

Minnesota Teacher Supply and Demand Study

A Component of the Teacher Preparation Project Undertaken
for the Minnesota Office of Higher Education

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Introduction

Policymakers and citizens alike have recently raised a number of questions concerning the supply of and demand for K-12 teachers in Minnesota.

Many of these questions reflect a widespread national concern that there is, or will soon be, a significant shortage of qualified teachers, especially in some key areas such as science, mathematics and special education.

The central questions concerning teacher supply and demand in Minnesota are:

- Is the overall supply of teachers well matched to demand?
- Is there significant oversupply or undersupply, according to
 - Areas of teaching licensure
 - Geographic regions of the state
- Is there expected to be significant oversupply or undersupply in the future?
- What role do alternative pathways to licensure play in teacher supply and demand?

The research undertaken to answer these questions was based on two types of data sources

- National and regional literature on teacher supply and demand since 2000
- Data and reports collected from
 - Minnesota Department of Education (MDE)
 - National Center for Education Statistics (NCES)
 - Minnesota Association of Colleges for Teacher Education (MACTE)

What follows is an account of the key findings of this research, first from the literature review and second from the data analysis.

Findings from the literature review

A literature review of national and Minnesota reports and analyses of K-12 teacher supply and demand was conducted. What follows is a description of the key findings of that review. The bibliography for this literature review is contained in the Appendix.

Key findings

- The Minnesota Department of Education (MDE) performs an analysis of K-12 teacher supply and demand that is reported to the legislature every two years, most recently in January 2009.
- The methodology of the MDE report follows best practices, as identified in “Methodologies used by Midwest Region states for studying teacher supply and demand” (Lindsay, et al., 2009)
- The most valuable analysis of K-12 teacher supply and demand for the purposes of this study is to be found in the work of Richard Ingersoll and his colleagues, and in particular in the 2009 report by Ingersoll and Perda. Their analytic framework goes beyond a focus on numbers of teachers trained and retiring to include the effects of pre-retirement exit from the profession and migration between teaching positions. Thus, it was selected as the basis for the approach taken in the analysis for this study.

Redefining the “Teacher Shortage Problem”

The research by Ingersoll and Perda (2009) focuses on two licensure areas, science and mathematics, that are also identified as areas where Minnesota districts have difficulty filling vacant teaching positions. (See the next section for details of Minnesota’s particular difficulties.)

The standard understanding of the “Teacher Shortage Problem”, according to Ingersoll and Perda, is that there is a shortage of teachers due to a combination of high retirement rates for current teachers and too few teachers being trained. Their research establishes that this understanding of the problem is not correct. Instead, their analysis of national data shows that there are many more teachers being trained and licensed than are retiring. In fact there is an overall surplus of teachers, and this is especially true in areas such as English and Social Studies. However, when one includes the teachers that leave the profession preretirement – that is, those lost to attrition – then there are teaching areas such as science and mathematics where the situation is importantly different. In those areas, there are still enough teachers being trained and licensed to fill the available positions, but the ratio of candidates to available positions is close to one-to-one at the national level. This creates the impression that these positions are hard to fill, especially when compared to areas such as English and Social Studies, where even when attrition is taken into account there are still a large number of candidates for each available position.

Moreover, their analysis is consistent with what we have found with the data in Minnesota where there is both an abundance of teachers trained compared to the small number that are retiring, but also where districts report that there are key licensure areas for which it is difficult to fill available positions. This makes it plausible that it is teacher attrition and migration (teachers moving from one teaching position to another) that are the key factors in the redefined “Teacher Shortage Problem”. The important consequence of this understanding of the issue is that it locates the solution to the problem not in the teacher education programs, but in the schools and districts where the teachers are working. Ingersoll and Perda note that the primary reason for attrition and migration is job dissatisfaction, and summarize the policy implications of this:

The data suggest that a key way to improve teacher retention is to improve the conditions of the teaching job. In our research, we have found that schools with more support for new teachers, more generous salary schedules, fewer student discipline problems, more adequate resources and classroom supplies, more effective leadership, and enhanced faculty input into school decision-making—all have significantly lower levels of teacher turnover ...
(p. 38)

It is beyond the scope of this study to develop recommendations for how to improve teacher retention through these or other approaches, especially in the current economic and budget context in the State. In what follows, we will present the key supply and demand data from Minnesota that support the hypothesis that in this state, as with the nation overall, the supply problem lies not with the training of new teachers, but rather the retention of current ones.

Findings from the data analysis

The primary data sources for this analysis were:

- The Minnesota Department of Education (MDE) K-12 “Teacher Supply and Demand” report to the legislature from January 2009, which provided most of the data needed to perform the analysis for this study.

