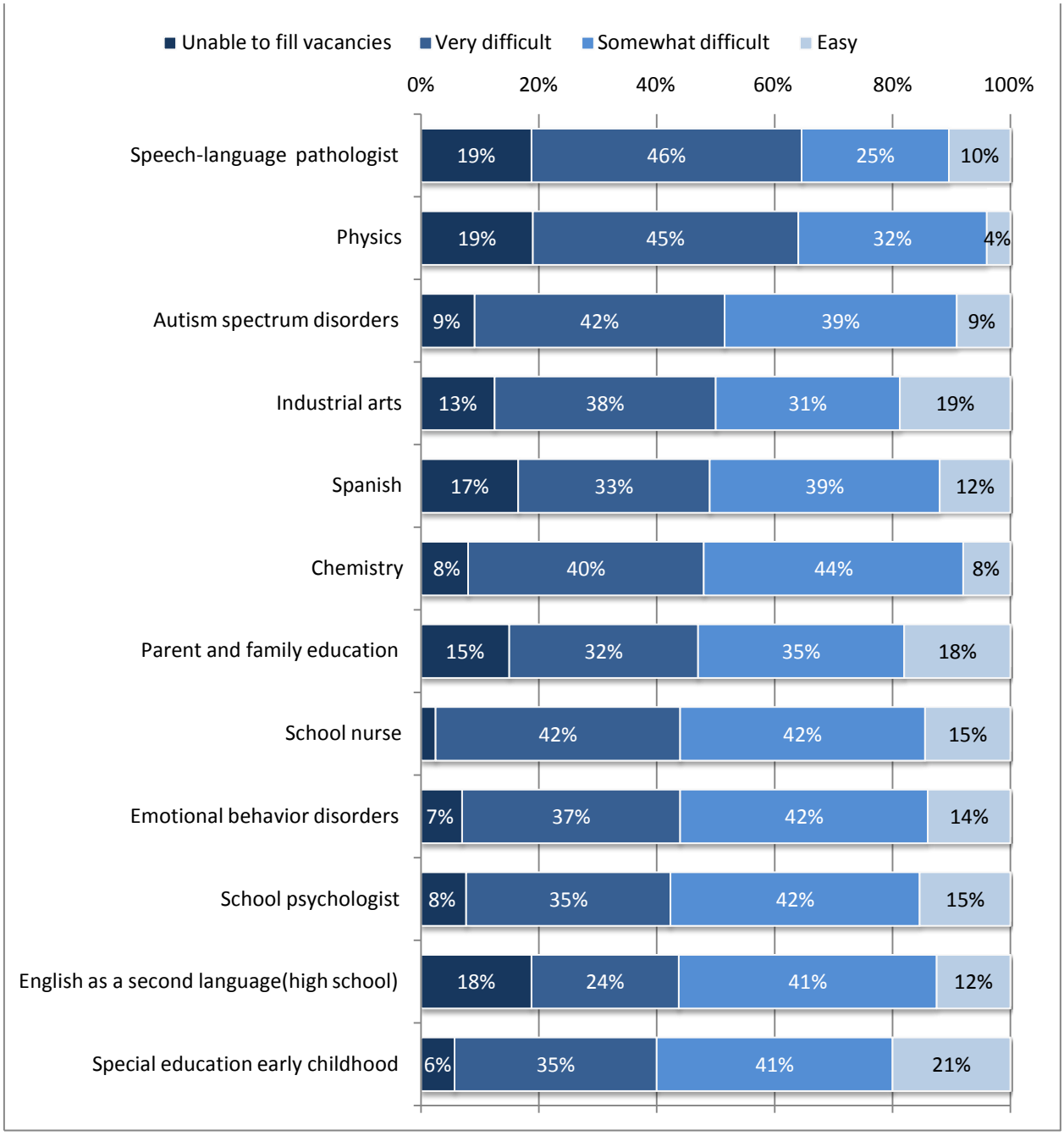
Other factors that are barriers for hiring

Other factors that are barriers for retaining

12. When hiring effective teachers, what important qualifications do you find lacking in teacher applicants? *Please tell us those qualifications by typing them in the box below.*

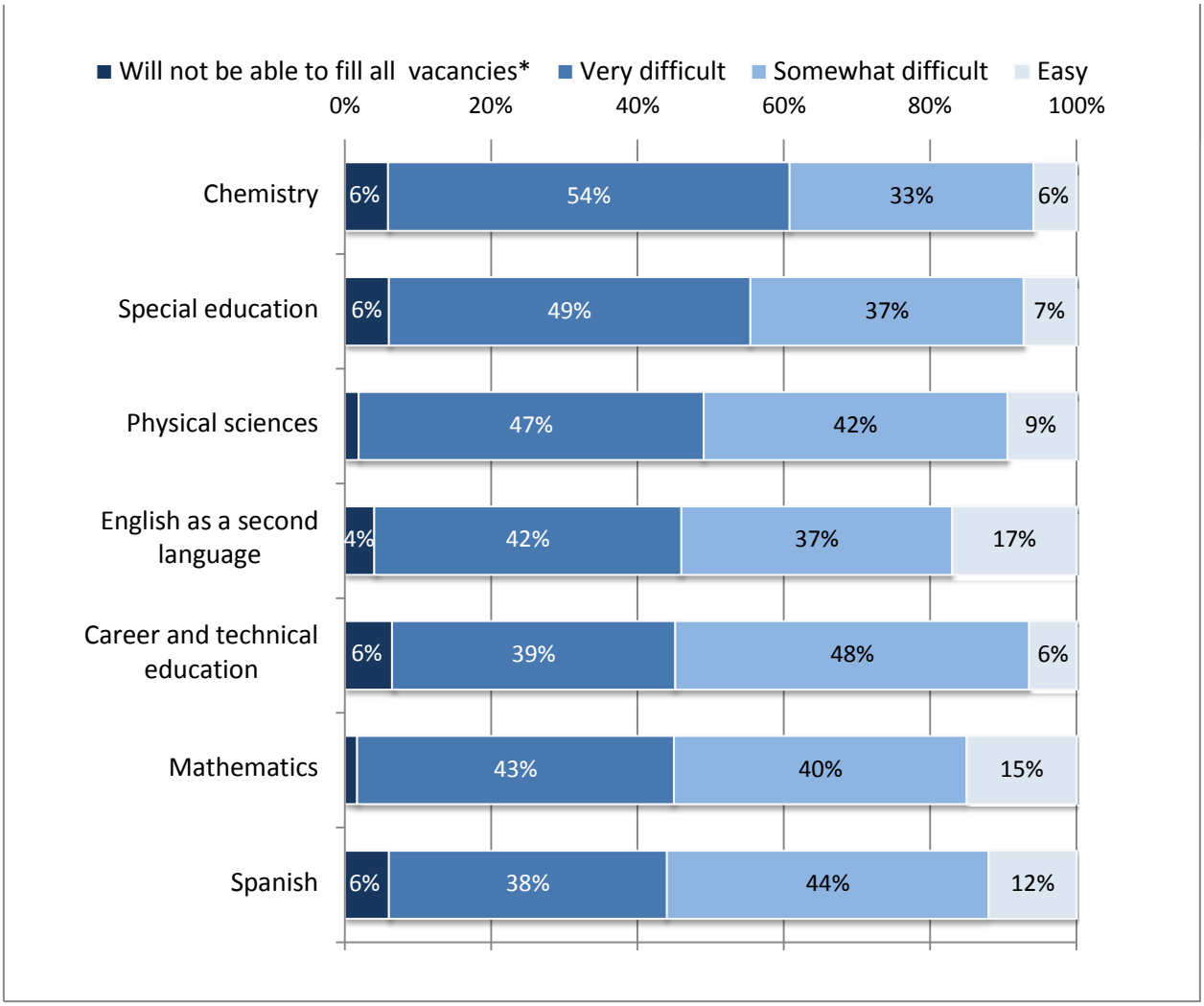
Thank you for participating. You or someone else in your district can revisit the survey to fill in any missing sections. This can be done from any computer as long as the same log-in information is used.

Figure 24. Level of Difficulty in Hiring Teachers During the Last Two Years, Based on Responses of Those That Had Vacancies, Rank Ordered From the Most Difficult to the Least Difficult



Note. The findings in this figure represent the difficulty in obtaining teachers among districts that had actual vacancies in these fields. Licensure fields in which fewer than 15 percent of the districts reported having vacancies were removed from the analysis.

Figure 25. Expected Level of Difficulty in Hiring Teachers Within the Next Five Years, Based on Responses of Districts That Expect to Have Vacancies, Rank Ordered From the Most Difficult to the Least Difficult



Note. The licensure areas presented here are those in which at least 15 percent of the districts expected openings in the next five years. Three licensure areas were omitted based on the 15 percent criteria: the number of schools expecting to hire in that area and the percentages of those schools were as follows: (1) A Chinese language (79 percent of 52 districts), (2) American sign language (65 percent of 66 districts), and Immersion education (61 percent of 42 districts). Districts also responded to staff with multiple licenses, for which 62 percent of 326 districts responded that it would be very difficult or that they expect to be unable to find qualified candidates.

Appendix C. Methodology for the 2012 Teacher Supply-and-Demand Study Survey for Representatives of Teacher Preparation Institutions

Survey research experts and teacher and supply and demand experts affiliated with the U.S. Department of Education's Regional Educational Laboratory Midwest (REL Midwest)[28] assisted MDE in designing an online survey to capture information directly from representatives of the 29 MACTE institutions. MACTE officials were consulted to refine the wording of the questionnaire items.

The online survey was created using Voveci. MACTE representatives received an e-mail approximately one week after a pre-notification e-mail that explained the purposes of the survey. A unique username and password was given with the survey link in the e-mail. This allowed for the survey to be saved and accessed from multiple computers in case more than one person needed to complete the survey. Response rates were monitored daily and weekly reminder emails were sent out to MACTE representatives who had not yet responded.

Surveys were completed by 25 of these institutions, for a response rate of 86 percent. A copy of this survey, along with the percent distributions of responses for all items on the survey and a complete listing of all text answers, is in Appendix D.

[28] More information about REL Midwest can be found at http://www.relmidwest.org.

Appendix D. 2012 Teacher Supply-and-Demand Study Survey for Representatives of Teacher Preparation Institutions

The following survey items focus on the extent to which market forces affect your institution's decisions about recruitment, admissions, preparation, and placement of teacher candidates. For each item, indicate the degree to which you agree or disagree. The survey is appended with response percent distributions and all of the survey responses.