Data sources for the MDE report are

- MDE 2009 Teacher Supply and Demand Survey of district superintendents and administrators
 - MDE Staff Automated Reporting System (STAR)
 - MDE Educator Licensing Division
 - Minnesota Board of Teaching
 - Minnesota Association of Colleges for Teacher Education (MACTE)
- Additional data on enrollment trends in K-12 were collected from the US government National Center on Education Statistics
 - Recent data on newly licensed teachers from Minnesota teacher preparation programs were collected from MACTE

Key findings

- When looking at the overall number of teachers graduated and newly licensed each year and comparing this to the demand based on retirements and teachers leaving the profession (attrition), Minnesota has and continues to produce an overall surplus of teachers. However it should be noted that many factors go into the details of supply and demand for teachers in

Minnesota. These include location of vacancy, teachers moving out of Minnesota, graduates not applying for licensure and policy changes. All of these contribute to the continued demand for teachers.

Table 1 shows that actual retirement and implied attrition rates are both relatively low, and that the number of new hires into the profession ranged from approximately 2,000 to 2,400 over this time period. (The implied negative attrition in 2008 can reasonably be attributed to the large increase in retirements in that year and the lag in hiring enough new teachers.)

Table 1
Number of Teachers in Minnesota and Attrition Rates for Minnesota Teachers In Terms Of Retirements vs. New Hires

Year	2002	2003	2004	2005	2006	2007	2008
Total employed	55862	56142	56021	56042	55237	55633	55879
Retirements	1460	1063	1211	1293	1388	1410	2692
New hires	2366	2081	2011	2158	2262	2293	2408
Change in total employed		280	-121	21	-805	396	246
Implied attrition		738	921	844	1679	487	-530
Implied attrition %		1.3%	1.6%	1.5%	3.0%	0.9%	-0.9%
Retirement %		1.9%	2.2%	2.3%	2.5%	2.5%	4.8%

SOURCE: MDE 2009 Supply and Demand Report

But Table 2 shows that there are many more teachers being prepared by Minnesota teacher preparation programs than are being hired in a given year. For the years for which we have complete data, we can see that there are approximately 4,100 to 4,800 students graduating, and that even more licensure programs are completed since a given student can do more than one teacher education licensure program.

Table 2
Numbers of Students Graduating and Programs Completed in Minnesota Teacher Preparation Programs

Year	2004	2005	2006	2009
Number of programs completed	5018	5347	5169	4513
Number of students graduating	4514	4810	4650	4060

SOURCE: MDE 2009 Supply and Demand Report and MACTE: <http://mtqm.mnteacher.org/node/8>

Thus, there are about twice as many students graduating every year as there are new hires into the teaching positions in the State. Of course, many of these graduates seek and obtain positions in other states, but there are also many students who do their preparation in other states and then obtain licenses in Minnesota. Of the 10,140 total initial licensees in 2008, 32% were prepared out of state. While this is a significant proportion of the total, it should be noted that the proportion of annual licensees from out of state has been decreasing from a high of 41% in 2002. (Note that the number of initial licenses is larger than the number of licensure programs completed since licenses may also be granted to graduates from previous years.)

- It is important to note that the apparent surplus of supply also holds for licensure areas that are reported as being difficult to fill (e.g., Physics, Mathematics and Special Education), although the surplus is much smaller than it is for licensure areas such as English and Social Studies.

The 2009 Teacher Supply and Demand Surveys identified the following as perceived shortage areas. These are listed from districts' perceptions of the most to the least critical:

- Mathematics
- Physics
- Chemistry
- Special Education-EBD
- Science 5-8
- Mathematics 5-8
- Special Education-Early Childhood
- Deaf and Hard of Hearing

The MDE defines the replacement rate for a licensure area as the number of initial licenses granted in the licensure area divided by the total number of retirements in that area. (MDE 2009 Supply and Demand Report, p.21) Table 3 makes it appear that there is no shortage of supply in these areas of perceived shortage. However, we should note that in addition to retirement, teachers leave the profession pre-retirement (see Table 1). If we include an attrition factor then we get an adjusted replacement rate that shows that, even in the worst cases, there are two initial licenses granted for each position opened up due to retirement or attrition. (We make the simplifying assumption that the attrition per licensure area equals the overall attrition rate. More will be said on this in what follows.)

Table 3
Replacement Rates for Perceived Shortage Areas

Licensure area	Replacement rate	Adjusted replacement rate
Mathematics	6	3
Physics	4	2
Chemistry	4	2
Special Education-EBD	8	4
Science 5-8	19	10
Mathematics 5-8	6	3
Special Education-Early Childhood	5	3
Deaf and Hard of Hearing	3	2

SOURCE: MDE 2009 Supply and Demand Report

- Despite the apparently adequate supply at the state level, both overall and even in perceived shortage areas, many districts still request Special Permissions for Licenses. It is probable that these special permissions are largely used to cover the loss of a teacher through preretirement exit from teaching or migration to another district or school, both of which often give schools and districts insufficient time to fill vacancies through the usual hiring procedures. This is the key factor in the supply and demand equation: teachers in perceived shortage areas are difficult to replace because there is not a large enough pool of candidates to ensure that

schools and districts can hire a teacher that suits their particular needs. (It is important to note that the numbers of special permission requests per licensure area is correlated with the perceived shortage areas as identified by the survey of districts hiring needs. (MDE 2009 Supply and Demand Report, p. 14). This indicates that the survey report of perceptions of shortage areas is a reliable indicator of where districts and schools are experiencing difficulty in filling vacancies, regardless of the state-level adequate supply.)