A. Recruitment and Admissions

	Disagree	Tend to Disagree	Tend to Agree	Agree
1. My institution seeks out potential candidates interested in teaching in state-identified shortage areas.	8%	12%	56%	24%
2. The faculty and non-faculty advisors in my institution counsel potential teacher candidates toward teaching fields in which more teaching positions are available.	4%	8%	52%	36%
3. My teacher preparation institution makes a concerted effort to recruit teacher candidates from racial or ethnic minority groups into our programs.	0%	4%	29%	67%
4. My institution adjusts admissions criteria based on demand for teachers in various licensure fields.	71%	21%	8%	0%
5. Criteria for admission into my teacher preparation institution are less challenging for those seeking to teach in state-identified areas of shortage.	92%	8%	0%	0%

B. Student Teaching Placements

	Disagree	Tend to Disagree	Tend to Agree	Agree
6. My institution is able to place teacher candidates into student teaching positions in nearby schools.	0%	0%	36%	64%
7. Local schools are not offering student teaching opportunities for candidates in state-identified areas of teacher shortage.	38%	29%	33%	0%
8. My institution has difficulty finding student teaching opportunities for candidates in some areas.	4%	40%	32%	24%

8a. If you answered "Agree" or "Tend to Agree" to Item 8, for which teaching areas (licensure areas) do you have the most difficulty finding placements?

- Secondary Sciences are difficult to find student teaching placements for.
- We are a fairly small district and we have to be very careful about saturating the schools with student teachers. No specific area.
- Secondary sciences (especially Earth Science), English as a Second Language, World Languages
- ESL, Science, Math, World Languages

- Spanish, Music, French
- ESL, secondary science
- We have the most difficulty finding music and physical education placements. However, due to the benefits that Bush grant institutions can offer their cooperating teachers, we find that many local schools are opting to work primarily with Bush grant institutions. This is one of the reasons we have difficulty making placements.
- Secondary music, world languages
- Special Education placements can be difficult to find.
- Social Studies, Special Education
- World Language—Elementary Level, English as a Second Language, Social Studies
- It is frequently difficult to find placements in elementary world languages.
- Communication Arts/Literature (secondary), Social Studies (secondary), and Elementary with Middle School Spanish.
- Social Studies
- It is especially difficult to find placements for special education, early childhood-special education, and languages.
- Spanish, French, science placements, and some mid-level placements due to restricted range (7th and 8th).

C. Job Placements for Program Completers

	Disagree	Tend to Disagree	Tend to Agree	Agree
9. Program completers from my institution are able to find positions within Minnesota schools.	0%	12%	72%	16%
10. Program completers in some teacher licensure areas are experiencing difficulty in finding teaching positions.	4%	32%	60%	4%

10a. If you answered “Agree” or “Tend to Agree” to Item 10, for which licensure areas is there the least demand for teachers?

All answers are included here.

- K–12 Art, PE, Music, 5–12 Health
- Areas such as music or social studies are difficult. Elementary ed is of course hard due to so many el ed programs in the state. We are just sustaining what we have in that area, and are moving to focus on need areas.
- Elementary education is still more difficult. Most candidates with strong records find jobs eventually and we encourage that they apply for substitute positions and look at charter schools as well as district schools.
- Elementary education
- Secondary social studies positions are the most difficult for our graduates to secure, as are some elementary placements, as there is a lot of competition for these positions.
- Secondary music

- Elementary Education, Physical Education, Social Studies
- Elementary; 5–12 social studies
- Elementary Education; Social Studies Education
- Physical Education, Secondary Social Sciences
- Secondary social studies
- Social Studies
- Elementary education and secondary social studies are areas that are difficult for students to find positions in MN. However, high quality candidates do get hired and schools appreciate having the opportunity to select from among high quality applicants.
- Secondary social studies, Elementary Education
- Elementary; 5–12 Social Studies; 5–12 Comm Arts & Lit, PE
- Elementary Education

11. Are there institutional or public policy-related factors you believe present challenges for your institution's capacity to prepare teachers in teacher shortage areas over the next 10 years? Examples might include a shortage of faculty, testing requirements for licensure, program accountability expectations, the need for scholarships, resource constraints, public support, etc. If yes, please describe.

All answers are included here organized by topic.

Testing

- Testing requirements for second language learners; increasing demands for more testing of licensure candidates
- Students are having difficulty with MTLE basic skills tests. This did not seem to be the case with the PPST (why did we change?) Secondary students are having problems with the math section (the non-math licensure students) and students of color are having difficulty on all sections. The cut-off scores for many/most content tests are 1 SD above the 'norm'. However, since we are encouraged/required to accept only the 'best and brightest students' into our programs in the first place, and these are the tested students—one SD above norm actually narrows the candidate pool even more! In my opinion, we are losing excellent candidates due to skewed testing requirements.
- The testing requirements have been a challenge, particularly in world languages.
- Testing requirements for licensure
- The testing requirements for the MTLE in some areas such as: Spanish, Middle Level Mathematics and Middle Level Social Studies. These testing requirements are limiting some of our students from obtaining licensure.
- Testing requirements for licensure
- Students who come to the institution under-prepared have a difficult time with MTLE.
- Testing requirements; The MTLE basic skills test is also causes problems for some candidates.
- Testing requirements are a roadblock. The MTLE are poor measures of our candidates' knowledge and skills.
- MTLE Testing limits the access of well qualified candidates in some fields. We have experienced many issues related to MTLE testing. The following are a few examples. Candidates for whom English is not a first language find the timing on the exams to be very challenging. As a result, we are losing some excellent teacher candidates who come from under-represented populations due to the testing issues. Similarly, some candidates are unable to complete the testing requirements successfully due to the on-screen reading requirements in a timed setting. The cost associated with all of the testing (Basic Skills,

Pedagogy, and Content) is discouraging some excellent candidates from pursuing teacher preparation.

- We are trying to recruit local students of Hmong, Somali, and Hispanic ethnicity, but the MTLE testing situation makes it very difficult for them to pass the basic skills tests.
- Yes, MTLEs present a challenge in high demand areas. The MTLE cut scores are difficult for some of our students to meet. We rarely had difficulty with passing in the content areas when our students took the PRAXIS. In addition, this year we have had several candidates drop out of our program and suggest that they would rather obtain a license in an "easier" way via Teach for America or other alternative licensure program.
- MTLE tests are presenting major challenges for some students and especially students of color and English Language learners. This makes it difficult to recruit them. The cost for licensure exams is escalating while teaching salaries are not.
- Admitting candidates with stronger academic preparation in order to successfully progress through teacher education programs, and successfully pass MTLE.
- Need resources to assist students in preparation for MTLE—especially basic skills
- Testing requirements are a factor. Our program and our candidates expect to meet rigorous standards, but we do expect them to be fair, relevant, and affordable. There does seem to be a lack of public support, and it is puzzling. Standards go up, and MN programs and candidates work to meet them. The typical response that follows is a statement that the standards still must be too low. Makes no sense and is unfair and disrespectful to candidates and programs.
- Testing: The MN tests for entering teaching have changed in the past 3 years and the new exams (the MTLE) have created scenarios where people who have demonstrated a strong ability to teach are being kept out of teaching careers based on a multiple choice exam. Also, efforts to diversify the teaching force in MN are being hindered by the disproportionate pass rates on the MTLE exams among candidates of color and candidates whose native language is not English.
- Testing continues to be an issue

Cost to become a teacher/need for scholarships

- Incentives for students in mathematics or science fields would be a wonderful place to start. Some kind of paid fellowships or internships in math and science fields or specific scholarships other than TEACH grants would be very welcome.
- Many students cannot afford to quit working to do student teaching and the only financial aid available is loans.
- The need for scholarships challenges our capacity to prepare teachers in teacher shortage areas. We especially note the need for scholarship support as we recruit underrepresented individuals.
- More scholarship opportunities for these students (Hmong, Somali, and Hispanic), along with candidates for Math, Chemistry, Special Ed, etc. would help to increase the opportunity for students interested in these areas to be able to attend college. With the funding now at nearly 70% tuition/30% state, compared with 68% state/32% tuition in the past, it is becoming harder than ever for low income students to pursue a 4 yr. degree for a field that doesn't pay well in the end.
- Need for scholarships without a required pay-back. Strong math and science majors do not choose teaching as they are able to receive much higher salaries in other professions.
- Scholarships and other forms of financial incentives would definitely be helpful in attracting students for high demand areas.
- Costs of higher education (Scholarships): The increasing costs of higher education at both the undergraduate and the graduate level are eliminating some potential candidates from pursuing a higher ed degree, and some of those potential degree-seekers are future teachers. This is especially hard-hitting in immigrant communities.
- Resource constraints are a consideration in offering more programs in shortage areas. Scholarships would be helpful so that increased enrollments could motivate more programs.
- Scholarship for underrepresented population
- Need for scholarships or loan forgiveness for teachers in shortage areas.

- cost of licensure program and program requirements (many courses and field experiences/student teaching) makes it difficult for some students/career transitions
- The overall cost of preparing to be a teacher in Minnesota has increased in recent years and continues to be a discouraging factor to potential candidates.

Resources needed to comply with accountability/data reporting requirements

- Staffing demands for reporting and data requirements, TPA requirements for in-house assessment, the cost of licensure testing (MTLE and soon TPA) and data management. Small private colleges have a large burden with these demands and passing on fees to students makes the teacher education program less attractive.
- Program accountability measures have grown in recent years. The increased demands for data reporting have resulted in institutional investments in additional personnel and assessment data systems. This is a large cost for institutions and limits the capacity of an institution to respond to the needs of the state since new programs demand such a high level of investment. In the current economy, costs are always critical factors to be considered by institutions as they add programs.
- We have enjoyed a long lasting reputation of quality teacher preparation based in our mission (which is grounded in preparing teachers and leaders for improving society). Policy related factors that present challenges to our programs include compliance oriented accountability measures, misunderstanding of knowledge structures assessment (testing requirements), and fragmented lists of rules/standards (for instance, we would like to move forward on the new InTASC standards, but find ourselves devoting resources to maintaining the current standards structure). Accountability needs to be balanced with reasonable autonomy of quality programs and room for innovation.
- Accountability may be the second major factor. Accountability is needed, but the amount and detail of reporting required by teachers and by teacher education programs appears to exceed what should be needed for quality control. This effort reduces the resources available for teacher preparation and for teaching.

Low teacher salaries

- Low starting salaries in math/science compared to the corporate sector
- Teacher salaries: While teacher salaries in MN are competitive nationally, it is difficult to convince families that investing in a college degree will be handsomely rewarded with a career in teaching. This is especially true among immigrant families who have very big dreams for their children who achieve a high education degree and for graduates in the mathematics and science fields where starting salaries in industry far exceed starting salaries in teaching.
- Also, salaries for teachers in shortage areas are not competitive with industries that employ graduates in sciences, mathematics, etc. Therefore candidates are not interested in teaching as a profession because they can make better salaries elsewhere (IBM, Mayo, etc.)

Faculty shortages/resources for faculty

- We have limited resources for faculty with the proper credentials in need area in content area departments. I am working hard to change that, but it takes time and unified effort.
- Shortage of faculty
- It is difficult to find qualified faculty with both teaching experience at specific grade levels (5–8 for middles school endorsement or 9–12 for secondary with no overlap allowed) and who are academically trained in field specific graduate studies (i.e.: master's or terminal degree in literature vs. English education) as rule is currently interpreted by BOT.
- Most of the above! Funding cuts have resulted in a shortage of faculty.

Public support for teaching profession

- Many factors present challenges in preparing teachers in shortage areas and the examples listed identify many of these. My perception is that the #1 factor is that teaching is not socially respected so it is hard to attract high quality candidates from disciplines that have other career opportunities. MDE can help promote teaching as a valued profession.

- Public Support: The media coverage about teaching seems to have created a public discourse that describes teachers the source of the achievement gap, as people who care more about protecting their jobs than doing right by children, as an underachieving group of college graduate who are not qualified for their job. This discourse has created a job market that is not attracting people into the field of teaching. People are led to believe that the low-salaried, high accountability job is not a career for them, unless they can "drop in" to it for a short term service activity (like a Peace Corps term of two-years and then out). Legislative / Policy discourse: legislators and business leaders in our community have contributed to the public discourse of distrusting teachers and calling for the "best and the brightest" to replace the tired and ineffective. Morale among teachers is at an all-time low, and potential teachers are being steered away from teaching as a career. The "best and the brightest" are not attracted to a profession that they see being pilloried. Policies supporting alternative routes into are attempting to attract people to teaching, but then create a mindset that anyone can teach with limited preparation and that all you have to do is "serve" for two years and then move on. This short-term approach to creating a teaching workforce that is effective will potentially backfire in the long-run by creating a revolving door of lesser experienced teachers.

Other comments

- The current trend of "value added" to tie preparation to student success...what other profession does this...
- We are a program that will consistently have small numbers, but we do have physics and chemistry candidates very few years. However, if the new program review process expects us to have at least ten completers over four–six years, we may not be able to meet this expectation. Having small numbers in small programs may present challenges for our institutions' ability to prepare teachers in these fields, but small numbers does not automatically imply that a program is not up to par.
- Need resources for "weaker" students to take fewer credits per semester to gain the knowledge and skills to become successful and effective teachers.
- Can't find licensed teachers to put people with
- Lack of candidate interests in teaching in general
- Small colleges are also competing for student teaching placements with the large public universities with grant money that are pushing new formats (co-teaching).

12. Please use the space below to offer comments on this survey or insights on teacher supply and demand in Minnesota, including suggestions for policies or programs that might improve recruiting, admission and preparation of teacher candidates in shortage areas.

All answers are included here organized by topic.

Financial incentives/scholarships/loan forgiveness

- The ability to have loan forgiveness programs for candidates preparing for teacher shortage areas would be helpful. A state-supported loan reduction program for all candidates at all institutions would encourage more individuals to seek teaching licenses in these challenge areas.
- Provide higher funding for low income students going into teaching in the high needs areas (at the state level). Provide scholarships for minority students entering high needs fields.
- State incentives for newly prepared teachers in highest need areas would be helpful. Financial incentives for universities coupled with increased accountability would enable additional programs and increased recruitment.

Change testing requirements

- I would also strongly encourage a change with using the MTLE basic skills exam as a licensing requirement. Investing more interest and focus on performance assessments such as edTPA will help us establish a pool of prepared educators.

- Something must be done about the MTLE. The exams are poorly written and do a terrible job measuring the important aspects of teaching.
- There seems to be duplication between the MTLE Pedagogy exam and the new edTPA required of all student teachers. We would strongly recommend requiring the edTPA and dropping the requirements for MTLE Pedagogy testing. This would help with the burden of testing time and costs for candidates.
- Revise the MTLE cut scores to where Pearson and the teaching panels recommended them.
- We need to change our system for preparing and licensing teachers to an assets model where there are multiple opportunities and pathways for demonstrating competencies instead of a 'gotcha' model where we use multiple strategies for demonstrating an individual cannot be a teacher.
- Rethink approaches to teacher testing to ensure that all candidates have an equal opportunity to succeed.

Better communication about shortage areas

- There needs to be clarity and accuracy about what and where shortage areas actually are.
- Shortage areas are traditionally defined by subject area/ licensure area. Questions shortage areas should begin to account for teachers who want to and are prepared to teach in urban schools with highly diverse populations and in rural areas where multiple licenses and a diverse work portfolio is needed for each teacher in the school. Thus, shortage areas need to be geographically defined as well as by licensure area.
- It would be helpful to receive reports and other current information MDE may have on teacher and school leader supply and demand. IHE and MDE could also benefit from joint efforts of recruiting.

STEM programs/licenses

- We are trying to recruit students into math and science out of traditional math/ science majors and to offer the option of a transition from undergrad to graduate course work. If MACTE and MDE could work together to perhaps create a condensed licensure option in these areas, where MSEPTS could be offered in intensive type courses or categorized in new ways, that might help in the development of more creative and attractive program development. And the paid fellowship idea as I indicated above could really help. And this needs to be meaningful money—like a like a $15,000 or $20,000 paid internship in a school for a year during which licensure coursework would be taught—basically a residency model.
- For math and science there needs to be more efforts early on in a college student's STEM preparation to engage them in "trying on teaching" through summer programs; working with Lego Robotic as mentors; service learning with STEM teachers. These early experiences are powerful and can refocus a college student on what they might really love to do. There needs to be more alternative programs for "filling in the areas to meet the MSEP's" for working adults that would like to transition to STEM teaching....they have to be available when they can come to the classes and their needs to be a financial bridge for STEM candidates to move through student teaching. Lastly, for student from under-represented minority groups to move into STEM teaching there needs to be a combination of financial support, pre-college feeder programs and summer STEM experiences to engage more middle and high schoolers to pursue STEM...it can't be just one program...you have to think through and offer a comprehensive program to increase numbers of teachers of color.

Enhance respect for the teaching profession

- Our shared work as leaders in Minnesota might benefit from a renewed investment in the honoring, respect, and investment in the public servants and leaders that accept the responsibility of being a teacher. As we work together to build professional capital so we can serve the full potential and capacity of the next generation, in edifying the profession we will attract talented candidates. Respect by the greater community and professional authority in enlivening workplaces will build the profession and the communities in which the next generation of teachers will serve.

- Our candidates are well aware of the national dialogue and critique of teachers and teacher preparation. It is not an attractive climate. Candidates who might otherwise consider a career in teaching are looking at alternative preparation and/or entering another profession.

Preparation/recruitment before college

- Candidates need good preparation in content areas before college and to have guidance counseling to take higher levels of math and science throughout high school. Elementary teachers should have content majors as well as education coursework.
- Recruiting needs to begin in middle school—at least. It may be possible to identify students who might be interested in, and good at, teaching.

Simplify accountability requirements

- Reign in the BOT—the level of detail and resources needed to complete program reviews/accreditation is approaching the ridiculous, and even they don't have the manpower to keep up with their own expectations.

Licensing

- MN's specialized licensing structure creates an illusion of high need areas in some cases. MN has very rigorous teacher licensing requirements, as it should. However, in the secondary sciences, it becomes difficulty for rural school districts to hire teachers who hold multiple science licenses (as each science is a different license—chemistry, physics, biology, earth science). To offer one section of physics in a small, rural high school requires that teacher to hold a physics teaching license—in order to teach one class of physics.

Compensation for cooperating teachers (for student teachers)

- MN should consider a state-wide model for compensating cooperating teachers at a rate that would raise the status of mentoring young professionals into teaching. Currently, compensation rates are locally negotiated and are a token amount that does not nearly cover the professional time spent coaching and mentoring for a 10 plus week period.

Teacher salaries

- Differentiated salary schedules.

Other comments/general

- Smaller programs at small colleges might do well to combine efforts with other colleges.
- There is a growing lack of interest in teaching positions in general. Expense, program requirements, and testing discourage candidates. Then the lack of public support and escalating expectations assault candidates who actually become teachers—even in shortage areas.
- Program accountability expectations, testing requirements for licensure
- Policy considerations in MN need to take into consideration whether we have a science shortage problem in the sciences, or if we have a distribution of talent issue, or if we have low population with diverse needs issue.
- MN's specialized licensing structure creates an illusion of high need areas in some cases. MN has very rigorous teacher licensing requirements, as it should. However, in the secondary sciences, it becomes difficulty for rural school districts to hire teachers who hold multiple science licenses (as each science is a different license—chemistry, physics, biology, earth science). To offer one section of physics in a small, rural high school requires that teacher to hold a physics teaching license—in order to teach one class of physics.

Thank you for providing input to the Minnesota Department of Education!

Appendix E. Teacher Preparation Program Completers (All Licensure Areas)

Table 32. Teacher Preparation Program Completers—All Licensure Areas: 2007 to 2011

License Area	2007	2008	2009	2010	2011
Adult Basic Education—Adult	13	13	22	25	17
Agricultural Education 5–12	4	8	8	14	8
Bilingual/Bicultural Education K–12	16	0	5	5	0
Business 5–12	57	44	21	27	14
Career and Technical Education Accommodation Specialists for Students w/ Disabilities	8	1	2	0	0
Chemistry, 9–12 (without 5–8 General Science)	41	31	39	19	33
Communication Arts/Lit 5–8 specialty	9	9	12	6	16
Communication Arts/Literature 5–12	200	207	225	219	187
Dance and Theatre Arts K–12	9	1	1	1	0
Dance K–12	0	0	1	2	0
Driver and Traffic Safety 9–12	0	0	0	19	0
Early Childhood Education Birth–Gr. 3	209	260	215	303	261
Earth and Space Science, 9–12 (without 5–8 General Science)	16	11	17	15	12
Elem K–6	0	0	0	97	198
Elem K–6 with Communication Arts/Lit 5–8 specialty [old license]	363	383	404	295	292
Elem K–6 with Math 5–8 specialty [old license]	233	229	258	240	190
Elem K–6 with Prekindergarten specialty	208	282	249	272	265
Elem K–6 with Science 5–8 specialty [old license]	140	137	155	115	90
Elem K–6 with Social Studies 5–8 specialty [old license]	324	277	255	256	156
Elem K–6 with World Language & Cultures—French K–8 specialty [old license]	7	7	9	6	2
Elem K–6 with World Language & Cultures—German K–8 specialty [old license]	0	0	3	0	0
Elem K–6 with World Language & Cultures—Latin K–8 specialty [old license]	0	0	0	0	0
Elem K–6 with World Language & Cultures—Norwegian K–8 specialty [old license]	0	0	0	0	0
Elem K–6 with World Language & Cultures—Ojibwe K–8 Specialty [old license]	4	0	1	0	0
Elem K–6 with World Language & Cultures—Russian K–8 specialty [old license]	0	0	0	0	0
Elem K–6 with World Language & Cultures—Spanish K–8 specialty [old license]	35	26	34	15	8
English as a Second Language K–12	168	89	184	179	63
Family and Consumer Sciences 5–12	15	17	23	15	12
Health 5–12	63	88	88	94	117