However, it should be noted that “the number of special permissions granted by the Minnesota Board of Teaching tends to be decreasing ... [and that they represent only] 3.3% of all teachers teaching in Minnesota schools during the 2007-2008 school year.” (MDE 2009 Supply and Demand Report, p.39) This small and declining percent of the total amount of teacher FTE indicates that the trend is toward it being easier for schools and districts to fill teaching positions, even in perceived shortage areas. Although it should be noted that this reduction in special permissions may also be influenced by policy decisions and changes in the types of special permissions. (Note as well that the number of special permissions in perceived shortage areas has also declined at similar rates, justifying the simplifying assumption above concerning attrition rates in these areas. (MDE 2009 Supply and Demand Report, p. 37))

- There is no significant difference in the requests for special permissions by geographic region in the State, indicating that the supply and demand balance is roughly equivalent across regions. (MDE 2009 Supply and Demand Report, p.37) (The abovementioned correlation between special permissions and the results of the Teacher Supply and Demand Surveys warrants this use of the regional distribution of special permissions as an indicator of regional supply and demand.)

Of course, there are likely to be different supply and demand forces at work in different regions of the state, but these different forces do not yield any significant difference in the supply and demand balance in different regions.

- Overall teacher five-year attrition from the profession is approximately 30% in the State. This is considerably less than the 50% rate that is often anecdotally mentioned as the national rate.

The only region of the State where attrition appears to be significantly higher is the Southwest Central region, where it is approximately 40%. However, it is not clear whether the higher attrition rate in this region is actually significant, given the small number of teachers in a given cohort (approximately 45 since 2002). (MDE 2009 Supply and Demand Report, pp. 25-28)

It should be noted that these higher attrition rates early in a teacher's career are consistent with the low overall attrition rates reported above. This is because after eight or nine years the attrition rate falls off dramatically, and the large majority of teachers in the state have been teaching for at least that many years. (MDE 2009 Supply and Demand Report, p.25)

- Overall retirement levels remain low, ranging from 1.9% in 2003 to 4.8% in 2008. [See Table 1.] (MDE 2009 Supply and Demand Report, p.20)

The increase in 2008 is expected to continue in 2009 and 2010, but to begin to decline again. This is due to the distribution of ages for current teachers

and the median retirement age, which has remained stable at approximately 59 years. (Ingersoll and Perda 2009, p.15)

- NCES data projects only a modest increase in enrollments in K-12 through 2017, indicating that current rates of teacher preparation are adequate.

As can be seen in Table 4, below, the projected need for additional teachers (e.g. 101 more in 2011) reaches a peak at 641 in 2016, with a total of approximately 3100 additional teachers required by the year 2017. This is more than adequately covered by the number of newly licensed teachers from Minnesota teacher preparation programs alone (3424 initial licenses in 2008-09*), as can be seen by comparing this number to the typical size of the cohort of new teachers (2408 first-year teachers in 2008**).

* MACTE <http://mtqm.mnteacherred.org/node/8#completers>

** MDE 2009 Supply and Demand Report, p.25

Table 4
Projected Enrollment in Grades PK-12 in Public Elementary and Secondary (in thousands)

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017
Minnesota*	826.3	826.0	827.5	831.7	837.9	846.3	855.2	864.7	874.1
Annual enrollment change	0.27%	0.04%	0.18%	0.51%	0.74%	1.00%	1.05%	1.11%	1.09%
Number of teachers needed*	55,726	55,702	55,803	56,087	56,504	57,070	57,669	58,310	58,946
Change in needed number of teachers	-153	-24	101	283	417	566	599	641	636
Number of teachers in 2008	55,879								
% Enrollment increase 2009-2017	5.5%								
Total increase in number of teachers 2009-17	3067								

* Assuming current student/teacher ratio

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "State Nonfiscal Survey of Public Elementary/Secondary Education," 1999–2000 through 2005–06; and State Public Elementary and Secondary Enrollment Model, 1980–2005. (This data was prepared December 2007.)

- Alternative pathways to licensure are, at present, not playing a significant role in alleviating demand pressures, even in perceived shortage areas. It should be noted that increased numbers of alternative pathways are being developed, especially in the Twin Cities, however their effects are not yet evident.

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