License Area	2007	2008	2009	2010	2011
Instrumental and Classroom Music K–12	81	71	61	59	75
Keyboarding for Computer Applications K–8	18	12	30	22	2
Kindergarten	23	26	13	31	35
Library Media Specialist K–12	44	51	54	25	14
Life Science, 9–12 (without 5–8 General Science)	116	66	90	106	70
Math 5–8 specialty	16	9	24	5	19
Mathematics 5–12	143	131	143	110	133
Parent and Family Education—Adult	4	8	29	20	13
Physical Education K–12	136	142	154	126	132
Physics, 9–12 (without 5–8 General Science)	18	14	14	20	10
Prekindergarten specialty	1	4	18	11	36
Reading K–12	212	36	194	198	172
Science—General 5–8	125	98	51	87	66
Science 5–8 specialty	16	7	23	7	2
Social Studies 5–12	261	285	289	249	214
Social Studies 5–8 specialty	0	3	9	2	21
Special Education: Blind or Visually Impaired Birth–12	0	0	0	0	1
Special Education: Deaf or Hard of Hearing Birth–12	22	9	13	12	13
Special Education: Developmental Adapted Physical Education PreK–12	25	21	47	38	19
Special Education: Developmental Disabilities K–12	74	133	140	114	95
Special Education: Early Childhood Birth–Age 6	36	99	91	67	82
Special Education: Emotional Behavioral Disorders K–12	197	203	230	252	166
Special Education: Learning Disabilities K–12	195	217	264	324	205
Special Education: Physical and Health Disabilities PreK–12	6	9	13	4	0
Teacher/Coordinator Work-Based Learning 5–12	11	10	13	2	12
Teachers of Communication and Technology Careers	1	1	2	2	1
Teachers of Construction Careers	2	1	2	3	1
Teachers of Creative Design Careers	1	0	1	0	1
Teachers of Early Childhood Careers	0	0	0	0	0
Teachers of Hospitality Service Careers	0	0	0	0	2
Teachers of Manufacturing Careers	1	2	1	0	0
Teachers of Medical Careers	3	0	0	0	0
Teachers of Transportation Careers	0	2	0	2	1
Technology 5–12	22	9	20	12	10
Theater Arts K–12	0	5	4	2	1
Visual Arts K–12	105	83	93	69	68
Vocal and Classroom Music K–12	58	56	61	30	59
World Lang & Cultures Am Sign Lang & Deaf Culture K–12	0	0	0	0	0
World Lang Classical Languages (Greek and Latin) K–12	0	0	1	0	1
World Language & Cultures—French K–8 specialty	0	1	0	1	4
World Language & Cultures—German K–8 specialty	0	0	1	0	0
World Language & Cultures—Latin K–8 specialty	0	0	0	0	0

License Area	2007	2008	2009	2010	2011
World Language & Cultures—Norwegian K–8 specialty	0	0	0	0	0
World Language & Cultures—Ojibwe K–8 Specialty	0	0	0	0	0
World Language & Cultures—Russian K–8 specialty	0	0	0	0	0
World Language & Cultures—Spanish K–8 specialty	2	2	0	1	21
World Languages and Cultures Arabic K–12	0	0	0	2	0
World Languages and Cultures Chinese K–12	1	0	1	11	4
World Languages and Cultures French K–12	21	13	14	5	12
World Languages and Cultures German K–12	4	6	7	6	2
World Languages and Cultures Hebrew K–12	0	0	0	0	0
World Languages and Cultures Italian K–12	0	0	0	0	0
World Languages and Cultures Japanese K–12	1	3	1	1	1
World Languages and Cultures Norwegian K–12	0	0	0	0	0
World Languages and Cultures Ojibwe K-12	0	0	0	0	0
World Languages and Cultures Polish K–12	0	0	0	0	0
World Languages and Cultures Russian K–12	0	0	0	0	0
World Languages and Cultures Spanish K–12	57	60	66	57	53
World Languages and Cultures Swedish K–12	2	0	0	0	0
Total Completers per Year	4,203	4,028	4,513	4,334	3,790

Note. Prepared from MACTE files on program completers.

Appendix F. Birth Patterns Involved in Making GPR-Based Enrollment Forecasts

Long-range forecasts using GPRs require analysts to examine population patterns. Specific trends that need to be examined include the following:

- The numbers of births in the last five years,
- The birth rate—sometimes called the fertility rate—representing the numbers of births occurring among women of childbearing age
    - The numbers of women ages 15–44 (considered childbearing years).
    - The numbers of females ages 10–39 who will be of childbearing age in five years.
    - The numbers of females ages 5–34 who will be of childbearing age in 10 years.

The GPR model was run 15 times: once for the entire state of Minnesota, once for projecting white students only, and once for each of the 13 economic development regions. No forecast models were run focusing on students and women of color in Minnesota because the numbers of those populations were insufficient for producing a reliable forecast model.

The following sections discuss the types of population data needed for GPR-based forecast models, sources for the population data, the calculations that go into making forecasts, and current population trends related to these forecasts.

Numbers of Births

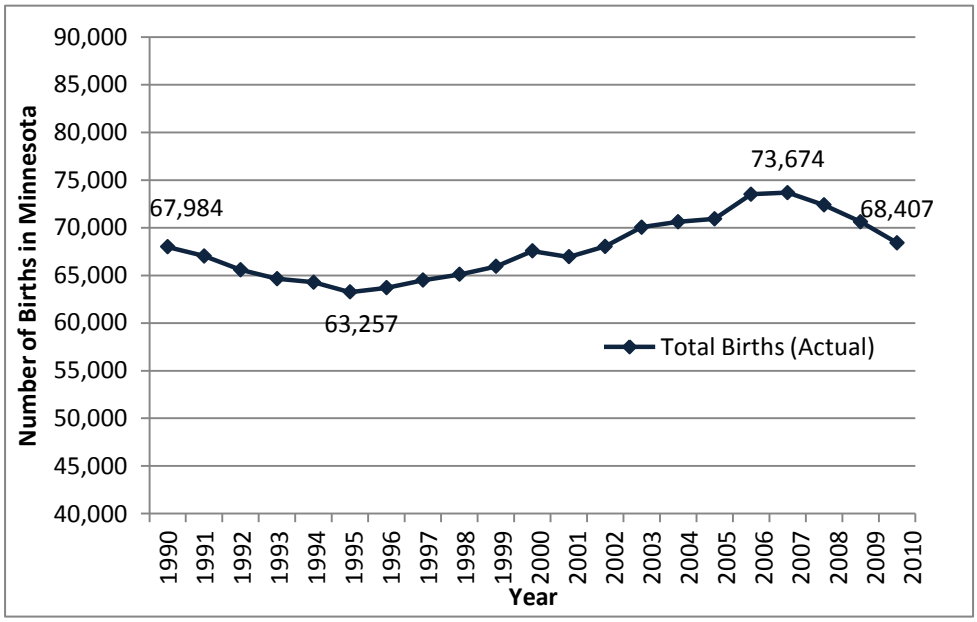
Data on the numbers of births are used to make three-year projections, and these data can be obtained from public access databases on the website maintained by MCHS (Minnesota Department of Health).[29] The numbers of births, in general and by the race of the mother, are available for consecutive years between 2002 and 2010. Data for years not available on MCHS's website were obtained from the *Minnesota Health Statistics Annual Summaries* (which can be found on another page of MCHS's website. Data for the years before 1996 were obtained through an inquiry to MCHS's helpdesk.

The annual birth trends for Minnesota are reflected in Figure 26 (page 98). The figure shows a 16 percent increase in births between 1995 and 2007, with the statewide annual numbers of births peaking at 73,674. For the following three years, the numbers of births decreased again to 68,407 (a 7.7 percent decrease).

The numbers of births are necessary for determining the likely number of kindergarten students five years in the future. Forecasts of kindergarten students are derived by multiplying the numbers of children born in a given year by the *birth–K* progression ratio. Forecasts of kindergarten cohorts four or more years in the future become more complicated as a result of time lags in the availability of official data on live births (or natality) within the state. Therefore, forecasters need to estimate the numbers of births likely to occur during a calendar year.

[29] Tables containing birth data for the years 1996, 1998, 2000, and 2002–2010 by county can be found on the website of the Minnesota Department of Health at http://www.health.state.mn.us/divs/chs/countytables/index.htm. For the missing years, 1997, 1999, and 2001, county level birth data came from the *Minnesota Health Statistics Annual Summa*ry, which can be found at http://www.health.state.mn.us/divs/chs/annsum/index.htm.

Figure 26. The Numbers of Children Born in Minnesota: 1990–2010



Note. Prepared from data from MCHS.

Numbers of Women Between 15 and 44

The number of likely births in a given year is predicted based on two other estimates:

- The numbers of female Minnesotans between the ages of 15 and 44 (considered the reproductive years) during the birth year (i.e., five years prior to the year of the kindergarten cohort in the forecast year).
- The fertility rate (the numbers of births for each 1,000 women between 15 and 44 years of age; explained in the next section).

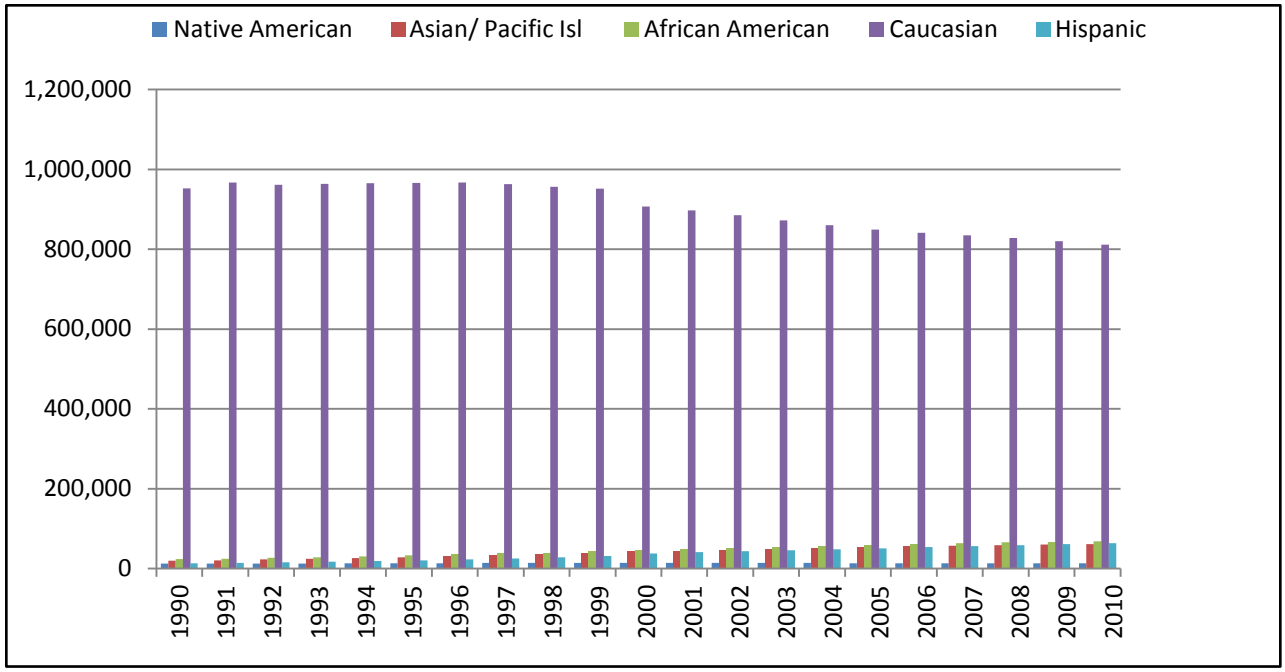
Population estimates were obtained from data files available on the U.S. Census Bureau's website.[30] The tables and the interactive tools on the Census Bureau's website show the annual estimates of the female population by racial group, ethnicity, county and state, and age group (and by all of these demographic factors combined). Separate population estimates are provided for each of 18 five-year age groups. By looking at the numbers of females in the 5–9, 10–14, 15–19, 20–24, 25–29, 30–34, 35–39 groupings, one can get an initial figure of the numbers of females who will be 15–44 in the year for which the birth forecast is being made.

The numbers of Minnesota women ages 15–44 between the years 1990 and 2010 are portrayed in Figure 27 (page 99). The figure shows that the total numbers of women within this age group ranged from 1,027,034 in 1990 to 1,083,916 in 2000. The numbers of Caucasian females within this age range have decreased by 10.5 percent between 2000 and 2010. Meanwhile, the numbers of females of racial and ethnic groups have increased 9 percent, 196 percent, 221

[30] Population estimates by age, sex, race and year for the 1990s and 2000s can be accessed from the following website: http://www.census.gov/popest/data/historical/index.html. The state and county links within these pages were used for state and county estimates.

percent, and 399 percent for Native American, African- American, Asian and Pacific Islanders, and Hispanic populations, respectively.[31]

Figure 27. The Numbers of Minnesota Females Ages 15–44



Note. Prepared from intercensal population estimates from the U.S. Census Bureau.

The process for forecasting the numbers of females in this 15–44 age range during the birth year also is complicated by time lags in the publication of population estimates. Estimation is therefore based on the number of females ages *10–39 five years prior* to the birth year (or 10 years prior to year in which these children will enter kindergarten). Ten-year forecasts also integrate the numbers of 5–35-year-olds 10 years prior to the birth year. Should historical data indicate a consistent disparity between estimates and actual numbers five to 10 years in the future (i.e., estimates consistently greater than or less than actual numbers, based on average percent errors), then multiplying these estimates by some factor representing these average disparities may yield improved forecasts.

In the case of forecasting the numbers of female Minnesotans in this age range, an analysis of historical data indicated that using the same cohort five years prior led to persistent *underestimates.* Adjusting the numbers of females ages 10–39 five years prior to the birth year by 1.87 percent yielded improved forecasts.[32] Enrollment forecasts to the years 2017 and 2022 therefore used this adjustment factor for determining the numbers of fertile women during birth years (see Table 33).

[31] To be consistent with earlier reports on teacher supply and demand in Minnesota, race/ethnicity is considered to be the same construct. That is, an individual can be placed into only one category (along with the category of other/multiple racial groups). The U.S. Census Bureau, MCHS, and the Minnesota State Demographic Center currently consider race and ethnicity as two separate constructs, allowing individuals to be given a value for both. Most Hispanics in Minnesota group align themselves with the Caucasian racial group.

[32] Ten-year forecasts of women ages 15–44 during birth years also used the numbers of females ages 5–35, 10 years prior to the birth year. Using a similar process of examining errors between predicted values and actual values, an adjustment factor of 5.6 percent was applied. Estimates using this adjustment factor improved from 5.6 percent to 0.9 percent.

Table 33. Discrepancies in Five-Year Predictions of Females Ages 15–44

a. Year forecast made (Year *x*)	b. Number of 10–39- year-old females in Year *x*	c. Year for which forecast is made (Year *x* + 5)	d. Number of 15-44 year old females during Year *x* + 5	v c
1990	1,027,326	1995	1,047,560	
1991	1,030,426	1996	1,052,888	
1992	1,032,606	1997	1,054,372	
1993	1,037,968	1998	1,053,665	
1994	1,040,287	1999	1,054,543	
1995	1,042,070	2000	1,083,916	
1996	1,043,654	2001	1,086,587	
1997	1,042,215	2002	1,084,036	
1998	1,039,416	2003	1,079,356	
1999	1,039,259	2004	1,074,722	
2000	1,062,830	2005	1,069,949	
2001	1,061,581	2006	1,065,989	
2002	1,058,021	2007	1,062,063	
2003	1,052,468	2008	1,056,396	
2004	1,047,619	2009	1,050,519	
2005	1,044,006	2010	1,045,685	
Average Percent Error	-1.87%		-0.03%	
(Mean Absolute Percent Error)	1.87%		1.18%	

Note. Adapted from intercensal estimates from a website maintained by the U.S. Census Bureau, Population Division. Calculations are by MDE.

Fertility Rates

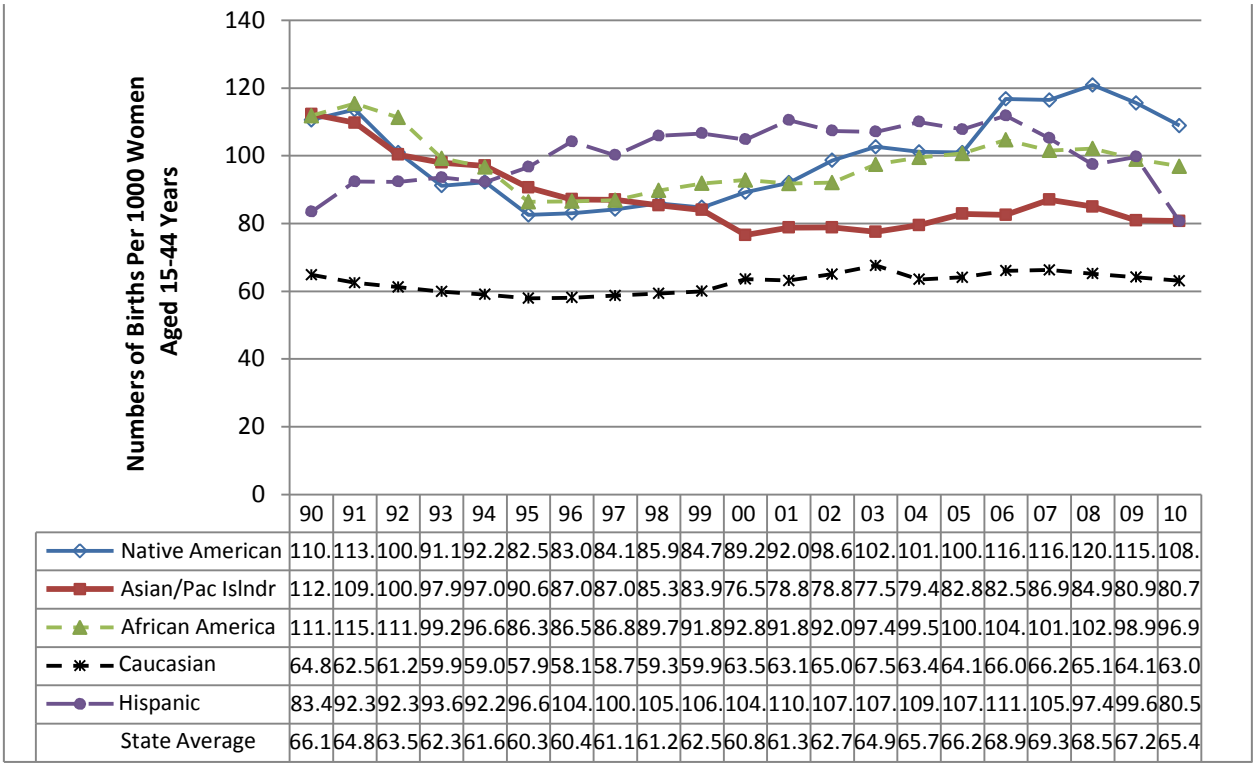
Fertility rate is defined as the number of births that occur for every 1,000 females between the ages of 15 and 44.[33] This statistic then represents a combination of the two statistics previously described—the numbers of births and the numbers of women between 15 and 44 years old.

[33] This definition is consistent with definitions currently used by MCHS, the National Center for Health Statistics (part of the Centers for Disease Control and Prevention), and the U.S. Census Bureau. Fertility rate is distinct from two similar statistics that are often reported with natality data: pregnancy rate (the numbers of pregnancies occurring per 1,000 women ages 15–44) and birth rate (the numbers of births per 1,000 population). However, the definition of fertility rate used here differs from the definition of fertility rate often used in research: the number of children that a woman is expected to have over the course of her lifetime. This latter definition has little relevance to the process of forecasting public school enrollments.

The sources for birth data and data on the populations of women between 15 and 44 years old have already been presented. Because of slight changes in the definitions of fertility rate from year to year, the forecasts presented in this report are based on analysts' own calculations of fertility rate, not the figures presented annually by MCHS and the National Center for Health Statistics.

Fertility rates were calculated for Minnesota as a whole, for the various race/ethnic groups, and for the 87 Minnesota counties (which were then aggregated for each economic development region). The statewide fertility rates are presented in Figure 28. Statewide, the overall fertility rate statistics show that the Caucasian birth rates first decreased from 64.8 to 57.9 between 1990 and 1995, then increased to a peak of 67.5 in 2003, and oscillated since then in the 63 to 66 range.

Figure 28. Fertility Rates in Minnesota from 1990 to 2010



	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10
Native American	110.	113.	100.	91.1	92.2	82.5	83.0	84.1	85.9	84.7	89.2	92.0	98.6	102.	101.	100.	116.	116.	120.	115.	108.
Asian/Pac Islndr	112.	109.	100.	97.9	97.0	90.6	87.0	87.0	85.3	83.9	76.5	78.8	78.8	77.5	79.4	82.8	82.5	86.9	84.9	80.9	80.7
African America	111.	115.	111.	99.2	96.6	86.3	86.5	86.8	89.7	91.8	92.8	91.8	92.0	97.4	99.5	100.	104.	101.	102.	98.9	96.9
Caucasian	64.8	62.5	61.2	59.9	59.0	57.9	58.1	58.7	59.3	59.9	63.5	63.1	65.0	67.5	63.4	64.1	66.0	66.2	65.1	64.1	63.0
Hispanic	83.4	92.3	92.3	93.6	92.2	96.6	104.	100.	105.	106.	104.	110.	107.	107.	109.	107.	111.	105.	97.4	99.6	80.5
State Average	66.1	64.8	63.5	62.3	61.6	60.3	60.4	61.1	61.2	62.5	60.8	61.3	62.7	64.9	65.7	66.2	68.9	69.3	68.5	67.2	65.4

Note. Prepared from population statistics from the U.S. Census Bureau's intercensal estimates. The numbers of births are found on the MCHS website.

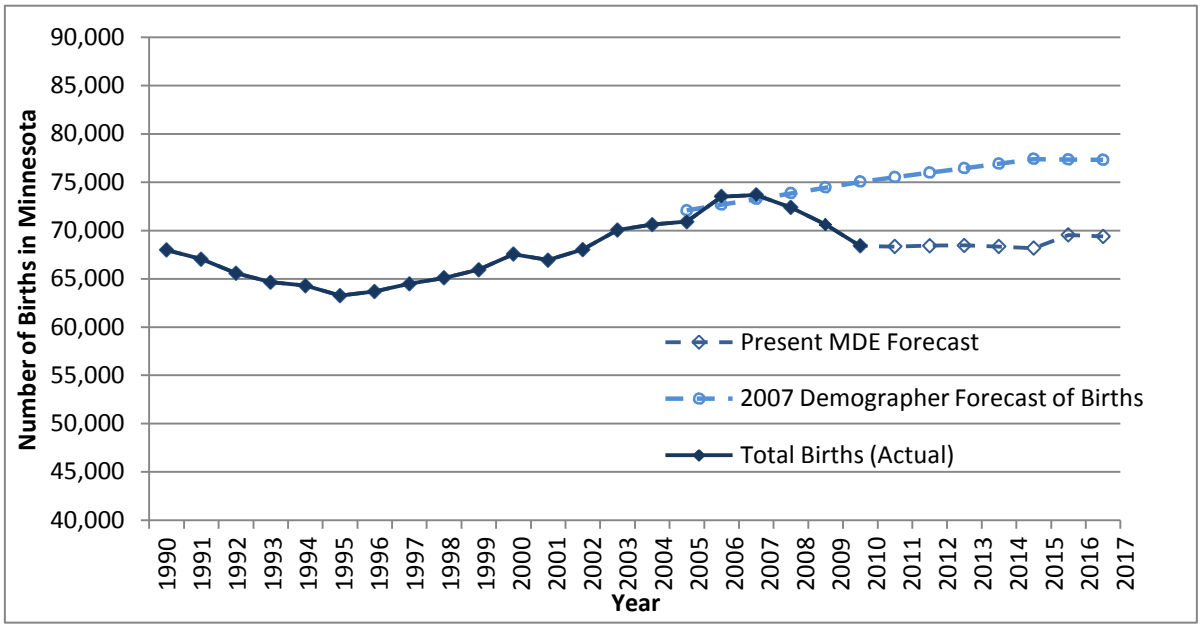
Consistent with fertility rates at the national level, Minnesota's fertility rates show higher numbers of births among racial and ethnic minority groups. These higher fertility rates among non-Caucasian populations, combined with the gradually increasing numbers of nonwhite females between 15 and 44 and gradually decreasing numbers of Caucasian females in that same age group suggest that children born in Minnesota will continue to be more diverse.

Summary

The process of making enrollment forecasts requires at least other estimates: (1) the numbers of births in recent years and (2) the numbers of women ages 15–44 for the birth year (or an estimate of the size of that group of females). Analysts can use the most recent birth rates and

multiply those rates by the estimated numbers of women between 15 and 44 for a given birth year. These estimates of the numbers of births for a given year then become part of the GPR calculations, given that these children will become kindergarteners in five years. Using the just-described process for determining the future numbers of births, it can be expected that annual numbers of births will increase only slightly—by a rate of 1.4 percent. By 2017—the year of birth for children who will enter kindergarten in 2022—the expected number of births is 69,393 (Figure 29).

Figure 29. The Projected Numbers of Births Through 2017



Appendix G. Tests of Forecast Models

To determine which forecast model to use for this teacher supply-and-demand study, a series of forecast models was created and tested. These models included the following:

1. Simply using the mean score from the previous year as the basis of forecast.
2. Growth models based on percentage increase/decrease from year to year.
3. Model based on growth progression ratios, or the numbers of children born in a given year, the percentage of those children who enter kindergarten, and the percentage of students who progress from grade to grade each year.
4. A series of regression models, including the following:
    a. Forecast enrollment = enrollment during year of prediction + annual growth rate in projections
    b. Forecast enrollment = enrollment during year of prediction + percent difference in cohorts of children from year to year. This second term represents the following:
        - The percent difference between the cohort currently ages 5–18 and the cohort ages 2–15 (for three-year forecasts),
        - The percent difference between the cohort currently ages 5–18 and the cohort ages 0–13 (for five-year forecasts)
        - The percent difference between the cohort currently ages 5–18 and the group of those likely to be born in five years (i.e., the number of women ages 10–39 × fertility rate) and present 8-year-olds.
    c. Forecast enrollment = enrollment during year of prediction + growth rate in the last three years weighted by recency.
    d. Forecast enrollment = best of models 4a, 4b, and 4c, plus the number of housing starts during previous three years (an indicator of economic functioning).
    e. Forecast enrollment = best of models 4a, 4b, and 4c, plus the net job growth during the three previous years (an indicator of economic functioning).

Analyses involving each of these models were conducted for the 87 Minnesota counties and again for the 13 economic development regions. Only models 1–3 were tested at the state level. Bias and accuracy were examined for each model by calculating the average percent errors (APEs) and mean absolute percent errors (MAPEs). The former statistic helps to determine whether models produce biased forecasts (i.e., whether the forecasts are consistently above or below the actual value). MAPEs are used as indicators of the magnitude of discrepancy between forecast values and actual values. These statistics were calculated as follows:[34]

[34] APE is usually calculated with (actual value – forecast value)/actual value. The terms in the numerator were reversed so that negative numbers would reflect underestimates and positive numbers would reflect overestimates.

The results of the tests of forecast models are presented in Table 34.

Table 34. Estimates of Bias and Accuracy for Eight Models of Enrollment Forecasts

Level of Aggregation	Period	Error Statistic	Method 1	Method 2	Method 3	Method 4a	Method 4b	Method 4c	Method 4d	Method 4e
County Estimates	3 yr	APE	2.44%	9.50%	0.56%	-2.81%	-2.61%	-2.89%	-2.85%	-2.93%
		MAPE	5.49%	16.34%	3.00%	8.14%	8.08%	6.38%	8.57%	8.14%
	5 yr	APE	5.03%	17.21%	1.70%	-4.01%	-4.06%	-4.42%	-4.23%	-4.05%
		MAPE	8.74%	27.71%	4.32%	13.63%	13.37%	10.10%	13.71%	13.32%
	10 yr	APE	12.45%	39.15%	4.10%	-3.39%	-4.52%	-5.46%	-4.10%	-4.34%
		MAPE	17.36%	58.37%	8.10%	27.04%	25.87%	19.00%	27.14%	22.88%
Economic Develop-ment Region	3 yr	APE	1.76%	6.92%	-0.14%	-0.91%	-1.21%	-0.64%	-0.51%	-0.93%
		MAPE	3.97%	12.05%	1.61%	2.86%	2.97%	2.29%	2.40%	2.84%
	5 yr	APE	3.77%	12.58%	0.19%	-1.37%	-1.87%	-0.90%	-0.81%	-1.55%
		MAPE	6.36%	20.63%	2.59%	4.74%	4.90%	3.64%	4.07%	4.79%
	10yr	APE	9.35%	28.13%	-0.86%	-2.00%	-2.93%	-0.82%	-1.46%	-2.59%
		MAPE	12.93%	43.48%	5.26%	9.26%	9.46%	6.00%	8.53%	8.75%
State	3 yr	APE	-0.90%	-3.76%	-0.47%	—	—	—	—	—
		MAPE	1.89%	3.76%	0.78%	—	—	—	—	—
	5 yr	APE	-0.87%	-5.51%	-0.11%	—	—	—	—	—
		MAPE	2.53%	5.51%	1.33%	—	—	—	—	—
	10 yr	APE	-0.46%	-9.78%	-0.85%	—	—	—	—	—
		MAPE	2.87%	9.78%	3.95%	—	—	—	—	—

Note. Prepared from MDE tests of accuracy of forecast models using public school enrollment data (MARSS) from the 1992–93 school year to the 2011–12 school year.

The model that produced the most accurate forecasts at the county, region, and state levels is model 3, the one that relies on GPRs to examine the numbers of children progressing through the academic grades. APEs for this model appear to be balanced around 0, suggesting that the model does not produce biased forecasts. MAPEs ranged from 0.78 percent to 8.10 percent.

Appendix H. Counts of Variances and Limited Licenses Granted by Year and Subject Area

2012		
SUBJECT AREA	**COUNT**	**PERCENT**
EMOTIONAL BEHAVIOR DISORDERS	294	12.8665
LEARNING DISABILITIES	265	11.5974
ELEMENTARY EDUCATION	204	8.9278
DEVELOPMENTAL DISABILITIES	145	6.3457
EARLY CHILDHOOD SPECIAL EDUCATION	91	3.9825
ENGLISH AS A SECOND LANGUAGE	86	3.7637
COMMUNICATION ARTS/LITERATURE	83	3.6324
MATHEMATICS	78	3.4136
SCHOOL PSYCHOLOGIST	66	2.8884
SPANISH	64	2.8009
READING	62	2.7133
SCIENCE 5–8	53	2.3195
PHYSICS	50	2.1882
DEVELOPMENTAL/ADAPTED PHYSICAL ED.	45	1.9694
CHEMISTRY	43	1.8818
TEACHER/COORDINATOR WORK BASED LRNG	43	1.8818
HEALTH EDUCATION	41	1.7943
PARENT AND FAMILY EDUCATION	38	1.663
SOCIAL STUDIES -ALL-	38	1.663
VISUAL ARTS	32	1.4004
SPEECH-LANGUAGE PATHOLOGIST	31	1.3567
PHYSICAL EDUCATION	30	1.3129
LIBRARY MEDIA SPECIALIST	25	1.0941
AMERICAN SIGN LANGUAGE	24	1.0503
VOCAL AND CLASSROOM MUSIC	22	0.9628
COMPUTER KEYBOARDING AND TECHNOLOGY	21	0.919
LIFE SCIENCES	21	0.919
PHYSICAL AND HEALTH DISABILITIES	19	0.8315
KEYBOARDING FOR COMPUTER APPL	17	0.744
EARLY CHILDHOOD EDUCATION	16	0.7002
TECHNOLOGY	16	0.7002
BUSINESS	15	0.6565
THEATRE ARTS	15	0.6565
CHINESE	14	0.6127
DANCE	14	0.6127
DEAF OR HARD OF HEARING	14	0.6127
FAMILY AND CONSUMER SCIENCES	14	0.6127
MEDICAL CAREERS	14	0.6127

SUBJECT AREA	COUNT	PERCENT
INSTR(BAND/ORCH) AND CLASSROOM MUSIC	12	0.5252
COMMUNICATIONS TECHNOLOGY CAREERS	11	0.4814
CONSTRUCTION CAREERS	10	0.4376
COUNSELOR OR TEACHING INTERN	10	0.4376
EARTH AND SPACE SCIENCE	10	0.4376
TRANSPORTATION CAREERS	10	0.4376
MANUFACTURING CAREERS	8	0.3501
AGRICULTURAL EDUCATION	5	0.2188
AGRICULTURE PRODUCTION/FARM MGMT	5	0.2188
BLIND OR VISUALLY IMPAIRED	5	0.2188
SCHOOL COUNSELOR	5	0.2188
FRENCH	4	0.1751
SCHOOL SOCIAL WORKER	4	0.1751
LATIN	3	0.1313
PRE-PRIMARY	3	0.1313
GERMAN	2	0.0875
HMONG	2	0.0875
HOSPITALITY SERVICE CAREERS	2	0.0875
JAPANESE	2	0.0875
ADULT BASIC EDUCATION	1	0.0438
AGRICULTURE (NON VOCATIONAL)	1	0.0438
ARABIC	1	0.0438
BILINGUAL/BICULTURAL EDUCATION	1	0.0438
CAREER ACCOMMODATION SPECIALIST	1	0.0438
CLASSROOM MUSIC	1	0.0438
CREATIVE DESIGN CAREERS	1	0.0438
DANCE AND THEATRE	1	0.0438
VOCATIONAL AGRICULTURE	1	0.0438

2011

SUBJECT AREA	COUNT	PERCENT
LEARNING DISABILITIES	290	12.6527
EMOTIONAL BEHAVIOR DISORDERS	278	12.1291
ELEMENTARY EDUCATION	194	8.4642
DEVELOPMENTAL DISABILITIES	177	7.7225
EARLY CHILDHOOD SPECIAL EDUCATION	94	4.1012
MATHEMATICS	88	3.8394
READING	82	3.5777
SPANISH	78	3.4031
ENGLISH AS A SECOND LANGUAGE	76	3.3159

SUBJECT AREA	COUNT	PERCENT
COMMUNICATION ARTS/LITERATURE	59	2.5742
SCHOOL PSYCHOLOGIST	53	2.3124
CHEMISTRY	48	2.0942
SCIENCE 5–8	45	1.9634
DEVELOPMENTAL/ADAPTED PHYSICAL ED.	38	1.6579
PHYSICS	37	1.6143
PARENT AND FAMILY EDUCATION	36	1.5707
HEALTH EDUCATION	35	1.5271
TEACHER/COORDINATOR WORK BASED LRNG	34	1.4834
LIBRARY MEDIA SPECIALIST	32	1.3962
KEYBOARDING FOR COMPUTER APPL	30	1.3089
PHYSICAL EDUCATION	29	1.2653
SOCIAL STUDIES -ALL-	29	1.2653
LIFE SCIENCES	24	1.0471
SPEECH-LANGUAGE PATHOLOGIST	24	1.0471
AMERICAN SIGN LANGUAGE	22	0.9599
THEATRE ARTS	22	0.9599
VOCAL AND CLASSROOM MUSIC	21	0.9162
BUSINESS	20	0.8726
FAMILY AND CONSUMER SCIENCES	19	0.829
VISUAL ARTS	19	0.829
MEDICAL CAREERS	17	0.7417
TRANSPORTATION CAREERS	17	0.7417
DANCE	16	0.6981
COMMUNICATIONS TECHNOLOGY CAREERS	15	0.6545
CONSTRUCTION CAREERS	15	0.6545
EARTH AND SPACE SCIENCE	15	0.6545
PRE-PRIMARY	15	0.6545
EARLY CHILDHOOD EDUCATION	14	0.6108
PHYSICAL AND HEALTH DISABILITIES	13	0.5672
TECHNOLOGY	13	0.5672
MANUFACTURING CAREERS	12	0.5236
AGRICULTURAL EDUCATION	9	0.3927
AGRICULTURE PRODUCTION/FARM MGMT	9	0.3927
BLIND OR VISUALLY IMPAIRED	8	0.349
DEAF OR HARD OF HEARING	8	0.349
INSTR(BAND/ORCH) AND CLASSROOM MUSIC	8	0.349
CHINESE	7	0.3054
BILINGUAL/BICULTURAL EDUCATION	6	0.2618
COUNSELOR OR TEACHING INTERN	6	0.2618
SCHOOL COUNSELOR	6	0.2618
JAPANESE	5	0.2182

SUBJECT AREA	COUNT	PERCENT
ORAL/AURAL DEAF EDUCATION	5	0.2182
FRENCH	3	0.1309
CLASSROOM MUSIC	2	0.0873
COMPUTER KEYBOARDING AND TECHNOLOGY	2	0.0873
DANCE AND THEATRE	2	0.0873
HOSPITALITY SERVICE CAREERS	2	0.0873
KINDERGARTEN	2	0.0873
LATIN	2	0.0873
ADULT BASIC EDUCATION	1	0.0436
CAREER ACCOMMODATION SPECIALIST	1	0.0436
CREATIVE DESIGN CAREERS	1	0.0436
EARLY CHILDHOOD CAREERS	1	0.0436
SCHOOL SOCIAL WORKER	1	0.0436

2010

SUBJECT AREA	COUNT	PERCENT
LEARNING DISABILITIES	287	12.2076
EMOTIONAL BEHAVIOR DISORDERS	271	11.527
ELEMENTARY EDUCATION	175	7.4436
DEVELOPMENTAL DISABILITIES	173	7.3586
MATHEMATICS	115	4.8915
READING	97	4.1259
EARLY CHILDHOOD SPECIAL EDUCATION	95	4.0408
SPANISH	86	3.658
COMMUNICATION ARTS/LITERATURE	70	2.9775
ENGLISH AS A SECOND LANGUAGE	66	2.8073
SCIENCE 5–8	62	2.6372
HEALTH EDUCATION	49	2.0842
DEVELOPMENTAL/ADAPTED PHYSICAL ED.	48	2.0417
CHEMISTRY	45	1.9141
SCHOOL PSYCHOLOGIST	44	1.8715
KEYBOARDING FOR COMPUTER APPL	43	1.829
PHYSICS	39	1.6589
PARENT AND FAMILY EDUCATION	38	1.6163
LIFE SCIENCES	33	1.4037
SOCIAL STUDIES -ALL-	33	1.4037
LIBRARY MEDIA SPECIALIST	31	1.3186
SPEECH-LANGUAGE PATHOLOGIST	31	1.3186
BUSINESS	26	1.1059
TEACHER/COORDINATOR WORK BASED LRNG	24	1.0208
AMERICAN SIGN LANGUAGE	22	0.9358

SUBJECT AREA	COUNT	PERCENT
COMMUNICATIONS TECHNOLOGY CAREERS	22	0.9358
VISUAL ARTS	21	0.8932
PHYSICAL EDUCATION	20	0.8507
MEDICAL CAREERS	19	0.8082
EARLY CHILDHOOD EDUCATION	18	0.7656
EARTH AND SPACE SCIENCE	18	0.7656
FAMILY AND CONSUMER SCIENCES	18	0.7656
THEATRE ARTS	16	0.6806
TRANSPORTATION CAREERS	16	0.6806
VOCAL AND CLASSROOM MUSIC	14	0.5955
CONSTRUCTION CAREERS	13	0.553
CHINESE	12	0.5104
INSTR(BAND/ORCH) AND CLASSROOM MUSIC	12	0.5104
COUNSELOR OR TEACHING INTERN	11	0.4679
DANCE	11	0.4679
DEAF OR HARD OF HEARING	11	0.4679
PHYSICAL AND HEALTH DISABILITIES	11	0.4679
PRE-PRIMARY	11	0.4679
TECHNOLOGY	11	0.4679
BLIND OR VISUALLY IMPAIRED	10	0.4254
MANUFACTURING CAREERS	9	0.3828
FRENCH	6	0.2552
GERMAN	5	0.2127
SCHOOL COUNSELOR	5	0.2127
ORAL/AURAL DEAF EDUCATION	4	0.1701
BILINGUAL/BICULTURAL EDUCATION	3	0.1276
AGRICULTURAL EDUCATION	2	0.0851
AGRICULTURE PRODUCTION/FARM MGMT	2	0.0851
ARABIC	2	0.0851
CAREER ACCOMMODATION SPECIALIST	2	0.0851
DANCE AND THEATRE	2	0.0851
HOSPITALITY SERVICE CAREERS	2	0.0851
JAPANESE	2	0.0851
LATIN	2	0.0851
SCHOOL SOCIAL WORKER	2	0.0851
BUSINESS EDUCATION -ALL-	1	0.0425
CLASSROOM MUSIC	1	0.0425
EARLY CHILDHOOD CAREERS	1	0.0425

2009

SUBJECT AREA	COUNT	PERCENT
EMOTIONAL BEHAVIOR DISORDERS	323	12.3565
LEARNING DISABILITIES	291	11.1324
DEVELOPMENTAL DISABILITIES	189	7.2303
MATHEMATICS	131	5.0115
ELEMENTARY EDUCATION	129	4.935
EARLY CHILDHOOD SPECIAL EDUCATION	126	4.8202
ENGLISH AS A SECOND LANGUAGE	94	3.596
SPANISH	87	3.3282
SCIENCE 5–8	80	3.0604
COMMUNICATION ARTS/LITERATURE	71	2.7161
READING	65	2.4866
CHEMISTRY	58	2.2188
KEYBOARDING FOR COMPUTER APPL	58	2.2188
HEALTH EDUCATION	57	2.1806
SCHOOL PSYCHOLOGIST	52	1.9893
DEVELOPMENTAL/ADAPTED PHYSICAL ED.	50	1.9128
PARENT AND FAMILY EDUCATION	48	1.8363
LIBRARY MEDIA SPECIALIST	46	1.7598
SOCIAL STUDIES -ALL-	46	1.7598
PHYSICS	43	1.645
TEACHER/COORDINATOR WORK BASED LRNG	40	1.5302
LIFE SCIENCES	38	1.4537
BUSINESS	34	1.3007
COMMUNICATIONS TECHNOLOGY CAREERS	34	1.3007
VISUAL ARTS	33	1.2624
PHYSICAL EDUCATION	31	1.1859
FAMILY AND CONSUMER SCIENCES	28	1.0712
SPEECH-LANGUAGE PATHOLOGIST	26	0.9946
AMERICAN SIGN LANGUAGE	24	0.9181
EARTH AND SPACE SCIENCE	21	0.8034
TRANSPORTATION CAREERS	21	0.8034
MANUFACTURING CAREERS	19	0.7269
VOCAL AND CLASSROOM MUSIC	18	0.6886
MEDICAL CAREERS	17	0.6503
PHYSICAL AND HEALTH DISABILITIES	17	0.6503
EARLY CHILDHOOD EDUCATION	16	0.6121
ORAL/AURAL DEAF EDUCATION	16	0.6121
THEATRE ARTS	14	0.5356
CONSTRUCTION CAREERS	13	0.4973

SUBJECT AREA	COUNT	PERCENT
TECHNOLOGY	13	0.4973
BLIND OR VISUALLY IMPAIRED	11	0.4208
INSTR(BAND/ORCH) AND CLASSROOM MUSIC	10	0.3826
DANCE	9	0.3443
DEAF OR HARD OF HEARING	9	0.3443
CHINESE	8	0.306
COUNSELOR OR TEACHING INTERN	6	0.2295
GERMAN	6	0.2295
PRE-PRIMARY	6	0.2295
BILINGUAL/BICULTURAL EDUCATION	4	0.153
FRENCH	4	0.153
HOSPITALITY SERVICE CAREERS	4	0.153
LATIN	4	0.153
CLASSROOM MUSIC	2	0.0765
DRIVER EDUCATION	2	0.0765
SCHOOL COUNSELOR	2	0.0765
ADULT BASIC EDUCATION	1	0.0383
AGRICULTURAL EDUCATION	1	0.0383
AGRICULTURE PRODUCTION/FARM MGMT	1	0.0383
ARABIC	1	0.0383
CAREER ACCOMMODATION SPECIALIST	1	0.0383
CREATIVE DESIGN CAREERS	1	0.0383
DANCE AND THEATRE	1	0.0383
EARLY CHILDHOOD CAREERS	1	0.0383
ELEMENTARY GUIDANCE & COUNSELING	1	0.0383
JAPANESE	1	0.0383

2008

SUBJECT AREA	COUNT	PERCENT
EMOTIONAL BEHAVIOR DISORDERS	308	12.4394
LEARNING DISABILITIES	250	10.0969
DEVELOPMENTAL DISABILITIES	168	6.7851
ENGLISH AS A SECOND LANGUAGE	121	4.8869
EARLY CHILDHOOD SPECIAL EDUCATION	115	4.6446
ELEMENTARY EDUCATION	113	4.5638
MATHEMATICS	100	4.0388
SCIENCE 5–8	80	3.231
SPANISH	70	2.8271
COMMUNICATION ARTS/LITERATURE	66	2.6656
CHEMISTRY	60	2.4233
LIBRARY MEDIA SPECIALIST	58	2.3425

SUBJECT AREA	COUNT	PERCENT
KEYBOARDING FOR COMPUTER APPL	55	2.2213
SCHOOL PSYCHOLOGIST	52	2.1002
TEACHER/COORDINATOR WORK BASED LRNG	52	2.1002
READING	50	2.0194
HEALTH EDUCATION	47	1.8982
SOCIAL STUDIES -ALL-	46	1.8578
DEVELOPMENTAL/ADAPTED PHYSICAL ED.	43	1.7367
BUSINESS	41	1.6559
PHYSICS	38	1.5347
LIFE SCIENCES	36	1.454
COMMUNICATIONS TECHNOLOGY CAREERS	33	1.3328
EARTH AND SPACE SCIENCE	33	1.3328
FAMILY AND CONSUMER SCIENCES	32	1.2924
VISUAL ARTS	29	1.1712
PHYSICAL EDUCATION	28	1.1309
SPEECH-LANGUAGE PATHOLOGIST	27	1.0905
AMERICAN SIGN LANGUAGE	26	1.0501
TRANSPORTATION CAREERS	25	1.0097
CONSTRUCTION CAREERS	23	0.9289
VOCAL AND CLASSROOM MUSIC	20	0.8078
PARENT AND FAMILY EDUCATION	19	0.7674
TECHNOLOGY	19	0.7674
THEATRE ARTS	17	0.6866
MANUFACTURING CAREERS	16	0.6462
BLIND OR VISUALLY IMPAIRED	14	0.5654
MEDICAL CAREERS	14	0.5654
PHYSICAL AND HEALTH DISABILITIES	13	0.525
DEAF OR HARD OF HEARING	12	0.4847
INSTR(BAND/ORCH) AND CLASSROOM MUSIC	12	0.4847
SCHOOL COUNSELOR	11	0.4443
CHINESE	9	0.3635
EARLY CHILDHOOD EDUCATION	9	0.3635
BILINGUAL/BICULTURAL EDUCATION	6	0.2423
COUNSELOR OR TEACHING INTERN	6	0.2423
DANCE	6	0.2423
FRENCH	6	0.2423
GERMAN	6	0.2423
PRE-PRIMARY	6	0.2423
AGRICULTURAL EDUCATION	5	0.2019
AGRICULTURE PRODUCTION/FARM MGMT	5	0.2019
LATIN	5	0.2019
HOSPITALITY SERVICE CAREERS	4	0.1616

SUBJECT AREA	COUNT	PERCENT
CAREER ACCOMMODATION SPECIALIST	2	0.0808
DRIVER EDUCATION	2	0.0808
ORAL/AURAL DEAF EDUCATION	2	0.0808
CLASSROOM MUSIC	1	0.0404
CREATIVE DESIGN CAREERS	1	0.0404
DANCE AND THEATRE	1	0.0404
ELEMENTARY GUIDANCE & COUNSELING	1	0.0404
RUSSIAN	1	0.0404

2007

SUBJECT AREA	COUNT	PERCENT
EMOTIONAL BEHAVIOR DISORDERS	331	12.5951
LEARNING DISABILITIES	271	10.312
DEVELOPMENTAL DISABILITIES	183	6.9635
MATHEMATICS	112	4.2618
ENGLISH AS A SECOND LANGUAGE	109	4.1476
EARLY CHILDHOOD SPECIAL EDUCATION	100	3.8052
COMMUNICATION ARTS/LITERATURE	93	3.5388
SPANISH	85	3.2344
SCIENCE 5–8	82	3.1202
CHEMISTRY	73	2.7778
ELEMENTARY EDUCATION	73	2.7778
LIBRARY MEDIA SPECIALIST	62	2.3592
READING	62	2.3592
PHYSICS	57	2.1689
SCHOOL PSYCHOLOGIST	56	2.1309
KEYBOARDING FOR COMPUTER APPL	55	2.0928
HEALTH EDUCATION	54	2.0548
DEVELOPMENTAL/ADAPTED PHYSICAL ED.	53	2.0167
SOCIAL STUDIES -ALL-	53	2.0167
BUSINESS	46	1.7504
TEACHER/COORDINATOR WORK BASED LRNG	46	1.7504
EARTH AND SPACE SCIENCE	37	1.4079
PARENT AND FAMILY EDUCATION	36	1.3699
LIFE SCIENCES	34	1.2938
PHYSICAL EDUCATION	32	1.2177
AMERICAN SIGN LANGUAGE	31	1.1796
FAMILY AND CONSUMER SCIENCES	28	1.0654
SPEECH-LANGUAGE PATHOLOGIST	25	0.9513
VISUAL ARTS	25	0.9513
PHYSICAL AND HEALTH DISABILITIES	22	0.8371

SUBJECT AREA	COUNT	PERCENT
EARLY CHILDHOOD EDUCATION	21	0.7991
TECHNOLOGY	21	0.7991
THEATRE ARTS	21	0.7991
TRANSPORTATION CAREERS	19	0.723
VOCAL AND CLASSROOM MUSIC	19	0.723
INSTR(BAND/ORCH) AND CLASSROOM MUSIC	18	0.6849
MEDICAL CAREERS	18	0.6849
COMMUNICATIONS TECHNOLOGY CAREERS	17	0.6469
SCHOOL COUNSELOR	14	0.5327
DEAF OR HARD OF HEARING	13	0.4947
BILINGUAL/BICULTURAL EDUCATION	12	0.4566
BLIND OR VISUALLY IMPAIRED	12	0.4566
ORAL/AURAL DEAF EDUCATION	11	0.4186
CHINESE	7	0.2664
COUNSELOR OR TEACHING INTERN	7	0.2664
FRENCH	7	0.2664
AGRICULTURAL EDUCATION	6	0.2283
AGRICULTURE PRODUCTION/FARM MGMT	6	0.2283
CONSTRUCTION CAREERS	6	0.2283
DANCE	6	0.2283
HOSPITALITY SERVICE CAREERS	5	0.1903
KINDERGARTEN	5	0.1903
MANUFACTURING CAREERS	5	0.1903
LATIN	4	0.1522
PRE-PRIMARY	4	0.1522
DANCE AND THEATRE	3	0.1142
GERMAN	3	0.1142
OJIBWE	3	0.1142
CLASSROOM MUSIC	2	0.0761
DRIVER EDUCATION	2	0.0761
CAREER ACCOMMODATION SPECIALIST	1	0.0381
CREATIVE DESIGN CAREERS	1	0.0381
FAMILY ED/EARLY CHILDHOOD EDUCATOR	1	0.0381
MUSIC	1	0.0381
RUSSIAN	1	0.0381